

# Inland Water Hazard and Risk Assessment Albert Town Bridge June 2024



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## Executive Summary

Albert Town Bridge is a small, one-way bridge located approximately five kilometres from central Wanaka. It serves as an essential transport route for members of the public travelling to Lake Hāwea. The bridge also attracts locals and visitors who jump from the bridge. Additionally, visitors can explore the site surroundings using the walking track underneath the bridge on the limestone trail. There is a large campground on the northern side of the bridge, where campers frequently jump, swim, and engage in other recreational activities in the surrounding aquatic environment. On the southeast side of the bridge, several trees serve as makeshift jumping platforms with improvised ropes. This site is referred to the "jumping tree" or "tree jumping location" throughout this report. The northeast side of the bridge is a boat ramp where members of the public may launch for a \$5 fee. No powered vessels are allowed between 1 December and 30 April from the Lake Wānaka Outlet to Albert Town Bridge. A five-knot speed limit also applies between 1 May and 30 November, except when there is a speed uplifting between 10.00am and 6.00pm from the Lake Wānaka Outlet to Albert Town Bridge.

To enhance the safety of the Albert Town Bridge and its surrounding areas, a series of targeted measures are recommended based on a comprehensive risk and hazard assessment. These recommendations aim to address various risks and hazards associated with different user groups, ensuring a safer environment for all members of the public.

This report includes an analysis of the hazards identified by the assessor and the main concern of vessel thoroughfare at Albert Town Bridge from Queenstown Lakes District Council. User numbers and times/dates are also considered based on ActiveXChange and an independent data consultant was also engaged. It also includes incident and participation data that were available from Queenstown Lakes District Council. Drowning Prevention Auckland/Aotearoa provides several recommendations to mitigate hazards outlined in this report. These recommendations involve the installation of compliant signage that meets the New Zealand Standard *AS/NZS 2416.1:2010*, which specifies the requirements for water safety signs and beach safety flags in workplaces and public areas, including car parks and access points. Examples of the recommended signage can be found at the end of this report.

Currently, there is no aquatic safety signage located at Albert Town Bridge. Signage is recommended and all new signage should comply with the New Zealand Standard *AS/NZS 2416.1:2010*. The existing signage on site relates to river use and jet boating, but it is extensive to the point of reducing its effectiveness in conveying the intended information as noted in a study

by Portella (2016). Therefore, it is recommended that a restructuring, redesign, and consolidation of the existing signs be undertaken to improve effectiveness and meet compliance requirements.

In addition to this report, a signage and public rescue equipment (PRE) implementation report can be produced to guide the recommended installation of new, compliant aquatic signage. This report will also provide information on signage design, placement, and the types of PRE measures recommended.

Recommendations:

#### Jumpers/Manu Users (Extreme Risk, High Priority)

- Recommendation: Promptly install hazard signage, public rescue equipment with instructions for use, and a depth marker to prevent spinal cord injuries. Ensure a minimum safe jumping depth of 2.5 meters, modifying the riverbed if necessary.
- Impact: These actions will provide clear hazard warnings, safe bystander rescue options, and ensure adequate water depth, significantly lowering the risk of severe injuries.

#### Swimmers (High Risk, Moderate Priority)

- Recommendation: Install hazard signage, public rescue equipment with instructions, and clear downstream vegetation to prevent entanglement.
- Impact: Improves safety by clearly indicating hazards and ensuring bystander rescue equipment is readily available, reducing the risk of drowning and entanglement.

#### Powered Craft Users (High Risk, Moderate Priority)

- Recommendation: Establish and signpost a designated boat thoroughfare lane under the bridge, separate from the jumping area, to minimize collision risks.
- Impact: Provides a clear and safe passage for powered craft, reducing the likelihood of collisions with bridge jumpers.

#### Vehicle-Related Risks (Medium Risk, Low Priority)

- Recommendation: Consider installing a council approved permanent jumping platform to prevent the public from scaling slippery barriers and ensure safe access to the water. Coordination with the New Zealand Transport Agency, which plans to upgrade the bridge in three years, could incorporate this platform into the new design. Alternatively, a higher

barrier between the road and the outer railing should be installed to prevent falls into traffic.

- Impact: These measures will significantly reduce the risk of accidents and injuries related to unsafe jumping practices and interactions with traffic.

#### Track or Bridge Users – Walkers/Cyclists (Medium Risk, Low Priority)

- Recommendation: Install public rescue equipment, such as a throw bag with an angel ring, to facilitate dry-based rescues and prevent the public from performing dangerous wet-based rescues.
- Impact: Enhances the ability to perform safe rescues, reducing the likelihood of drowning or injury.

#### Non-Powered Craft Users (Medium Risk, Low Priority)

- Recommendation: Remove downstream strainers to prevent entanglement of capsized crafts and install public rescue equipment with instructions.
- Impact: Reduces the risk of drowning and injury from entanglement, enhancing overall water safety.

#### Kai Gatherers (Medium Risk, Low Priority)

- Recommendation: Install hazard signage and public rescue equipment with instructions to prevent the need for wet-based rescues.
- Impact: Ensures that kai gatherers are aware of potential hazards and have access to safe rescue equipment, enhancing overall safety.

Overall Safety Enhancement Implementing these recommendations will transform the Albert Town Bridge into a safer environment by addressing specific risks for different user groups. These measures will reduce the likelihood of incidents, injuries, and fatalities, providing a safer recreational area for the community and visitors alike.

#### Signage Recommendations

- a) Albert Town Bridge – Two defined access signs
- b) Albert Town Bridge – One defined access sign with public rescue equipment
- c) Albert Town Bridge – One carpark sign
- d) Albert Town Bridge – Boat thoroughfare signage under the bridge

- e) Albert Town Bridge – Install 5 knot area prior to the bridge
- f) Tree Jumping Site – One defined access sign
- g) Tree Jumping Site – One defined access sign with public rescue equipment

#### Infrastructure Recommendations

- a) Queenstown Lakes District Council should consider clearing the submerged objects to reduce the likelihood of entanglement risk for members of the public when recreating at the tree jumping location.
- b) Queenstown Lakes District Council should consider clearing strainers that are located downstream from the tree jumping location.
- c) Queenstown Lakes District Council should consider installing a depth gauge at Albert Town Bridge near the preferred jumping location.
- d) Queenstown Lakes District Council should consider formalising a jumping platform/area at Albert Town Bridge.

Through the implementation of these measures, a safer aquatic environment will be established for individuals engaging in all recreational activities in open water settings, thereby promoting safer behaviour to reduce the likelihood of incidents.

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## 1. Introduction

Queenstown Lakes District Council engaged Drowning Prevention Auckland/Aotearoa following the distribution of the Inland Water Hazard Assessment brochure to Council Chief Executives. The initial engagement revolved around a scope of work that included discussions about a risk assessment at the site in conjunction with an Inland Water Hazard Assessment. The aim of this report is to inform Queenstown Lakes District Council of the hazards and risks associated with the Albert Town Bridge. The scope of the hazard assessment extends to proposing recommendations to reduce risk for users at the Albert Town Bridge site. Recommendations include infrastructure changes, installation of water safety signage, and the installation of public rescue equipment (PRE) at the site. Our collaborative effort seeks to identify hazards, enhance safety measures, and mitigate risks for visitors in these aquatic areas.

Drowning Prevention Auckland now works across Aotearoa New Zealand under our sister organisation, Drowning Prevention Aotearoa. Since 1994, the team have been serving Tāmaki Makaurau Auckland as the lead agency for drowning prevention education, research, and advocacy, providing life-long learning initiatives. Drowning Prevention Aotearoa offers these services to other areas of the country.

The client should consider these recommendations to inform the public about the hazards present and take appropriate actions to minimise them. Drowning Prevention Auckland/Aotearoa has compiled this report in good faith, exercising all due care and attention. Drowning Prevention Auckland/Aotearoa will not be held liable for the implementation or lack thereof of these recommendations.



*Figure 1 Kayakers Passing Under Albert Town Bridge*

## 2. Methodology

Josh Carmine, Aquatic Research Educator from Drowning Prevention Auckland/Aotearoa visited Albert Town Bridge on 15 May 2024. He was accompanied by the Queenstown Lakes District Council Harbourmaster, Ricky Campbell, who provided context, anecdotes, and history throughout the site assessment process.

Prior to the site visit a comprehensive desk audit was completed of the site to identify site use, popular locations of recreation at the site and the estimated user visitor numbers to the site. The assessor split the site into two main points of interest that are referred to in this report as Albert Town Bridge and the tree jumping site.

During the assessment, site users provided anecdotal information to the assessor that provided valuable insights. These are documented within this report.

ActiveXChange data was also used to add context to the assessment. This data is sourced from over 600 million monthly users worldwide to show relative footfall and vehicle movement nationwide by the hour, day, and month using GPS cell phone data within a 100 x100 metre grid called a quadkey. This data can be used to identify user numbers and times of day that the site is being used. This information was used to provide context for the site-specific hazard assessment. Additionally, Queenstown Lakes District Council provided some usage data to enable a crude assessment of risk at the site.

The goal of this assessment is to provide recommendations that enable the Queenstown Lakes District Council to make informed decisions about implement actions to enhance safety in, on and around the aquatic environments at Albert Town Bridge.

### 3. Limitations

Water depth has been estimated at Albert Town Bridge, not accurately measured. More accurate data may affect recommendations.

There are limitations related to the ActiveXChange data and the participation data provided by Queenstown Lakes District Council. ActiveXChange movement data is aggregated from over 45,000 apps however in certain contexts the targeted population may not be typical users of these apps, take their phone with them, or have it turned off. Sites that are in a valley or next to sharp inclines in the topography (over 15 degrees) may block signal. Where there are very small numbers on an hourly basis (across the month) the activity index may show as zero for privacy and personal safety reasons so as not to create risk for individuals.

The participation data, while useful, is not complete in the sense that we don't know percentages of people in the area compared to those in the water, exact numbers and times of jumpers from the bridge and tree, and whether most people are locals or visiting holiday-makers. In other inland aquatic environments, (Stanley et al., 2023) a 1:2 ratio of in-water to out-of-water site users has been determined in summer months. This can be used to generally estimate in-water numbers during warmer summer months. It is important to note that accurate user data at this site is needed to provide an accurate estimate of site use due to car and walking thoroughfare.

This report is based on participation data supplied by the Queenstown Lakes District Council. The report's precision and comprehensiveness could be significantly enhanced with additional data analysis, particularly in the areas of boating participation, bridge jumping incidents over time, site user demographics, and the perceptions and competencies of site users.

Finally, although this report has been based on the ISO and Standards Australia and New Zealand Risk management – Principles guidelines 31000:2009 and Water safety signs and beach safety flags, 2416.1:2010, it has not been peer reviewed.

## 4. Drowning Statistics and Incident History

Water Safety New Zealand Drownbase™ shows that for the 10 years 2013 – 2022, there were 817 people fatally drowned in New Zealand. One-fifth of these were in rivers (20%, n = 164), and of these river fatalities, 15 occurred in Otago. Most were male (87%, n = 13), most were NZ European (67%, n = 10), and all were over the age of 15 years (15-19, n = 2; 20-24, n = 3; 30-34, n = 4; 40-44, n = 2; 60+, n = 4).

The activities being undertaken were wide-ranging. There were three fatalities each from falls and non-powered craft (kayaking/rafting), two each from kai gathering (net fishing/angling) and powered craft (jetboat/boat over 4m), and one each from swimming, river crossing, swept away, board riding, and unknown.

There is no non-fatal drowning data included in this report.

### Incident History

There are no reports of past incidents resulting in injury. There are, however, numerous reports of near misses at the bridge.

The Harbourmaster has received reports from DOC staff working near the Albert Town Bridge during the summer, expressing concerns about the high number of people jumping off the bridge while commercial jet boats travel underneath. These observations highlight a perceived risk due to the speed of the vessels and the volume of individuals jumping into the water.

Additionally, 10-12 people approached the Harbourmaster over the busy summer period who all had concerns around the same two issues. The first was that jumpers were jumping off the whole width of the bridge, including the camping ground end of the bridge where boats would be approaching from behind and possibly unnoticed by the jumpers. The boats approaching are on the legal side of the river that boats should be sticking to when heading back up into the lake. The second issue is that a lot of young people aged 8-15-year were in groups jumping off the bridge. They were distracted by others in the group and not even checking if a boat was approaching from behind before jumping.

Requests lodged in the QLDC system include:

2023 – 3 requests lodged in system

2019 – 1 request lodged in the system

These complaints were raised by members of the public and related to concerns of people jumping off Albert Town Bridge with powered vessels and swimmers' underneath.

Observations which could be considered a potential issue of conflict would be between jumpers and commercial operator powered vessels travelling upstream from behind the jumpers, in a lot of instances, jumpers were observed not looking behind them to check if anything was coming up stream before jumping. When river levels are low boats are forced to the southern side of the river due to this being the only deep channel under the bridge.

## 5. Hazards

Albert Town Bridge and the jumping tree present hazards that are deemed moderate to high risk.

Note that all hazards identified may be exacerbated at times of high flow and flooding.

### *Deep water/ Sudden drop off*

Albert Town Bridge and the jumping tree both possess an unknown depth which may be further obscured by glare, murky and turbulent water. Swimmers with lower levels of water competence may be caught unaware as the water depth at these locations may not be immediately obvious, particularly for unsupervised small children. It was observed that much of the riverbank in the immediate area possesses a sudden, steep drop off. This is particularly prominent at the tree jumping location. If the sudden depth were to come as a surprise to water-users, this may cause panic and result in swimmers becoming distressed.

### *Reduced buoyancy*

Freshwater is less dense than salt water, therefore personal buoyancy is reduced in freshwater when compared to salt water. This will make it more difficult for people to float and tread water. Swimmers may not be aware of this when entering the deeper parts of the river and become distressed.

### *Cold water*

When the water temperature is below 16°C, cold water shock response and hypothermia may occur, and become a causal factor of drowning. This can lead to rapid skin cooling which initiates an immediate gasp response, the inability to breath-hold, and hyperventilation. The gasp response may cause drowning if the head is submersed during the initial entry into cold water.

The site was assessed to be 9°C however, this temperature may drop over winter and shoulder months.

#### *Submerged objects*

Submerged rocks and other objects present a hazard to members of the public diving and jumping into the water. Abrasions, bruising, broken bones, or more serious injuries, such as head or spinal injuries, or death may result.

#### *Slippery surface/ rocks/ shoreline*

Slippery surfaces/ rocks/ shoreline are an issue at this site. Walking along the riverbank, climbing the bridge railing and climbing the jumping tree may prove hazardous due to the slippery surfaces, rocks/ shoreline and may result in abrasions, bruising and broken bones from slips, trips, and falls. It was noted that there was also a high risk of slipping and falling from the railing of the bridge into oncoming traffic at the Albert Town Bridge site.

#### *Murky water*

At times the river may have reduced visibility due to rainfall or other factors. This makes it difficult to spot objects under the surface of the water. It is also difficult to judge the depth of water and may catch the public unaware.

#### *Strainers/ Entanglement risks*

Higher levels of water or decaying trees can dislodge logs, fallen branches, rocks, and other objects creating strainers which may cause members of the public to become entangled in these hazards. Whether the person is fully or partially submerged in the water, it can be difficult to escape and may result in injury and/or drowning. It was noted that the strainers were very prominent and abundant posing a high-risk downstream area from the tree jumping site.

#### *Sweepers*

Tree growth in multiple locations at the tree jumping site creating overhanging sweepers. The branches/trunks of sweepers form obstructions that are hazardous for recreational users paddling craft, river drifting or boating on the river. These are particularly prominent at the tree jumping site.

### *Aerated water*

Water becomes aerated as it travels and rushes around fixed objects or over shallow underwater terrain. This results in the water becoming less dense and therefore less buoyant. This means it is harder to stay afloat in the areas of aerated water. There will also be a passive undertow which will cause the aerated water to revolve towards the riverbed and bring swimmers under the surface of the water with it. This may catch swimmers unaware and pose a drowning risk in areas of high aeration. The risk of the aerated water increases behind the fixed bridge pylons.

### *Fast moving water*

The Clutha River has fast flowing water. During rainfall events there is an increased water volume travelling downstream results in increased water velocity and an increase in the strength of currents. During river flooding events, individuals who enter the water are at elevated risk of being swept away, injury, or drowning. The water level may rise rapidly, due to the steep nature of the surrounding catchment, and users may be caught unaware. The Clutha River has a large range of flow rate. The flow rate over summer period is 197 m<sup>3</sup>/s on average and 350 m<sup>3</sup>/s in winter (Flow Rate Aotearoa n.d.).

### *Vessel thoroughfare*

Powered vessels are able to use the Clutha River for recreational and commercial purposes. There is a ban on all powered vessels without permit from 1 December to 30 April from the Lake Wanaka Outlet to Albert Town Bridge. A 5-knot speed limit applies between 1 May and 30 November except where there is a speed uplifting between 10am and 6pm from the Lake Wanaka Outlet to Albert Town Bridge. Jet boats may pose significant hazards to other river users, including swimmers, non-powered craft, and other powered vessels. Swimmers, due to their low visibility, are particularly vulnerable to collisions and severe injuries. Non-powered craft including canoes and kayaks, face risks of capsizing or collision due to their slower speeds and limited manoeuvrability.

## 6. Hazard Assessment

### 6.1 Albert Town Bridge

|  |   |  |
|--|---|--|
| Site name: Albert Town Bridge – Clutha River   |   | Date assessed: 15 May 2024                 |
| Site type: River   | Site area: Wicklow Terrace, Albert Town | Access location:<br>44°40'52"S 169°11'25"E |
| <p><b>Brief Description:</b></p> <p>The Albert Town Bridge is built over the Clutha River on the eastern side of Wanaka. There is a large, popular campground on the northwest side of the bridge and a walking trail on the southern side. Additionally, a boat ramp is located on the northeastern side. Parking is limited on the southern side, but the northeastern side features a large parking area accommodating approximately 50 or more cars. Accessible parking is available on the northern side of the bridge, providing additional spaces.</p> <p>The river was observed to be relatively shallow on the northern side, becoming progressively deeper towards the southern end of the bridge. The southern end of the bridge was observed to be the popular jumping spot. This can be seen in Figure 7 as the assessor witnessed members of the public jumping from the bridge. Skateboard grip tape has been installed on the bridge railing to improve grip and identify a preferable jumping location; this can be observed in Figure 8. The water below the jumping site appeared to be approximately 4 metres deep, though this was not definitively measured.</p> <p>A lack of easy access and egress was noted; during the assessment several site users were observed walking on the outside of the bridge railing on the telecommunications pipe, posing significant electrocution and infrastructure integrity hazard.</p> <p>Egress following bridge jumping involves a 20-metre float to the southern bank through a break in the trees. Missing this egress point could lead to difficulties, as there are many strainers downstream and challenging access points, making river exit strenuous and potentially dangerous for members of the public.</p> <p>The main hazards present at this site are the collision risk with vessels, fast-flowing water, deep water, cold water, submerged objects, entanglement risk in vegetation and structure, and lack of supervision which may result in harm.</p> |   |  |



|  |  |  |
|--|--|--|
| <p>Water quality testing:</p> <p>Excellent - For at least half the time, the estimated risk is &lt;1 in 1000 (0.1% risk). The predicted average infection risk is 1%* (LAWA, n.d.).</p>  | <p>Water temperature:</p> <p>9 degrees Celsius</p>   | <p>Rainfall catchment:</p> <p>Extremely Large – Largest catchment area of 21,022 km<sup>2</sup> and flow volume of 575 m<sup>3</sup>/s in New Zealand (LAWA, n.d.)</p> |
| <p>Site use: Walking, Cycling, Camping, Boat Launching/Retrieval, Swimming, Fishing, Kayaking, Jumping/Bombing, and Sightseeing.</p>   |  |  |
| <p>Signage:</p> <p>On the northern side of the site lies numerous signs that provide the site users with a quantity of information relating to no camping beyond this point, no soap or detergent in the river, no bathing or dishes in the river, jet boating information, Albert Town Recreation Reserve information, no powered vessel timeframe information, Clutha River fishing information.</p> <p>All signage can be seen as Figures 2 – 6.</p> <p>It was noted that there were no signs pertaining to aquatic safety for swimmers who use the site.</p> |  |  |
| <p>Public rescue equipment on site: No PRE on site</p>   |  |  |
| <p>Hazards present:</p> <ul style="list-style-type: none"> <li>• Deep water</li> <li>• Shallow water</li> <li>• Submerged objects</li> <li>• Sudden drop off</li> <li>• Entanglement risk in vegetation/structure</li> </ul>   | <ul style="list-style-type: none"> <li>• Maritime traffic</li> <li>• Reduced buoyancy in freshwater</li> <li>• Slippery surfaces, rocks and shoreline</li> <li>• Cold water</li> <li>• Fast flowing current</li> <li>• No lifeguard supervision</li> </ul> |  |
| <p>Additional comments:</p> <p>The assessor conducted several informal interviews with members of the public which provided the following anecdotes:</p> <ul style="list-style-type: none"> <li>• 'If the bridge was closed for jumping, we would still find a way to do it anyway.'</li> <li>• 'We always come here even in winter as this is part of our kayaking circuit, we jump all year round.'</li> </ul>   |  |  |

- 'Kids come from all over the country to stay at this campground and jump, it's like a rite of passage.'
- 'We would love an actual jumping spot, I saw a kid here last year slip, fall back and hit his head on the railing barrier before the road.'
- 'Everyone does it in the safe spot, someone put grip tape there to help people know when to jump.'
- 'We have informal bombing competitions here over summer.'
- 'We only jump when boats aren't around; you can hear them coming pretty easily.'

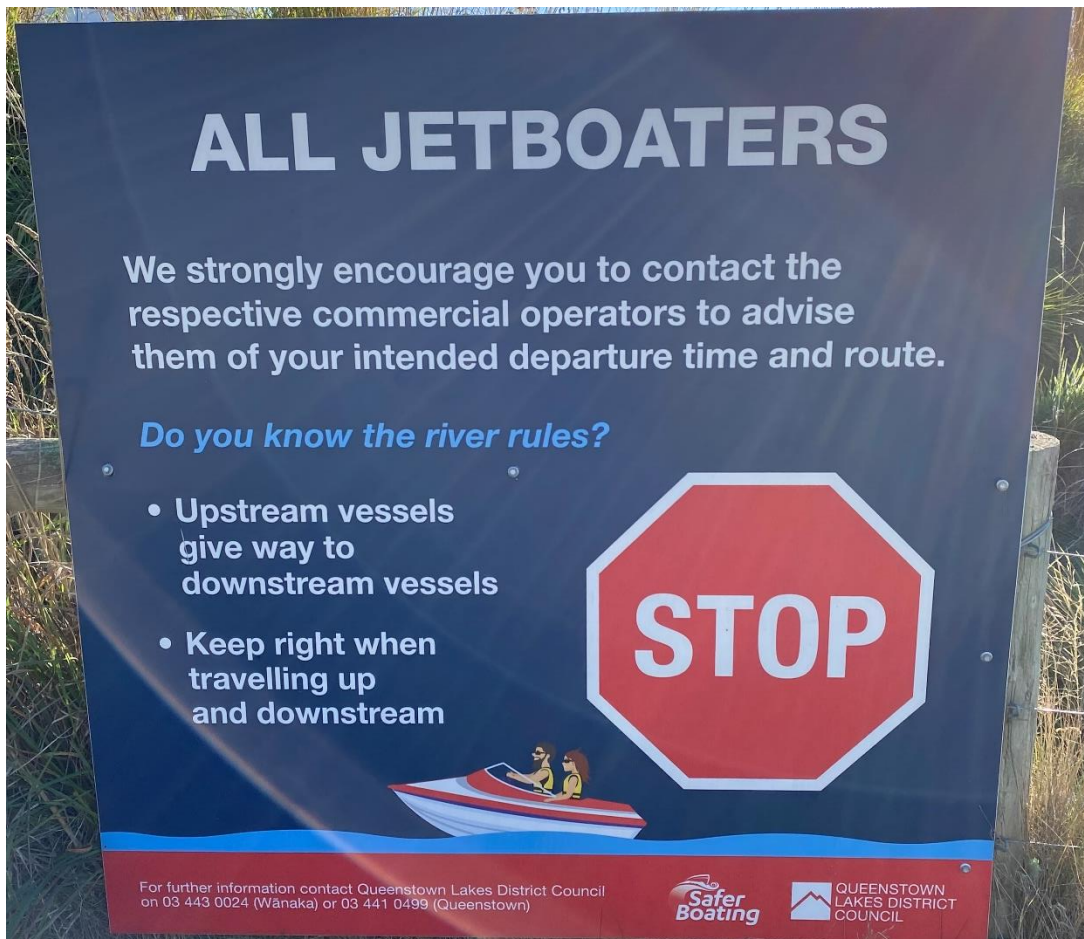
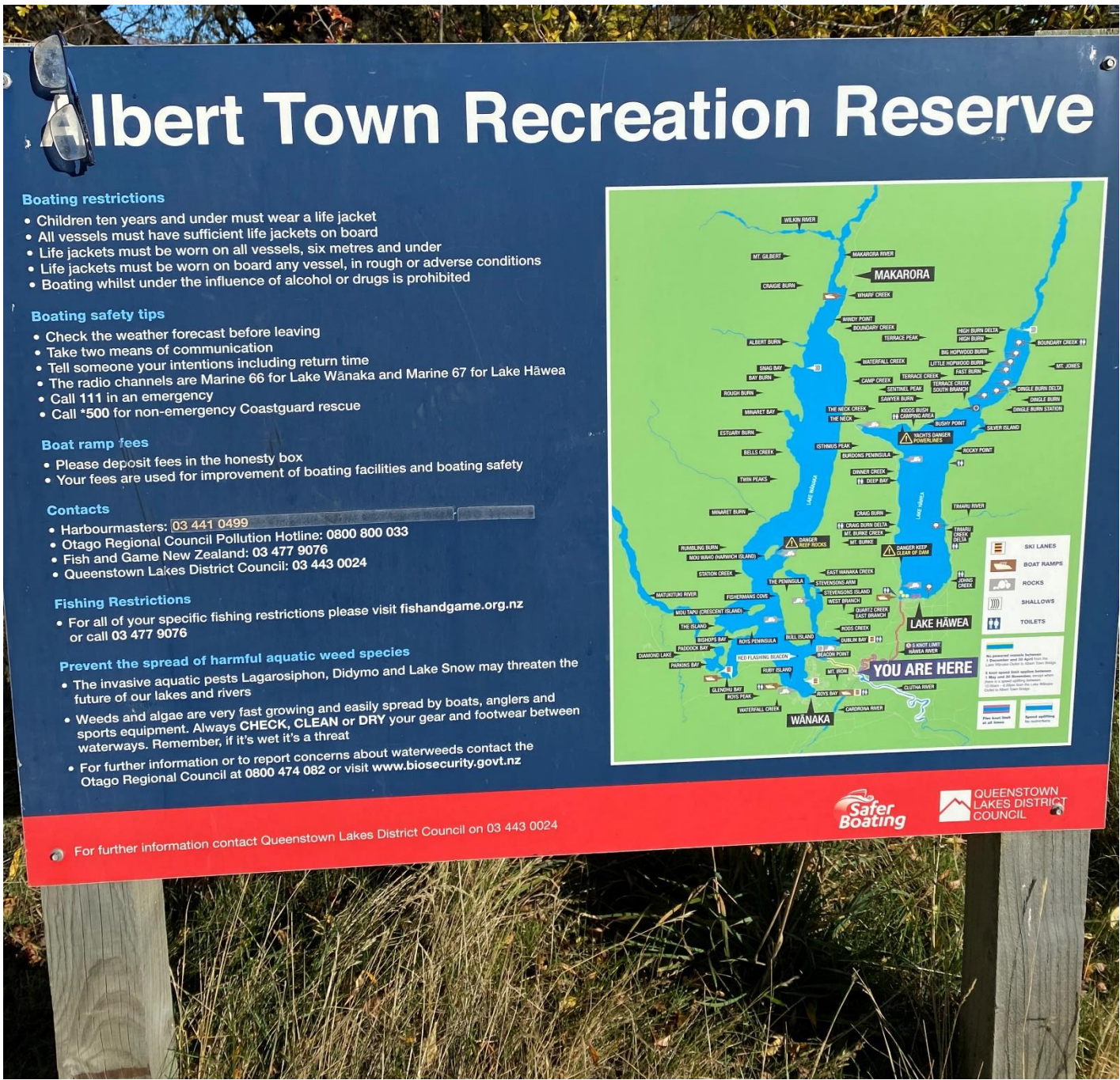


Figure 2 Jet Boat Signage



# Albert Town Recreation Reserve

## Boating restrictions

- Children ten years and under must wear a life jacket
- All vessels must have sufficient life jackets on board
- Life jackets must be worn on all vessels, six metres and under
- Life jackets must be worn on board any vessel, in rough or adverse conditions
- Boating whilst under the influence of alcohol or drugs is prohibited

## Boating safety tips

- Check the weather forecast before leaving
- Take two means of communication
- Tell someone your intentions including return time
- The radio channels are Marine 66 for Lake Wanaka and Marine 67 for Lake Hāwea
- Call 111 in an emergency
- Call \*500 for non-emergency Coastguard rescue

## Boat ramp fees

- Please deposit fees in the honesty box
- Your fees are used for improvement of boating facilities and boating safety

## Contacts

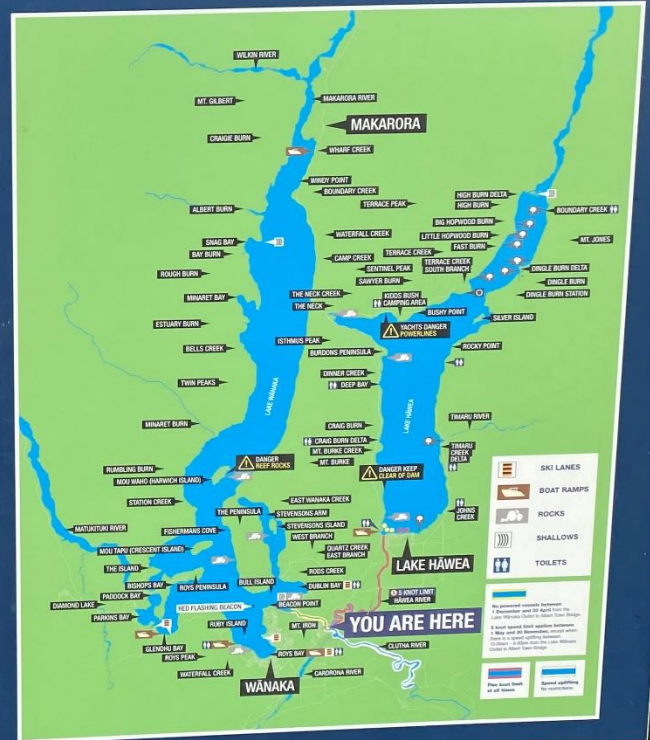
- Harbourmasters: 03 441 0499
- Otago Regional Council Pollution Hotline: 0800 800 033
- Fish and Game New Zealand: 03 477 9076
- Queenstown Lakes District Council: 03 443 0024

## Fishing Restrictions

- For all of your specific fishing restrictions please visit [fishandgame.org.nz](http://fishandgame.org.nz) or call 03 477 9076

## Prevent the spread of harmful aquatic weed species

- The invasive aquatic pests Lagarosiphon, Didymo and Lake Snow may threaten the future of our lakes and rivers
- Weeds and algae are very fast growing and easily spread by boats, anglers and sports equipment. Always **CHECK, CLEAN or DRY** your gear and footwear between waterways. Remember, if it's wet it's a threat
- For further information or to report concerns about waterweeds contact the Otago Regional Council at 0800 474 082 or visit [www.biosecurity.govt.nz](http://www.biosecurity.govt.nz)



For further information contact Queenstown Lakes District Council on 03 443 0024

Figure 3 Albert Town Recreation Reserve Signage



Figure 4 Clutha River Signage



Figure 5 Campground Signage



Figure 6 Jet Boat Signage Continued



*Figure 7 Bridge Jumpers*



*Figure 8 Grip Tape Installed on Preferred Jumping Zone*





*Figure 9 Exemplary Bridge Signage Concept – Green Sign (Boat Thoroughfare Only), Red Sign (Swimmers Only)*

## 6.2 Albert Town Bridge- Tree Jumping Site

|   |   |   |
|---|---|---|
| Site name: Albert Town Bridge – Clutha River  |   | Date assessed: 03.11.2023   |
| Site type: River  | Site area: Wicklow Terrace,<br>Albert Town  | Access location:<br>44°40'53"S 169°11'26"E  |
| <p><b>Brief Description:</b></p> <p>This site is situated approximately 20 metres downstream from the main jumping point on the Albert Town Bridge. There is no parking directly at this site, but users appear to walk and may park on the roadside on the south of the bridge or on the north of the bridge in either the campground or in the boat ramp park, cross the bridge and access this site.</p> <p>The jumping tree site possesses a moderate sized bank under shady trees with an apparent storm water drain running through the middle of the area with worn grass indicating a high traffic area where members of the public may choose to recreate. This area poses several access points to the riverbank that have been worn through the trees on the bank.</p> <p>There is a moderate sized tree with four observed swinging ropes from several trees as seen in Figure 10 that members of the public were witnessed to be jumping from. There are also numerous wooden steps and structures nailed into the tree to encourage access to jumping platforms that were installed at estimated heights of two and four metres above the rivers surface. The assessor noted the questionable structural integrity of the wooden structures and rope swings.</p> <p>Beneath the jumping platforms and ropes lies a shingle riverbed with a sudden drop off and partially submerged vegetation in a close proximity downstream from the entry points. Both of these hazards would likely catch members of the public unaware as they recreate at this spot. When the bank becomes wet, egress from the site may also pose a challenge to members of the public due to the steep incline of the bank and the sudden drop off.</p> <p>The main hazards present at this site are the fast flowing current, cold water, sudden drop offs, entanglement risk in vegetation, and lack of supervision which may result in harm.</p> |   |   |
| Water quality testing:<br><br>Excellent - For at least half the time, the estimated risk is <1 in 1000  | Water temperature:<br><br>9 degrees Celsius | Rainfall catchment:<br><br>Extremely Large – Largest catchment area of 21,022 km <sup>2</sup> and |

|  |  |  |
|--|--|--|
| (0.1% risk). The predicted average infection risk is 1%*. (LAWA, n.d.)   |  | flow volume of 575 m <sup>3</sup> /s in New Zealand (LAWA, n.d.) |
| Site use: Swimming, Jumping/Bombing.   |  |  |
| <p>Signage: The site has no signage.</p> <p>All aquatic signage at this location should be compliant with the New Zealand AS/NZS 2416.1:2010 Water safety signs and beach safety flags - <i>Specifications for water safety signs used in workplaces and public areas.</i></p>   |  |  |
| Public rescue equipment on site: No PRE on site  |  |  |
| <p>Hazards present:</p> <ul style="list-style-type: none"> <li>• Deep water</li> <li>• Shallow water</li> <li>• Submerged objects</li> <li>• Sudden drop off</li> <li>• Entanglement risk in vegetation/structure</li> </ul>   | <ul style="list-style-type: none"> <li>• Reduced buoyancy in freshwater</li> <li>• Slippery surfaces, rocks and shoreline</li> <li>• Cold water</li> <li>• Fast flowing current</li> <li>• No lifeguard supervision</li> </ul> |  |
| <p>Additional comments:</p> <p>The assessor had an informal interview with site users who were actively recreating at this site. The youth who were interviewed provided anecdotal evidence that indicated the following:</p> <ul style="list-style-type: none"> <li>• ‘Boats are easy to hear but people just assume they will use the middle bit of the river.’</li> <li>• ‘People could very easily drift down into the trees and find it pretty hard to get out but most people are good swimmers who jump.’</li> <li>• We are part of an outdoor education course at university that teach us how to stay safe, we often share this knowledge because lots of local kids don’t have a good understanding of water safety.’</li> </ul> |  |  |



*Figure 10 Tree Jumping Platforms and Ropes*



*Figure 11 Downstream Vegetation*

## 7. ActiveXChange and Independent Data Consultant Information

ActiveXChange data is sourced from over 600 million monthly users worldwide to show relative footfall and vehicle movement nationwide by the hour, day, and month using GPS cell phone data within a 100 x100 metre grid called a quadkey. This data can be used to identify user numbers and times of day that the site is being used. Unfortunately, due to the quadkey pattern that is not able to be changed, data for both the bridge and jumping spot have been combined. Observations are recommended to identify actual user numbers at both Albert Town Bridge and the tree jumping locations. The data sourced through the consultancy includes the same data sources used from ActiveXChange however, the ability to further refine the data with additional area limitations and normalisations is able to be included.

The data from the independent consultancy indicated that 71,266 persons visited Albert Town Bridge from October 2021 to January 2024. Using data filters, road and cyclist traffic was able to be removed by creating a geofence and removing cell phone pings moving over five kilometres per hour, this also removed cyclists from this data. On average we were able to determine that on average there is 2,640 persons per month using the Albert Town Bridge. It was also identified that of those 71,266 persons visiting the site, 43,465 did not visit or park in the campground. This indicates that on average, approximately 1,610 visitors per month visit this site from outside of the campground to recreate in this area.

This data can be used to assist with the recommendations and justification for recommendations within this report as user numbers are identified for each site. Please note that there may be some limitations with the data as mentioned within the limitations statement at the beginning of the report. ActiveXChange data should only be used as an approximate user figure and should be used in addition with an observation and behaviour study to validate these findings. Detailed bar graph representations are available in the appendices of this document, facilitating a comprehensive interpretation of the data. These visual aids may further enhance understanding and analysis of the data provided.

Note that not all users identified within the movement data are swimming at the sites. Observational analysis of one other inland water sites has shown that one-half of all visitors enter the water (Stanley et al., 2023). It is not known what the ratio would be at this site without site-specific observations. It is also important to note that some users may not have brought their phone to the site which will mean that these numbers haven't been included in the datasets.

## 7.1 ActiveXChange Data – Albert Town Bridge and Jumping Tree

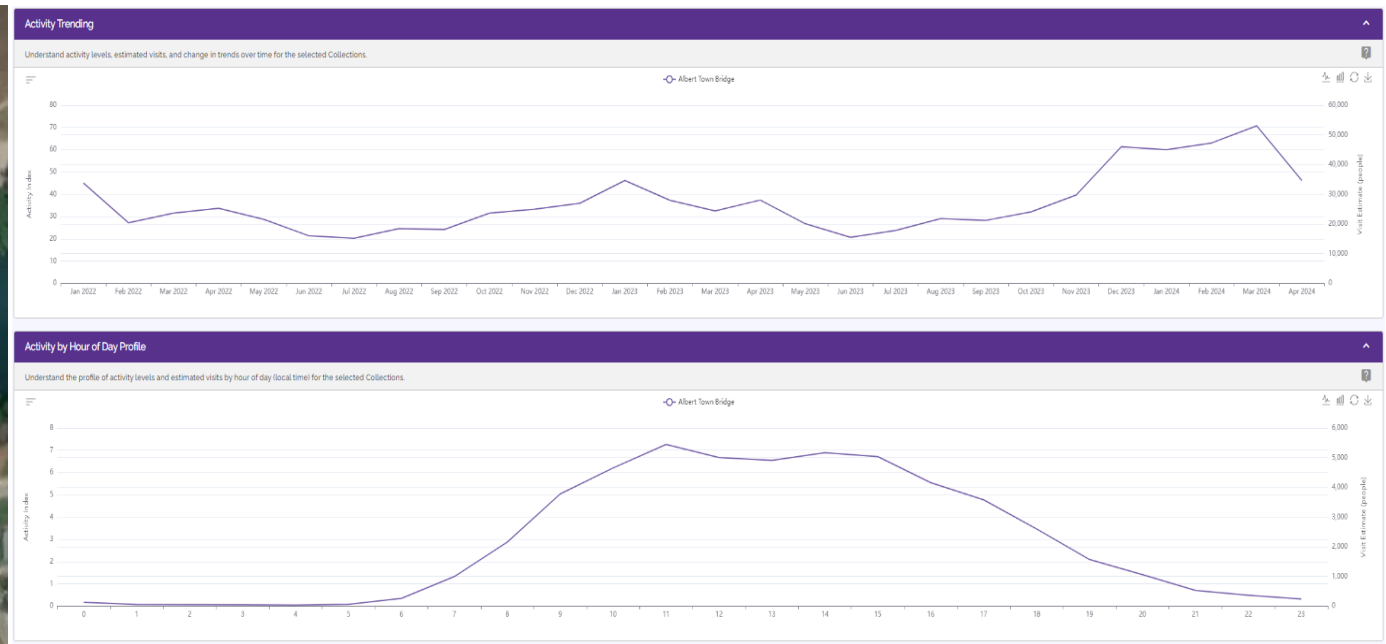


Figure 12 Albert Town Bridge and Tree Jumping Quadkey

Figure 13 Albert Town Bridge and Tree Jumping User Data

Using ActiveXChange data, a more accurate visitor use of the site can be determined by analysing the figures above. Albert Town Bridge and Jumping Tree has several large peaks of use over the summer months ranging between 36,000 people in January 2022, 37,000 people in January 2023 and 56,000 people in January 2024. Notably the site is often used between 11am-3pm.

## 7.2 Independent Consultant Data – Albert Town Bridge Filtered User Data (Road Traffic Removed)

Average Daily Visits by Day of the Week and Month

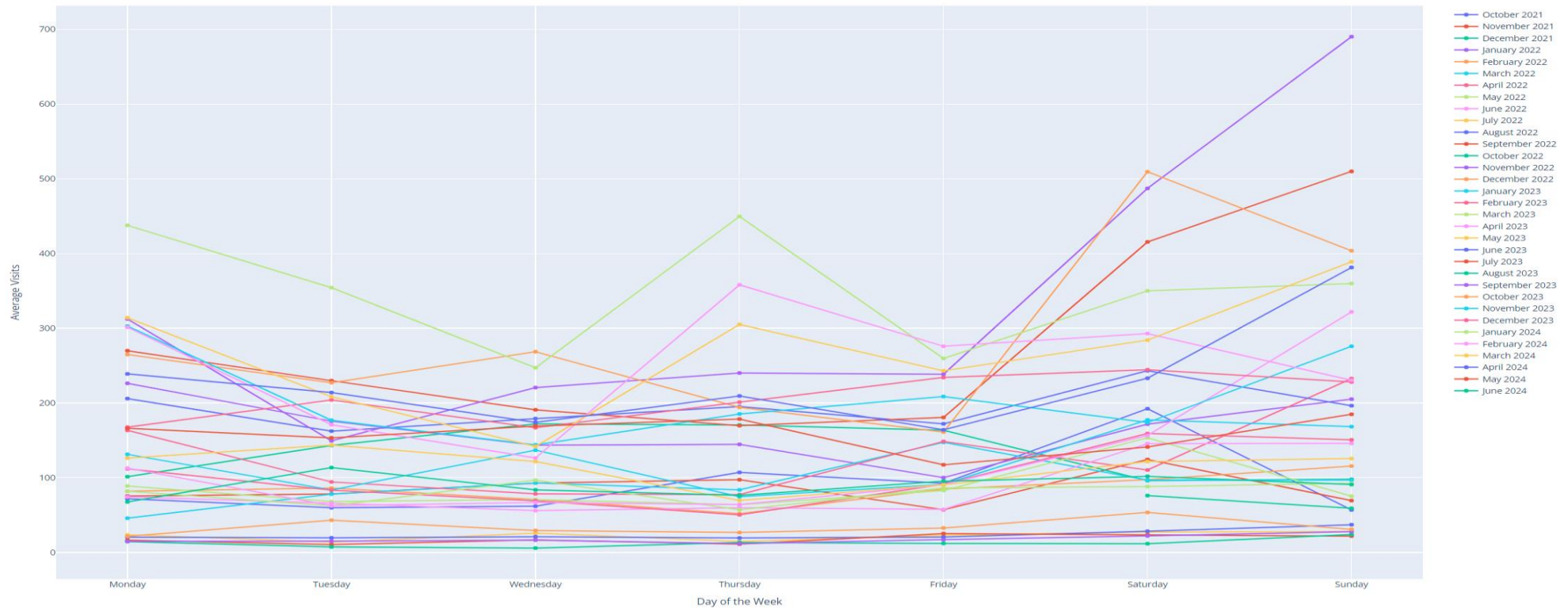


Figure 14 Albert Town Bridge Filtered User Data – Days of Week Use

Road traffic and anyone moving over five kilometres per hour (to remove cyclists) has been removed from this data to enable accurate identification of the most popular days of use at the site from October 2021 – June 2024. Data shows that Sunday is the most popular time to visit this site. This data is captured using refined and filtered ActiveXChange datasets.



7.3 Independent Consultant Data – Albert Town Bridge Filtered User Data Area (Road Traffic Removed)



Figure 15 Albert Town Bridge Filtered Data Area

## 7.4 Independent Consultant Data – Jumping Tree Filtered User Data

Average Daily Visits by Day of the Week and Month

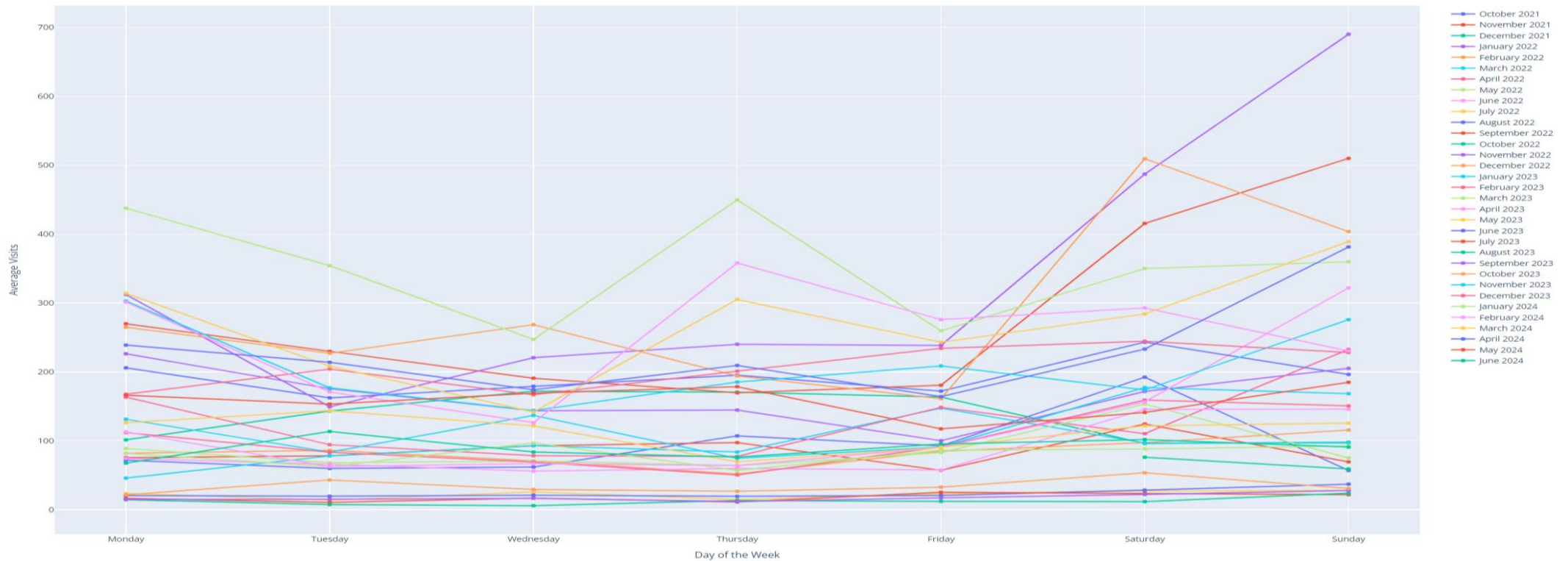


Figure 16 Jumping Tree Filtered User Data – Days of Week Use

The trail data has been removed from this dataset to enable accurate identification of the most popular day to visit this site from October 2021 – June 2024. Data shows the most popular day to visit this site is on a Sunday. This data is captured using refined and filtered ActiveXChange datasets.

### 7.5 Independent Consultant Data – Jumping Tree Filtered User Data Area



Figure 17 Jumping Tree Filtered Data Area

## 8. Risk Assessment of Users

### Framework

The risk management framework followed here for the Albert Town Bridge site is aligned to the current standard: AS/NZS ISO 31000:2009 (Standards Australia/Standards New Zealand, 2009). The process is displayed in Figure 3-1, and further explained below.

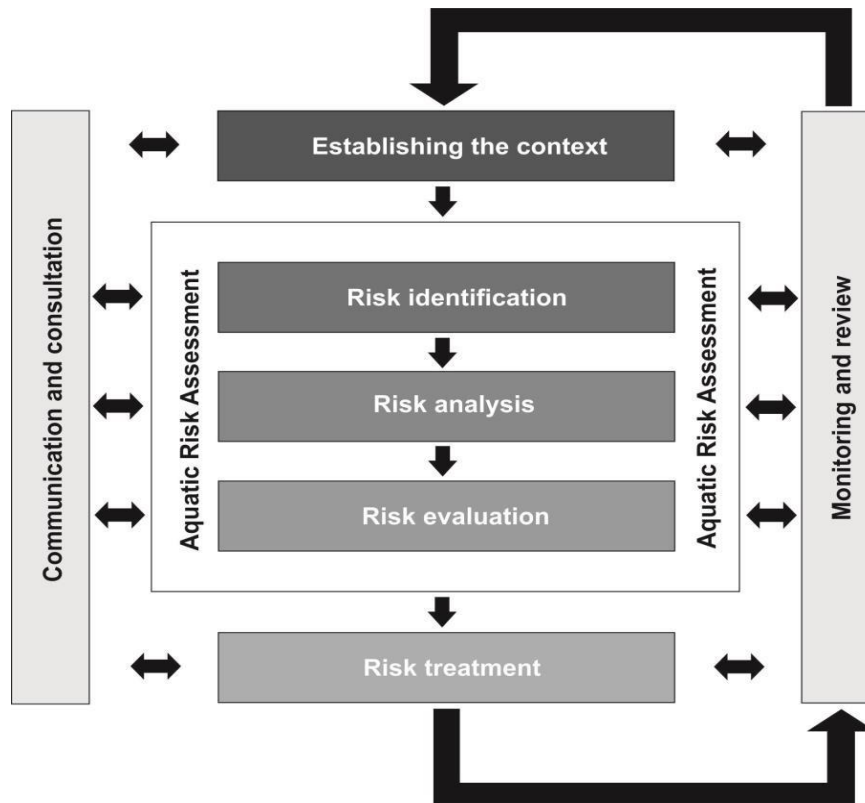


Figure 18 Risk Management Process, adapted from AS/NZS ISO 31000:2009 (Standards Australia/Standards New Zealand, 2009).

## Activities and Usage at Albert Town Bridge

The following information on jumping, non-powered craft, and powered craft has been provided by Queenstown Lakes District Council to build the following user profiles. The assessment noted other site users that have been included here as well.

Breakdown: Specify the activities people engage in at the bridge (e.g., walking/jogging, cycling, swimming, jumping off the bridge, using non-powered or powered crafts).

The main purpose of the bridge is for access over the river for vehicles and people. There are a wide range of other site-users in the area as follows:

### 1. Vehicles

Cross the one-way vehicle lane of the bridge with traffic lights to control traffic flow.

### 2. Cyclists and walkers

Using the pedestrian walkway on the West side of the bridge.

Note that QLDC does not hold data on the bridge use for vehicles or cyclists.

### 3. Jumping

This activity can take place throughout the year; however, the main period is between October to March. There is a high peak period over the Christmas and New Year's break period where there is an increase in holiday makers in Wanaka and at the adjacent Albert Town Campground, along with school holidays. During this period there is a large increase in youth in the area.

When busy, the number of people jumping or waiting to jump can be as high as 30 people waiting with, at times, groups of five or more observed jumping at one time. There may be up to 5-10 people in the water at any given time.

Jumping generally occurs on the southern end of the bridge, approximately 10 metres from the shoreline, however Jumping can expand out to the centre of the bridge if water levels are high enough.

Observed jumper's range in age from 8-year-olds through to adults. From observations people attend the site in groups, and at times there is obvious signs of peer pressure within groups.

#### 4. Non - powered craft: (Floaters (drifters) / kayakers / paddleboarders)

Passive water users passing through this area are recorded from 1<sup>st</sup> December through until the end of February. The records show approximately 7,370 persons on the section of this river between the outlet and Albert Town Bridge. The largest number of non-powered craft users was 376 people down the river in a single day.

Most passive users will enter the river at the outlet and then make their way down the river towards the bridge. Most people simply floating down the river will exit the river just before the bridge on the beach area in front of the campground. The remaining people on kayaks and float devices will normally pass under the bridge and exit the river further down.

#### 5. Powered craft:

From 1<sup>st</sup> December through to 30<sup>th</sup> April, powered craft are prohibited on the stretch of river from the Lake outlet through to the Albert Town Bridge under the QLDC Navigation Safety Bylaw. Unfortunately, there are still people breaching this area during the prohibited time period.

This year (2023-2024) we observed five recreational vessels go through the prohibited area at speed, each was identified, and action taken against the owners.

In addition to the above, there are two commercial jetboat operations authorised to conduct their operations on the river all year round including within the prohibited area. Both operations operate out of Lake Wanaka and pass through this area and under the bridge during their operations.

Powered craft are required to always keep right as per Maritime NZ rules, and this can put them in conflict with the jumpers / swimmers also on the southern side or righthand side of the river. The positive with this is that the jetboats approach to the jumping area is on the same side of the bridge so both parties can easily see each other as the jetboats approach the bridge.

Both companies operate 2-5 runs per day at peak periods. Normally the southern side of the bridge when heading down the river and the northern side when heading back up the river towards the lake.

#### 6. Swimmers

The Albert Town Bridge possesses numerous favourable swimming sites including the tree jumping site. There are several banks and shallow gradient entry points where swimmers may

choose to recreate at this area. The campground located on the northern side of the river may be a popular place for members of the public to access the river from.

#### 7. Fishers / Anglers

The Clutha River presents opportunities for fishermen from the 1<sup>st</sup> of October to the 30<sup>th</sup> of September each year. It is noted that fishing is prohibited from any boat, canoe, pontoon or flotation device upstream of Albert Town Bridge to the Wanaka Outlet. Drift fishing is permitted below Albert Town Bridge.

## 9. Risk Levels

Risk exists to all visitor users at varying levels. The above participation and incident data has been used to develop an estimated risk level to each of the Albert Town Bridge area users.

| Visitor Type                             | Consequence  | Level of Severity of Consequence (impact) |
|--|--|---|
| Vehicle                                  | Crashing while watching jumpers  | Moderate                                  |
| Track or Bridge User<br>– Walker/Cyclist | Unintentional entry - slips, trips or falls into the river<br>Attempt to rescue a drowning person  | Moderate                                  |
| Jumper / Manu                            | Slips from the bridge railing into the water or oncoming traffic<br>Spinal cord injury<br>Entanglement in structure/vegetation<br>Collision with other jumpers/vessels/craft<br>Cold water shock | High                                      |
| Non-powered craft (passive) user         | Capsize<br>Collision with swimmers/jumpers<br>Entanglement in structure/vegetation   | Moderate                                  |
| Powered craft user                       | Collision with swimmers/jumpers  | High                                      |
| Swimmers                                 | Entanglement in structure/vegetation<br>Collision with other jumpers/vessels/craft<br>Cold water shock<br>Attempt to rescue a drowning person  | High                                      |

*Table 1 Visitor Risk Level*



## 10. Analysing, Assessing and Minimising Risk

The task of accurately analysing potential personal risk in open water settings is complex. It is made more difficult by the continually changing dynamic nature of the environment. The presence and level of a potential danger changes with factors such as season, weather, water conditions, and human interaction.

When managing risk, risk is often defined in terms of a combination of the consequences of an event, including the changes in circumstances, and the associated likelihood of occurrence. The level of hazards will affect the consequences for an event, while the type of participation will affect the likelihood of that event occurring (ISO). Risk will vary as both hazards and usage varies.

Risk ( $R$ ) is a function ( $f$ ) of hazard ( $H$ ) and usage ( $U$ ), or  $R = f(H \times U)$ .

The following table has been developed by the authors to explain the levels of consequence of an event, and the likelihood of it occurring.

| Level | Consequence          | Examples   | Level | Likelihood     | Definitions                 |
|-------|----------------------|--|-------|----------------|-----------------------------|
| 1     | Insignificant        | Insignificant injury/illness (no medical treatment required).                | 1     | Very Rare      | Only exceptional situations |
| 2     | Minor                | Minor injury/illness (basic first aid required).                             | 2     | Unlikely       | Could occur, but unlikely   |
| 3     | Moderate             | Moderate injury/ illness (referral/transport to hospital required).          | 3     | Possible       | Could occur some time       |
| 4     | Major                | Serious injury/illness (urgent hospitalisation, extended medical treatment). | 4     | Likely         | Will probably occur         |
| 5     | Extreme/Catastrophic | Death or total permanent disability.   | 5     | Almost Certain | Is expected to occur        |

Table 2 Risk Matrix

A risk rating score has been developed by adding the consequence and its likelihood of occurrence. The risk rating provides recommendations on the immediacy of action required to address the risk.

Rating Score:

| Consequence + Risk Likelihood | Risk     | Action   |
|-------------------------------|----------|--|
| 2 to 4                        | Low      | No immediate action required                   |
| 5 to 6                        | Moderate | Medium risk. Further action optional.          |
| 6 to 7                        | High     | High risk. Further action recommended.         |
| 8 to 10                       | Extreme  | Extreme risk. Further action should be prompt. |

Table 3 Risk Assessment Rating Score

Each visitor type to the area has been assessed for the hazard, possible outcome, severity of the outcome and the likelihood of the occurrence happening. The final column in the table below provides an estimated level of risk for each visitor type, and therefore the immediacy of action recommended to address the risk.

| Visitor Type                          | Hazard   | Possible Harmful Outcome   | Severity of Outcome   | Likelihood of Occurrence (Usage) | Estimated Level of Risk                          |
|---------------------------------------|--|--|---|----------------------------------|--|
| Vehicle                               | 1.Distraction<br>2.Unintentional obstruction by a jumper   | 1.Crash<br>2.Collision with member of the public   | 3 Moderate injury/ illness (referral/transport to hospital required). | 2 Unlikely                       | 5 Medium risk. Further action optional.          |
| Track or Bridge User – Walker/Cyclist | 1.Distraction<br>2.Slip, trip or fall<br>3.Collision with another member of the public, object or infrastructure | 1.Unintentional entry – slips, trips and falls into the river<br>2.Drowning<br>3. Drowning while attempting rescue drowning person | 3 Moderate injury/ illness (referral/transport to hospital required). | 1 Only exceptional situations    | 4 No immediate action required.                  |
| Jumper / Manu                         | 1.Slippery bridge railing<br>2.Oncoming traffic<br>3.Vegetation<br>4. Other jumpers                              | 1.Spinal cord injury from slip or fall<br>2.Injury from collision<br>3.Entanglement  | 5 Death or total permanent disability of public.                      | 4 Likely                         | 9 Extreme risk. Further action should be prompt. |

|                                  |   |  |  |                               |  |
|----------------------------------|---|--|--|-------------------------------|--|
|                                  | 5. Craft<br>6. Cold water<br>7. Moving water  | 4. Cold water shock<br>5. Drowning   |  |                               |  |
| Non-powered craft (passive) user | 1. Entanglement risk in structure or vegetation<br>2. Collision with swimmers/jumpers   | 1. Drowning<br>2. Cold water shock   | 5 Moderate injury/ illness (referral/transport to hospital required).          | 1 Only exceptional situations | 6 Medium risk. Further action optional.  |
| Powered craft user               | 1. Collision with swimmers/jumpers<br>2. Alteration of course due to swimmers   | 1. Drowning<br>2. Injury<br>3. Grounding   | 4 Serious injury/illness (urgent hospitalisation, extended medical treatment). | 2 Unlikely                    | 6 High risk. Further action recommended. |
| Swimmers                         | 1. Entanglement in structure/vegetation<br>2. Collision with other jumpers/vessels/craft<br>3. Cold water shock<br>4. Attempt to rescue a drowning person | 1. Spinal cord injury from slip or fall<br>2. Injury from collision<br>3. Entanglement<br>4. Cold water shock<br>5. Drowning         | 5 Death or total permanent disability of public.                               | 2 Unlikely                    | 7 High risk. Further action recommended. |
| Kai Gatherer                     | 1. Distraction<br>2. Slip, trip or fall<br>3. Collision with another member of the public, object or infrastructure                                       | 1. Unintentional entry – slips, trips and falls into the river<br>2. Drowning<br>3. Drowning while attempting rescue drowning person | 5 Death or total permanent disability of public.                               | 1 Only exceptional situations | 6 Medium risk. Further action optional.  |

Table 4 Risk Assessment Visitor Type Score

## Drowning and Drowning Prevention Factors

Six overarching factors could lead to a drowning in aquatic environments, and as such there are six corresponding strategies which can be applied to mitigate the level of risk, and therefore the incidence of drowning and injury (Mulchahy, 2014).

| Factors leading to drowning and injury                            | Strategies designed to address each of these factors  |
|---|---|
| 1.Exposure to the hazard  | 1. Eliminate or isolate the hazard<br><br>Where the hazard cannot be fully eliminated or isolated, the following additional strategies should be considered |
| 2. Ignorance or misunderstanding of the hazard                    | 2. Increase awareness and understanding   |
| 3. Disregard for the hazard                                       | 3. Legislate, monitor, and enforce  |
| 4. Inability to cope when exposed to the hazard                   | 4. Enable and equip   |
| 5. Lack of surveillance and advice when exposed to the hazard     | 5. Increase supervision and surveillance  |
| 6. Inability to affect a rescue prior to succumbing to the hazard | 6. Increase efficiency and effectiveness of response  |

*Table 5 Drowning Prevention Factors*

| Visitor Type<br>Activity | Estimated Level of Risk                           | Controls<br>How can it be prevented?<br>First try to eliminate the risk. If this is not possible, how can the risk be minimised?   | Residual Risk Rating? |
|--------------------------|---|--|-----------------------|
| Vehicle                  | 5<br><br>Medium risk.<br>Further action optional. | A formalised jumping platform should be considered at the site to assist with the safe access into the water. This will remove the need for members of the public to scale a slippery barrier fence to jump from the bridge. By installing a council approved permanent jumping platform the public will be jumping at the most appropriate location with an adequate depth at the bridge. An article by Pattemore (2024) states that the New Zealand Transport Agency is looking to upgrade the bridge in three years. Consideration should be given to consult with them on the design process. If a council approved permanent jumping platform is unable to be provided or included in the designs, consideration should be given to installing a higher barrier between the road and the outer railing of the bridge to reduce the likelihood of members of the public falling backwards onto the road onto incoming traffic. | Low                   |

|                                       |  |   |          |
|---------------------------------------|--|---|----------|
| Track or Bridge User – Walker/Cyclist | 6<br>Medium risk.<br>Further action optional.          | Public rescue equipment should be installed at this site to reduce the likelihood of members of the public entering the water to perform a wet-based rescue. This will also assist in the rescue of members of the public who may slip, trip, or fall into the water. A throw bag attached to a life ring should be provided at this site to enable safe, dry based rescue for members of the public.   | Low      |
| Jumper / Manu                         | 9<br>Extreme risk.<br>Further action should be prompt. | Signage should be installed at this site to provide members of the public with an indication of the hazards at this site. Public rescue equipment with instructions on how to use it should also be installed at this site to provide bystanders with a means of assistance in the event of an in-water emergency. A depth marker should be installed at this site. A study by DeVivo & Sekar (1997) identified that 75% of spinal cord injuries caused by swimming occur when no depth marker is present. DeVivo & Sekar (1997) also identified that no warning signs were present in 87% of these spinal cord injuries.<br><br>Recommendation should be given to identify, and sign post a minimum safe jumping water depth of 2.5 meters deep with an optimal safe jumping water depth of 2.74 metres deep (Barss, 2008; DeVivo & Sekar, 1997). If the optimal depth is not already achieved, Queenstown Lakes District Council should remove a segment of the riverbed below the jump site to enable a safe jumping depth for members of the public to reduce the likelihood of spinal cord injury (Barss, 2008; DeVivo & Sekar, 1997). | Moderate |
| Non-powered craft (passive) user      | 6<br>Medium risk.<br>Further action optional.          | The strainers located downstream from the bridge should be removed to reduce the likelihood of capsized craft from entanglement. Public rescue equipment with instructions on how to use it should also be installed at this site to provide bystanders with a means of assistance in the event of an in-water emergency.   | Low      |

|                    |  |   |          |
|--------------------|--|---|----------|
| Powered craft user | 6<br>High risk.<br>Further action recommended. | A boat throughfare lane should be identified underneath the bridge to provide powered craft users through a defined access point when travelling underneath Albert Town Bridge. This thoroughfare should be separate to the manu/jumping area of the bridge. The middle lane of the Albert Town Bridge should be sign posted as powered craft throughfare to reduce the likelihood of collisions with bridge jumpers.   | Moderate |
| Swimmers           | 7<br>High risk.<br>Further action recommended. | Signage should be installed at this site to provide members of the public with an indication of the hazards at this site. Public rescue equipment with instructions for use should be installed at this site to reduce the likelihood of members of the public entering the water to perform a wet based rescue. Vegetation downstream from the jumping tree site should also be cleared to reduce the likelihood of members of the public becoming entangled in the strainers. | Moderate |
| Kai Gatherer       | 6<br>Medium risk.<br>Further action optional.  | Signage should be installed at this site to provide members of the public with an indication of the hazards at this site. Public rescue equipment with instructions for use should be installed at this site to reduce the likelihood of members of the public entering the water to perform a wet based rescue.  | Low      |

Table 6 Residual Risk with Controls

## 11. Recommendations, Signage, and Safety Systems

The purpose of the recommended signage is to inform the public of the hazards associated with the Albert Town Bridge and Jumping Tree to assist in minimising the drowning and water-related injury risks. It is recommended that Queenstown Lakes District Council implement the recommendations of this report to enable compliance of aquatic signage standards in accordance with New Zealand Standard AS/NZS 2416.1:2010.

Drowning Prevention Auckland/Aotearoa takes no responsibility for the action or inaction taken by the public caused by the messaging of such signage.

### 11.1 Eliminate or Isolate the Hazard

People drown or are injured due to their exposure to hazards. Therefore, risk management strategies should focus on removing or isolating hazards from the environment to create safer conditions. The removal of hazards, such as hazardous dilapidated infrastructure, is the most effective risk mitigation option. Risk management strategies to eliminate or isolate hazards include:

- Stabilising the riverbank
- Removing dangerous infrastructure
- Installation of safety structures
- Restricting access to dangerous areas
- Clearing submerged objects from the water
- Clearing protruding vegetation downstream of the site

Recommendations:

- A depth marker should be installed to assist members of the public with a safe egress method. A study by DeVivo & Sekar (1997) identified that 75% of spinal cord injuries caused by swimming occur when no depth marker is present. Additionally, they found that no warning signs were present in 87% of these spinal cord injuries.
- Identify and signpost a minimum safe jumping water depth of 2.5 meters, with an optimal depth of 2.74 meters (Barss, 2008; DeVivo & Sekar, 1997). If the optimal depth is not achieved, remove a segment of the riverbed to ensure a safe jumping depth.



- Consider a formalised jumping platform to ensure safe access to the water and appropriate jumping locations with adequate depth. Pattemore (2024) states that the New Zealand Transport Agency is looking to upgrade the bridge in the next three years.
- Consideration should be given to clear submerged objects from the water below the tree jumping site and clearing protruding vegetation downstream from the site to reduce the collision risk with submerged objects and entanglement risk for members of the public using this site. The protruding vegetation that is recommended to be removed can be seen in Figure 11.

### 11.2 Increase Awareness and Understanding

Education programmes targeted at specific age, gender, ethnicity, or other groups can enhance awareness and understanding of water safety. Risk management strategies to increase awareness and understanding:

- Signage
- Targeted education and development

Recommendations – Albert Town Bridge:

- Include the following warning symbols on compliant aquatic safety signage: fast-flowing water, deep water, cold water, submerged objects, entanglement risk in vegetation and structure, and supervision of children at all times.
- Install two defined access signs, one open access sign with public rescue equipment, and one carpark sign (exemplars can be seen in Appendix 1, 2, 3, and 4).
- Install boat thoroughfare signage under the bridge (an exemplar can be seen in Figure 9).
- Install signage on the bridge railing to identify the safest jumping location if a formalised jumping platform is commissioned.

Recommendations – Jumping Tree:

- Include the following warning symbols on compliant aquatic safety signage: fast-flowing current, cold water, sudden drop-off, entanglement risk, and supervision of children at all times.
- Consideration should be given to install a defined access and open access with PRE sign. An exemplar of this is provided as Appendix 3 and 4.

### 11.3 Legislate, Monitor, and Enforce

People drown or are injured due to their disregard for hazards. Risk management strategies should focus on discouraging such behaviour through legislation, monitoring, and enforcement.

Clear evidence should be provided prior to developing legislation, with an awareness campaign and a period of informing and warning affected groups before penalties or infringements are applied.

Recommendations:

- Control vessel thoroughfare through recommended segments of the bridge from December 1 to April 30, limiting powered craft access to permitted users only.
- Restrict vessel speed to 5 knots at all times from 200 meters upstream from Albert Town Bridge to the boat ramp.

#### 11.4 Enable and Equip

Providing the necessary equipment and facilities can significantly enhance safety and emergency response.

Recommendations:

- Public Rescue Equipment (PRE)
- Install PRE at two locations at this site, specifically a throw bag. An exemplar of this equipment is provided in Appendix 3.

#### 11.5 Increase Supervision and Surveillance

Effective supervision and surveillance can help prevent accidents and enable prompt responses to emergencies.

Recommendations:

- Identify groups and organisations, such as Campground Staff, Jet Boat Operators (Commercial), Department of Conservation Rangers, to assist in providing 'first response' emergency services. Drowning Prevention Aotearoa have an extensive expertise in this area.

#### 11.6 Increase Efficiency and Effectiveness of Response

People in difficulty drown because rescues cannot be affected before the victim succumbs to the hazard. Risk management strategies should focus on increasing the efficiency and effectiveness of emergency response.

Recommendations:

- A community-based training session to inform local residents of the hazards, risks and bystander rescue techniques that can be used if a member of public is seen to be in trouble. Drowning Prevention Aotearoa have an extensive expertise in this area.

By adhering to these recommendations, hazards identified as the most common in open water environments can be mitigated as much as reasonably practical. This includes addressing significant risk factors such as entering the water from a pier, bridge, or dock, diving headfirst without checking the water depth, and being unfamiliar with the location, thereby enhancing safety and reducing the likelihood of accidents (Branche et al., 1991).

## 12. Recommendations Summary

New signage should be installed that is compliant with the New Zealand Standard AS/NZS 2416.1:2010 *Water safety signs and beach safety flags - Specifications for water safety signs used in workplaces and public areas*, including car park and access signs. All signage types and exemplars have been provided within the Appendix section.

A signage and PRE plan can be developed to assist with the signage installation locations. This will complement this report to assist with implementation of recommendations made within this report.

Drowning Prevention Auckland / Aotearoa recommends training for commercial organisations that work near this site, including campground staff, DOC, harbourmaster and jet boat operators to upskill and enable effective first response options in the event of an emergency.

### Albert Town Bridge

- a) Two defined access signs, one open access sign with public rescue equipment and one car park sign should be installed with the following hazards: fast flowing water, deep water, cold water, submerged objects, entanglement risk in vegetation and structure and supervise children at all times.
- b) Consideration should be given to install boat thoroughfare signage under the bridge.
- c) Consideration should be given to installing signage on the bridge to identify a safe jumping area/formalise a jumping area.
- d) Consideration should be given to control/direct vessel thoroughfare through the bridge from December 1 – April 30.
- e) Public rescue equipment should be provided at this site.
- f) A depth marker should be installed next to the preferred jumping area on the bridge.
- g) A formalised jumping platform should be considered.

### Tree Jumping Site

- h) A defined access sign and an open access sign with public rescue equipment should be installed with the following hazards: fast flowing water, deep water, cold water, submerged objects, entanglement risk in vegetation and supervise children at all times.
- i) Public rescue equipment should be provided at this site.

- j) Consideration should be given to clearing submerged objects from the water below the jumping tree.
- k) Consideration should be given to clearing vegetation downstream of the jumping tree.

### 13. Further Research

To assess and analyse the specific drowning risk at each site, in-depth water usage and participation data is recommended to be obtained to provide additional targeted recommendations. Additionally, a further interview study would assist in determining knowledge, attitudes, and perceived risk. Whilst reasonable accurate visitation and participation data has been included in this report, there is a gap in knowledge about the number or percent of in-water users, their perceptions of competence and risk, their knowledge of the site, and whether they are locals or visitors. This information would help to determine risk and provide any other mitigation and education strategies more accurately. Drowning Prevention Auckland/Aotearoa recommends that an observation and interview study be completed to determine this.

### 14. Conclusion

This risk and hazard assessment has provided valuable insights into the safety challenges present in, on and around the aquatic environments at Albert Town Bridge. The main hazard of collision by powered craft to jumpers was highlighted by Queenstown Lakes District Council. By identifying all key hazards, proposing targeted risk management strategies, and recommending practical measures to enhance safety, this assessment serves as a foundation for informed decision-making by the Queenstown Lakes District Council.

The recommendations outlined in this assessment, including the installation of signage with warning symbols, provision of public rescue equipment, infrastructure improvements, and implementation of vessel speed restrictions, address various aspects of risk mitigation comprehensively. By prioritising measures to eliminate or isolate hazards, increase awareness and understanding, legislate and enforce safety regulations, enable and equip responders, and enhance supervision and surveillance, a safer environment can be created for all river users.

Drowning Prevention Auckland / Aotearoa recommends these are implemented in a timely and effective manner, with ongoing monitoring and evaluation to ensure their continued efficacy.

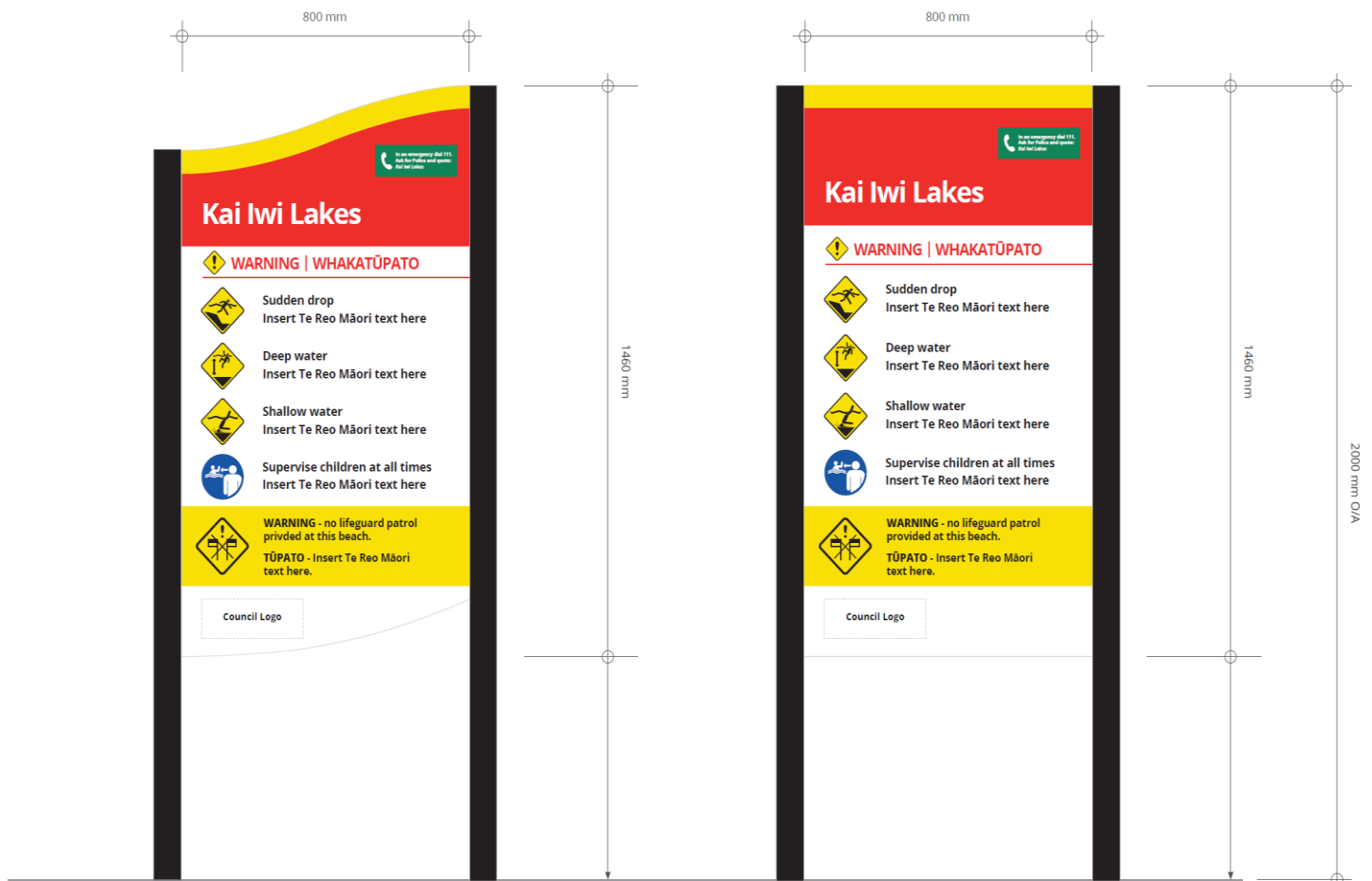
Collaboration among stakeholders, including local authorities, emergency services, community groups, and the public, will be essential for the successful implementation of these measures.

Ultimately, by prioritising safety and taking proactive steps to address identified risks, the Albert Town Bridge area can become a safer and more enjoyable destination for all, minimising the likelihood of accidents and ensuring the well-being of river users now and in the future.

## 15. Appendices

### Appendix 1 – Carpark Signage

Beach Signage / Kai Iwi Lakes / Carpark Sign  
English / Te Reo Māori



Water safety and information signage template for Kai Iwi Lakes.  
The design complies with the current water safety signage standard AS/NZS 2416:2010

## Appendix 2 – Open Access Signage

### Water Safety Signage / Hammond Park Beach / Open Access Sign


(Te Reo Māori translations to be added later on)



(Dimensions shown are a guide only)



Appendix 3 – Open Access Signage with PRE

 In an emergency dial 111.  
Ask for Police and quote:  
Tōtara Reserve Regional Park

## Kererū Camp

 **WARNING | KIA TŪPATO**



**Unstable cliffs**  
Tanuku ana ngā poupou nei



**Sudden drop off**  
He poupou



**Strong currents**  
He au kaha



**Undercut banks**  
Tapahi ana ngā tahataha



**Entanglement risk**  
He tūrara whīwhiwhi



**Supervise children at all times**  
Tiaki tamariki i ngā wā katoa



**WARNING - no lifeguard patrol in this area of the river.**

**KIA TŪPATO - karekau he manapou i tēnei wāhanga o te awa.**






## Emergency use only

 **Dial 111 - Ask for Police**

Do not enter the water with this device, throw from the riverbank.  
Kaua e uru wai me tēnei taonga, me whiu mai i te tahataha



Pick up  
throw bag  
Hikina ake te  
pēke whiu



Keep hold  
of end of line  
Purihia te pito  
o te taura



Throw bag to person  
Pull person to shore  
Whiua te pēke ki te  
tangata, tōia mai te  
tangata ki uta

Once you've saved a life,  
please return this throw bag  
so that we can save another

If the throw bag is damaged or missing please contact:  
Horizons Regional Council  
Phone 0508 800 800

Mehemea kua pakaru te pēke, engaro ana rānei, wehea atu ki te Kaurihera 0508 800 800

## Appendix 4 – Defined Access Signage

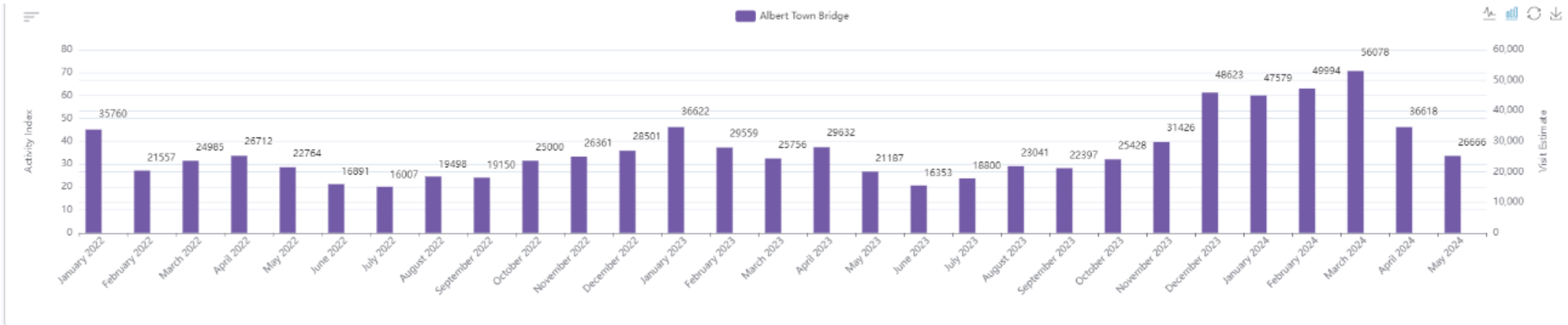
### Water Safety Signage / Braithwaite Jetty / Defined Access sign

(Te Reo Māori translations to be added later on)



(Dimensions shown are a guide only)

Appendix 5 – ActiveXChange Bar Graph Albert Town Bridge and Jumping Tree Site



## References

- Barss, P., Djerrari, H., Leduc, B. E., Lepage, Y., & Dionne, C. E. (2008). Risk factors and prevention for spinal cord injury from diving in swimming pools and natural sites in Quebec, Canada: a 44-year study. *Accident Analysis & Prevention*, 40(2), 787-797.
- DeVivo, M. J., & Sekar, P. (1997). Prevention of spinal cord injuries that occur in swimming pools. *Spinal cord*, 35(8), 509-515.
- Flow Rate Aotearoa (n.d) *Cardrona Confluence*. <https://flwrate.co.nz/river/clutha-river/cardrona-confluence>
- Standards Australia/Standards New Zealand. (2009). AS/NZS ISO, Risk management – Principles and guidelines: 31000:2009. Standards Australia/Standards New Zealand.
- Pattemore, L. (2024, April 11) NZTA acknowledges Albert Town Bridge needs upgrade. *CRUX*.  
<https://crux.org.nz/crux-news/nzta-acknowledges-albert-town-bridge-needs-upgrade>
- Portella, A. (2016). *Visual pollution: advertising, signage and environmental quality*. Routledge.
- Stanley, T., Carmine, J., & Moran, K. (2023). *Waikato River - Hazard Assessments, Behaviours, and Factors that may Encourage Risky Behaviours*. Report to Hamilton City Council.
- Standards Australia / Standards New Zealand. (2010). Water safety signs and beach safety flags, 2416.1:2010. Part 1: *Specifications for water safety signs used in workplaces and public areas* (ISO 27012-1:2008, MOD). Australia/New Zealand.