Appendix 03

Powerhouse Fast-track Application

Three Waters Servicing Feasibility Report

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15 December 2025

SUMMARY MEMORANDUM

TO: Guy Hingston, Bowen Peak Limited

FROM: James Hadley, Managing Director, Hadley Consultants Ltd

DATE: 24 November 2025

SUBJECT: Restoring The Reserve – 3 Waters Servicing Feasibility

PROJECT: 243919

1.0 Introduction

Hadley Consultants Limited (HCL) have been engaged by Bowen Peak Limited (BPL) to provide a feasibility level assessment for the 3 Waters infrastructure required for the Restoring the Reserve Development which has been lodged for Referral application to use the Fast Track Consent under the title 'Restoring the Reserve' – Powerhouse to Peak Cable Cars and Fernhill Heights Development

The purpose of this memorandum is to assess the feasibility of the servicing options available to the proposed development of the site and identify key challenges and constraints and how these can be addressed in order to confirm that 3 Waters servicing to support the Restoring the Reserve project is achievable. This report does not seek to provide detailed analysis and resolution of 3 Waters design considerations, but instead focuses on the fundamental parameters such as demand, capacity and connectivity.

This memorandum is prepared as part of a package of documents created by the wider project team to support the referral application to use the fast-track consent, and therefore a general understanding of the project is assumed, with the full background and intentions of the proposal not necessarily described within this memorandum.

In assessing the feasibility of 3 Waters servicing of Restoring the Reserve, HCL have;

- reviewed the Queenstown Lakes District Council (QLDC) Long Term Plan (LTP),
- reviewed QLDC growth projections,
- considered demand generation in the context of the QLDC Code of Practice (CoP),
- conducted desktop analysis and assessment of hydraulics, pumping feasibility, reticulation feasibility, connectivity to existing networks and have considered concept stormwater management solutions.

Concerns raised by QLDC in the FTAA-2502-1025 (declined) BPL referral application to use the Fast Track process are also addressed. Specifically, QLDC's comment on the previous submission states:

> *"The development's scale exceeds existing Council service capacities (see bullet points below). The ability to accommodate this development within the QLDC networks is of significant concern to QLDC and it is considered that without available capacity severe adverse effects would result. There is no known mitigation to this situation."*

As outlined in this memorandum, while the existing surrounds and steep terrain pose engineering challenges that will need to be overcome, engineering solutions to these challenges are possible and the 3 Waters servicing of the proposed development is feasible. Further, and more importantly, connection to QLDC infrastructure is not considered to be outside of the scope of QLDC's ongoing long term upgrade plan for the 3 Waters network, particularly given the ultimate project demand horizon of 2053 for this Restoring the Reserve project.

2.0 Proposed Development Overview

The proposed development includes several separate elements spread across physical locations, those being the Fernhill Heights residential development, the One Mile Powerhouse Reserve, and the Saddle and Bowen Peak Infrastructure.

While the developments are clearly linked through this project, the separate locations have very distinct and separate 3 Waters servicing requirements due to the different infrastructure types, the surrounding environment and existing developments and the nature of the servicing demand at each location.

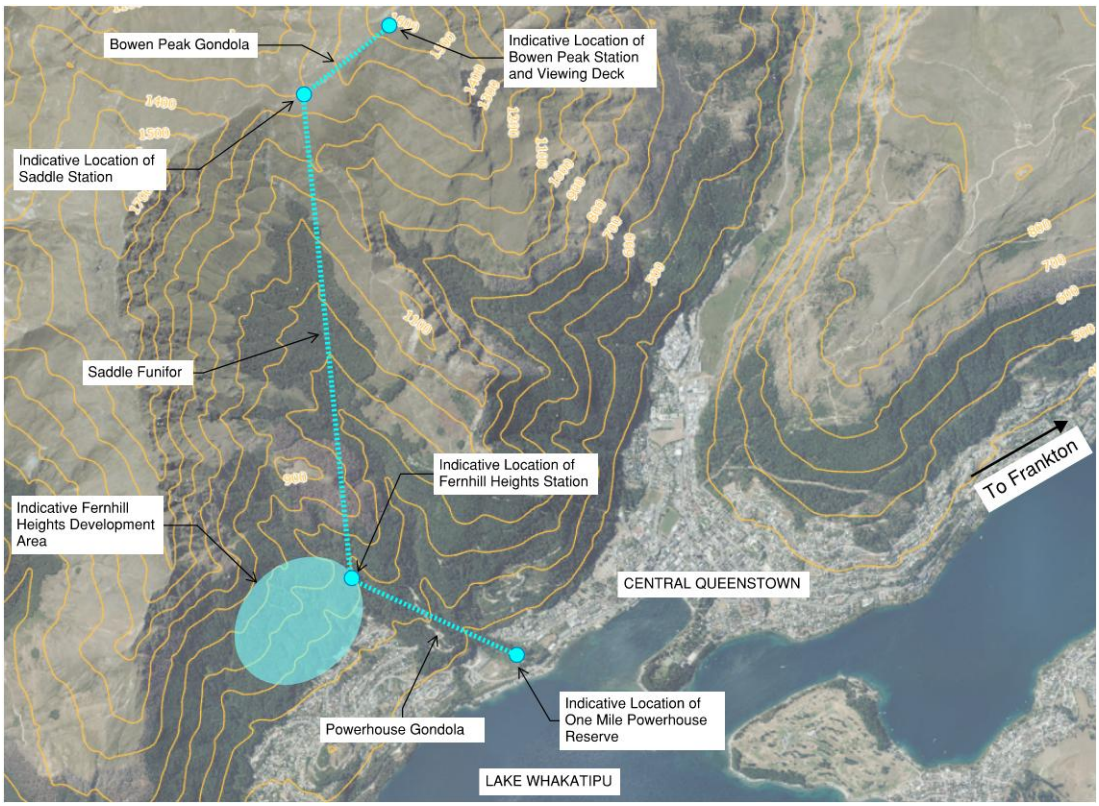

Figure 1: Overview of Development

2.1 Fernhill Heights

The proposed Fernhill Heights residential development sits above the existing Fernhill and Sunshine Bay residential areas and includes 175 residential 'chalet' buildings. Each chalet building contains multiple residential units to a total of 1,333 residential units spread across the Fernhill Heights development area. This part of the development includes the Fernhill Heights Station, which serves as the upper terminal for the Powerhouse Gondola and the lower terminal for the Saddle Funifor.

2.2 Saddle Station and Bowen Peak

The proposed two storey Saddle Station complex located near Ben Lomond Saddle comprises the upper Funifor terminal (connected to the Fernhill Heights Station), a lower floor including basic visitor community accommodation (bunk bed/backcountry style), an upper floor including cafe and restaurant, and the lower terminal for the Bowen Peak Summit Gondola.

Further upslope near the summit of Bowen Peak is proposed to be the small-scale upper terminal for the Summit Gondola located below a viewing deck with shelter and backcountry toilets.

2.3 One Mile Powerhouse Reserve

The proposed Powerhouse Reserve development includes establishment of a small-scale retail, hospitality and tourism precinct, as well as the lower terminal for the Powerhouse Gondola link to Fernhill Heights.

2.4 Development Timeline

The development has a sequenced staging as laid out in the Indicative Timeline document, which sees gradual implementation of the development areas to an ultimate horizon of 2053. This timeline therefore allows for staged and incremental installation and upgrades to the new and existing 3 Waters servicing infrastructure.

The key elements of the development and the servicing options and initial concepts are outlined in further detail in the following sections.

3.0 Fernhill Heights

The proposed Fernhill Heights development includes the development of 52 hectares of existing forestry land into a residential area comprising 1,333 housing units contained within a series of chalets across 175 allotments.

The development land rises some 300m above the existing Fernhill Residential (Wynyard Crescent) area to a maximum elevation of 890m above sea level (ASL), however the maximum serviced height is somewhat lower at approximately 840m ASL. For context, the existing Fernhill residential area extends to a height of approximately 550m ASL, which is similar to other existing residential developments such as Queenstown Hill (490m), Marina Heights (465m) and Silver Creek (540m). However, higher elevation developments also already exist in the district such as Alpine Retreat (720m) and Mount Cardrona Station (700m). In this context development up to 840m is not unprecedented or necessarily out of context in the QLDC area.

The construction of residential chalets is proposed to commence in 2030, with 15 chalets completed every two years (approx. 55 dwellings per year) until the end of the project horizon in 2053.

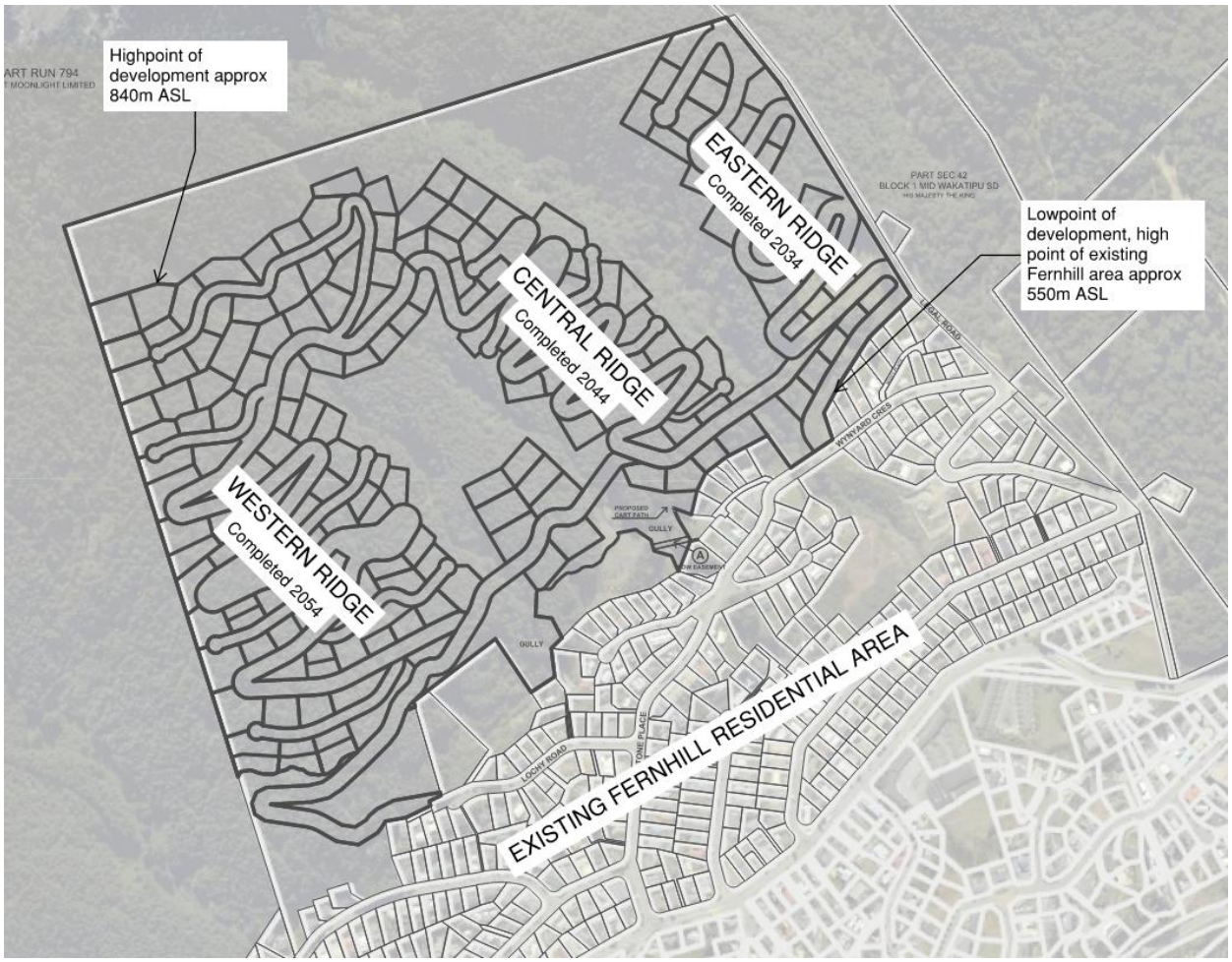

Figure 2: Proposed Fernhill Heights development layout including proposed completion dates.

The development area sits upslope of the existing Fernhill and Sunshine Bay residential areas which contain approximately 1500 existing private dwellings (Stats NZ, 2023 Census) which are already connected to QLDC reticulated services.

The historic rates of new dwelling consents in the Queenstown Centre and Fernhill and Sunshine Bay areas have been reviewed. The annual new dwelling consents for both areas are shown in Figures 3 and 4 below.

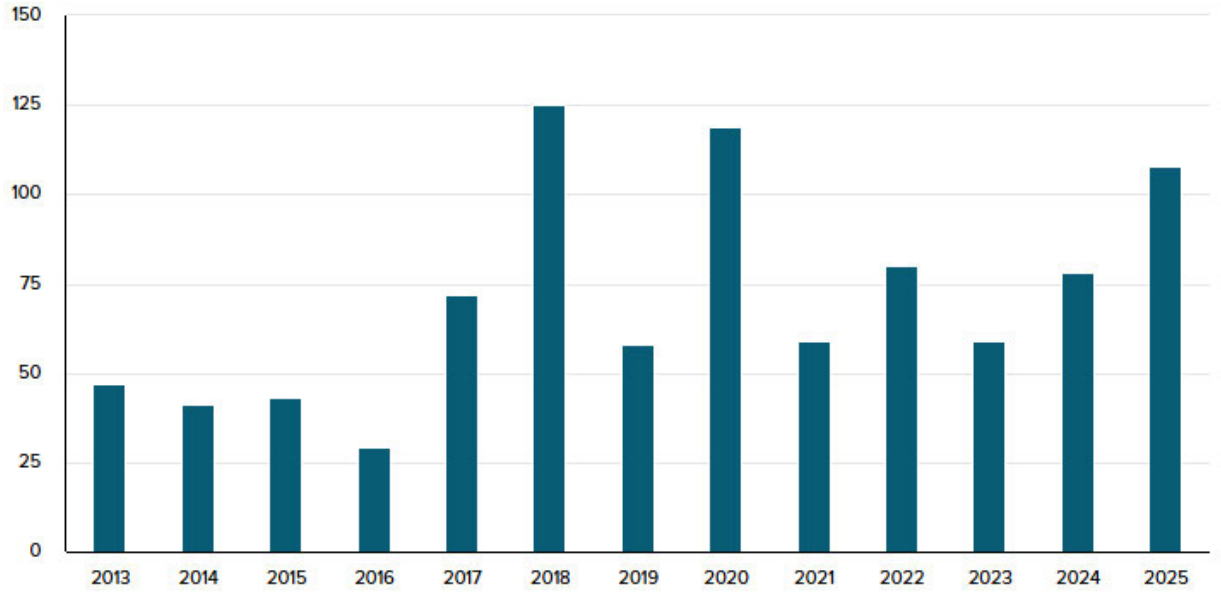

Figure 3: New dwellings consented in Queenstown Centre including Fernhill and Sunshine Bay (Sourced - Stats NZ Building Consents)

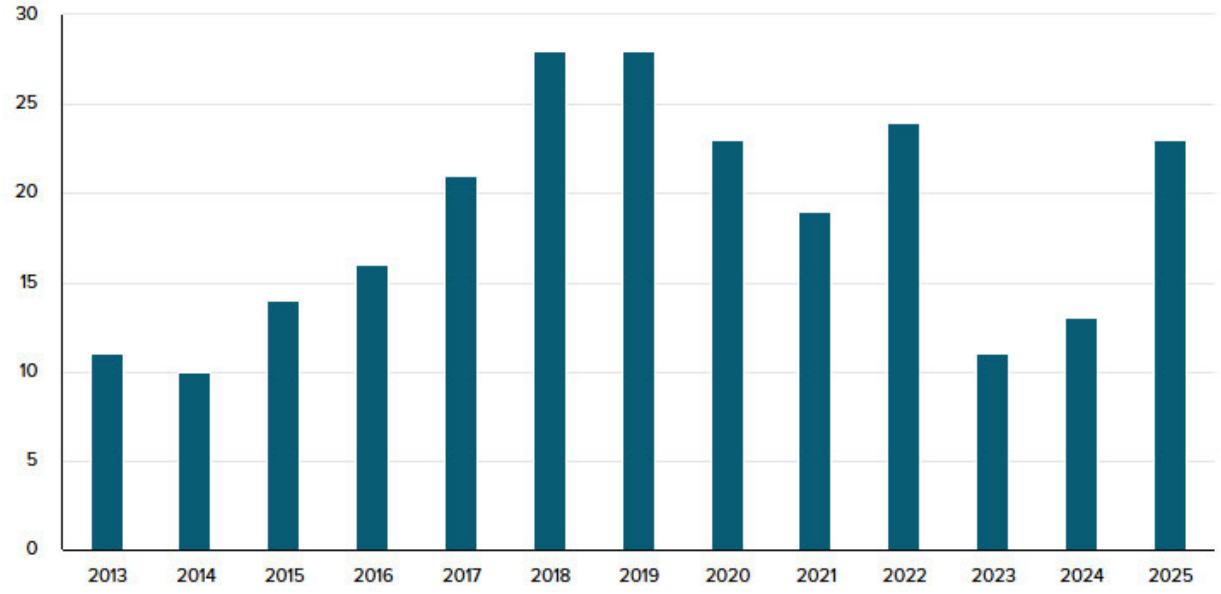

Figure 4: New dwellings consented in Fernhill and Sunshine Bay (Sourced - Stats NZ Building Consents)

This data shows the rate of development averages 79 dwellings per year over the last 10 years in the Queenstown Centre area, and more specifically in the Fernhill/Sunshine Bay area an average of 21 dwellings have been consented per year for the last 10 years. The 10 year average is considered relevant as it identifies the economic peaks and troughs that will occur over the lifespan of a proposed development such as Fernhill Heights.

As noted earlier, the rate of development associated with the Fernhill Heights project is expected to be approximately 55 dwellings per year, commencing in 2030. Whilst this rate of development is greater than the 10 year average for Fernhill/Sunshine Bay area, it is well within the Queenstown Centre average which

is served by key QLDC trunk infrastructure such as Queenstown CBD wastewater pump stations and water supply intakes.

These same primary pump stations and water intakes will ultimately serve the Fernhill Heights project and contrary to earlier statements by QLDC, the rate of development will not exceed the historic average provided QLDC continues to invest in long term growth upgrades under their LTP, as has been the case for the last 30 years.

Consistent with the analysis of historic rates of development above, the Fernhill Heights proposal also sits within the wider context of QLDC budgeting for significant 3 Water infrastructure investment into the future. QLDC have a planned $1.47 billion spend over the next 10 years to 2034 through the development of the new Council Controlled Organization (CCO) for 3 Waters, which has now been reviewed and approved by Central Government. Following that spend, at the 2034 date, only 30 Chalets will have been completed. The key point in this analysis is that whilst the ultimate development level in 2053 is significant, the rate of development is gradual and manageable in terms of planning and providing for infrastructure servicing.

3.1 Water Supply

There is existing water supply reticulation throughout the Fernhill catchment which utilises an existing intake from Lake Whakatipu (~311m ASL) at Two Mile followed by treatment and reticulation to a series of three reservoirs. This intake, treatment and lower reservoir also supply other areas of Queenstown Centre and CBD. Figure 5 shows the general arrangement of the water supply network.

Water supply from the Lake Whakatipu take to the existing Fernhill reservoirs is via two 300mm PVC pressure rising mains to the first reservoir and pump station (labelled WRF#1 - 400m ASL), with 150mm steel and 200mm PE rising mains above that to the existing upper reservoir (WRF#2 - 505m ASL). From there a single 150mm steel rising main feeds the top existing reservoir (WRF#3 - 585m ASL).

The existing rising main pipeline(s) from the lake to the upper reservoirs follow an alignment largely through undeveloped land, and could be upgraded or duplicated as required to cater for growth within the project horizon timeline in the case that is required. It is reasonable to assume that ongoing maintenance and upgrades to the infrastructure will be performed to account for ongoing growth from both the proposed development area and the wider Queenstown network over the next 25 years.

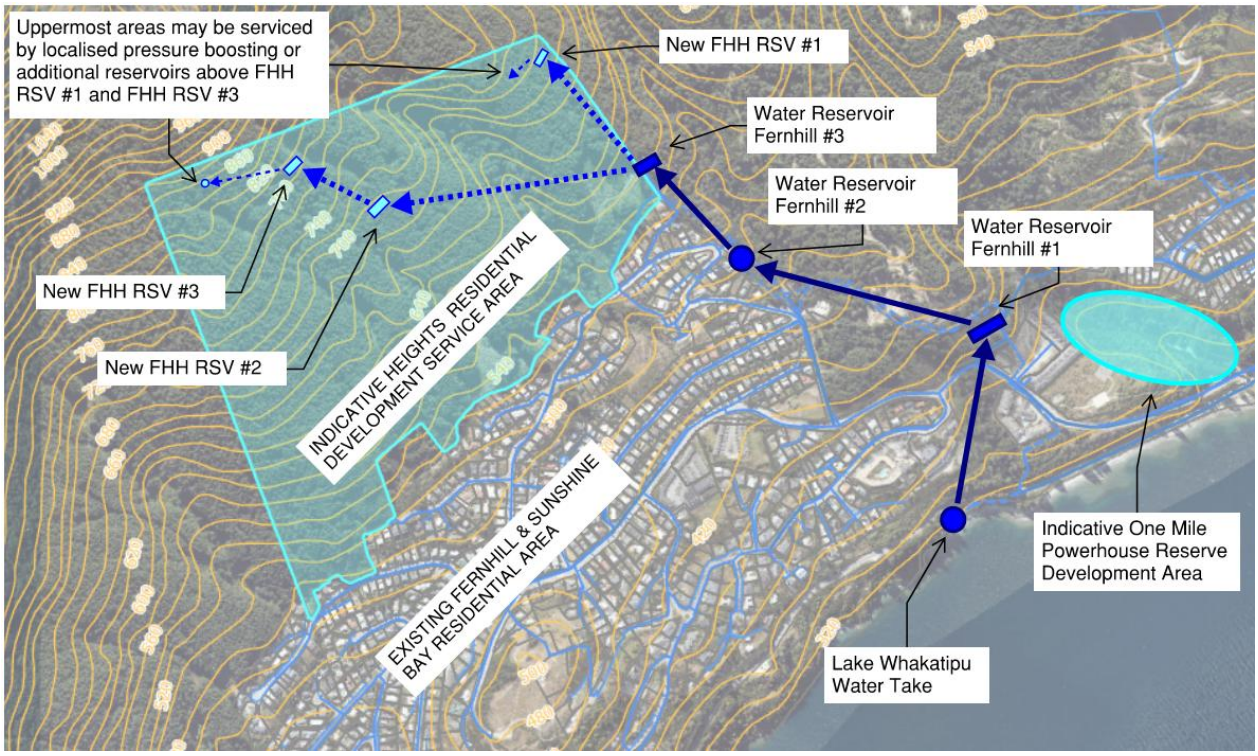

Figure 5: General Arrangement of relevant existing and proposed Water Supply infrastructure

The proposed development, with 1,333 residential dwellings, assessed in line with the QLDC CoP (ranging from 250 to 750L per person per day, at 3 occupants per dwelling) may demand 1,000m^3 per day (12L/s) to 2,800m^3 per day (32 L/s)(peak) to be conveyed from Lake Whakatipu. Due to the design of the chalets, it is anticipated that the water demand will be in the lower end of this range, due to the typically reduced occupancy and reduced water demand associated with townhouse or apartment style residences, when compared to lower density housing. The above demand is based on the full development completed at the year 2053, and it is noted that staging of the development will also result in ongoing gradual water demand increases, and the full demand will not be realised immediately.

The system will be designed to fulfil firefighting requirements in accordance with SNZ PAS 4509.

In order to service the proposed development additional pumping infrastructure would be installed adjacent to the existing upper reservoir (WRF#3 - 585m) to convey water up a new rising main to a proposed new reservoir or series of reservoirs further up within the proposed development (New FHH RSV#1, approximately 700m ASL). This new water infrastructure would be sized to supply the entirety of the proposed Eastern Ridge of the Fernhill Heights service area. Above FHH RSV#1 localised pressure boosting may be required to service the top of the development, pending final chalet location.

An additional rising main and second new reservoir or series of reservoirs (New FHH RSV#2, approximately 700m ASL) would be constructed when required and utilised to provide adequate supply to the majority of the Central and Western Ridge stages in conjunction with an upper reservoir (New FHH RSV#3, approximately 800m ASL). In detailed design, and subject to the final top elevation of chalets, it is possible that localised pressure boosting may be adequate to service the uppermost reaches of the development

above 800m, or an additional reservoir may be implemented if required. The proposed scheme operating from appropriately sized reservoir supply mitigates the effect of peak flows for the bulk supply rising main infrastructure from Lake Whakatipu.

By inspection the proposed water supply infrastructure can be split across multiple locations and developed over the lifetime of the project to reflect the staging of the development. Initially the infrastructure would comprise a reservoir and pumpstation on the eastern ridge, with an additional reservoir and pumping station for the upper portion of the eastern ridge. The network would then be expanded across the central and western ridges to suit the staging of chalet development.

The timeline of the project and gradual demand increase allows staged upgrade of existing QLDC infrastructure including the Lake Whakatipu water take and pumping infrastructure to the top of the existing Fernhill scheme. This upgrade work can be timed to align with scheduled maintenance and renewals. The installation of pumping and reservoir infrastructure to service the proposed development is physically achievable, as evidenced by the existing Fernhill Water Supply Scheme which is of larger scale than is proposed for Fernhill Heights, and in comparable terrain.

3.2 Stormwater

The site is currently undeveloped and forested. All stormwater flows shed to existing natural waterways and gullies within the property which ultimately discharge to Lake Whakatipu. The existing waterways are natural in some locations, however also contain existing features such as bridges and culverts which augment the waterways as they flow through the existing Fernhill and Sunshine Bay residential areas. The existing developed areas discharge to these same natural and altered flowpaths with no known flow attenuation.

Due to the steep natural slopes and potential for flooding within and below the site, stormwater must be managed thoughtfully and conservatively. It is intended that stormwater impacts are mitigated through extensive on-site attenuation at each property, with storm flows captured from roof and hardstand areas to onsite storage tanks with controlled release. With the stormwater attenuation storage allowed for in the design of the chalets, the desktop analysis shows that the net stormwater effects can be managed such that the storm run-off during peak events post development is less than the current pre-development runoff. This allows discharge to the existing natural flow paths without adverse downstream storm flow effects.

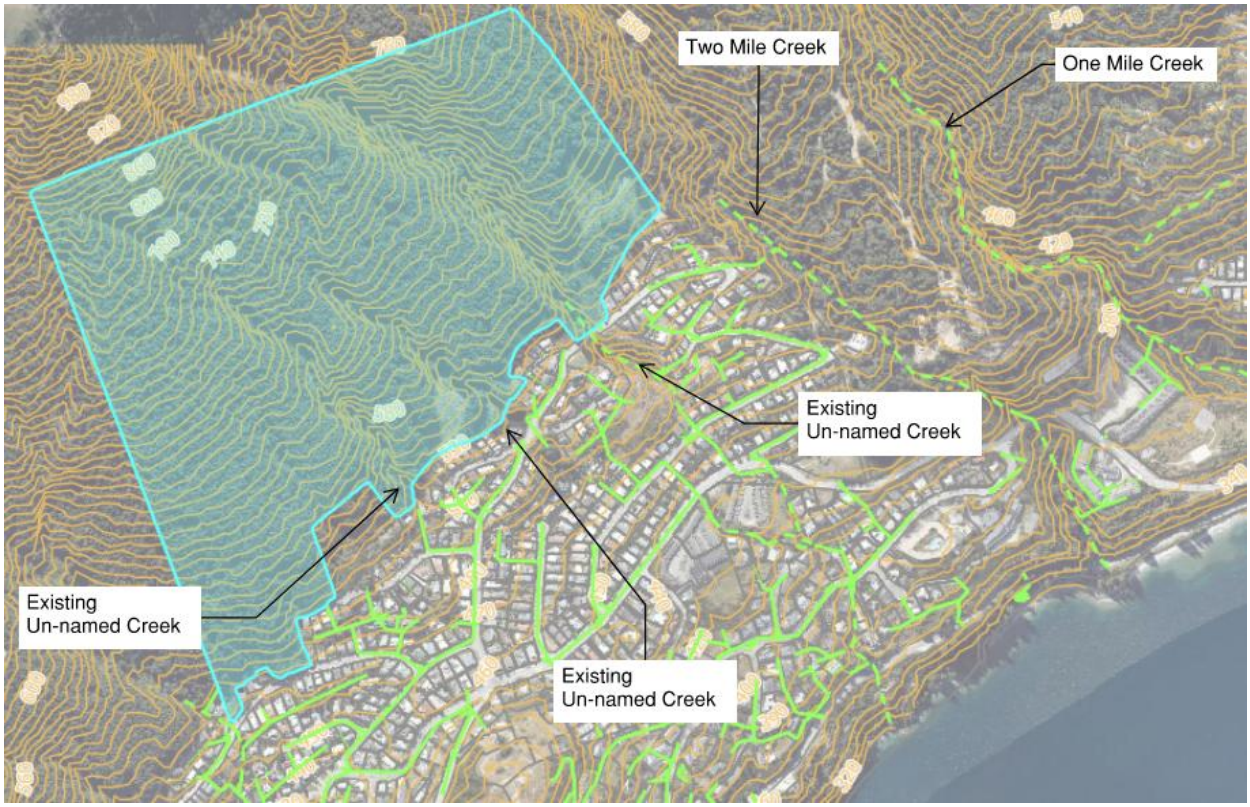

Figure 6: Existing waterways through site are conveyed downstream through Fernhill and Sunshine Bay Stormwater infrastructure discharges to lake Whakatipu.

The within-lot requirements can be developed to reduce run-off such that the roading infrastructure does not need attenuation, however, if necessary, options also exist for providing attenuation of the run-off generated from road catchments including detention basins and discrete tanks as required in road reserves.

The primary discharge locations are to be to the existing waterways onsite, however it is also noted that the existing reticulation in Greenstone Place and Wynyard Terrace have capacity to service the lots in the lower elevation areas of Fernhill Heights.

3.3 Wastewater

Wastewater discharge from the existing Sunshine Bay and Fernhill areas drains by gravity to the shores of Lake Whakatipu, where it is conveyed by gravity or pumped mains through the Central Queenstown network area, and ultimately to the Shotover Wastewater Treatment Plant.

There is currently no specific attenuation and flow control within the gravity wastewater network other than working storage within existing or repurposed pumping wet wells.

With a proposed 1,333 residential units, QLDC's CoP suggests daily flow demand be calculated based on 250 litres per day per person, with 3 people per dwelling, resulting in dry weather daily demand of 1,000m^3, or 2,000m^3 when the dilution/infiltration factor is applied for wet weather. Across the day, this equates to 23L/s average flow (wet weather), with a wet weather peak hour flow of 58L/s (Peaking Factor 2.5). It is important to note again that that demand will only gradually increase as the development progresses to

the end date of 2053, and as an example at the year 2034, only some 30 Chalets (229 residential units) will have been implemented, resulting in an average flow of 4L/s and peak flow of just 10L/s.

It is assessed that residual capacity already exists within the Fernhill and Sunshine Bay gravity networks. In particular, off-peak capacity certainly exists and could be utilised by the proposed development if within-lot or centralised wastewater attenuation and controlled discharge is implemented. This could discharge to the existing reticulated network potentially without any network upgrades during the early stages of the Fernhill Heights development.

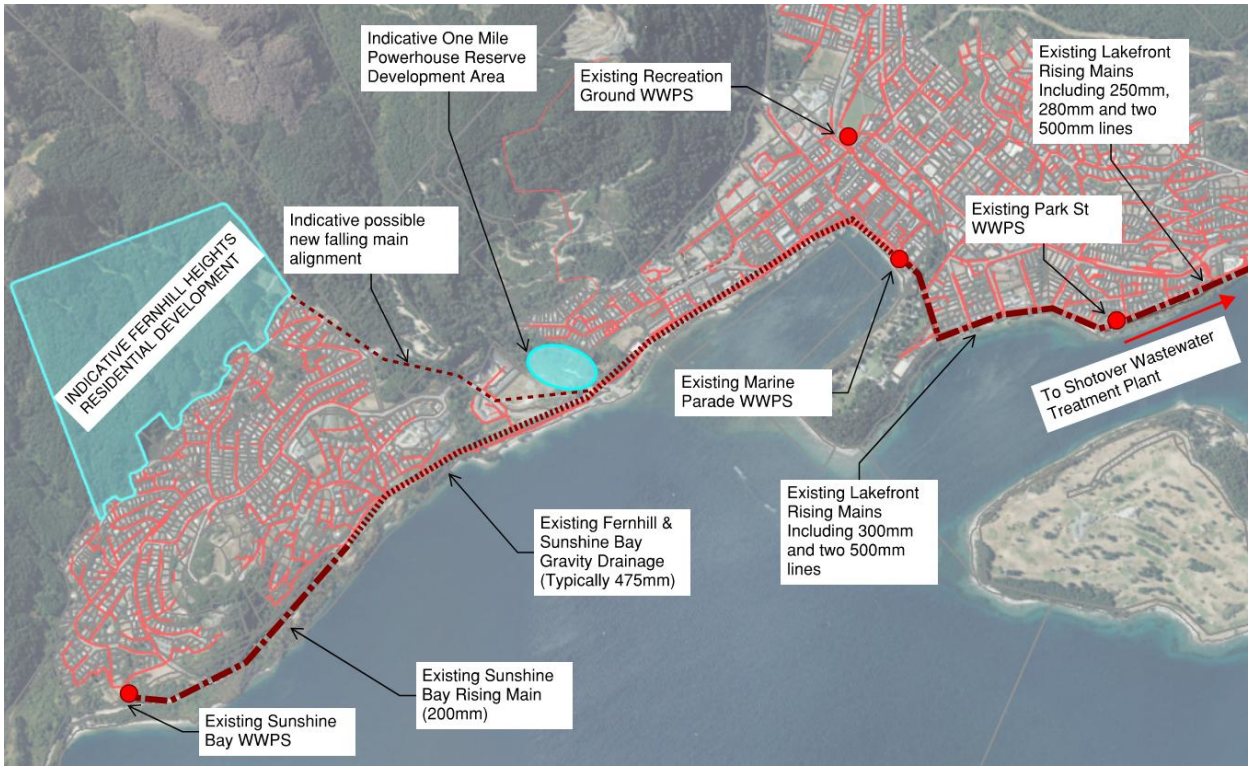

Figure 7: General Arrangement of existing Fernhill and Sunshine Bay Wastewater drainage and Whakatipu Lakefront Mains

If necessary, a further servicing option exists to install a falling main from the Eastern extent of the site, bypassing the existing gravity network to the One Mile Powerhouse area, where it could adjoin the Lakefront infrastructure. In the case where a significant capacity constraint is identified within the existing Fernhill and Sunshine Bay networks, this alternative routing may become the preferred option, when compared to providing significant attenuation and/or managing septicity.

The lakefront wastewater infrastructure is critical for the entire Central Queenstown area servicing, and can be expected to be maintained and upgraded as required to service the existing network and facilitate the gradual growth as proposed within this development, and as has been ongoing in the area historically.

Detailed analysis of the existing network capacity has not been undertaken at this stage, however it is known that the new infrastructure at the recreation fields has reduced demand on the existing Marine Parade WWPS, so existing capacity will be available. It is understood that over the course of the

development some existing QLDC infrastructure will need to be upgraded and this is feasible over the duration of the project. The largest capacity constraint is likely the Lake Esplanade gravity infrastructure, however replacement of the existing line, or installation of an additional gravity or pumping main is expected to be required as part of current planned network maintenance and upgrade works. Incorporation of additional capacity to cater for the Fernhill Heights development at this time will not add unreasonable complexity or cost to the scale of these planned upgrade works.

4.0 Saddle Station

The proposed Saddle Station incorporates the Saddle Funifor Terminal, Cafe & Restaurant, 60 bunk bed accommodation for overnight community group lodging, and a public shelter & toilet at an elevation of approximately 1,300m ASL. The nearest reticulated three waters services are some 500 vertical metres below the saddle station and 3km away horizontally within the Fernhill Heights development area. It is therefore assumed at this stage that connection to reticulated services is unlikely given the distances and terrain, and that servicing will be provided for on an independent, on-site basis with supplementary servicing available as required via the Funifor connection to Fernhill Heights.

The infrastructure servicing demands for the Saddle Station will arise as a result of visitors to the cafe/restaurant, sightseers and day visitors (who will predominantly be visiting for a limited period of time) and overnight visitors staying in the lodging accommodation. It is noted that the overnight lodging is intended to be in a backcountry style with limited, shared facilities, which will limit the resultant servicing demands.

4.1 Water Supply

As noted above it is unlikely that reticulated water supply will be extended to the Saddle Station. As such a servicing concept utilising on-site servicing with roof rainwater collection and reuse, combined with supplementary water supply transported to the site via the Funifor as required, is assessed and confirmed as follows.

Whilst the layout, capacity and operational activites of the Saddle Station facility and likely average and peak patronage of elements such as the cafe/restaurant are not yet confirmed we have assumed a daily restaurant/cafe patronage of 300 people per day with an additional maximum lodging capacity of 60 people. This will be assessed further and confirmed in the next stage of the project.

No directly applicable water demand allowances are specified within QLDC standards to inform an initial water demand assessment. However, typical wastewater design flow allowances are provided for cafe, restaurants and unserviced camping grounds within Table H4 of AS/NZS1547:2012 On-site Domestic Wastewater Management and these are expected to also reflect water demand. The relevant figures are noted below.

- Cafe 15-25L/person
- Restaurant 25-30L/person
- Serviced Campground 100L/person

AS/NZS1547 also suggests that reductions in the order of 33% can be readily achieved through the use of water reduction fittings and fixtures. Given the relatively remote site and on-site servicing it is reasonable to assume that a very high degree of water reduction measures will be incorporated in this portion of the project and this could readily reduce water demand by more than the 33% noted above. Options for water reduction include use of greywater recycling and reuse for toilet flushing or the use of waterless composting toilets, high water efficiency appliances and fixtures and off-site food preparation and laundering. The specific water reduction measures to be implemented for the Saddle Station will be assessed and confirmed in the next stage of the project and at this stage we have conservatively assumed a 33% reduction will be achieved.

Based on the figures noted above the Saddle Station water demand is estimated to be approximately 10,000 litres per day.

We note also that international high mountain huts (such as in Europe) in similar configurations to the Saddle station have been reported to achieve efficiencies in the order of 20L – 50L per visitor per night in this arrangement, including for meal preparation, or as low as 10L per person for daytrip/single meal visitors. This is lower than the estimations and allowances made above and confirms further reductions in demand are likely possible.

Based on information from the GrowOtago maps the site receives a median rainfall in the order of 1,250mm to 1,500mm annually. Based on a roof area of 1,200m^2 this corresponds to a theoretical average rainwater volume of approximately 1,650m^3 that could be harvested by a roof capture system annually. The necessary fire fighting reserve volume will be sourced from this roof runoff capture.

Given seasonal climactic variations, and specifically the summer period having prolonged dry periods and low precipitation that are likely to coincide with a high visitor period and hence high water demand. When a dry summer period is considered, based on the GrowOtago maps the site can be expected to receive between 250mm to 300mm of rainfall in a 1 in 5 year dry summer period. This equates to a theoretical rainwater volume in the order of 330m^3 across the summer months or an average volume of approximately 3,600 litres/day. This equates to approximately half of the estimated daily water demand. Whilst water storage can buffer these summer shortfalls we recommend that a supplementary water source is provided to give surety of supply.

Provision of this supplementary water supply could be readily achieved through service use of the Funifor during off-peak periods to carry supplementary water from the Fernhill Heights station to the Saddle Station to top up the on-site water tanks. As the funifor has an occupancy of 110 people, it is expected in a service capacity with no passengers that approximately 8,000 litres of water could be carried in a single load.

Springing water is also evident in the western faces in proximity to the Saddle Station and subject to site investigations it is possible that a well point could be constructed in this location to provide an on-site water source. This will be investigated further in the next phase of the project.

Water servicing of the Saddle Station can be achieved by a combination of on-site harvesting and storage of roof rainwater with supplementary supply via Funifor delivery or the development of on-site springs. Inclusion of water reduction measures is feasible and the various options available will be assessed further and confirmed in the next stage of the project.

4.2 Stormwater

Direct stormwater runoff from the Saddle Station is expected to be minimal as noted above roof rainwater will generally be captured and reused to assist in meeting potable water demands for the site.

By inspection attenuation and discharge to ground by way of soakage, or in a controlled manner to nearby natural overland flowpaths is considered feasible at this site with negligible impacts on the catchment behaviour or downstream receiving environment.

4.3 Wastewater

As outlined above it is unlikely that reticulated services will be extended to the Saddle Station. As such a servicing concept utilising on-site treatment and disposal, in conjunction with wastewater reduction measures and periodic servicing via the Funifor as required, is assessed and confirmed as follows.

As discussed within the Saddle Station water supply assessment above we have assumed a daily restaurant/cafe patronage of 300 people per day at this stage with an additional maximum lodging capacity of 60 people and this will be assessed further and confirmed in the next stage of the project.

Typical wastewater design flow allowances for cafe, restaurants and unserviced camping grounds are provided in Table H4 of AS/NZS1547:2012 On-site Domestic Wastewater Management and the relevant figures are noted below.

- Cafe 15-25L/person
- Restaurant 25-30L/person
- Serviced Campground 100L/person

AS/NZS1547 also suggests that wastewater generation reductions in the order of 33% can be readily achieved through the use of water reduction fittings and fixtures and that the split between greywater and blackwater is typically expected to be 30%/70% of total flow respectively.

Given the relatively remote site and on-site servicing it is reasonable to assume that a very high degree of wastewater generation reduction measures will be incorporated in this portion of the project and these will reduce wastewater generation by more than the 33% noted above. Options for wastewater reduction include use of greywater recycling and reuse for toilet flushing or the use of waterless composting toilets, high water efficiency appliances and fixtures and off-site food preparation and laundering. The specific wastewater reduction measures will be assessed and confirmed in the next stage of the project and at this stage we have conservatively assumed a 33% reduction will be achieved.

Based on the figures noted above the Saddle Station wastewater generation is conservatively estimated to be approximately 10,000 litres per day. Assuming traditional flush toilets and separated black and grey water this is estimated to consist of approximately 3,000 litres/day of blackwater and 7,000 litres/day of greywater. This can be effectively treated on-site to a high standard by way of proprietary, package wastewater treatment plant.

Based on our experience of alpine ground conditions the predominant near surface soils in the vicinity of the Saddle Station will be silty in nature and would conservatively be classified as Category 4 in accordance with Table M1 of AS/NZS1547:2012 and a design irrigation rate (DIR) of 3.5mm/day is recommended at this stage. This will be assessed in detail and confirmed as a part of the next stage of this project.

Adopting a conservative DIR of 2mm/ day to account for factors such as slope and climatic conditions being applied to both treated black and greywater this would result in a required land application area of 5,000m^2. By inspection sufficient area is available within proximity to the Saddle Station and we confirm that it is feasible to develop and construct such land application areas within the alpine tussock environment in an environmentally sensitive manner. While it is acknowledged that on-site wastewater treatment and land application can be challenging within the alpine environment, based on our experience it is readily achievable, as demonstrated by our work at various ski resorts around the District.

We confirm that on-site wastewater servicing for the Saddle Station by way of high quality on-site treatment prior to land application is feasible and can be readily achieved.

4.4 Bowen Peak Upper Station

The proposed Bowen Peak Upper Station includes only the Peak Gondola terminal, a viewing deck, and toilets. The toilets are proposed to be backcountry style (i.e. no water supply) containment toilets with holding tanks suitable for periodic servicing/replacement via service gondola or vehicle. No on-site water supply or wastewater treatment/discharge is envisaged in this location at this stage.

5.0 One Mile Powerhouse Reserve

The One Mile Powerhouse Reserve development is minimal in nature, with a small-scale retail, hospitality and tourism precinct, as well as the lower terminal for the Powerhouse Gondola link to Fernhill Heights. The location will not have exceptional demand requirements and is within the serviced network area for Water Supply and Wastewater reticulation. Stormwater control can be managed within the site, with controlled discharge to the last reaches of One-Mile creek or directly to Lake Whakatipu.

For the avoidance of doubt, it is noted that remnants of historic water infrastructure related to the One Mile Powerhouse, including defunct dam, in the reserve are to remain. That historic infrastructure will be unaffected by the 3 waters servicing of the new development.

6.0 Forward Works to Complete Substantive Application

This memorandum confirms that feasible options exist for the provision of 3 waters infrastructure servicing to the various elements of the proposed Restore the Reserve development in order to assist in confirming the overall project feasibility as part of the Referral Application to the Fast-track consenting process.

Further work will be completed prior to the lodgement of the Substantive Application including comprehensive concept development, options assessments, detailed modelling, engineering assessment, and design of the 3 waters servicing demands and associated servicing methodology. These tasks will be undertaken to inform the robust application required for the substantive application phase and subsequent expert panel assessment.

For brevity the anticipated liaison points with other parties are not listed in the forward steps below, however it is well understood that much of the future work project will be in co-ordination with key project stakeholders such as representatives from Papatipu Rūnanga, with analysis and design completed collaboratively alongside other technical experts assembled to complete the project including, but not limited to, Structural, Geotechnical and Transport Engineers, Planners, Structural and Landscape Architects, Aerial ropeway specialists, DOC, QLDC and their consultants and contractors as the owners and operators of the existing surrounding infrastructure.

A high-level summary of the key infrastructure assessment items for the various 3 waters elements of the project to be completed for the Substantive Application is outlined below.

6.1 Fernhill Heights

- Confirmation of development staging.
- Detailed water demand modelling including assessment of demand during project staging.
- Hydraulic modelling and condition and capacity assessment of existing QLDC water supply network and proposed upgrades.
- Onsite investigations to confirm suitable water reservoir and pumping infrastructure locations.
- Confirmation of Water Supply design including supply scheme and servicing network.
- Detailed wastewater demand modelling including assessment of peak demand during project staging.
- Hydraulic modelling and condition and capacity assessment of existing wastewater infrastructure and proposed upgrades.
- Confirmation of Wastewater servicing design including attenuation and staged upgrades.
- Detailed stormwater modelling including hydrologic assessment and computational modelling of upslope catchment and downstream flowpaths and infrastructure elements including allowance for overland flow containing debris and infrastructure blockage.
- Site investigations to assess and consider stormwater locations for stormwater attenuation and discharge locations and conveyance paths.
- Detailed three waters reticulation route and location assessments and risk mitigation in co-ordination with wider project team specialists.
- Identification of required QLDC 3 waters network upgrades and associated triggers and timing.

6.2 One Mile Powerhouse Reserve

- Confirm concepts, scope, usage and servicing requirements.
- Detailed 3 waters demand modelling including requirements during any project staging.
- Site assessment to confirm ground conditions for discharge of stormwater flows, suitable discharge locations to One Mile Creek and Lake Whakatipu, and the condition and capacity of the existing creek and culverts.
- Hydrologic stormwater modelling of the upstream catchment and creek modelling including flood levels and flows of One-Mile creek in the proximity of the development.
- Confirmation of appropriate connection location to existing Water Supply reticulation including any associated upgrades to the nearby QLDC network.
- Confirmation of connection location to existing Wastewater reticulation including assessment for in-site requirements for gravity or pressure servicing and any associated upgrades to the nearby QLDC network.

6.3 Saddle Station

- Confirmation of usage and servicing requirements.
- Detailed assessment of wastewater and water reduction options including items such as greywater separation & reuse, composting toilets and low flow fittings and fixtures to confirm provisions to be included.
- Confirmation of wastewater generation assessment including proposed water and wastewater reduction measures.
- Water demand assessment including incorporating water reduction measures.
- Detailed assessment of rainwater recovery, storage capacity, fire fighting reserves, and anticipated dry periods to confirm storage capacity and supplementary supply requirements.
- Specific liaison with Funifor specialists to confirm extents of servicing available.
- Site assessment to confirm ground conditions for discharge of stormwater overflows and treated grey & black water to be discharged on-site.
- Design of soakage discharge device(s) for stormwater
- Design of on-site wastewater treatment and land application system.

6.4 Bowen Peak Upper Station

- Confirm usage and servicing requirements.
- Site assessment to confirm ground conditions for discharge of stormwater overflows and/or any treated grey & black water to be discharged on-site.
- Confirmation of wastewater harvesting and removal processes if required.

7.0 Conclusion

This memorandum confirms that the Restoring the Reserve proposal has viable options to provide 3 waters servicing.

The Fernhill Heights residential development can be serviced by the implementation of:

- Water supply created by installation of a series of new reservoirs and pumping infrastructure, alongside gradual improvements to the existing QLDC network water takes and rising main infrastructure in the Fernhill area.
- Stormwater control utilising on-site attenuation and controlled discharge to existing waterways, and attenuation and controlled discharge of roading infrastructure to the same.
- Wastewater attenuation and discharge to the existing Fernhill and Sunshine bay gravity reticulation, alongside ongoing maintenance and upgrade of the existing QLDC Whakatipu Lakefront wastewater infrastructure.

The One Mile Powerhouse Reserve area is readily serviced as it lies within existing QLDC 3-waters servicing boundary and is relatively small-scale in nature.

The Saddle Station complex can be serviced appropriately by:

- Water supply from rainwater harvesting, supplemented by Funifor cartage or development of onsite water springs.
- Stormwater discharge onsite.
- Wastewater treatment and discharge onsite, with periodic servicing via the Funifor connection.

It is therefore feasible to provide suitable 3 Waters servicing to the entirety of the proposed Restore the Reserve development.

8.0 Limitations

This report has been written for the particular brief to HCL from their client and no responsibility is accepted for the use of the report for any other purpose, or in any other context or by any third party without prior review and agreement.

Signed,

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