MARSHALL DAY Acoustics

QUEENSTOWN CABLE CAR
HIGH LEVEL ACOUSTIC ASSESSMENT

Rp 001 20250370 | 29 October 2025

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1.0 SUMMARY

Marshall Day Acoustic has been engaged to provide a description of the anticipated and known adverse acoustic effects of the Queenstown Cable Car (QCC) project, on behalf of Southern Infrastructure (Cable Car) Limited. The QCC is a proposed cable car system connecting Queenstown Town Centre to key residential, employment, and transport hubs.

Our report has been prepared for a referral application under the Fast-track Approvals Act 2024 process. We have prepared this with indicative information known about construction methodology, the likely cable car system, vehicle and passenger movement data, and public announcement systems. Our report provides a "*description of the anticipated and known adverse effects of the project on the environment.*".

Our report therefore describes the anticipated and known adverse noise and vibration effects, and details the methods that will be included to identify, assess, and manage any effects. It does not include any specific evaluation of those effects; . we understand that a full assessment will be required should the project progress to the substantive application phase.

We have reviewed the Jasmax Station Context Studies dated 19 September 2025 and the Patersons' alternative route east overview drawings dated 6 October 2025 to inform our report.

In this report, we present:

- The applicable construction noise and vibration performance standards
- The applicable operational noise performance standards
- A description of anticipated and known construction noise and vibration effects
- A description of the anticipated and known operational noise on receivers in the different zonings, and fauna that may be nearby.

Our high-level conclusions are:

- There is risk of infringing the construction noise limits due to construction works at five stations. However, this is based on a conservative assessment assuming piling is required. We understand that, at a high level, piling is only required on sloping ground, so the risk of infringement is low.
- There is risk of infringing the construction vibration limits due to construction works. However, as above, the risk is likely low.
- The key operational noise sources are cable car operations at the stations, traffic movement noise at the stations, and PA systems.
- We consider there is risk of exceeding the operational noise limits from station noise and therefore mitigation may be required to reduce noise levels and enable compliance.
- We consider noise effects on recreational users to be acceptable.
- We consider noise from traffic movements would likely comply with District Plan requirements.
- We consider noise from PA systems can also likely comply with District Plan requirements.
- We consider there is negligible noise effects risk on fauna.
- The above matters could be managed by way of conditions on any approval.

Appendix A provides a glossary of terminology. Appendix B describes the experience of the authors.

2.0 PROJECT DESCRIPTION

2.1 Overview

The QCC project is proposed as a mass rapid transit solution to address transport challenges in the Queenstown Lake District. Figure 1 and Figure 2 shows the two route options. Appendix C shows larger images with a legend.

Figure 1: Overview of route option A

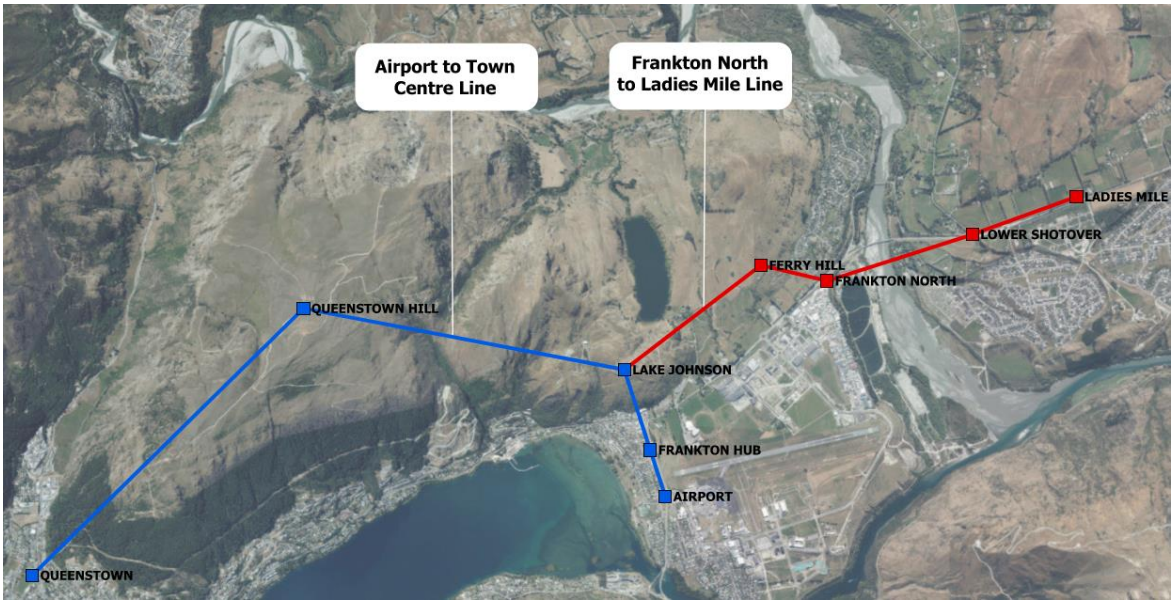


Figure 2: Overview of route option B

The key features are (refer to the application documents for greater detail):

- Passenger cabins (10 pax) every 12 seconds, capable of transporting 3000 passengers per hour in each direction
- The proposal will include the Option A Frankton Flats to Ladies Mile route OR the Option B Lake Johnson to Ladies Mile Route, not both).

Both options have a total of nine stations and two main lines :

- In both route options:
  - Airport Station – within approximately 10m to the boundary of a dwelling
  - Frankton Hub – within approximately 10m to the boundary of a dwelling
  - Lake Johnson – in rural land
  - Queenstown Hill – in rural land
  - Central Queenstown – within approximately 20m to the boundary of a dwelling
  - Lower Shotover – within approximately 35m of new residential subdivision
  - Ladies Mile
- In route option A only:
  - Ferry Hill – within approximately 180m to the boundary of a dwelling
  - Frankton North – within approximately 50m to the boundary of a dwelling
- In route option B only:
  - Five Mile
  - Quail Rise

- Electric-powered cable car system
- All stations would be elevated above ground

2.2 Existing receiving environment

Stations will be the only aspects of the project that could emit noise of concern given this is where any drive machinery would be located. Cable car travelling noise and noise from the intermediary pylons between stations would have negligible noise contribution with respect to compliance. Therefore, we focus our assessment on the station areas only.

Appendix D shows the zoning in the Proposed Queenstown Lakes District Plan (PDP). Table 1 overleaf provides a table of the zonings.

Note the Ferry Hill and Five Mile stations are on land that has no zoning in the PDP but is zoned in the Operative District Plan (ODP).

At the Airport, Frankton Hub, Queenstown, Lower Shotover, and Ladies Mile stations the surrounding noise receivers are predominantly residential. We note that residential receivers within the Air Noise Boundary (ANB) may have also been acoustically insulated with respect to aircraft noise. This is discussed further in Section 4.2.2.

At the Five Mile Station, there are only commercial receivers.

At the Frankton North and Quail Rise stations, there is a mix of sensitive (i.e. residential) and non-sensitive (i.e. commercial and recreational) receivers.

At the Lake Johnson, Queenstown Hill and Ferry Hill stations, there do not appear to be any existing noise sensitive receivers within 1km of the stations but there may be recreational receivers near the stations.

Recreational users of pathways or tracks near the Lake Johnson, Queenstown Hill, Ferry Hill, and Quail Rise Stations may experience an acoustic effect due to the change in acoustic environment introduced by the stations (discussed further in Section 4.2.3). Furthermore, there may be fauna to consider (discussed further in Section 4.2.6). This is to be confirmed by the project's ecologist and, if necessary, further evaluated as part of the substantive assessment.

Table 1: Stations and their zoning[1]

Station	*PDP Source Zoning (unless started otherwise)*	*Receiver PDP Zoning(s) (unless started otherwise)*
In both route options		
Airport Station	*Informal Recreation, Road*	*Lower Density Suburban Residential, Airport*
Frankton Bus Hub Station	*Informal Recreation*	*Lower Density Suburban Residential, Airport*
Lake Johnson Station	*Rural*	*Rural*
Queenstown Hill Station	*Rural*	*Informal Recreation*
Central Queenstown Station	*High Density Residential*	*High Density Residential*
Lower Shotover	*Road*	*Te Pūtahi Ladies Mile*
Ladies Mile	*Te Pūtahi Ladies Mile*	*Te Pūtahi Ladies Mile, Lower Density Suburban Residential*
In route option A only		
Ferry Hill Station	*PDP: Not zoned* *OPD: Quail Rise*	*PDP: Not zoned* *OPD: Quail Rise*
Frankton North Station	*Informal Recreation / General Industrial and Service*	*PDP: General Industrial and Service* *OPD: Quail Rise*
In route option B only		
Frankton Hub B	*PDP: Community Purposes*	*PDP: Airport*
Five Mile	*PDP: Not zoned* *OPD: Frankton Flats B (Activity Area A)*	*PDP: Business Mixed Use* *OPD: Frankton Flats B (Activity Area C1 and C2)*
Quail Rise	*Informal Recreation*	*PDP: Not zoned* *OPD: Quail Rise*

2.3 Anticipated existing ambient noise environment

We consider the existing acoustic environment would be controlled by aircraft noise with influence from distant traffic at the Lake Johnson, Queenstown Hill, and Ferry Hill Stations. However at these stations the ambient noise environment is likely to be relatively quiet.

At the remaining stations, we expect the existing ambient noise environment to be controlled primarily by traffic noise and some aircraft noise.

[1] We refer to the Town Planning Group referral report with regard to zonings; we understand that some station locations may be subject to refinement once detailed design has been completed. We consider that the receiving environment for the stations would remain consistent with our assessment. We have also been advised that roads are zoned '*Road*' in the District Plan and we have considered these zones non sensitive for the purposes of our report.

For these, we anticipate existing ambient noise levels would likely be around 50 – 60 dB L_{Aeq} during the daytime. Night-time ambient noise would likely be around 30 – 40 dB L_{Aeq}. We consider this is typical of this type of general urban environment. The ambient noise levels in the *Informal Recreation* zones would likely be lower because they are further from urban activities.

A full suite of environmental noise surveys would be carried out as part of the substantive assessment.

3.0 CONSTRUCTION NOISE AND VIBRATION ANTICIPATED EFFECTS

3.1 Construction methodology

We understand that a construction methodology would be established as part of the detailed design leading into a substantive application. We have been provided with high level construction commentary from the project team and from this, we set out the following assumptions around the likely construction methodology:

- Construction at each station taking up to 20 weeks
- Construction hours between Monday to Saturday 0730 – 1800 hrs where the project is near to sensitive receivers
- Piling (potentially impact or vibro-hammer) will form the construction effects envelope.[2]
- Some general excavation
- Concreting
- Crane usage
- Station fitout

3.2 Construction Noise

3.2.1 Performance standards

PDP Rule 36.5.13 refers to New Zealand Standard NZS 6803: 1999 *Acoustics - Construction Noise*. The Rule says that construction noise must be measured and assessed in accordance with NZS 6803. OPD Rule 12.15.5.2.vii.b. also refers to NZS 6803:1999.

The noise limits apply at 1m from an occupied building. Table 2 shows the relevant construction noise limits in **bold**.

Table 2: NZS 6803 recommended noise limits for typical duration construction work

Day of week	Time period	Noise limit (dBA)	
		L_{eq}	L_{max}
Weekdays	0630 – 0730	60	75
	0730 – 1800	**75**	**90**
	1800 – 2000	70	85
	2000 – 0630	45	75

[2] We understand that piling would likely only be required if a structure is constructed on sloping ground. The remainder will largely be founded on pad footings. For this referral assessment, we assume the worst-case scenario to conservatively assess the potentially widest effects envelope.

Day of week	Time period	Noise limit (dBA)	
		L_{eq}	L_{max}
Saturdays	0630 – 0730	45	75
	0730 – 1800	**75**	**90**
	1800 – 2000	45	75
	2000 – 0630	45	75
Sundays and public holidays	0630 – 0730	45	75
	0730 – 1800	55	85
	1800 – 2000	45	75
	2000 – 0630	45	75

3.2.2 Construction noise sources

Table 3 presents the typical operating sound power levels of equipment assumed for this project. The table presents noise levels at 1m from a façade at various distances from the works. The predicted noise levels are conservative and do not include mitigation, shielding provided by natural terrain/intervening buildings, or consideration for duration of activities. Table 4 shows the sources that could practicably be mitigated using noise barriers and the predicted mitigated noise levels on ground floors noting that any upper floor receivers would not likely receive any benefit from noise barriers.

The indicative sound power levels have been sourced from our database of measured noise sources or BS 5228-1:2009 "*Code of practice for noise and vibration control on construction and open sites Part 1: Noise*". This list is not exhaustive.

Table 3: Indicative construction noise levels at 1m from the facade without effective noise barriers

Equipment	Sound Power	Façade Noise Level (dB L_{Aeq})			Limit Setback (m)
	(dB L_{WA})	15m	25m	50m	75 dB L_{Aeq}
Vibratory casing piling	116	87	83	76	52
Impact piling (casing & dolly)	114	85	81	74	44
Bored or screw piling (large rig)	111	82	78	71	33
Grinder (hand-tools)	108	79	75	68	25
Excavator (20T)	103	74	70	63	14
Concrete truck and pump	103	74	70	63	14
Static or vibratory roller	103	74	70	63	14
Excavator (5T)	102	73	69	62	13
Mobile Crane (35T) operating	98	69	65	58	8
Hydraulic power pack	97	68	64	57	7
Generator (150kVA)	93	64	60	53	4

Table 4: Indicative construction noise levels at 1m from the facade with effective noise barriers

Equipment	Sound Power	Façade Noise Level (dB L_{Aeq})			Limit Setback (m)
	(dB L_{WA})	15m	25m	50m	75 dB L_{Aeq}
Bored or screw piling (large rig)	111	72	68	61	11
Grinder (hand-tools)	108	69	65	58	8
Excavator (20T)	103	64	60	53	4
Concrete truck and pump	103	64	60	53	4
Static or vibratory roller	103	64	60	53	4
Excavator (5T)	102	63	59	52	4
Mobile Crane (35T) operating	98	59	55	48	3
Hydraulic power pack	97	58	54	47	2
Generator (150kVA)	93	54	50	43	1

3.2.3 Indicative construction noise assessment

Figure 3 to Figure 13 show the potential construction noise infringement / effects envelope for 11 stations (seven in both routes, with two each in either option). The noise limits have been applied at the Queenstown, Frankton Hub, Airport, Ferry Hill, Five Miles, Frankton North, Quail Rise, Lower Shotover, and Ladies Mile Stations because there are likely to be occupied buildings nearby.

The noise limits do not apply at the Queenstown Hill and Lake Johnson Stations because there are no occupied buildings within 1km. While there may still be a potential construction noise effect on temporary recreational visitors, this is unlikely due to the land being held in private ownership. We consider any construction noise effect would be acceptable at these two stations given that any temporary visitor to that area would be there at the landowner's discretion and that their exposure is limited.

We understand that piling would likely only be required if a structure is constructed on sloping ground. The remainder will largely be founded on pad footings. For this referral assessment, we assume the worst-case scenario (i.e. vibrated casing) to conservatively assess the potentially widest effects envelope. Given this, we predict there is a potential risk of noise effects at the Queenstown, Frankton Hub, Airport, Frankton North Stations, and Lower Shotover only.

Figure 3: Potential construction noise effects envelope - Queenstown Station

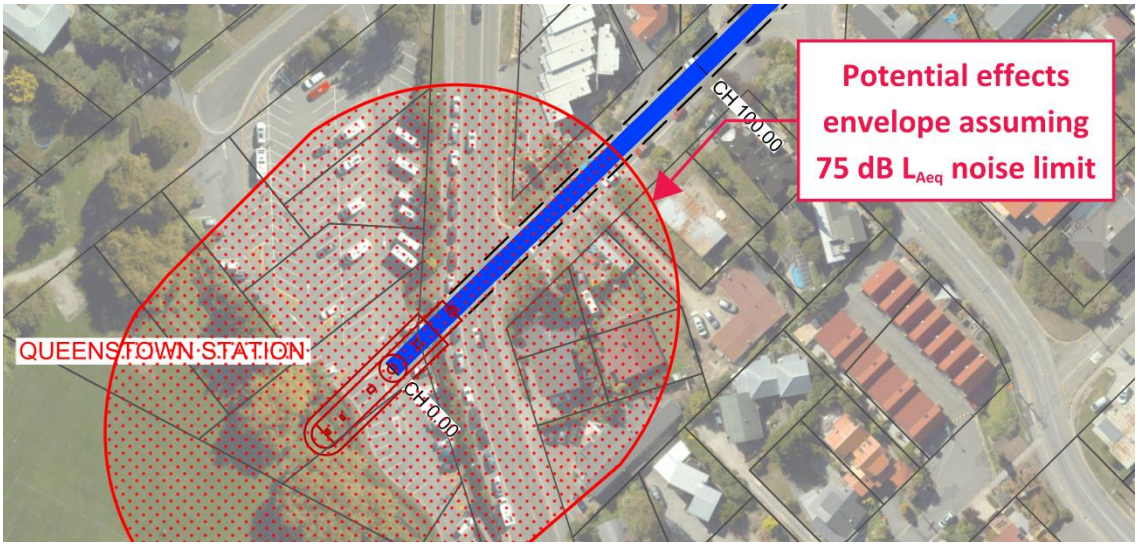


Figure 4: Potential construction noise effects envelope – Queenstown Hill Station

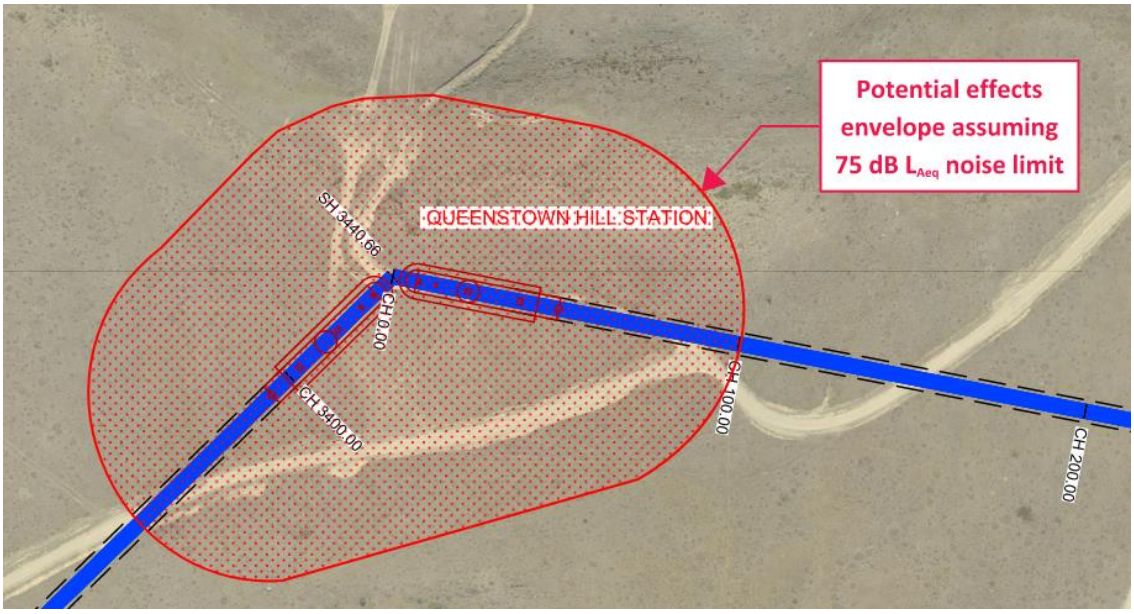


Figure 5: Potential construction noise effects envelope – Lake Johnson Station

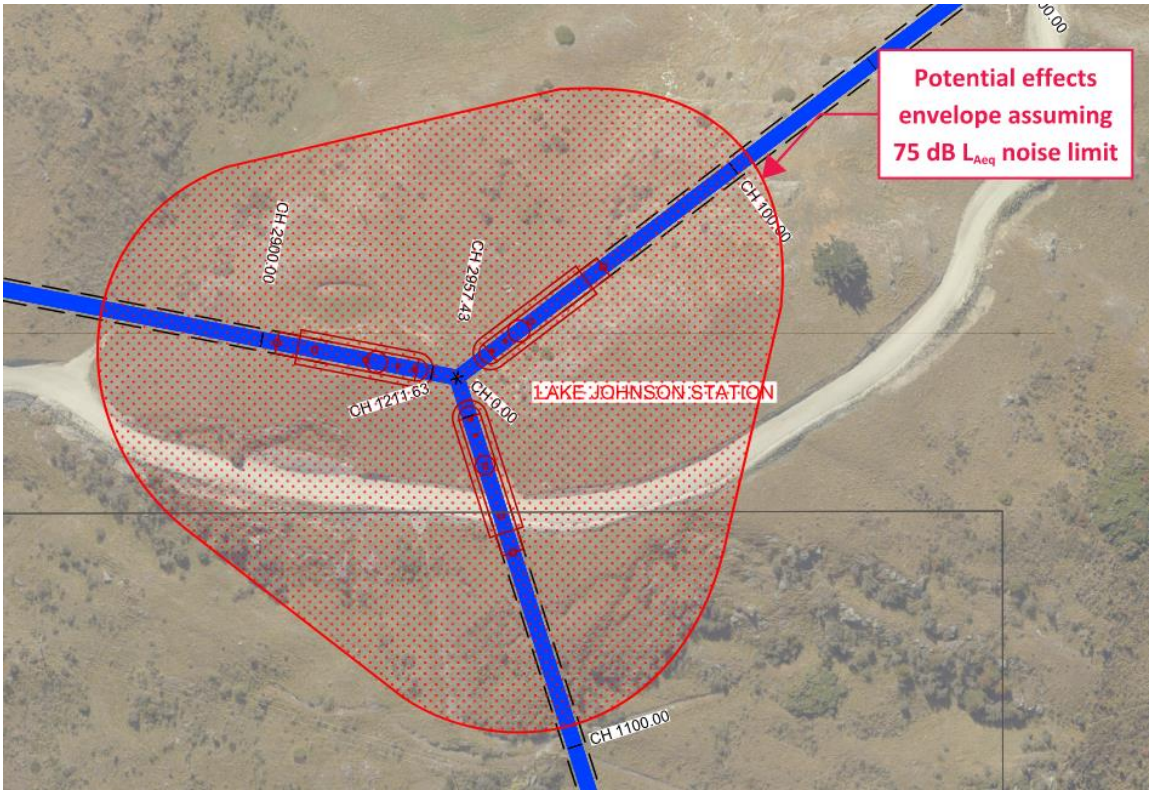


Figure 6: Potential construction noise effects envelope –Frankton Bus Hub Station

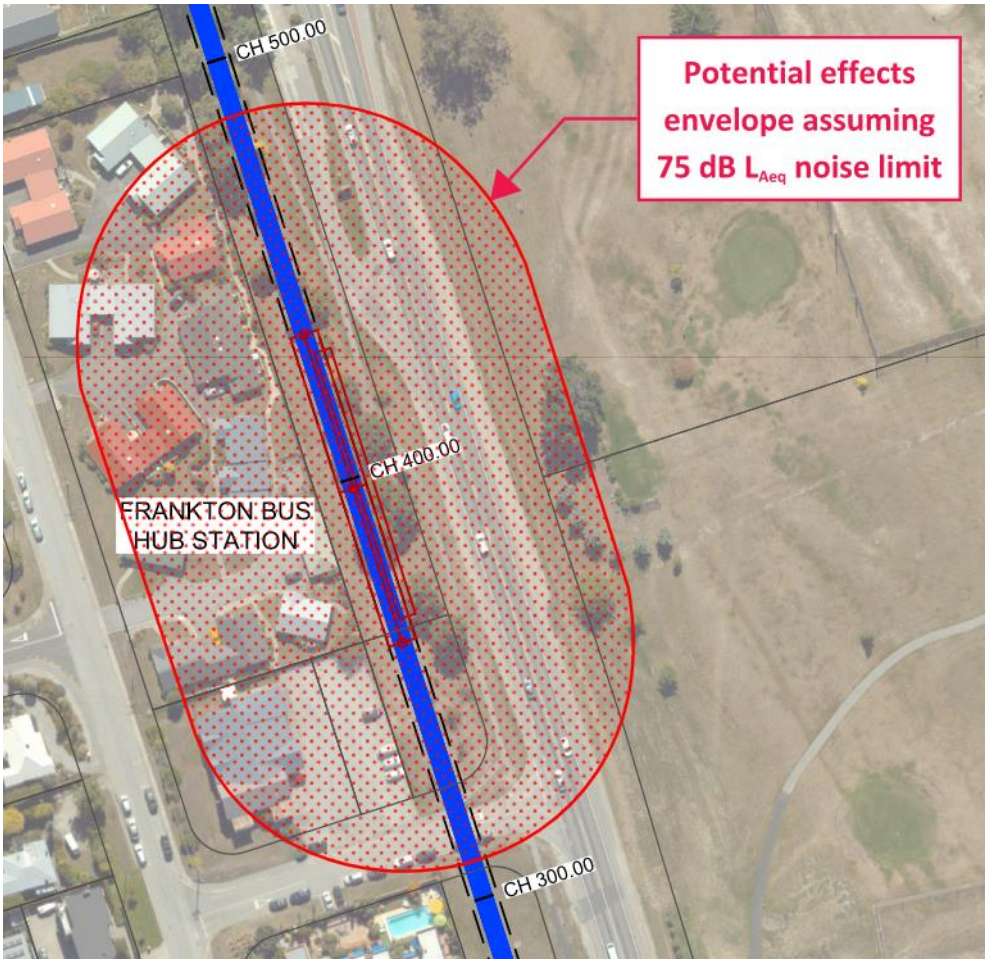


Figure 7: Potential construction noise effects envelope - Airport Station

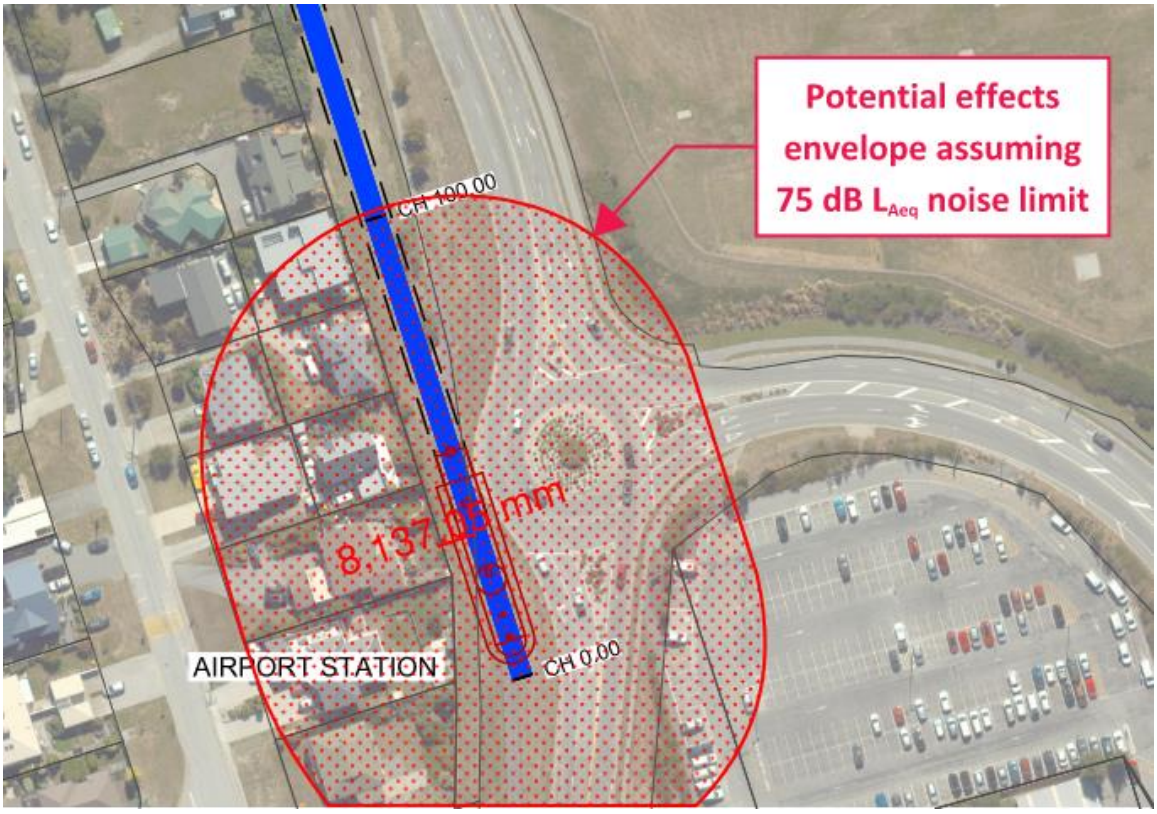


Figure 8: Potential construction noise effects envelope - Ferry Hill Station

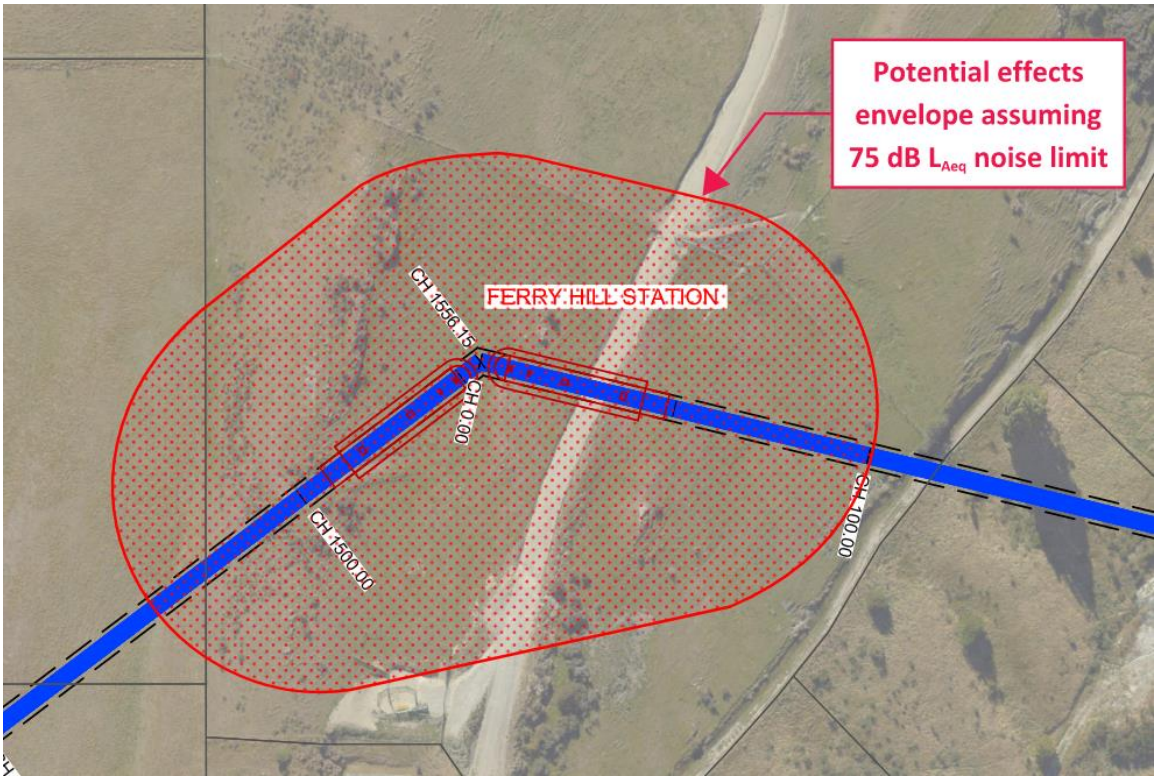


Figure 9: Potential construction noise effects envelope - Frankton North Station

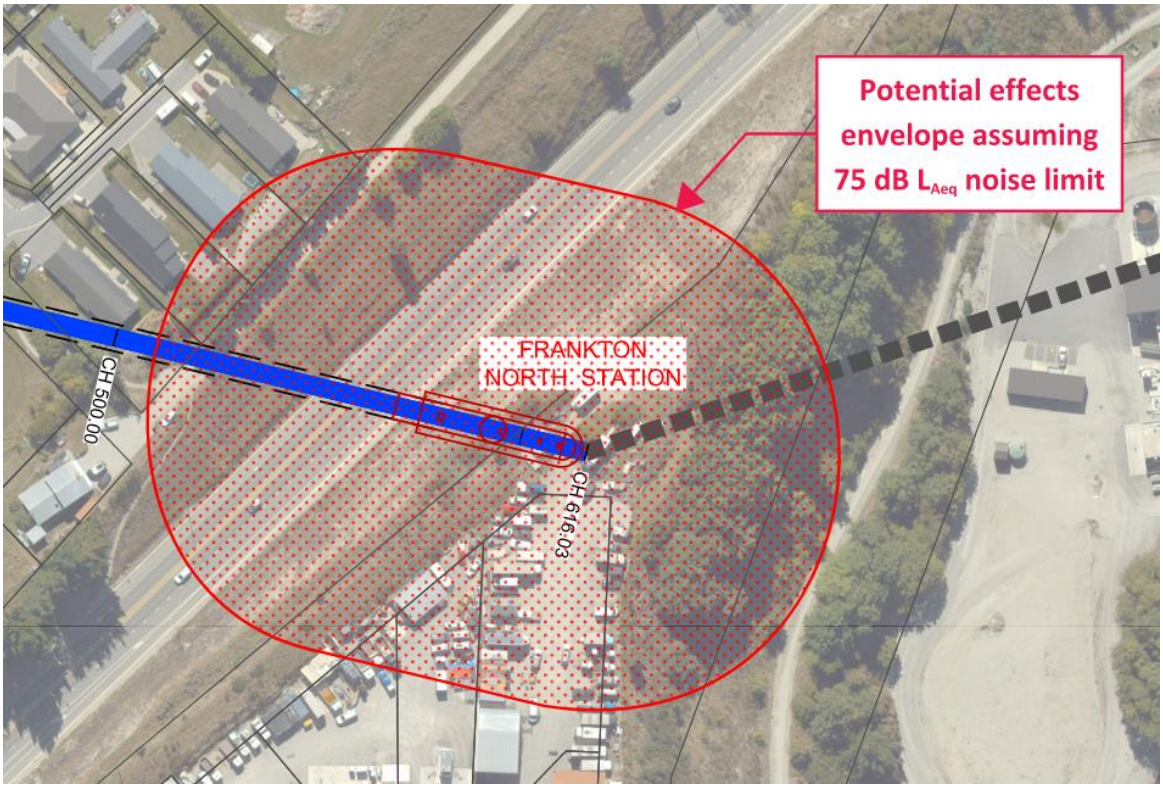


Figure 10: Potential construction noise effects envelope - Lower Shotover Station

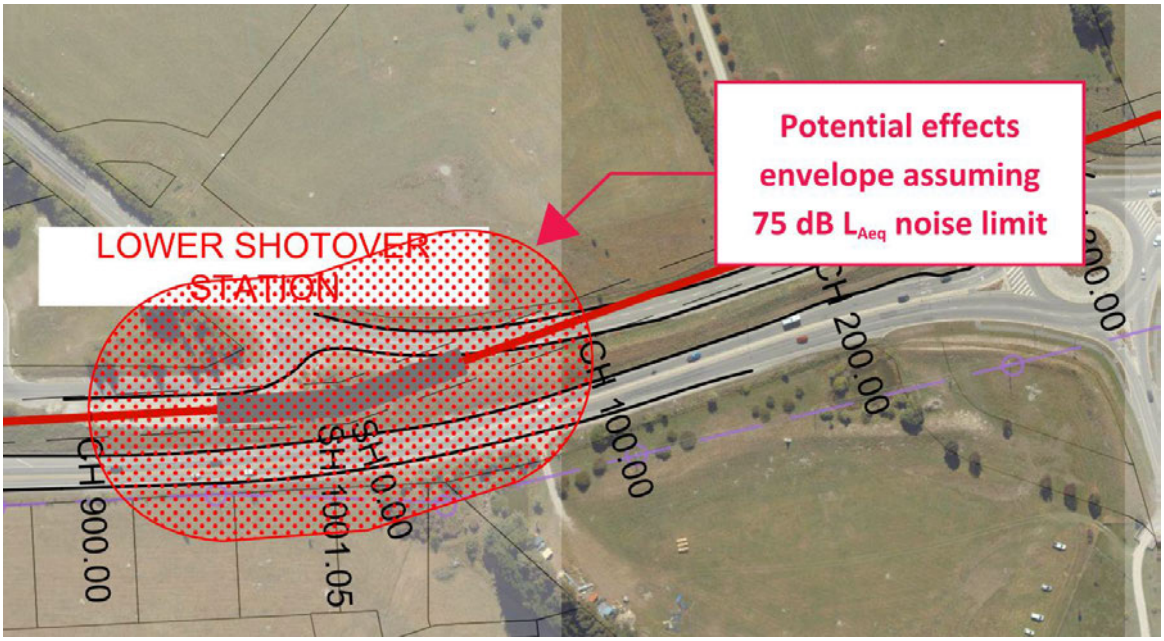


Figure 11: Potential construction noise effects envelope - Ladies Mile Station

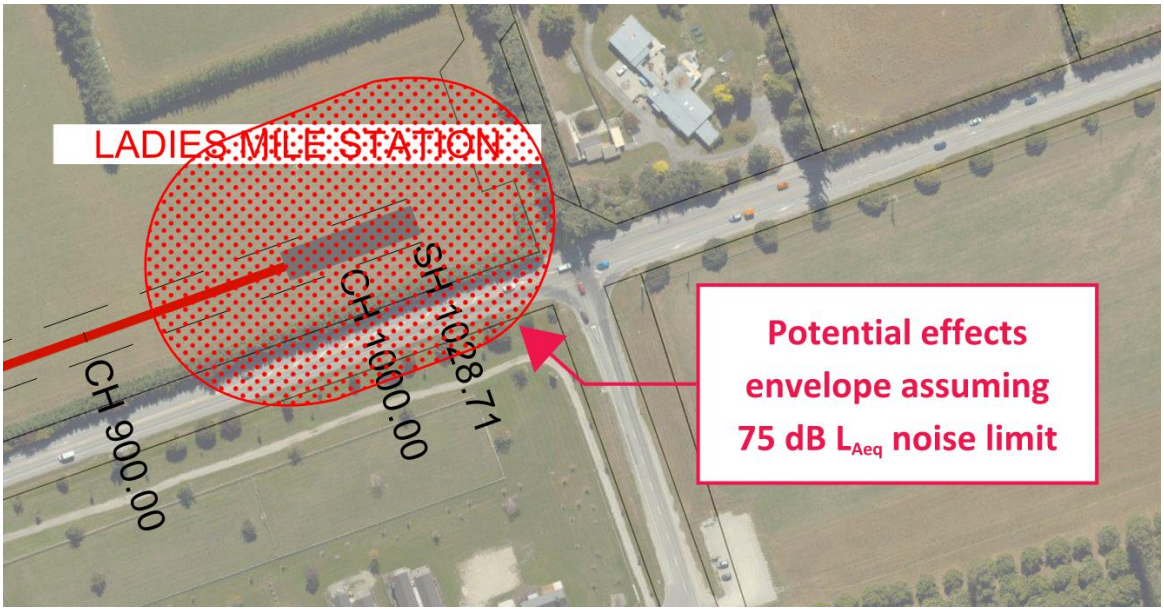


Figure 12: Potential construction noise effects envelope - Five Mile Station

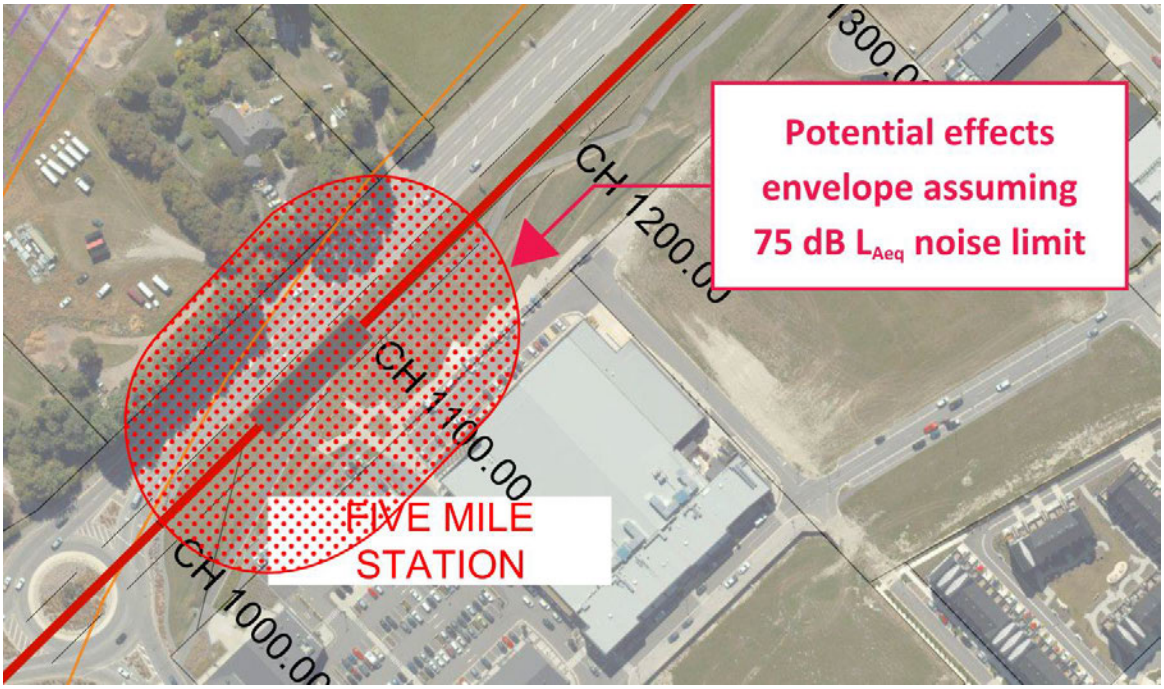
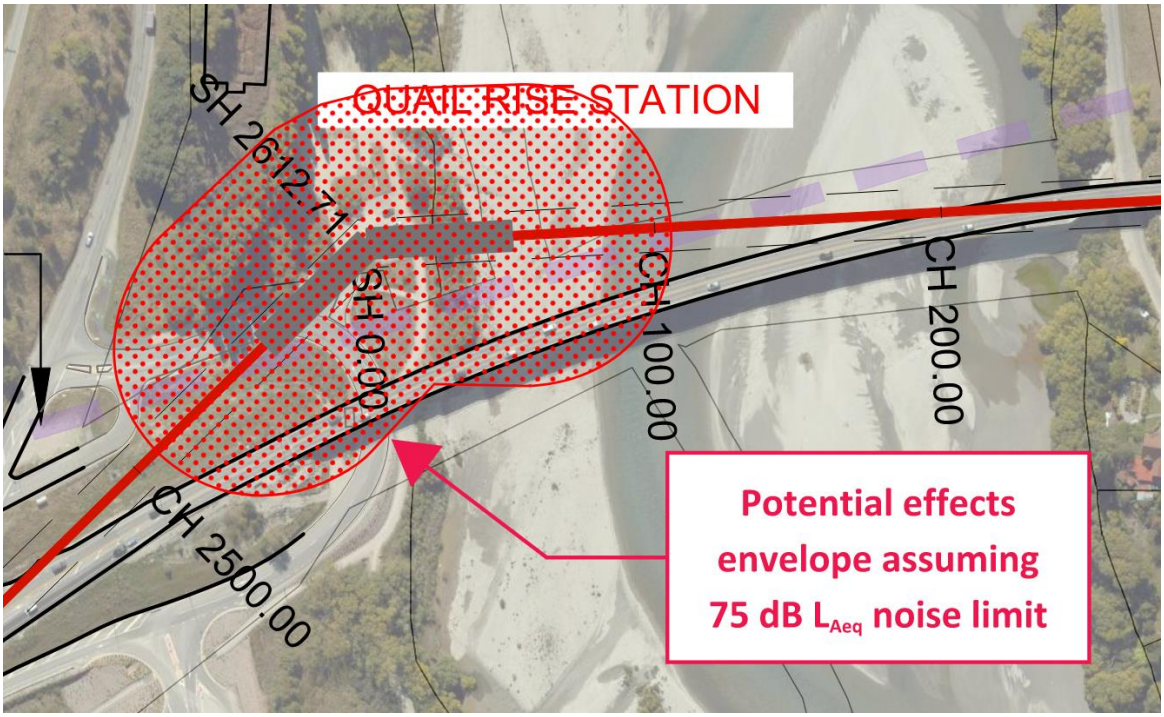


Figure 13: Potential construction noise effects envelope - Quail Rise Station



We note that, for many of the remotely located stations or stations in high noise environments, such as Queenstown Hill, Lake Johnson, 5 Mile, and Quail Rise, relocating (although the general location will remain the same) or reconfiguring the station will not have any significant change on the extent of construction noise effects.

To quantify the risk of construction noise infringing the relevant noise criteria, we need to understand the construction methodology and duration of high noise activities. This informs where compliance would be achieved, the extent of any potential infringements, what mitigation measures should be implemented, and the potential noise effects and the reasonableness of it.

Overall we consider that for a project of this scale and likely construction programme, that with appropriate management and mitigation measures in place, enshrined in a construction noise and vibration management plan (CNVMP), construction noise can be managed to acceptable levels.

3.3 Construction Vibration

3.3.1 Performance standards

PDP Rule 36.5.10 doesn't specifically mention construction vibration but says that vibration from any activity shall not exceed the guideline values given in German Standard DIN 4150-3:1999 "*Structural vibration – Part 3: Effects of vibration on structures*" on any other site.

We consider this is an appropriate standard to use with respect to construction vibration and it is often used in other jurisdictions in New Zealand.

The criteria relate to the avoidance of cosmetic building damage, such as cracking in paint or plasterwork. Cosmetic building damage effects are deemed '*minor damage*' in the Standard and can generally be easily repaired. The cosmetic building damage thresholds are much lower than those that would result in structural damage. The Standard states:

"Experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur."

The short-term (transient)[3] vibration limits in Figure 14 apply at building foundations in any axis.

The long-term (continuous)[4] vibration limits in Table 5 apply at all floor levels, but levels are normally highest in horizontal axes on the top floor.

Figure 14: Vibration at building foundation (DIN 4150-3 1999: Figure 1)

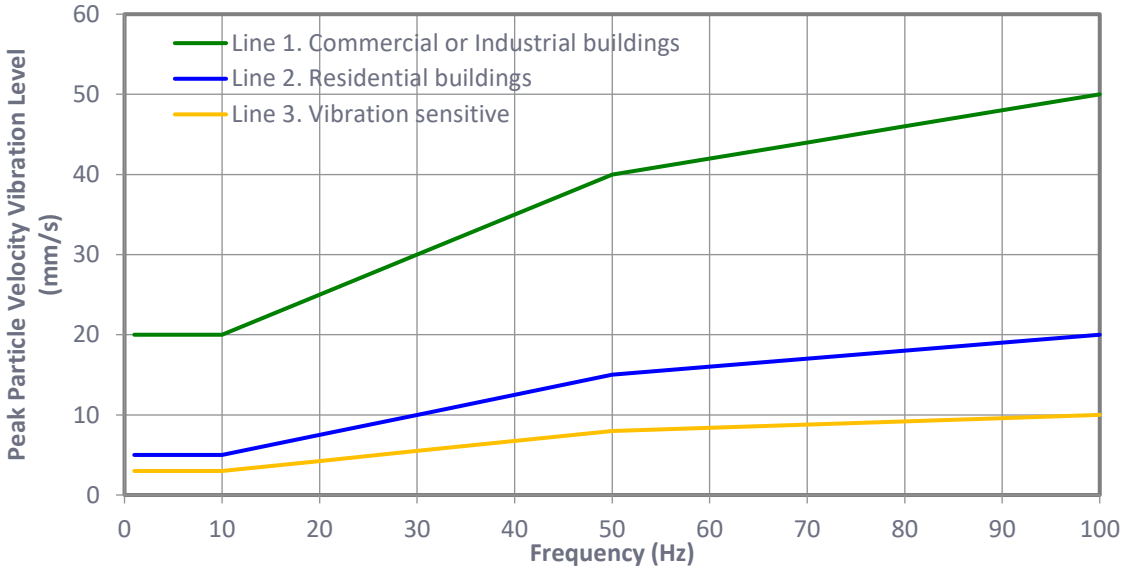


Table 5: Vibration at horizontal plane of highest floor (DIN 4150-3 1999: Tables 1 and 3)

Structure / building type	Peak Particle Velocity Vibration Level (mm/s)	
	Short-term (transient)	Long-term (continuous)
Line 1. Commercial or Industrial	40	10
Line 2. Residential	15	5
Line 3. Vibration sensitive	8	2.5

3.3.2 Construction vibration sources

Table 6 provides indicative construction vibration levels for the assumed activities that have the potential to result in vibration in building structures. They are based on our measurement database.

The amenity vibration levels are the typical vibration levels expected for each activity, while the cosmetic building damage limits conservatively includes a 100% safety factor to manage risk.

[3] Short-term (transient) vibration is "*vibration which does not occur often enough to cause structural fatigue and which does not produce resonance in the structure being evaluated*"

[4] Long-term (continuous) vibration includes types not covered by the short-term vibration definition

Table 6: Indicative distances to comply with vibration limits at building foundations

Equipment	Cosmetic Building Damage Setback (m) [5]		
	Heritage 2.5 mm/s PPV	Residential 5 mm/s PPV	Commercial 10 mm/s PPV
Impact piling	46	19	8
Vibratory Roller	30	14	6
Sheet piling	30	11	4
Concrete breaker	16	10	7
Vibrated pile casings	15	6	3

3.3.3 Construction vibration assessment

Only the Queenstown, Frankton Hub, Airport, Ferry Hill, Frankton North, and Lower Shotover Stations are relevant with respect to a construction vibration assessment. There are no building receivers within relevant distances with respect to construction vibration at the other stations.

We predict there is a potential for vibration infringements if impact piling is carried out closer than 19m from receivers. We understand that piling would likely only be required if a structure is constructed on sloping ground. The remainder will largely be founded on pad footings. For this referral assessment, we assume the worst-case scenario to conservatively assess the potentially widest effects envelope. Given this, there is a potential risk of vibration effects at the Queenstown, Frankton Hub, and Airport Stations only.

To fully quantify this risk, we need to understand the required construction methodology and duration of high vibration activities, which we understand will be confirmed as part of the substantive application. This informs whether compliance would be achieved, the extent of any potential infringements, what mitigation measures should be implemented, and the potential vibration effects and the reasonableness of it.

We consider that for a project of this scale and likely construction programme, and if piling is required at any of these five locations, a CNVMP would be capable of appropriately managing construction vibration to acceptable levels.

[5] Based on regression analysis of available vibration measurements, plus a 100% safety factor (conservative)

4.0 OPERATIONAL NOISE ANTICIPATED EFFECTS

4.1 Performance Standards

4.1.1 District Plan

PDP Rule 36.3.2.2 states that:

"Sound levels shall be measured and assessed in accordance with NZS 6801:2008 Acoustics - Measurement of Environmental Sound and NZS 6802:2008 Acoustics - Environmental Noise, except where another Standard has been referenced in these rules, in which case that Standard should apply."

Table 7 shows the applicable noise limits from the PDP.

Table 7: Noise limits – PDP

PDP Rule number	*Receiving zone*	Assessment location	Time	Noise limits
36.5.1	*Rural*	Notional boundary of a residential unit	0800 – 2000	50 dB $L_{Aeq\ (15min)}$
			2000 – 0800	40 dB $L_{Aeq\ (15min)}$ 75 dB L_{AFmax}
36.5.2	*Lower, High Density Residential, Informal Recreation, Te Pūtahi Ladies Mile*	Any point within any site	0800 – 2000	50 dB $L_{Aeq\ (15min)}$
			2000 – 0800	40 dB $L_{Aeq\ (15min)}$
36.5.3	*Airport Zone – Queenstown*	Any point within the site	Any time	No limit
16.5.10	*Business – Mixed Use*	Any point within the site	0800 – 2200	60 dB $L_{Aeq\ (15min)}$
			2200 – 0800	50 dB $L_{Aeq\ (15min)}$ 75 dB L_{AFmax}
No rule	*General Industrial and Service*	n/a	n/a	No limit

Table 8: Noise limits – ODP

ODP Rule number	*Source Zone*	*Receiving zone*	Assessment location	Time	Noise limits
12.15.5.2.vii.a	*Quail Rise*	*Outside the source zone*	Any point within any site	0800 – 2000	50 dB $L_{Aeq\ (15min)}$
				2000 – 0800	40 dB $L_{Aeq\ (15min)}$ 70 dB L_{AFmax}
12.20.6.2.xxvi.a	*Frankton Flats B (Activity Area A)*	*Frankton Flats B (Activity Areas C1 and C2)*	Any point within the boundary of any other site	0800 – 2000	65 dB L_{A10}
				2000 – 0800	65 dB L_{A10} 75 dB L_{max}

As shown, no noise limits technically apply for the Ferry Hill Station since both source and receiver are both within the *Quail Rise* zone. We consider the *Quail Rise* zone noise limits are essentially the same as the *Rural* noise zone limits in the PDP except for the assessment location. Therefore, for consistency of approach, we recommend adopting the PDP *Rural* noise limits for the receivers in the *Quail Rise* zone.

4.1.2 Section 16 of the Resource Management Act

There is an obligation required under Section 16 (s16) of the Resource Management Act (RMA) which states

"every person carrying out an activity… shall adopt the best practicable option to ensure that the emission of noise… does not exceed a reasonable level".

A reasonable level of noise depends on the existing ambient noise environment, and this is typically guided by the noise limits prescribed for a zone in the relevant district plan. In this case, Queenstown Lakes District Council has determined the noise limits in Section 4.1.1 above to be the standard for reasonable levels of noise as per PDP Section 36.1:

"Reasonable" noise levels are determined by the standard of amenity and ambient noise level of the receiving environment and the Council provides direction on this through the prescription of noise limits for each Zone.

4.2 Operational noise assessment

We assume the main noise sources will be:

- Cable car operation at the stations
- Traffic movement noise
- Amplified public announcement (PA) systems

4.2.1 Cable car operation for compliance

Appendix E shows manufacturer noise level measurements for representative cable car stations. There are two stations presented – a bottom station, and a top station which contains the drive machinery. These noise levels are consistent with other similar cable car operations we have been involved with and are therefore considered representative of cable car operational noise levels.

The measurements show various results at different positions. For this assessment, we refer to the measurements at 10m and 25m to assess compliance risk at the various stations. The different measurements were used because of the different setback distances from stations to receivers.

Confirmation on the equipment and frequency of use per day (i.e. operating hours, and is it on 100% of the time within that window) would be required to refine our assessment as part of the substantive reporting.

We predict there is a high likelihood of operational noise exceeding the applicable District Plan limits at six stations; five of which are in both route options, and one is only in route option A – see Table 9 overleaf.

Table 9: Compliance risk assessment

Stations potentially at risk of exceedance	Measurement reference	Noise level	Assessment
Airport Frankton Hub Queenstown	10m measurement position and at the highest cable car velocity (5m/s)	66 – 68 dB L_{Aeq}	Up to 16 dB above daytime noise limit of 50 dB L_{Aeq} Up to 26 dB above the night-time noise limit of 40 dB L_{Aeq}
Frankton North	25m measurement position and at the highest cable car velocity (5m/s) but extrapolated to 50m	52 – 56 dB L_{Aeq}	Up to 6 dB above daytime noise limit of 50 dB L_{Aeq} Up to 16 dB above the night-time noise limit of 40 dB L_{Aeq}
Lower Shotover	25m measurement position and at the highest cable car velocity (5m/s) but extrapolated to 35m	49 – 53 dB L_{Aeq}	Up to 3 dB above daytime noise limit of 50 dB L_{Aeq} Up to 13 dB above the night-time noise limit of 40 dB L_{Aeq}
Ladies Mile	25m measurement position and at the highest cable car velocity (5m/s) but extrapolated to 100m	46 – 50 dB L_{Aeq}	Up to 4 dB above the night-time noise limit of 40 dB L_{Aeq}

At the other stations not mentioned in Table 9, we predict compliance is likely due to setback distances and/or the receiver zones.

If necessary, there are a range of mitigation measures, such as the following, that could be adopted to reduce these noise levels:

- Limiting cable car speeds
- Selecting quieter machinery
- Enclosing specific cable car machinery
- Providing screening between the station and the nearest receivers
- Enclosing the entire cable car station inside a building

We predict potential noise effects to receivers at the Queenstown Hill, Lake Johnson, Ferry Hill, and Quail Rise stations in the next section of this report because there are no receivers relevant for a compliance assessment for at least 1km.

4.2.2 Cable car operation for potential noise effects from the Airport Station

We note that existing dwellings within the ANB[6] are exposed to high levels of aircraft noise and are offered full cost of any façade sound insulation upgrades. These receivers are also directly next to the Airport Station. It is important to note that not all dwellings in the ANB would have the upgrades. New builds would be acoustically insulated by design.

[6] https://www.queenstownairport.co.nz/media/File%20Resource/Noise%20contour%20map.pdf

Therefore, internal noise effects of the Airport Station would only be managed for those dwellings that have sound insulation upgrades. External noise effects are not impacted by the façade upgrades but may be put into context next to the existing high aircraft noise.

Despite the above, we consider noise from the Airport Station should still comply, where practicable and pending confirmation of external noise levels as part of the substantive assessment, to ensure noise effects to backyard areas is reasonable and to demonstrate that the s16 obligations have been fulfilled.

4.2.3 Cable car operation for potential noise effects on recreation users

We consider noise effects on any recreational users in the area near to the Queenstown Hill, Lake Johnson, Ferry Hill, and Quail Rise stations would be acceptable because:

- The introduction of the stations would increase localised noise levels but would be similar in character to the existing ambient noise levels
- The existing noise environment would likely not be pristine because of the nearby airport and the relatively close proximity of State Highway 6A
- The whole Queenstown basin and area through which the cable car route traverses are not back country or remote and therefore noise sensitivity of recreational users would be lower
- The land in question is largely privately owned so recreational users would be at the pleasure of the landowners, so there is an expectation that use would be limited.
- Recreational users are also not lot likely to spend extended periods in proximity to the cable car and so noise exposure is temporary and short term in nature
- Therefore, there would not likely be an expectation of quiet tranquillity in the area and any increase in noise level would be acceptable

4.2.4 Traffic movement

The Queenstown Station is at the site of an existing public car park. A reconfigured carpark / kiss and ride / rideshare / dropoff area is intended to be established alongside the Queenstown Station. Traffic movement noise from within the new carpark / kiss and ride / ride share / drop-off areas induced by the Queenstown Station may need to be considered, even though the carpark is an existing site. In addition, we understand there will also be bus movements to and from the Ferry Hill Station. To carry out full assessment at both stations, we need to understand the traffic movement numbers for the day and peak hours, and the vehicle breakdown (i.e. how many buses compared to small vehicles). However, based on our experience of other transport hubs, we anticipate:

- Compliance would likely be achieved at all receivers
- The noise character would be the same as the existing noise environment which would likely be dominated by traffic noise
- Any noise effects would be reasonable.

4.2.5 Amplified public announcement

We consider this is a low-risk noise source. PA systems are directional and designed to be audible to people in the station only and at comfortable volumes. We expect that compliance would be achieved with both the daytime and night-time noise limits.

If required, mitigation would likely be software related using limiters on the speakers at certain times of the day.

4.2.6 Potential effects on fauna

We consider there would likely be negligible risk to fauna, in terms of noise effects, at any of the stations. This is because:

- We expect that the design would take into consideration any potential fauna mating / nesting areas and would avoid it. This means noise levels would likely be lower than the representative noise levels shown for the 25m situation in Appendix E
- The Queenstown, Frankton Hub, Airport, Frankton North, Lower Shotover, and Ladies Miles stations are a built-up area with existing noise levels that would likely be similar to the station noise levels at setback distances greater than 25m from the station
- It is likely that any fauna in the area would have adapted to the existing noise environment, and the new stations would likely not significantly alter this. We consider an ecologist should confirm this.

4.2.7 Road Noise (NZS 6806) assessment

The Frankton Hub and Airport stations require moderate road layout changes[7]. We consider there is negligible risk that this would trigger an assessment in accordance with New Zealand Standard NZS 6806:2010 *Acoustics - Road-traffic noise - New and altered roads* because:

- The road layout brings one lane slightly closer to some receivers
- The change would have no impact in and of itself on traffic flows
- in our experience such a change is unlikely to trigger the assessment thresholds of NZS New Zealand Standard NZS 6806:2010 *Acoustics - Road-traffic noise - New and altered roads*
- The change in noise level would be negligible to marginal.

5.0 CONCLUSION

For the purposes of the referral application, we have identified the range of actual and potential effects that we expect could rise from the project.

We consider that construction noise and vibration effects are manageable through a CNVMP to ensure that significant noise effects are avoided.

Further acoustic review will be necessary through the detailed design and development of the construction management methodology, which will occur as part of any substantive application.

[7] Refer Jasmax Station Context Studies dated 12 June 2025

APPENDIX A GLOSSARY OF TERMINOLOGY

A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
Ambient	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
dB	Decibel The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 μPa i.e. dB = 20 x log(P/Pr)
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A- weighted) so as to more closely approximate the frequency bias of the human ear.
$L_{Aeq\ (t)}$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
$L_{A90\ (t)}$	The A-weighted noise level equaled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
Noise	A sound that is unwanted by, or distracting to, the receiver.
Notional boundary	A line 20 metres from any side of a dwelling, or the legal boundary where this is closer to the dwelling. This definition is from NZS 6802:2008.
SWL or L_W	Sound Power Level A logarithmic ratio of the acoustic power output of a source relative to 10^{-12} watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.

APPENDIX B EXPERIENCE OF THE AUTHORS

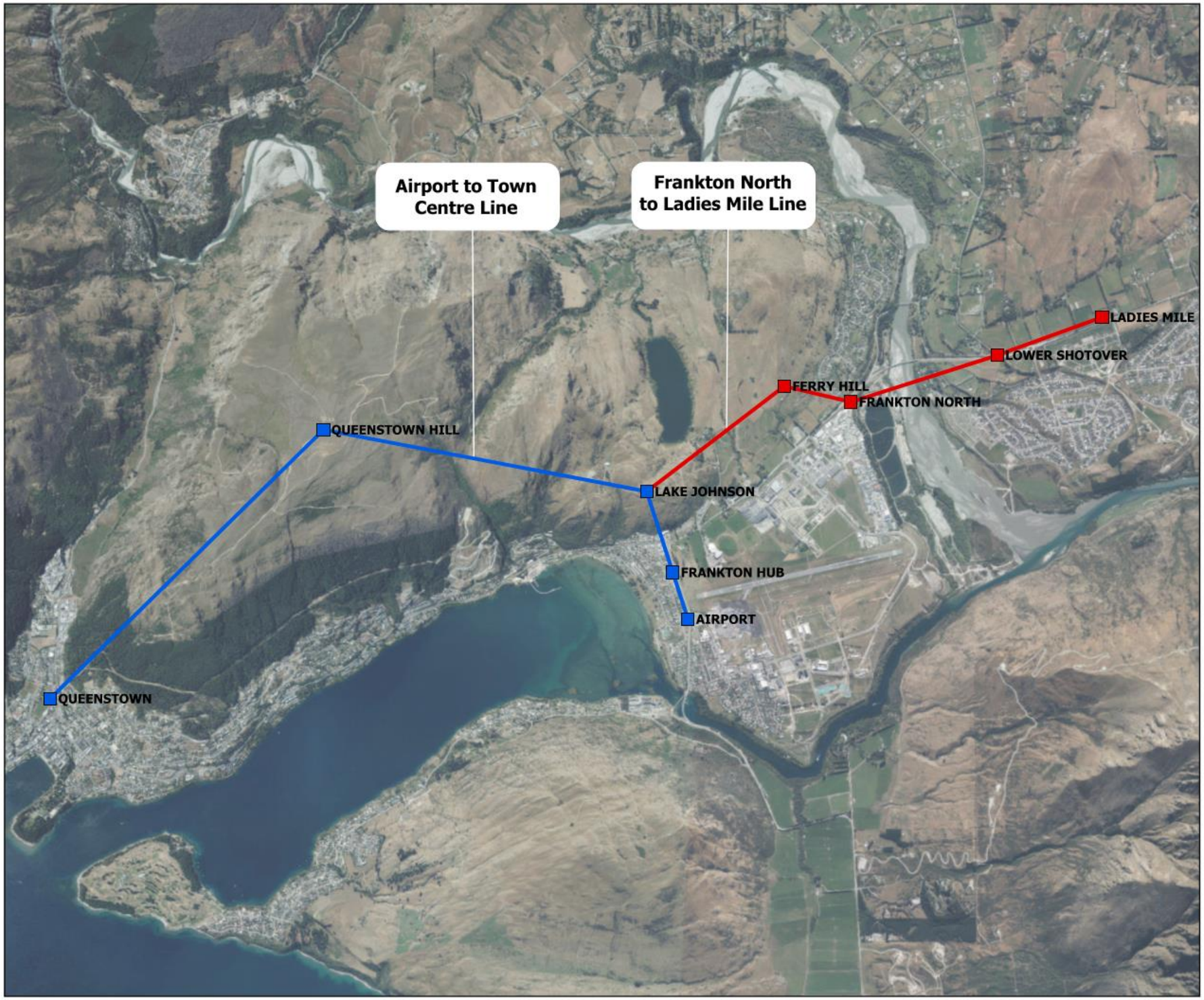
Where this report relies on information provided by other experts, this is outlined within the report.

My name is Micky Suen Wen Yang, and I am the lead author of this report. I am a senior acoustic engineering consultant with 9 years' experience at Marshall Day Acoustics. I hold a Bachelor of Engineering and Commerce Conjoint degree from the University of Auckland. I have worked on a wide range of environmental noise projects from large infrastructure development to smaller commercial projects across the country. I am a Member of the Acoustical Society of New Zealand.

Stephen Jack Peakall is a reviewer and is an Associate at Marshall Day Acoustics. He has been at Marshall Day since May 2005. He holds a degree in Environmental Engineering obtained from the University of West England (United Kingdom) and a postgraduate diploma in Acoustics and Noise Control from the United Kingdom's Institute of Acoustics, of which he is also a member. He is also a full professional member of the Acoustical Society of New Zealand. His professional experience includes noise and vibration advice on projects for various clients, including almost all New Zealand airports, Waka Kotahi NZ Transport Agency, Transpower NZ, KiwiRail and several quarries and mines throughout the country. He is currently involved in environmental noise and vibration assessment work that includes computer noise modelling, noise measurement surveys, strategic noise mapping and noise effects assessments.

Rob Lachlan Hay is the other reviewer and is an Associate and Director at Marshall Day Acoustics. He holds a Bachelor of Science and Masters of Science degree from the University of Canterbury, majoring in Chemistry. He has worked in the field of acoustics for over 21 years. He joined Marshall Day in 2006 and has been involved in many significant large scale environmental noise assessment projects throughout New Zealand including manufacturing, transportation and recreation and subdivision activities. Rob has assessed the noise related effects of mixed-use subdivisions incorporating residential, hospitality and retail activities.

APPENDIX C AERIAL WITH THE PROPOSED ALIGNMENTS



LEGEND

- Airport to Town Centre Line
- Airport to Town Centre Stations
- Frankton North to Ladies Mile Line
- Frankton North to Ladies Mile Stations

ROUTE A

Queenstown Cable Car

Southern Infrastructure Ltd

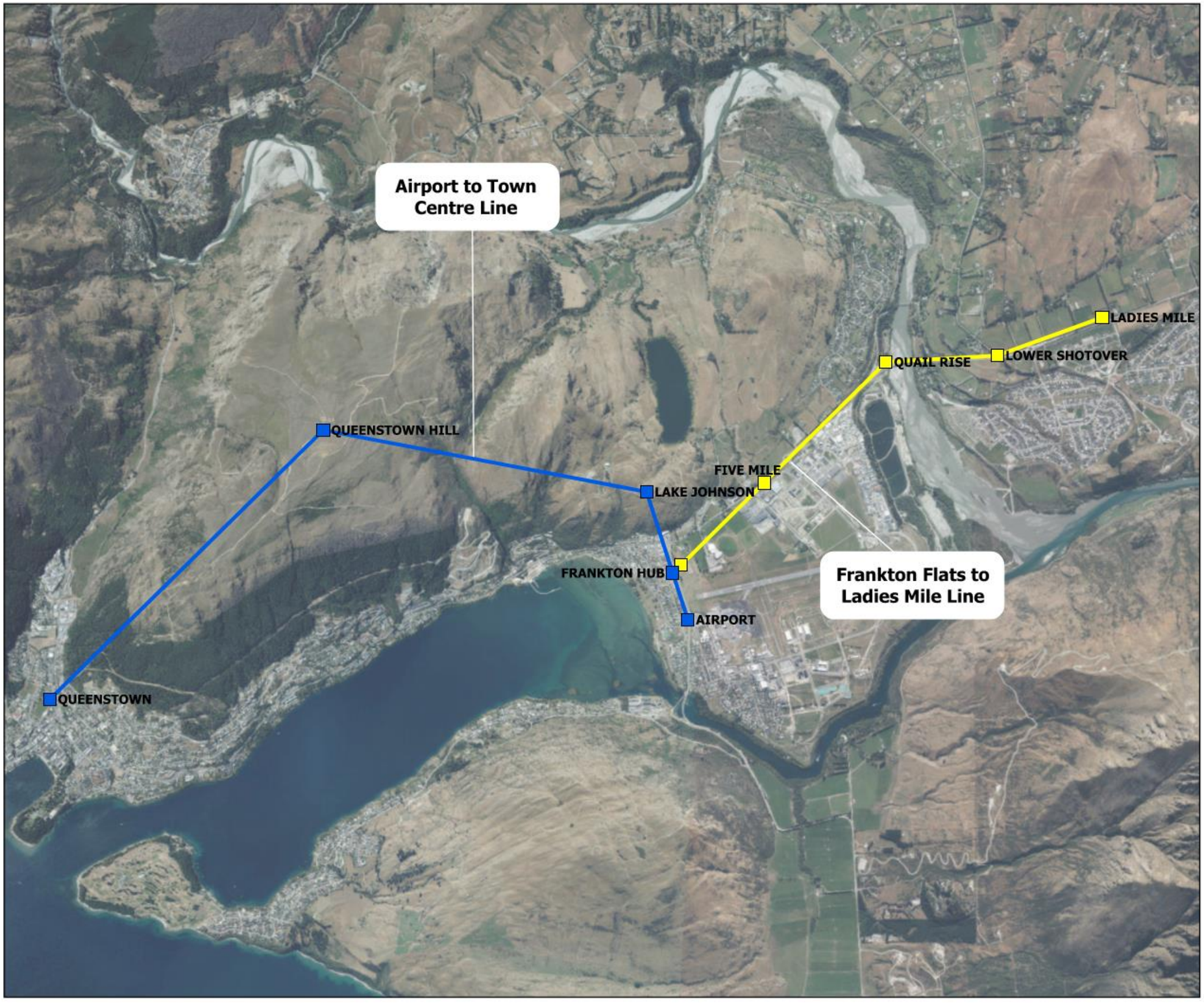
Source: LINZ, Southern Infrastructure

Date: 9/09/2025
Scale: 1:46,000 @ A3
Project: 3370-25

N

Revision: 2

TOWNPLANNING GROUP



LEGEND

- Airport to Town Centre Line
- Airport to Town Centre Stations
- Frankton Flats to Ladies Mile Line
- Frankton Flats to Ladies Mile Stations

ROUTE B

Queenstown Cable Car

Southern Infrastructure Ltd

Source: LINZ, Southern Infrastructure

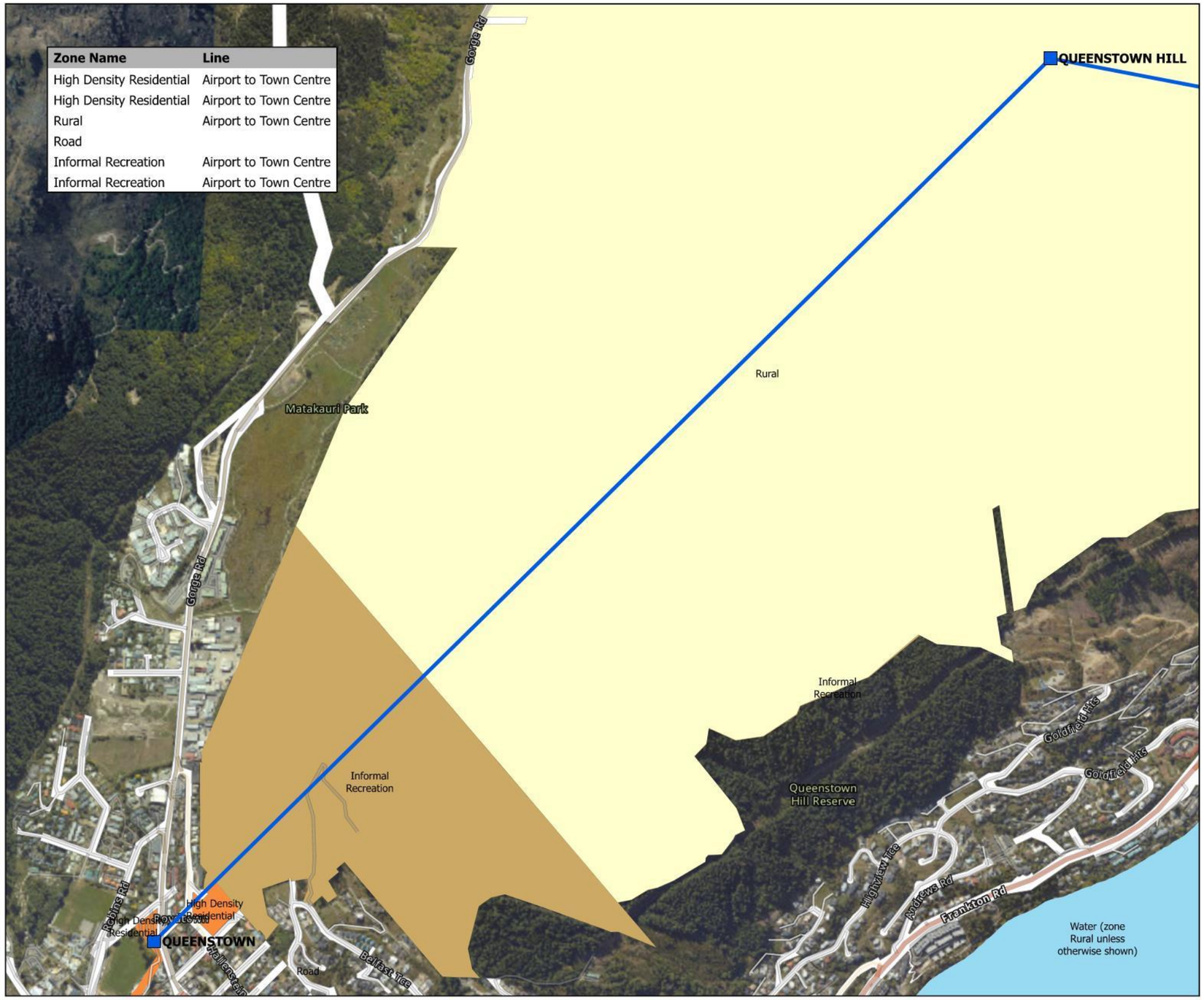
Date: 9/09/2025
Scale: 1:46,000 @ A3
Project: 3370-25

N

Revision: 2

TOWNPLANNING GROUP

APPENDIX D ZONING MAPS



LEGEND

- Airport to Town Centre Stations
- Airport to Town Centre Line
- High Density Residential
- Informal Recreation
- Road
- Rural
- Water (zone Rural unless otherwise shown)

ZONING

Queenstown Cable Car

Southern Infrastructure Ltd

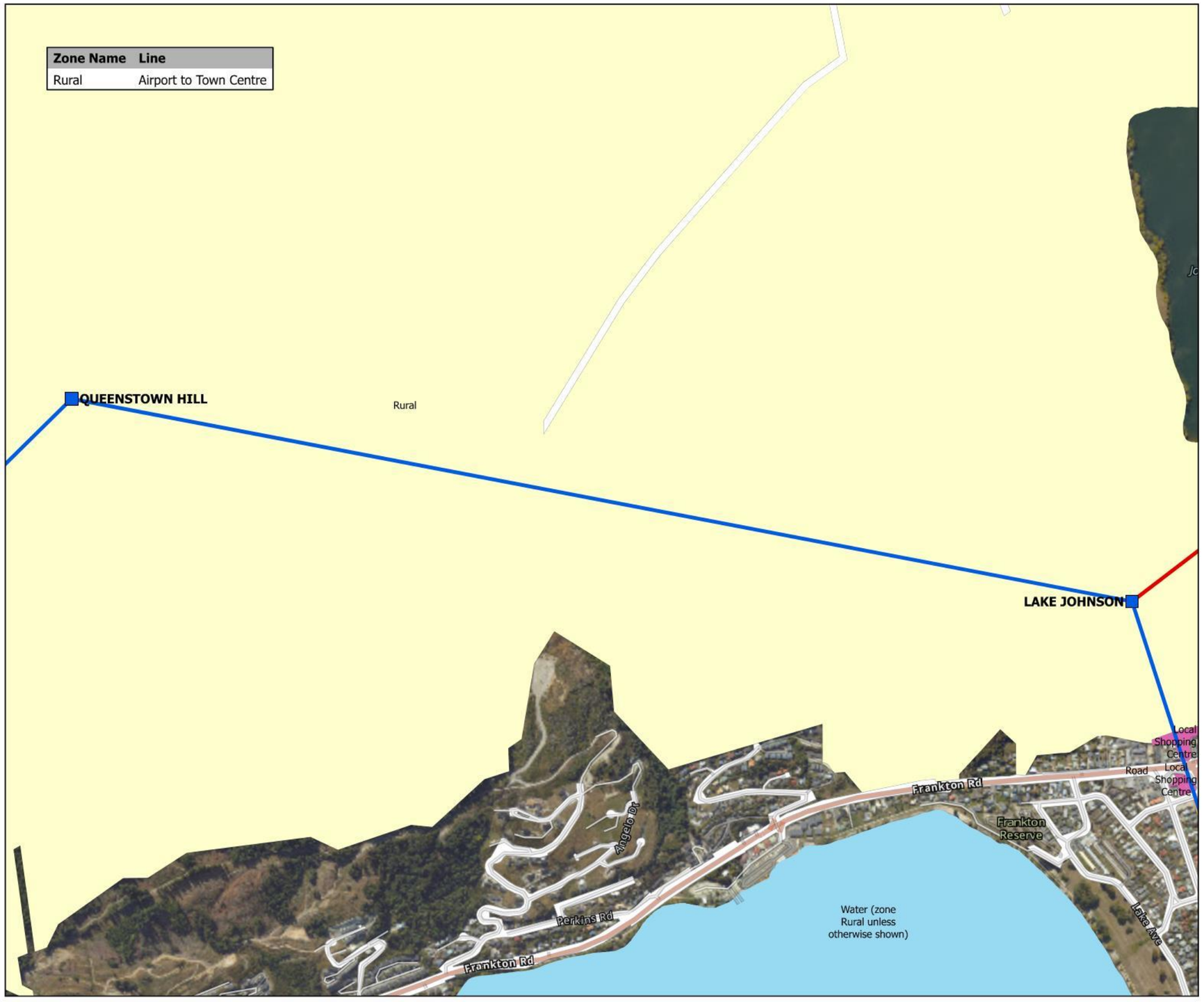
Source: LINZ, Southern Infrastructure Limited, QLDC PDP

Date: 24/10/2025
Scale: 1:14,000 @ A3
Project: 3370-25

N

Revision: 3

TOWNPLANNING GROUP



LEGEND

- Frankton North to Ladies Mile Line
- Airport to Town Centre Stations
- Airport to Town Centre Line
- Informal Recreation
- Local Shopping Centre
- Road
- Rural
- Water (zone Rural unless otherwise shown)

ZONING

Queenstown Cable Car

Southern Infrastructure Ltd

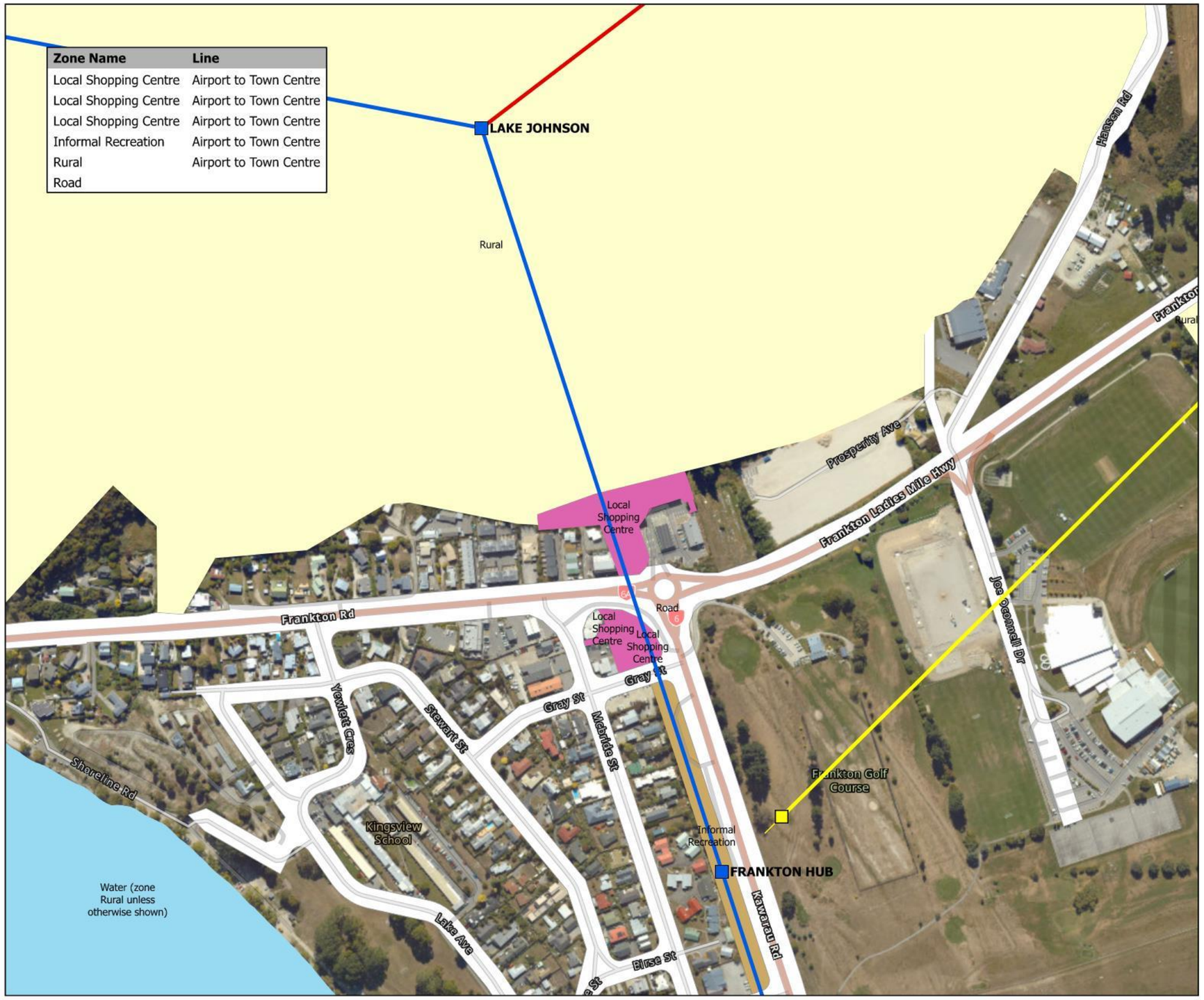
Source: LINZ, Southern Infrastructure Limited, QLDC PDP

Date: 24/10/2025
Scale: 1:14,000 @ A3
Project: 3370-25

N

Revision: 3

TOWNPLANNING GROUP



LEGEND

- Frankton Flats to Ladies Mile Stations
- Frankton Flats to Ladies Mile Line
- Frankton North to Ladies Mile Line
- Airport to Town Centre Stations
- Airport to Town Centre Line
- Informal Recreation
- Local Shopping Centre
- Road
- Rural
- Water (zone Rural unless otherwise shown)

ZONING

Queenstown Cable Car

Southern Infrastructure Ltd

Source: LINZ, Southern Infrastructure Limited, QLDC PDP

Date: 24/10/2025 Scale: 1:5,000 @ A3 Project: 3370-25	N	Revision: 3

TOWNPLANNING GROUP

LEGEND

- Frankton Flats to Ladies Mile Stations
- Frankton Flats to Ladies Mile Line
- Airport to Town Centre Stations
- Airport to Town Centre Line
- Informal Recreation
- Lower Density Suburban Residential
- Road
- Water (zone Rural unless otherwise shown)

ZONING

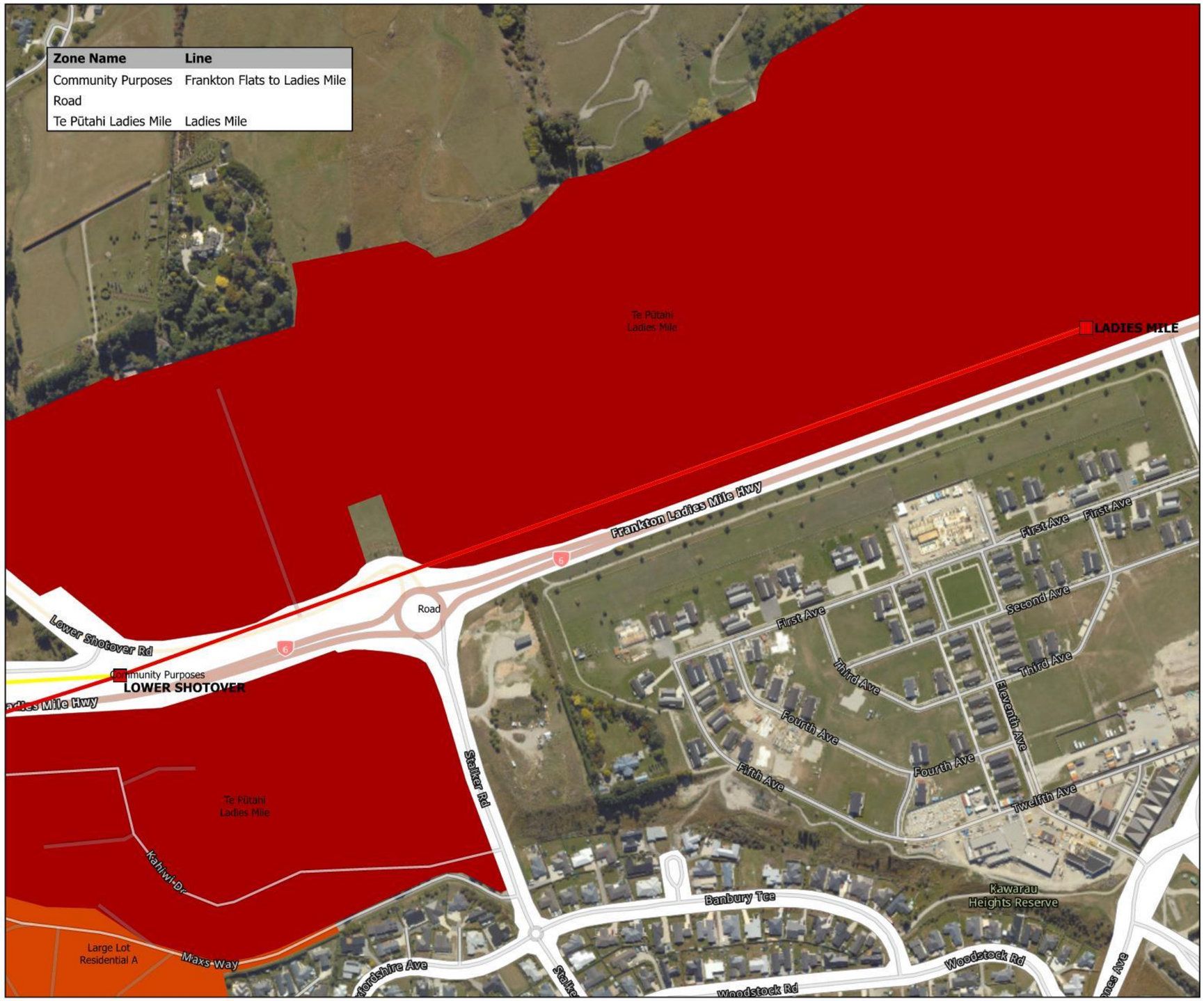
Queenstown Cable Car

Southern Infrastructure Ltd

Source: LINZ, Southern Infrastructure Limited, QLDC PDP

Date: 24/10/2025 Scale: 1:3,000 @ A3 Project: 3370-25	N	Revision: 3

TOWNPLANNING GROUP



LEGEND

- Frankton Flats to Ladies Mile Stations
- Frankton Flats to Ladies Mile Line
- Frankton North to Ladies Mile Stations
- Frankton North to Ladies Mile Line
- Community Purposes
- Large Lot Residential A
- Road
- Te Pūtahi Ladies Mile

ZONING

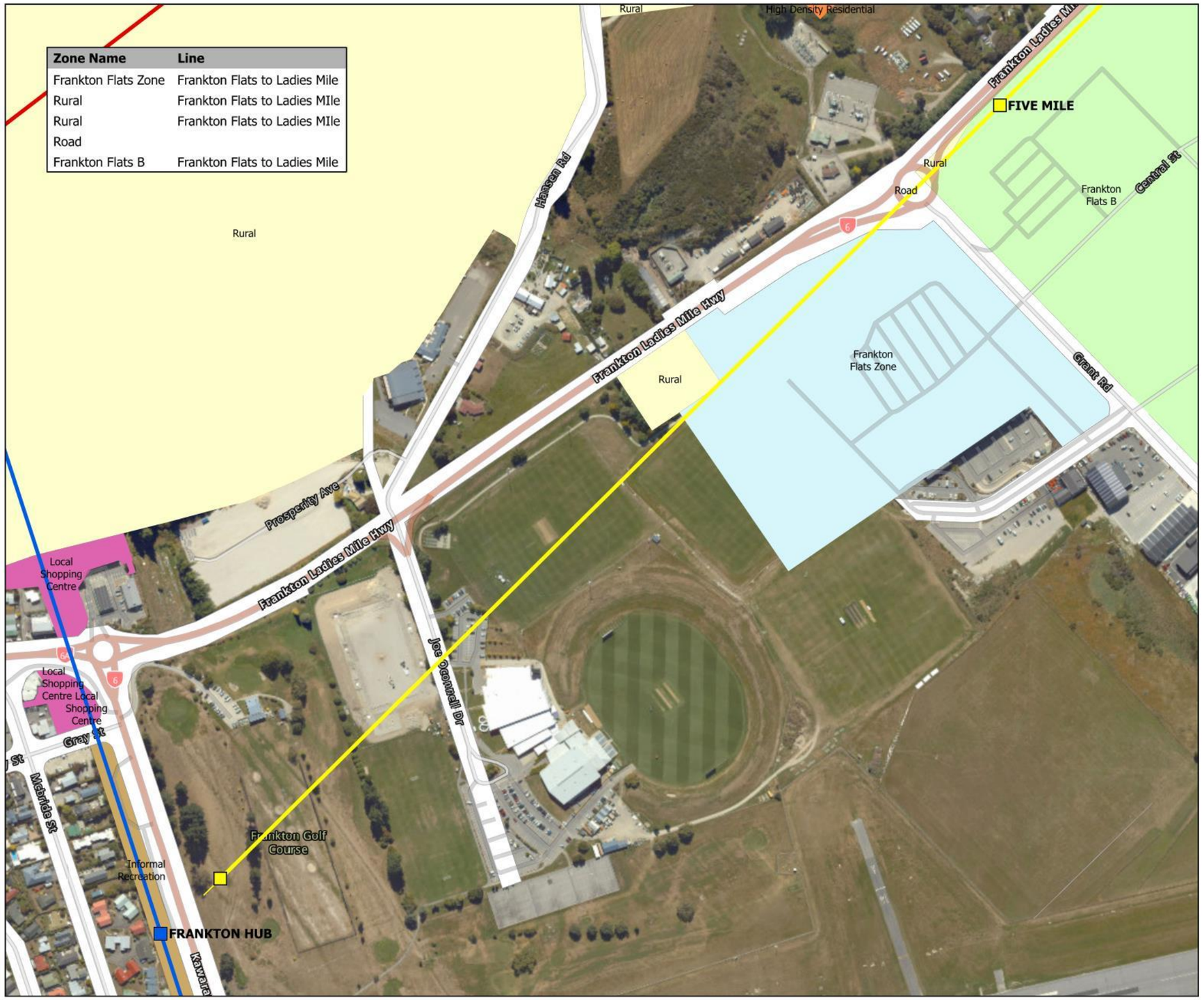
Queenstown Cable Car

Southern Infrastructure Ltd

Source: LINZ, Southern Infrastructure Limited, QLDC PDP

Date: 24/10/2025 Scale: 1:5,000 @ A3 Project: 3370-25	N	Revision: 3

TOWNPLANNING GROUP



LEGEND

- Frankton Flats to Ladies Mile Stations
- Frankton Flats to Ladies Mile Line
- Frankton North to Ladies Mile Line
- Airport to Town Centre Stations
- Airport to Town Centre Line
- Frankton Flats Zone
- High Density Residential
- Informal Recreation
- Local Shopping Centre
- Road
- Rural
- Frankton Flats B

ZONING

Queenstown Cable Car

Southern Infrastructure Ltd

Source: LINZ, Southern Infrastructure Limited, QLDC PDP

Date: 24/10/2025
Scale: 1:5,000 @ A3
Project: 3370-25

N

Revision: 3

TOWNPLANNING GROUP

LEGEND

- Frankton Flats to Ladies Mile Stations
- Frankton Flats to Ladies Mile Line
- Frankton North to Ladies Mile Stations
- Frankton North to Ladies Mile Line
- Frankton Flats Zone
- High Density Residential
- Informal Recreation
- Medium Density Residential
- Quail Rise Zone
- Road
- Road Zone
- Rural
- Wakatipu Basin Rural Amenity Zone
- Water (zone Rural unless otherwise shown)
- Frankton Flats B

ZONING

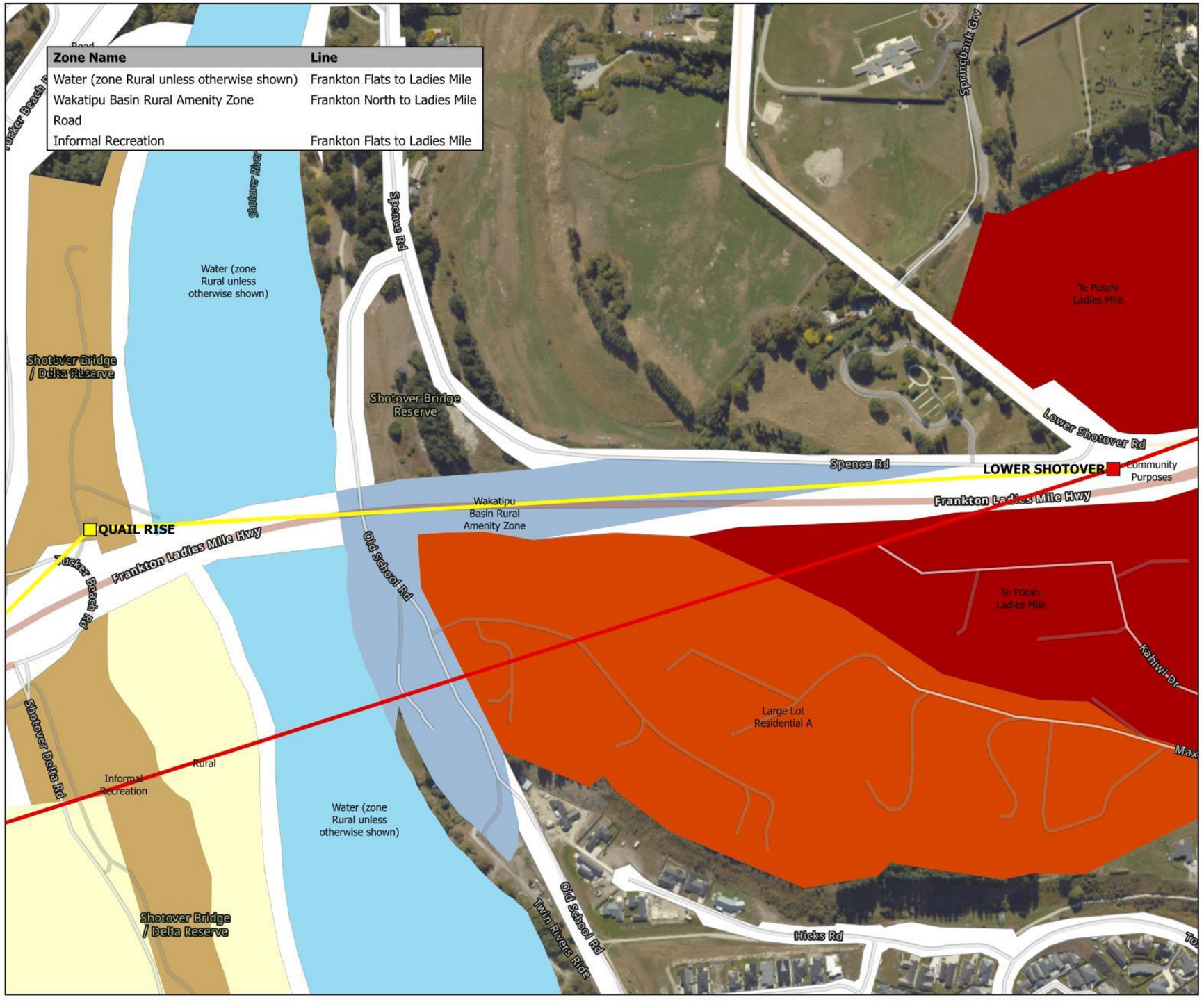
Queenstown Cable Car

Southern Infrastructure Ltd

Source: LINZ, Southern Infrastructure Limited, QLDC PDP

Date: 24/10/2025 Scale: 1:7,000 @ A3 Project: 3370-25	N	Revision: 3

TOWNPLANNING GROUP



LEGEND

- Frankton Flats to Ladies Mile Stations
- Frankton Flats to Ladies Mile Line
- Frankton North to Ladies Mile Stations
- Frankton North to Ladies Mile Line
- Community Purposes
- Informal Recreation
- Large Lot Residential A
- Road
- Rural
- Te Pūtahi Ladies Mile
- Wakatipu Basin Rural Amenity Zone
- Water (zone Rural unless otherwise shown)

ZONING

Queenstown Cable Car

Southern Infrastructure Ltd

Source: LINZ, Southern Infrastructure Limited, QLDC PDP

Date: 24/10/2025
Scale: 1:5,000 @ A3
Project: 3370-25

N

Revision: 3

TOWNPLANNING GROUP

LEGEND

- Frankton Flats to Ladies Mile Stations
- Frankton Flats to Ladies Mile Line
- Frankton North to Ladies Mile Stations
- Frankton North to Ladies Mile Line
- Airport to Town Centre Stations
- Airport to Town Centre Line
- Frankton Flats Zone
- High Density Residential
- Quail Rise Zone
- Road
- Rural
- Frankton Flats B

ZONING

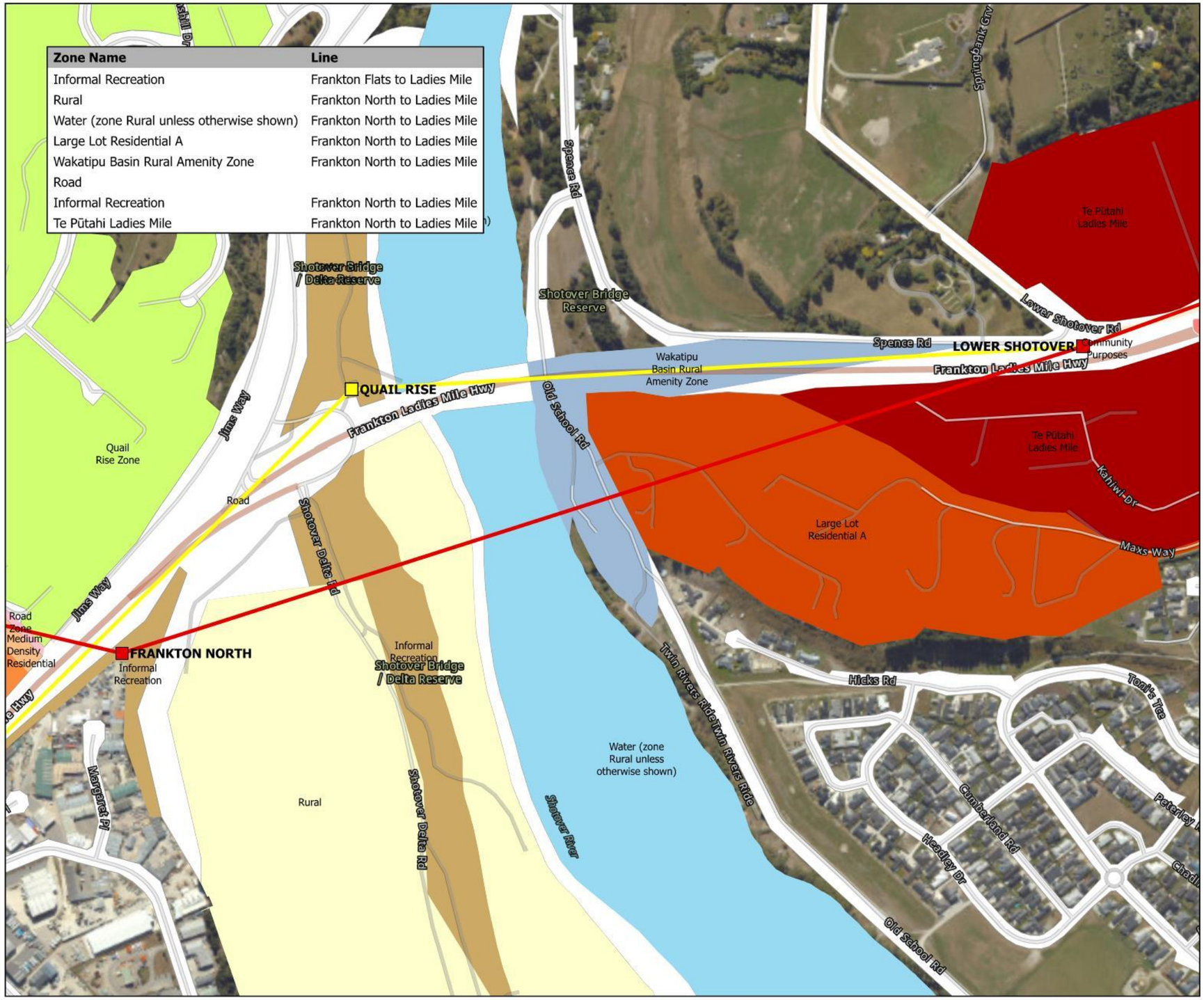
Queenstown Cable Car

Southern Infrastructure Ltd

Source: LINZ, Southern Infrastructure Limited, QLDC PDP

Date: 24/10/2025 Scale: 1:6,000 @ A3 Project: 3370-25	N	Revision: 3

TOWNPLANNING GROUP



LEGEND

- Frankton Flats to Ladies Mile Stations
- Frankton Flats to Ladies Mile Line
- Frankton North to Ladies Mile Stations
- Frankton North to Ladies Mile Line
- Community Purposes
- High Density Residential
- Informal Recreation
- Large Lot Residential A
- Medium Density Residential
- Quail Rise Zone
- Road
- Road Zone
- Rural
- Te Pūtahi Ladies Mile
- Wakatipu Basin Rural Amenity Zone
- Water (zone Rural unless otherwise shown)

ZONING

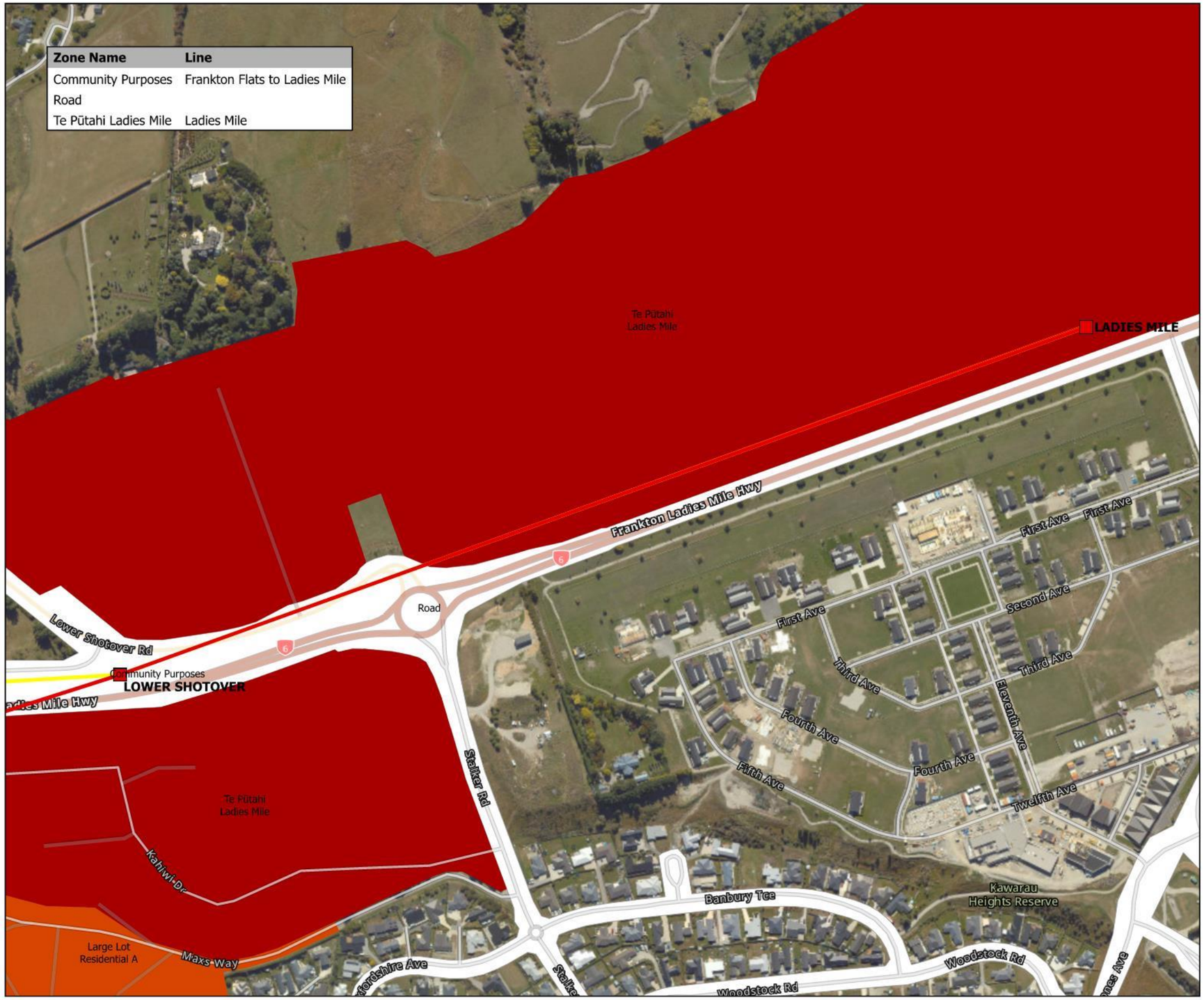
Queenstown Cable Car

Southern Infrastructure Ltd

Source: LINZ, Southern Infrastructure Limited, QLDC PDP

Date: 24/10/2025 Scale: 1:7,000 @ A3 Project: 3370-25	N	Revision: 3

TOWNPLANNING GROUP



LEGEND

- Frankton Flats to Ladies Mile Stations
- Frankton Flats to Ladies Mile Line
- Frankton North to Ladies Mile Stations
- Frankton North to Ladies Mile Line
- Community Purposes
- Large Lot Residential A
- Road
- Te Pūtahi Ladies Mile

ZONING

Queenstown Cable Car

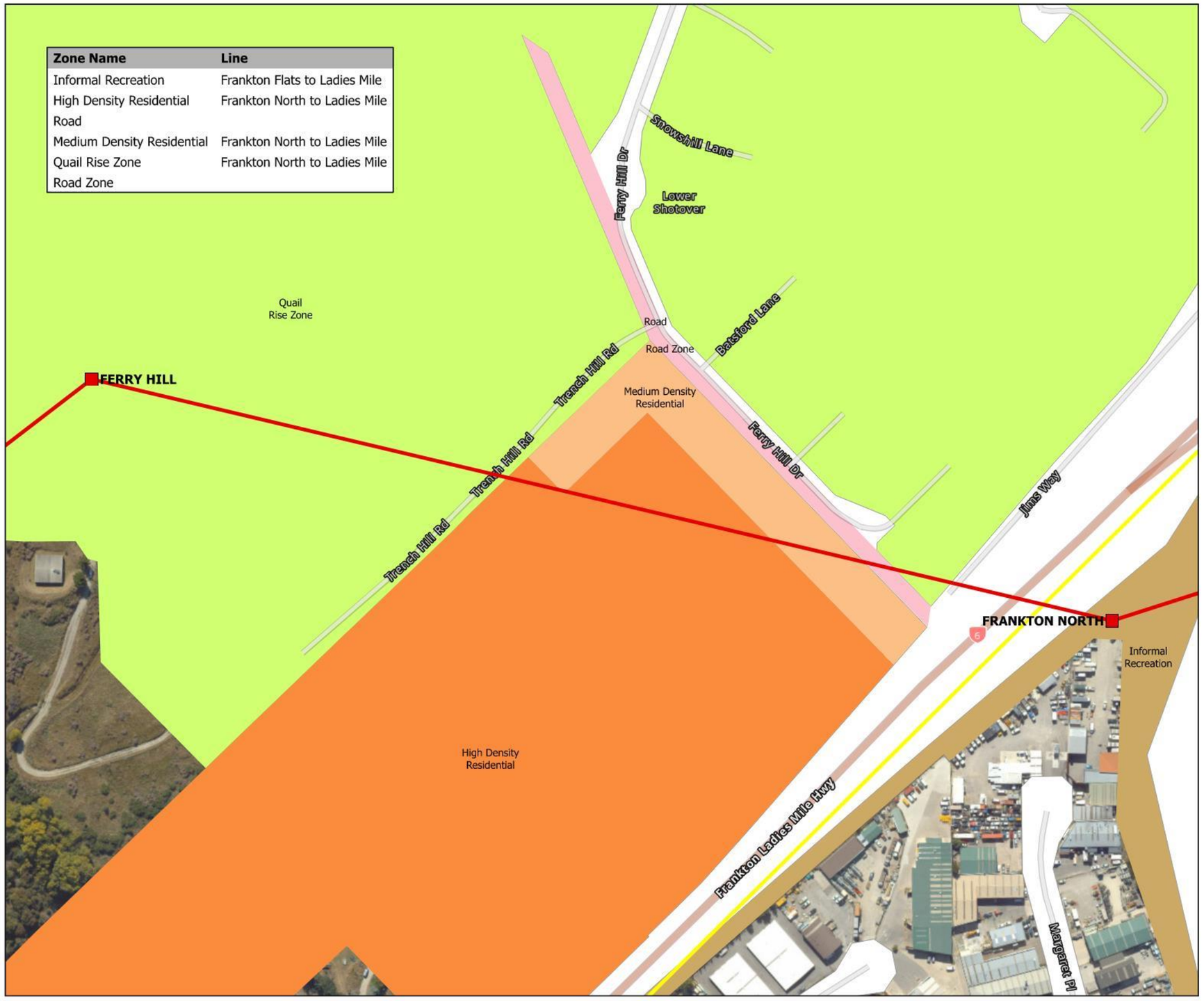
Southern Infrastructure Ltd

Source: LINZ, Southern Infrastructure Limited, QLDC PDP

Date: 24/10/2025 Scale: 1:5,000 @ A3 Project: 3370-25	N	Revision: 3

TOWNPLANNING GROUP

Zone Name	Line
Informal Recreation	Frankton Flats to Ladies Mile
High Density Residential	Frankton North to Ladies Mile
Road	
Medium Density Residential	Frankton North to Ladies Mile
Quail Rise Zone	Frankton North to Ladies Mile
Road Zone	



LEGEND

- Frankton Flats to Ladies Mile Line
- Frankton North to Ladies Mile Stations
- Frankton North to Ladies Mile Line
- High Density Residential
- Informal Recreation
- Medium Density Residential
- Quail Rise Zone
- Road
- Road Zone

ZONING

Queenstown Cable Car

Southern Infrastructure Ltd

Source: LINZ, Southern Infrastructure Limited, QLDC PDP

Date: 24/10/2025
Scale: 1:3,000 @ A3
Project: 3370-25

N

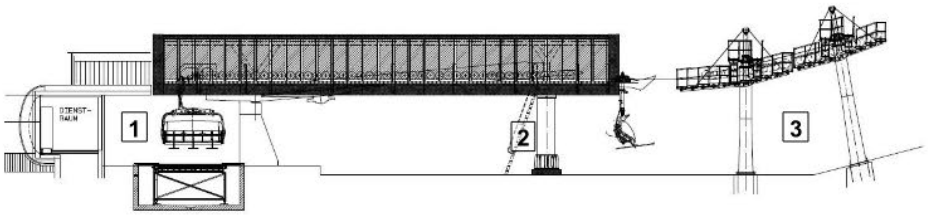
Revision: 3

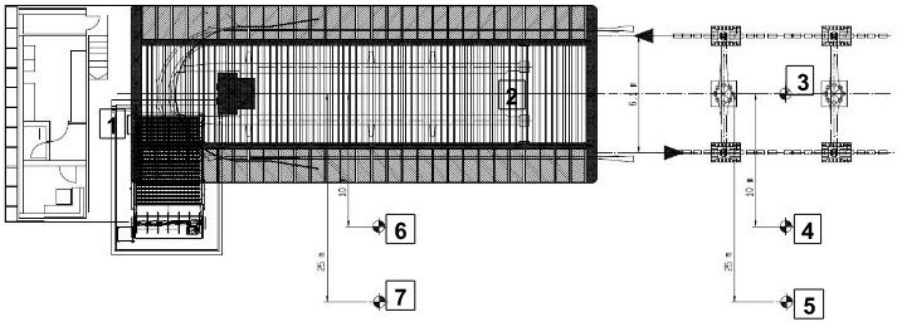
TOWNPLANNING GROUP

APPENDIX E REPRESENTATIVE CABLE CAR NOISE LEVEL DATA

Noise Measurements

Project Nr.:	AAA0002469
Project Name:	**Fluhexpress**
Type:	6-CLD/B
Rope:	DM 50 mm
$V_{max:}$	5,0 m/s
Gauge:	6,1 m
Bottom Station:	UNI-G-M Return Moveable 5,0m Carriage





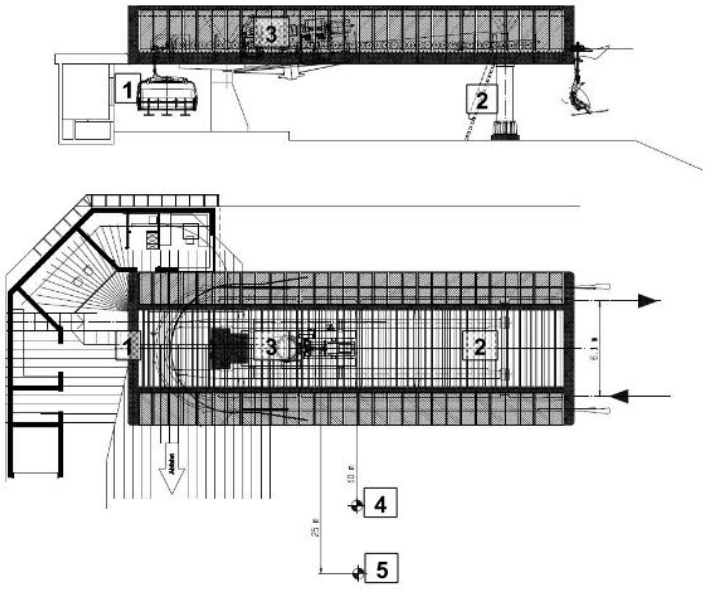
	Noise Level Lp in dB(A)				
	3,0 m/s	3,5 m/s	4,0 m/s	4,5 m/s	5,0 m/s
Rear of Station (1)	68	70	71	72	72
CL inside of station near Grip OC Lines (2)	66	70	71	72	73
CL under towers (3)					71
10m sideways to towers 1A/B (4)			63		66
25m sideways to towers 1A/B (5)			56		62
10m sideways to bottom station (6)			65		66
25m sideways to bottom station (7)			55		58

For D-Line expect noise emissions to be reduced 2 - 3 dB(A)

(For UNI-G Station, Translated HGA 16/05/2019)

Noise Measurements

Project Nr:	AAA0002469
Project Name:	**Fluhexpress**
Type:	6-CLD/B
Rope:	DM 50 mm
$V_{max:}$	5,0 m/s
Gauge:	6,1 m
Top Station:	UNI-G-M
Gearbox:	GPC 270 S34 / n_e=530 U/min
Elec-Motor:	DSD SM560-16



		Noise Level Lp in dB(A)				
		3,0 m/s	3,5 m/s	4,0 m/s	4,5 m/s	5,0 m/s
Rear of Station	(1)	72	73	73	73	74
CL inside of station near Grip OC Lines	(2)	71	72	72	73	73
1m-close to drive machinery	(3)			83		85
10 m sideways to Top Station	(4)	65	66	65	67	68
25 m sideways to Top Station	(5)	56	57	58	59	59

Note UNI-G with DSD Drive.

D-Line expected to be 2 - 3 dB(A) less, and Direct Drive is the same as the return

(For UNI-G Station, Translated HGA 16/05/2019)