Acoustics assessment

Ashburton Second Urban Bridge

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Prepared for

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1

Introduction

1.1 Project overview

The Ashburton District Council (ADC) proposes to construct a new 2-lane bridge across the Ashburton River and an associated road that directly links Chalmers Avenue through 'green fields' to the east of Tinwald to a connection with Grahams Street. The proposed new bridge and associated new road is collectively referred to as the Ashburton Second Urban Bridge project (ASUB, "the project") (see Figure 1-1). The ASUB will provide an alternative urban route between east Tinwald and Ashburton township. The distance of the ASUB is approximately 2 kilometres (km).

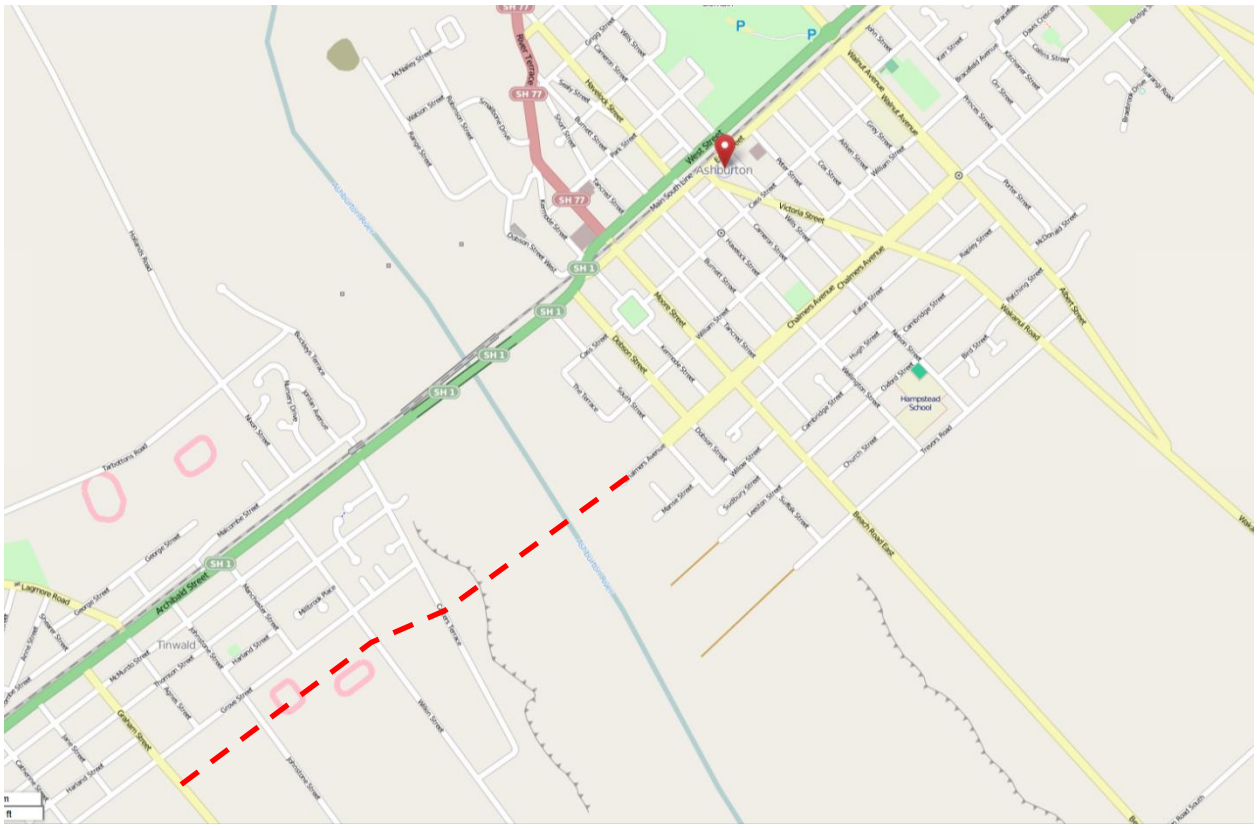

Figure 1-1 Overview plan (approximate location shown by red dashed line)

ADC is seeking a new designation to include the entire infrastructure associated with the ASUB including a 2-lane bridge, traffic lanes (including cycle lanes and parking), footpaths / pedestrian connections, intersections, stormwater infrastructure, landscaping, ancillary road infrastructure (e.g.; services within the road corridor), and road construction.

1.2 Project development

The proposed ASUB project is only one of a number of related transport projects for the Ashburton urban area that was identified in the Ashburton Transportation Study (ATS) completed in 2006. The purpose of that study was to identify present and future transportation demands within the Ashburton study area for the 20 year period through to 2026, and to recommend measures to optimise the performance of the land transport system within Ashburton township.

Physical construction of the ASUB is not required until approximately 2026, at which time traffic congestion on the existing bridge is expected to reach a point which justifies the need for a second

bridge. Traffic modelling indicates that up to 14,000 vehicles per day (vpd) are likely to use a second bridge by 2026, with between 5-10% expected to be heavy goods vehicles (HGVs). This traffic is likely to distribute amongst side roads to the north and south of the bridge and is expected to result in an overall reduction in total average travel time for all vehicles in the Ashburton urban area.

It is expected that by the time the ASUB project is required to be constructed, the environment within which the proposed designation is located will have undergone a degree of change from the current low density rural-residential land use to a land use that is in accordance with the new residential zonings within the district plan. ADC wishes to protect the route for a future bridge and associated new road before further development occurs. The designation for the ASUB is being sought now in order to secure the required land to ensure the project can proceed at the time that it is needed.

1.3 Noise assessment

1.3.1 2010 assessment

URS performed a preliminary assessment[1] of two options that would link Chalmers Avenue with Grove Street. URS recommended that noise mitigation such as a low-noise road surface would be appropriate, as the traffic volumes were sufficient to create adverse noise effects.

1.3.2 2012 assessment

In 2012, three alternate corridors were considered[2], each commencing at Chalmers Avenue, north of the river. The three corridors are shown graphically below and were referred to as:

- Grove Street
- Tinwald (urban)
- Tinwald (rural)

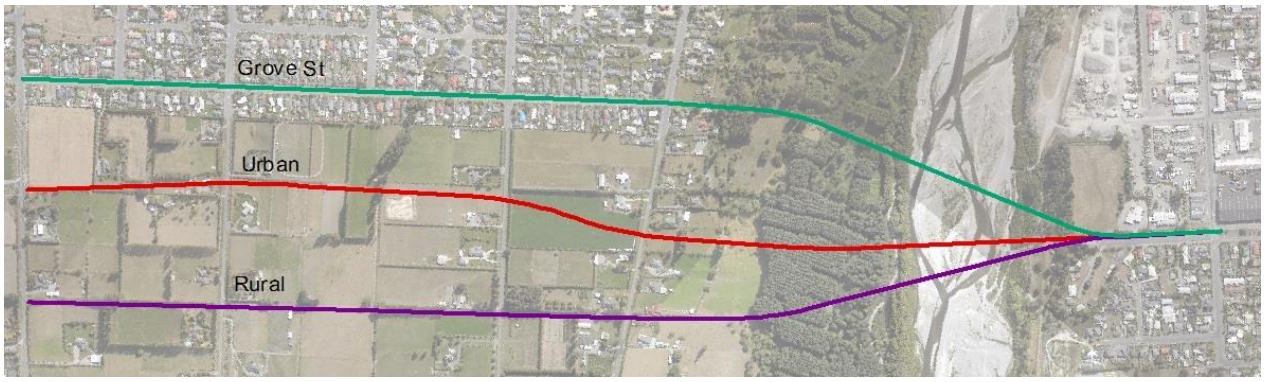

Figure 1-2 Alternate corridors

The Grove Street option included a low-noise surface, as recommended in Section 1.3.1. A low-noise surface was also included for the Tinwald (urban) option.

URS performed road-traffic noise modelling for the three corridors to compare the relative noise impacts, and also modelled the common section of Chalmers Avenue and Bridge Street north of the

[1] URS Letter dated 24 March 2010, Document 42173947 / L002B
[2] URS letter dated 13 August 2012, Document 42188320 / L001A

1 Introduction

river, which will experience increased traffic due to the new connection. Both the Grove Street and Tinwald (Urban) options resulted in all receivers within NZS 6806 Category A (see Section 2.4 for a discussion of criteria).

Table 1-1 Number of receivers in NZS 6806 categories (year 2026)

Alignment	Cat A	Cat B	Cat C
Grove Street	296	0	0
Tinwald (urban)	296	0	0
Tinwald (rural)	285	8	3

1.3.3 Assessment of Environmental Effects (AEE)

This noise assessment for the Project has been conducted by URS between July and August 2013 as part of the overall environmental assessment of the Project. This noise assessment supports the Assessment of Environmental Effects that will accompany the Notice of Requirement for a new designation in the Ashburton District Plan. The purpose of the noise assessment is to predict and assess future road-traffic noise levels, in accordance with New Zealand Standard NZS 6806[3], and to assess the resulting noise effects and any mitigation required.

The first stage of an assessment under NZS 6806 is a screening process to determine whether noise mitigation options should be developed. In this instance the relevant NZS 6806 thresholds are not exceeded and therefore no further assessment or development of noise mitigation is required under that Standard. The results of the screening process are presented in Sections 2 to 4 of this report.

Section 5 of this report assesses potential adverse effects from road-traffic noise. This includes existing roads north of the river that are outside of the proposed designation, but will receive increased traffic volumes due to the new connection. Only roads with a predicted traffic volume of greater than 2000 vpd have been modelled, and the considered area only extends north to Racecourse Road.

Section 6 discusses potential construction noise effects and describes the framework that will be used to manage these effects. A separate vibration assessment[4] has been performed by Opus.

Section 7 provides recommended conditions for this project.

[3] NZS 6806:2010, Acoustics – Road-traffic noise – New and altered roads
[4] Opus Research Report 13-6DHLNB..06 Ashburton Second Urban Bridge Project: Vibration assessment, September 2013

2

Criteria

2.1 Overview

There is no National Environmental Standard for road-traffic noise, and most district plans (including Ashburton) exclude road-traffic noise from zone noise limits and do not provide alternate criteria. In the absence of other criteria, virtually all significant state highway projects prior to 2010 were subject to noise assessment under the 'Transit Guidelines' (see Section 2.3).

In 2010 a New Zealand Standard for road-traffic noise NZS 6806 was published, and the NZTA has adopted[5] it as an assessment standard in place of the Transit Guidelines. Criteria are proposed by NZS 6806 to protect from sleep disturbance and provide a reasonable level of residential amenity. Unlike the Transit Guidelines, criteria are not based on the existing noise environment. However, a qualitative assessment of changes in noise levels is made in this report in addition to the quantitative assessment under NZS 6806.

Noise from individual vehicles has not been separately analysed as part of this investigation, but can be related to the distance of a receiver, called a Protected Premise and Facility (PPF), from the road. South of the river, there are 10 PPFs within 50 metres of the road.

2.2 Ashburton District Plan

The Partially Operative Proposed District Plan (the District Plan) excludes noise from vehicles on public roads from complying with zone standards. It does note that the NZ Transport Agency (NZTA) has developed guidelines for management of noise from state highways (see Section 2.3) and this can be used for other roads.

As the project will be authorised through a designation rather than resource consent, compliance with any rules would not be strictly required, but they provide a useful reference.

2.3 Transit Guidelines

The Transit Guidelines[6] were an internal document produced by Transit New Zealand and widely accepted and used for over a decade almost as if they were a National Environmental Standard. In the Transit Guidelines there is an average noise design criterion. For each location by a road, the average noise design level relates to the existing ambient noise level using the relationship shown in Table 2-1.

Table 2-1 Transit Guidelines noise criteria ($L_{Aeq(24h)}$)

Noise Area	Ambient Noise Level*	Average Noise Design Level*
Low	Less than 40.5 dB $L_{Aeq(24h)}$	52.5 dB $L_{Aeq(24h)}$
	40.5 - 47.5 dB $L_{Aeq(24h)}$	Ambient + 12 dB
Medium	47.5 - 56.5 dB $L_{Aeq(24h)}$	59.5 dB $L_{Aeq(24h)}$
High	56.5 - 64.5 dB $L_{Aeq(24h)}$	Ambient + 3 dB
	64.5 - 67.5 dB $L_{Aeq(24h)}$	67.5 dB $L_{Aeq(24h)}$
	More than 67.5 dB $L_{Aeq(24h)}$	Ambient

*Levels adjusted to free-field levels for consistency with NZS 6806. Original façade levels are 2.5 dB higher.

[5] NZTA (2011), Guide to assessing road-traffic noise using NZS 6806 for state highway asset improvement projects
[6] NZTA (1999), 'Appendix 6: Guidelines for the management of road traffic noise - state highway improvements' in Planning policy manual

The extensive use of the Transit Guidelines revealed four key challenges, in the way they were applied in many cases:

- They did not encourage integrated design. For example, in some projects the required performance of a noise barrier would take precedence over the adverse visual effects it might create.
- There was no requirement to mitigate unreasonable existing noise levels when altering a state highway. If the levels were already say 80 dB $L_{Aeq(24)}$ prior to a project then they could remain at that level under the Transit Guidelines.
- The criteria for new roads could be prohibitive.
- Mitigation was sometimes interpreted as being required to meet the noise limit even though the reduction achieved by the mitigation was imperceptible.

2.4 NZS 6806

2.4.1 Background

To address some of the weaknesses in the Transit Guidelines, the NZTA opted to participate in an independent process initiated by the Ministry of Transport and run by Standards New Zealand to create a new national standard for road-traffic noise.

To develop a Standard, Standards New Zealand appoints experts to a technical committee from organisations which should include representatives of all stakeholders. In the case of NZS 6806, the organisations were: Department of Building and Housing, INGENIUM, Local Government New Zealand, Ministry of Health, Ministry of Transport, New Zealand Acoustical Society, New Zealand Institute of Environmental Health, New Zealand Transport Agency, Road Controlling Authorities New Zealand and Roading New Zealand.

New Zealand Standard 6806 provides criteria and an assessment method for road-traffic noise. The method provides performance targets and requires assessment of a number of different options for noise mitigation, such as noise barriers and low-noise road surfaces, where performance targets are exceeded.

2.4.2 Criteria

The performance targets in NZS 6806 are set to be reasonable taking into account adverse health effects associated with noise on people and communities, the effects of relative changes in noise levels, and the potential benefits of new and altered roads.

Different performance targets are specified for new and altered roads, to account for the different level of existing traffic noise at receivers. Receivers are called protected premises and facilities (PPFs) by the standard, and are discussed further in Section 2.4.3.

Table 2-2 lists the criteria from NZS 6806.

2 Criteria

Table 2-2 NZS 6806 criteria

Category	Criterion	Free-field level	
		New road	Altered road
A	Primary	57 dB $L_{Aeq(24h)}$	64 dB $L_{Aeq(24h)}$
B	Secondary	64 dB $L_{Aeq(24h)}$	67 dB $L_{Aeq(24h)}$
C	Internal	40 dB $L_{Aeq(24h)}$	40 dB $L_{Aeq(24h)}$

A new road is defined as a road where no previously formed legal road existed. The proposed alignment south of the river fits this description, other than within 100 metres of existing local roads where NZS 6806 defines the project as an altered road.

An altered road requires a change in alignment. While no change in alignment occurs north of the river, the altered road criteria have been used to assess noise effects from the redistribution of traffic associated with this project.

The criteria apply to a design year 10 to 20 years after the completion of the new or altered road. In this, construction of the Project is not anticipated until approximately 2026, and the latest traffic predictions are for that year. In the absence of any other traffic modelling, these values have been used in the assessment.

2.4.3 Protected premises and facilities

NZS 6806 specifies PPFs where road-traffic noise from the Project should be assessed. PPFs include existing houses, schools, marae and various other locations defined in the Standard. The distance from the road within which PPFs are considered is set in NZS 6806 as:

- Urban areas – 100 metres from the edge of the nearside traffic lane
- Rural areas – 200 metres from the edge of the nearside traffic lane

The extents of rural and urban areas are defined by Statistics New Zealand[7]. Under this definition, the Ashburton urban area extends east to Grove Farm Road / Milton Road, and the project is entirely contained within an urban area. However, as shown in Figure 2-1, south of Grove Street, dwellings are only sparsely located and we consider a 200 m catchment to be more appropriate in this area.

These distances provide practical criteria to ensure the assessment is made at the most relevant receivers. Outside of these areas PPFs are not explicitly assessed. Potential noise effects are still controlled at receivers further away by virtue of noise criteria applying at receivers nearest to the road.

Future (unbuilt) PPFs are not considered by NZS 6806, unless they have building consent at the time of the application. Regardless, as the ASUB is not expected to be constructed until 2026, an assessment of effects on future dwellings is presented in Section 5.4.

[7] New Zealand: An urban/rural profile, Statistics New Zealand

2 Criteria

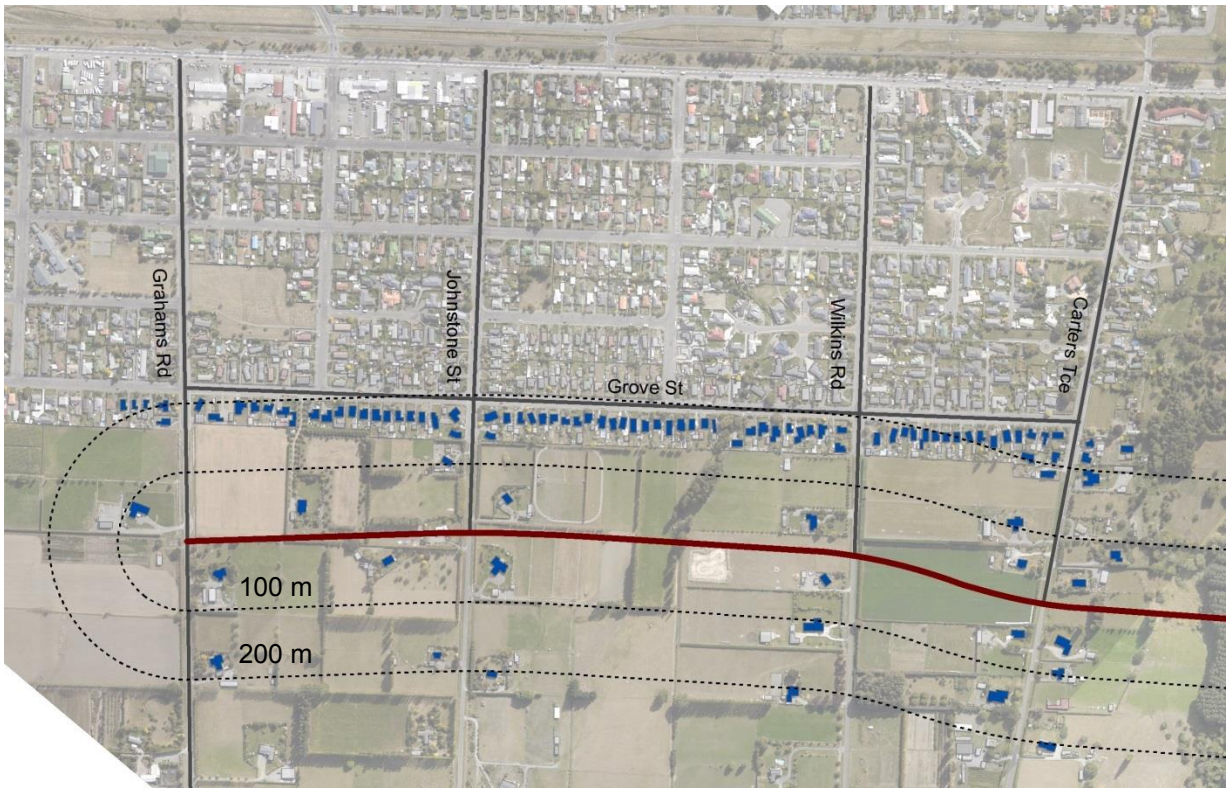

Figure 2-1 PPFs (south of river)

2.4.4 Mitigation

Noise mitigation options are to be assessed, and if practicable, the Category A criterion should be achieved. If this is not practicable then mitigation should be assessed against Category B. However, if it is still not practicable to comply with categories A or B then mitigation should be implemented to ensure the internal criterion in Category C is achieved. Depending on the specific building, mitigation in Category C could include ventilation and/or sound insulation improvements ranging from upgraded glazing through to new wall and ceiling linings. In Category C there is no protection of outdoor amenity.

NZS 6806 provides a procedure for assessing the benefits and costs of mitigation options to help determine the Best Practicable Option, where mitigation is required.

3

Existing environment

Unlike previous standards, the criteria in NZS 6806 to assess road-traffic noise are not dependent on the existing noise levels. Measurements of existing levels are therefore not required for that part of this assessment. However, an appreciation of the existing environment is required to assess the potential noise effects, regardless of compliance with any particular noise criteria.

South of river

Between Grove Street and SH1, the land is zoned Residential C under the District Plan, and currently established with typical density dwellings. Noise from distant vehicle movements on SH1 is audible, and relatively constant throughout the day. South of Grove Street is zoned Residential D, however this land is currently only sparsely developed, with large section sizes. The noise environment is typical of a urban / suburban area.

North of river

There is a large area of Business A and C zoned land fronting SH1, which contains rural service and other commercial activities. Noise from vehicle movements on SH1 is clearly audible. Noise from vehicle movements on the roads servicing the business zones is also significant part of the acoustic environment.

Heading east (away from SH1), the zoning and underlying land use changes to Residential A then to B, and east of Chalmers Avenue, becomes Residential C. Chalmers Avenue is approximately 600 metres from SH1, and distant road-traffic noise is less dominant. Vehicle movements on local roads becomes more prominent.

4

Modelling

4.1 Procedures

The modelling of noise provides an objective basis to consider the effects of future activities. The modelling techniques used are well established in New Zealand.

The following scenarios were modelled:

- Existing – the existing roads with 2010 traffic;
- Do-nothing – the second bridge not constructed; the existing roads with 2026 traffic (this is equivalent to the 'do minimum' scenario referred to in the traffic engineering report); and
- Do-minimum – the second bridge constructed; 2026 traffic; no specific noise mitigation,.

Table 4-1 lists the key model settings.

Table 4-1 Model settings

Parameter	Setting/source
Software	Cadna/A v4.3
Algorithm	CRTN[8]
Reflection model	CRTN
Parameter	$L_{Aeq(24h)}$
Ground absorption	1.0
Receiver height	1.5 m (4.5 m upper floors) – most exposed façade
Noise contour grid	1.5 m height, 10 m resolution
Receivers and grid position	free-field

The CRTN algorithm gives results in terms of the $L_{A10(18h)}$. To convert this to $L_{Aeq(24h)}$ a –3 dB adjustment has been made.

Input data

The following data has been used in the computer noise model:

- Topographic contours have been imported at 1 metre intervals.
- Building outlines have been imported from Ashburton District Council data and two-story buildings identified from Google Streetview. All buildings have been modelled as 5 metres uniform height for single storey buildings and 7.5 metres uniform height for two storey buildings.
- Road alignments have been imported as centrelines and road widths. Each two-lane carriageway has been modelled as a single road. Each carriageway of Chalmers Avenue has been modelled as a separate road.
- The bridge has been configured to be a 'self-screening' road, which blocks the sound of the road passing through it.
- Surfaces of all roads have been modelled as specified in Table 4-2.
- The road surface correction in the model includes a –2 dB adjustment for a reference asphaltic concrete (AC) road surface[9], and corrections for other surfaces have been calculated separately[10]. The data for chip seal applies to Grade 2 and Grades 2/4 to 3/6.

[8] Calculation of Road Traffic Noise (CRTN). UK Department of Transport and the Welsh Office. ISBN 0115508473. 1988

4 Modelling

Traffic data has been provided by Opus for all roads as the Annual Average Daily Traffic (AADT), percentage of heavy vehicles (HV) and speed, as shown in Table 4-2.

[9] Research Report 28. Traffic noise from uninterrupted traffic flows, Transit, 1994
[10] Research Report 326: Road surface effects on traffic noise: Stage 3 – Selected bituminous mixes. Land Transport New Zealand, 2007

4 Modelling

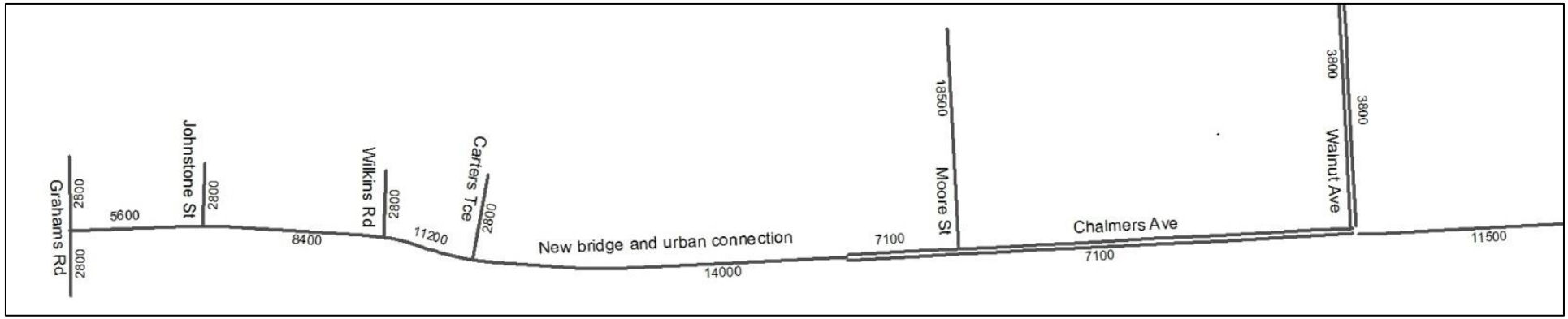

Figure 4-1 Traffic data (2026, with project)

Table 4-2 Traffic data

Section	Existing (2010)				Do-nothing (2026)				Do minimum (2026)			
	Surface	Speed	AADT	HV	Surface	Speed	AADT	HV	Surface	Speed	AADT	HV
Walnut Ave	Chip Seal	50	1600	7%	Chip Seal	50	5900	7%	Chip Seal	50	7600	7%
South St (east of East St)	Chip Seal	50	3000	11%	Chip Seal	50	4400	11%	Chip Seal	50	900	11%
Moore St (east of East St)	Chip Seal	50	3200	5%	Chip Seal	50	16000	5%	Chip Seal	50	18500	5%
Bridge St (south of Seafield Rd)	Chip Seal	50	2700	6%	AC*	50	9900	8%	AC*	50	11500	8%
Chalmers Ave (south of Walnut Av)	Chip Seal	50	3000	10%	Chip Seal	50	11000	8%	AC*	50	14200	8%
New bridge and connection									AC	50	14000	8%
Grahams Rd (Grove St to SH1)	Chip Seal	50	1900	6%	Chip Seal	50	3200	6%	Chip Seal	50	2800	6%

* It is noted that ADC's intention to resurface Bridge Street and Chalmers Avenue is not a requirement of this project

4.2 Results

Predicted noise levels in the form of noise contour plots are provided in Appendix A. The noise contours in these figures are relatively constrained due to the modest traffic volumes and screening effect of buildings near the roads.

PPFs in these figures are coloured in accordance with the categories from NZS 6806. A summary of the number of PPFs in each NZS 6806 category is shown in Table 4-3. PPFs north and south of the river are shown separately.

The noise levels predicted are only from roads included in the noise model. Where PPFs are not near modelled roads, predicted noise levels will not reflect the actual noise level at these locations, as noise levels will be controlled by other sources. For this reason, noise levels are not presented in the area south of the bridge without the project.

Table 4-3 Predicted noise levels, dB $L_{Aeq(24)}$

Alignment	Cat A	Cat B	Cat C
South of Dobson St / River			
Existing (2010)	N/A[1]	N/A[1]	N/A[1]
Do-nothing (2026, no bridge)	N/A[1]	N/A[1]	N/A[1]
Do-minimum (2026, bridge)	108	0	0
North of Dobson St / River			
Existing (2010)	447	0	0
Do-nothing (2026, no bridge)	409	20	18
Do-minimum (2026, bridge)	417	11	19

[1] Existing and do-nothing noise levels will not be controlled by road-traffic noise

South of the river, all PPFs are within Category A. Increases in noise level over the existing environment are difficult to predict due to low flows on local roads. The noise environment is influenced by distant traffic noise from the state highway.

4.3 NZS 6806

As all PPFs south of the river are within Category A, no mitigation is required to be considered under NZS 6806. It is noted that asphaltic concrete is a low-noise surface, and has been included in the do minimum design.

5

Assessment of operational noise effects

5.1 NZS 6806

NZS 6806 sets reasonable criteria for road-traffic noise levels, taking into account health issues associated with noise and other matters. On this basis, it is considered that road-traffic noise levels in compliance with NZS 6806 Category A should generally result in acceptable noise effects. Where the existing environment is heavily influenced by road-traffic noise, compliance with Category B may also represent acceptable noise levels.

5.2 New bridge and urban road

Moderate noise levels are predicted at the nearest PPFs to the new urban road, with setbacks of 30-50 metres typical from the carriageway. All PPFs where road-traffic noise from the urban road will dominate will be within the Category A (new road) criteria. PPFs where traffic noise from the side roads connecting the new urban road to SH1 will dominate will be within Category A (altered road).

Compliance with the most stringent Category A will result in acceptable noise effects.

5.3 Existing roads

While no alignment changes are made north of the proposed bridge over the Ashburton River, there will be re-routed traffic on some local roads because of the project. For this reason, noise from affected roads in the vicinity of the bridge, with over 2000 vehicles per day, has also been modelled. As shown in Table 4-3, 30 PPFs north of the river are in either Category B or C. These PPFs are all on Moore Street. A significant increase in noise is predicted at these PPFs in the design year even if the project does not proceed (do-nothing), due to other factors increasing the traffic volume.

NZS 6806 includes thresholds for projects to determine whether they should be assessed under the Standard. In this instance the relevant thresholds are in Section 1.5 of NZS 6806 and are triggered if the do-minimum noise levels are greater than:

- 64 dB $L_{Aeq(24h)}$ and the increase over the do-nothing noise level is at least 3 dB; or
- 68 dB $L_{Aeq(24h)}$ and the increase over the do-nothing noise level is at least 1 dB.

Traffic on Chalmers Avenue will increase from 11,000 to 14,200 vpd as a result of the project. The increase in noise level is limited to 1 dB, which is not significant. The ADC is proposing to resurface the existing chip seal surface with asphaltic concrete, and noise levels will decrease and all PPFs there remain in Category A (64 dB or less). 2 Tuarangi Road has a predicted noise level of 65 dB, however the increase in noise level over the do-nothing scenario is limited to 1 dB. Therefore the altered road trigger has not been achieved.

On Moore Street, a change in traffic from 16,000 vpd in the do-nothing to 18,500 vpd in the do-minimum scenarios is predicted. This will result in an increase in noise level of 1 dB. The highest predicted noise level is 69 dB. On this basis, the requirement for consideration under NZS 6806 would be marginal. As discussed, there is no realignment of Moore Street, and NZS 6806 does not apply.

For Moore Street, as discussed above, the Category B and C noise levels are because of general traffic growth and cannot be directly attributed to this project. Resurfacing this section of Moore Street with an asphaltic concrete would result in a noise reduction of approximately 5 dB, making all PPFs either Category A or Category B. However, this is not required as a result of the ASUB project.

5.4 Future residential dwellings

As discussed in Section 2.4.3, only existing dwellings are considered PPFs by NZS 6806. The owners of any dwellings built after the designation is confirmed, but prior to construction of the road, will be aware of the designation, and should consider the potential effects of the road.

The following noise levels are predicted at different distances from the road:

- At 6 m from the carriageway edge, a noise level of 64 dB $L_{Aeq(24h)}$ is predicted. This is the Category B criterion from NZS 6806 for new roads, and is the equivalent to Category A for altered roads.
- At 25 m from the carriageway edge, a noise level of 57 dB $L_{Aeq(24h)}$ is predicted. This is the Category A criterion from NZS 6806 for new roads.

The designation boundary is between 6 and 8 metres from the edge of the carriageway. Therefore, if a dwelling was constructed right against the designation boundary, noise levels are still predicted to achieve Category B for new roads. In practice, dwellings are likely to be set back from the parcel / designation boundary and will experience lower noise levels. Noise effects from the project on the Residential C and D land are therefore considered acceptable, and will not unreasonably restrict future land use.

6

Construction noise effects

6.1 Introduction

Potential construction noise effects can arise through the use of construction machinery and ancillary machinery such as stand-by generators. These potential noise effects will be controlled through a detailed management procedure in accordance with nationally recognised good practice. A full methodology for physical works has not been established at this stage, however the project will involve excavation, service relocation, pavement construction, piling for bridge piers, and surface finishing, in proximity to residential dwellings. At this stage the construction sequencing and overall duration is unknown, however it is anticipated that the majority of construction activities will be in the order of 3 to 6 months in one location, with the exception of the bridge which may take up to a year. It is anticipated that all works can be performed during daytime hours, with traffic diversions in place as required.

While a separate technical report has been prepared for vibration, the management processes for construction noise and vibration should be aligned.

6.2 Management

The NZTA has established processes for managing construction noise from roading projects, which will form the basis of the management systems for this Project. These management processes are documented in the NZTA *State highway construction and maintenance noise and vibration guide*[11] (Construction Guide). The Construction Guide adopts the framework for managing construction noise from the New Zealand Standard NZS 6803[12], including its guideline noise limits. This is consistent with the District Plan requirements.

In accordance with the NZTA processes, prior to construction, a Construction Noise and Vibration Management Plan (CNVMP) will be prepared. The appointed contractors will be responsible for implementing this plan. The NZTA has a standardised template[13] for this purpose that should be used. The plan will include:

- Noise and vibration targets;
- Summary of assessments/predictions;
- General construction practices, management and mitigation;
- Noise management and mitigation measures specific to activities and/or receiving environments;
- Monitoring and reporting requirements;
- Procedures for handling complaints;
- Procedures for review of the CNVMP throughout the Project; and
- Management schedules to the CNVMP for specific activities and locations where further assessment and control is required.

For significant activities (e.g. piling), a schedule to the CNVMP will be prepared once details of specific construction equipment and locations have been confirmed. These schedules will set out specific conditions relating to a defined activity and location. Any activity which will require night works will require a schedule to be prepared.

[11] NZTA State highway construction and maintenance noise and vibration guide, V1.0, August 2013

[12] NZS 6803:1999 Acoustics – Construction noise

[13] www.acoustics.nzta.govt.nz/tools/templates

6.3 Assessment of effects

The nearest existing receivers are 25 to 50 metres from the edge of the carriageway. In the future, residential dwellings may be constructed adjacent the designation boundary, which is 6-8 metres form the edge of the carriageway. At these distances, construction noise levels are anticipated to be at levels that may at times interfere with daytime domestic activities. Temporary daytime disturbances from construction activities is an issue that is commonly managed using standard processes on roading projects. Any areas requiring enhanced management will be identified when preparing the CNVMP.

Designation conditions have been proposed in Section 7.2, which require the construction noise and vibration management measures discussed above to be implemented. On this basis and with construction activities being limited to daytime hours, construction noise effects from this project are considered acceptable.

7

Recommended conditions

The following conditions are recommended to manage operational and construction noise effects.

7.1 Operational noise

Condition N1

A low-noise surface such as asphaltic concrete shall be installed on the new alignment.

7.2 Construction noise

Condition C1

The ADC shall implement a Construction Noise and Vibration Management Plan (CNVMP) throughout the entire construction period of the Project. The CNVMP shall be provided to the [council officer] for certification that it addresses Conditions [C1] to [C3] prior to commencement of construction of the project.

The CNVMP must describe the measures adopted to seek to meet:

- the noise criteria set out in Condition [C2] below, where practicable. Where it is not practicable to achieve those criteria, alternative strategies should be described to address the effects of noise on neighbours, e.g. by arranging alternative temporary accommodation; and

The CNVMP shall, as a minimum, address the following:

- Description of the works, anticipated equipment/processes and their scheduled durations.
- Hours of operation, including times and days when construction activities causing noise and/or vibration would occur.
- The construction noise and vibration criteria for the project.
- Identification of affected houses and other sensitive locations where noise and vibration criteria apply.
- Requirement for building condition surveys at locations close to activities generating significant vibration, prior to and after completion of the works (including all buildings predicted to exceed the Category A vibration criteria in Condition [C3]).
- Mitigation options, including alternative strategies where full compliance with the relevant noise and/or vibration criteria cannot be achieved.
- Management schedules containing site specific information.
- Methods and frequency for monitoring and reporting on construction noise and vibration.
- Procedures for maintaining contact with stakeholders, notifying of proposed construction activities and handling noise and vibration complaints.
- Construction equipment operator training procedures and expected construction site behaviours.
- Contact numbers for key construction staff, staff responsible for noise assessment and council officers.

Condition C2

Construction noise must be measured and assessed in accordance with NZS 6803:1999 ‘Acoustics-Construction Noise’. The construction noise criteria for the purposes of the CNVMP are:

7 Recommended conditions

Time of week	Time period	Duration of construction work at any one location			
		less than 20 weeks		more than 20 weeks	
		$L_{Aeq(1h)}$	L_{AFmax}	$L_{Aeq(1h)}$	L_{AFmax}
Residential					
Weekdays	0630-0730	60 dB	75 dB	55 dB	75 dB
	0730-1800	75 dB	90 dB	70 dB	85 dB
	1800-2000	70 dB	85 dB	65 dB	80 dB
	2000-0630	45 dB	75 dB	45 dB	75 dB
Saturdays	0630-0730	45 dB	75 dB	45 dB	75 dB
	0730-1800	75 dB	90 dB	70 dB	85 dB
	1800-2000	45 dB	75 dB	45 dB	75 dB
	2000-0630	45 dB	75 dB	45 dB	75 dB
Sundays and public holidays	0630-0730	45 dB	75 dB	45 dB	75 dB
	0730-1800	55 dB	85 dB	55 dB	85 dB
	1800-2000	45 dB	75 dB	45 dB	75 dB
	2000-0630	45 dB	75 dB	45 dB	75 dB
Industrial and commercial					
All days	0730-1800	75 dB	-	70 dB	-
	1800-0730	80 dB	-	75 dB	-

8

Conclusion

URS has performed modelling of road-traffic noise for the proposed Ashburton Second Urban Bridge project. This project is unlikely to be constructed for approximately 10 years, however a designation is sought to protect the route. Predicted noise levels at existing receivers south of the river remain within the preferred 'Category A' defined by NZS 6806 for altered roads. On this basis, noise effects are considered acceptable.

While future dwellings are not considered PPFs by NZS 6806, they have been considered in this assessment. Future dwellings greater than 6 m from the carriageway achieve Category B (new road) / Category A (altered road) and dwellings greater than 25 m comply with the more stringent Category A (new road).

The proposed bridge and new road will be surfaced with asphaltic concrete, which is a low-noise surface. No other specific mitigation for noise effects is required.

Noise levels at receivers on Moore Street are predicted to increase in 2026 both with and without the project. Resurfacing with asphaltic concrete could be considered as a separate exercise to reduce this exposure.

The nearest existing dwellings are 25 to 50 metres from the edge of the carriageway, and future dwellings are likely to be closer, potentially only 6 metres away. At these distances, construction noise levels are anticipated to be at levels that may at times interfere with daytime domestic activities. Construction works will be limited to daytime hours and be of limited duration. With appropriate management and communication, construction noise effects are considered acceptable.

9

Limitations

URS New Zealand Limited (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Opus International Consultants Ltd.

It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this Report.

It is prepared in accordance with the scope of work and for the purpose outlined in the contract dated 28 June 2012.

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This Report was prepared between July and September 2013 and is based on the information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

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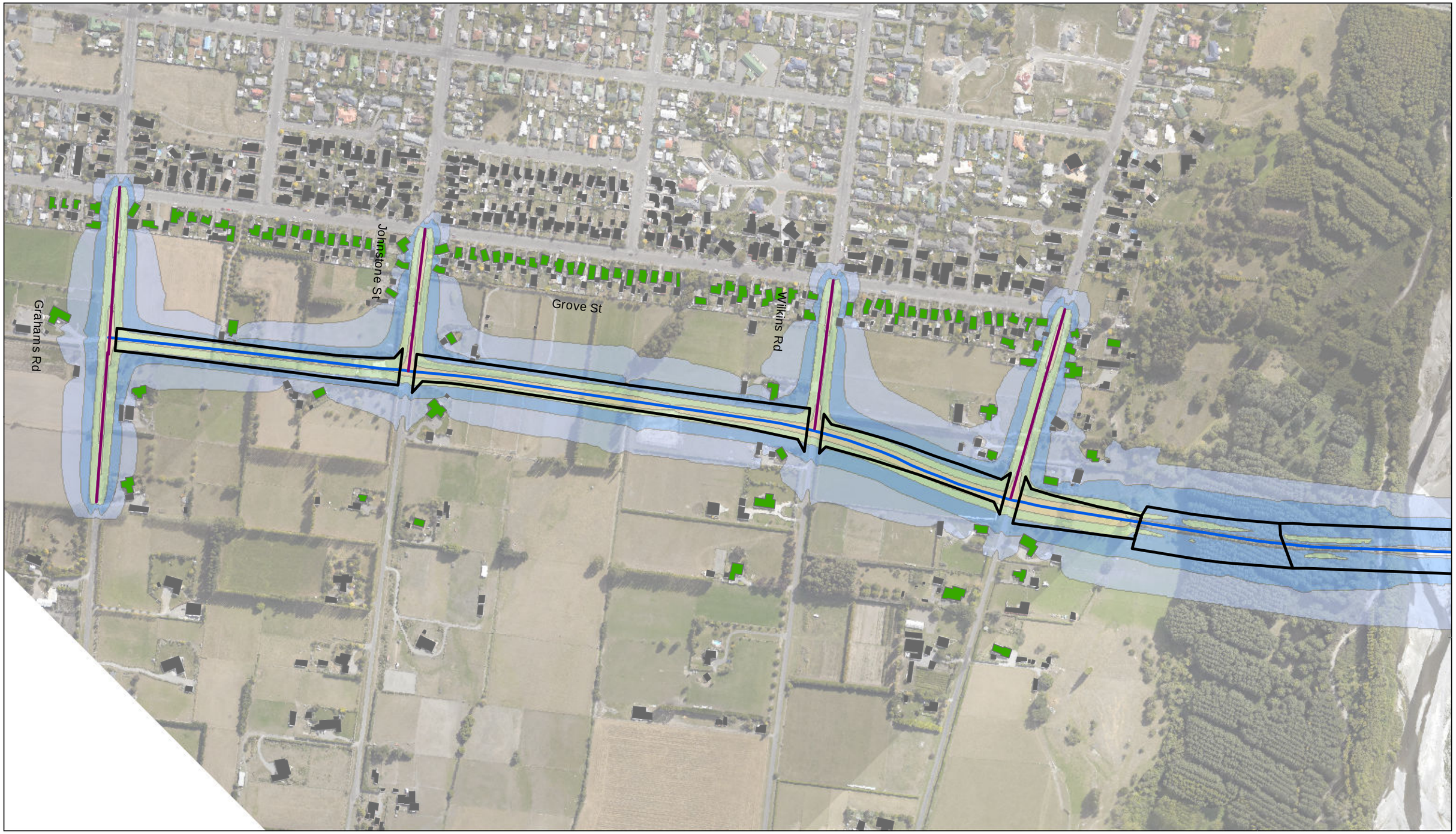
It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

A

Appendix A Noise contours



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Scale: 1:5,000 (A3)

NZGD 2000 New Zealand Transverse Mercator

Source: J:\CHC\421883201\5 Works\GIS\G003 Ashburton NoR.mxd

Modelled road surfaces

- Chip seal
- Asphalt

Other symbols

- Designation boundary

NZS 6806 Categories

- Category A
- Category B
- Category C

Noise contours

- 50 - 55 dB
- 55 - 60 dB
- 60 - 65 dB
- 65 - 70 dB
- 70 - 75 dB

NEW URBAN LINK

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ASHBURTON SECOND URBAN BRIDGE / PREDICTED NOISE LEVELS (2026)

Figure: **A1**

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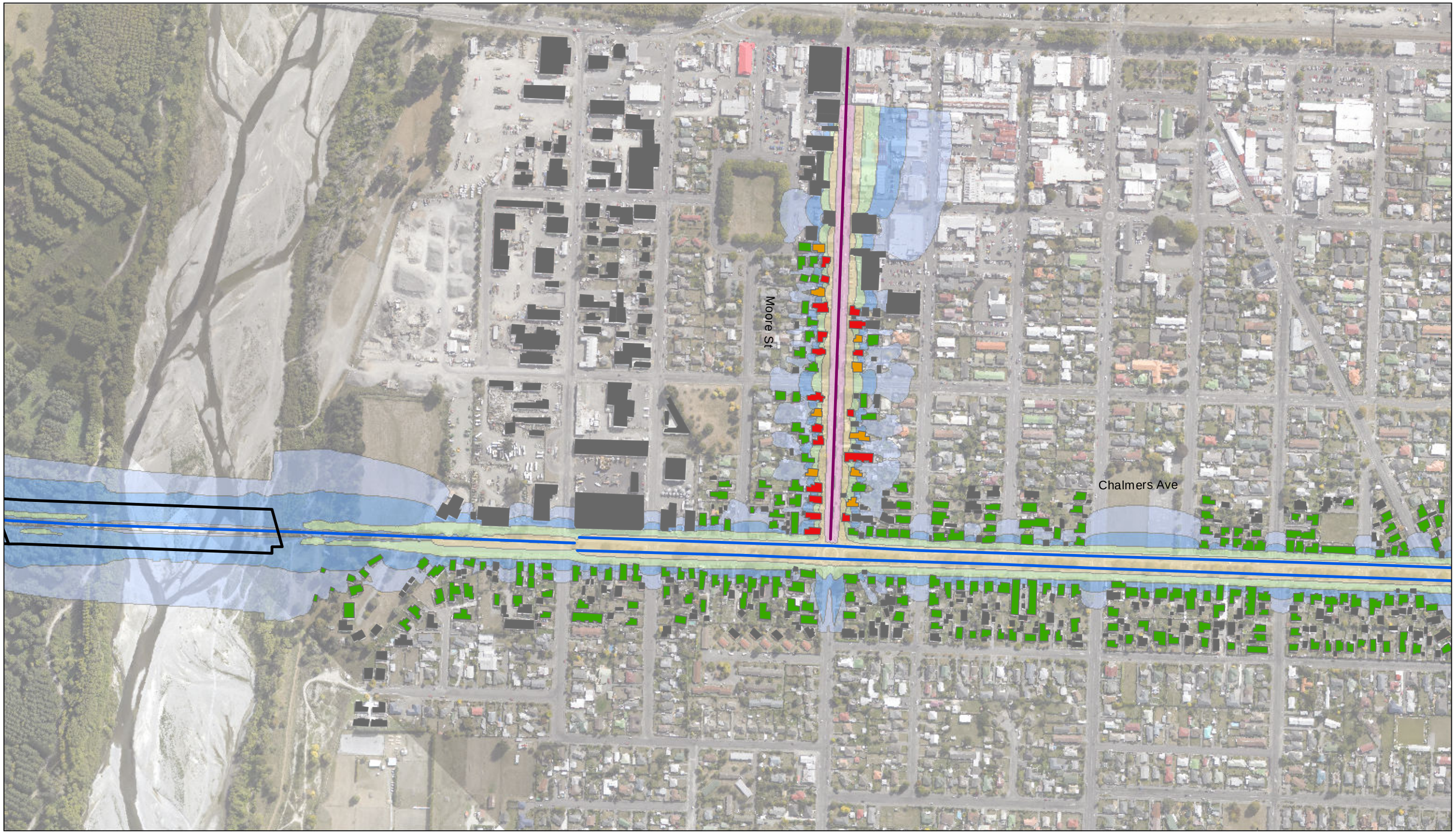
273 Cashel Street, Christchurch, 8011 Phone: + 64 3 374 8500 Fax: + 64 3 377 0655



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NZGD 2000 New Zealand Transverse Mercator

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Modelled road surfaces

- Chip seal
- Asphalt

Other symbols

- Designation boundary

NZS 6806 Categories

- Category A
- Category B
- Category C

Noise contours

- 50 - 55 dB
- 55 - 60 dB
- 60 - 65 dB
- 65 - 70 dB
- 70 - 75 dB

CHALMERS AVENUE

ASHBURTON SECOND URBAN BRIDGE / PREDICTED NOISE LEVELS (2026)

Figure: **A2**

Drawn: **MS** Reviewed **SC** Date: **12/09/2013**

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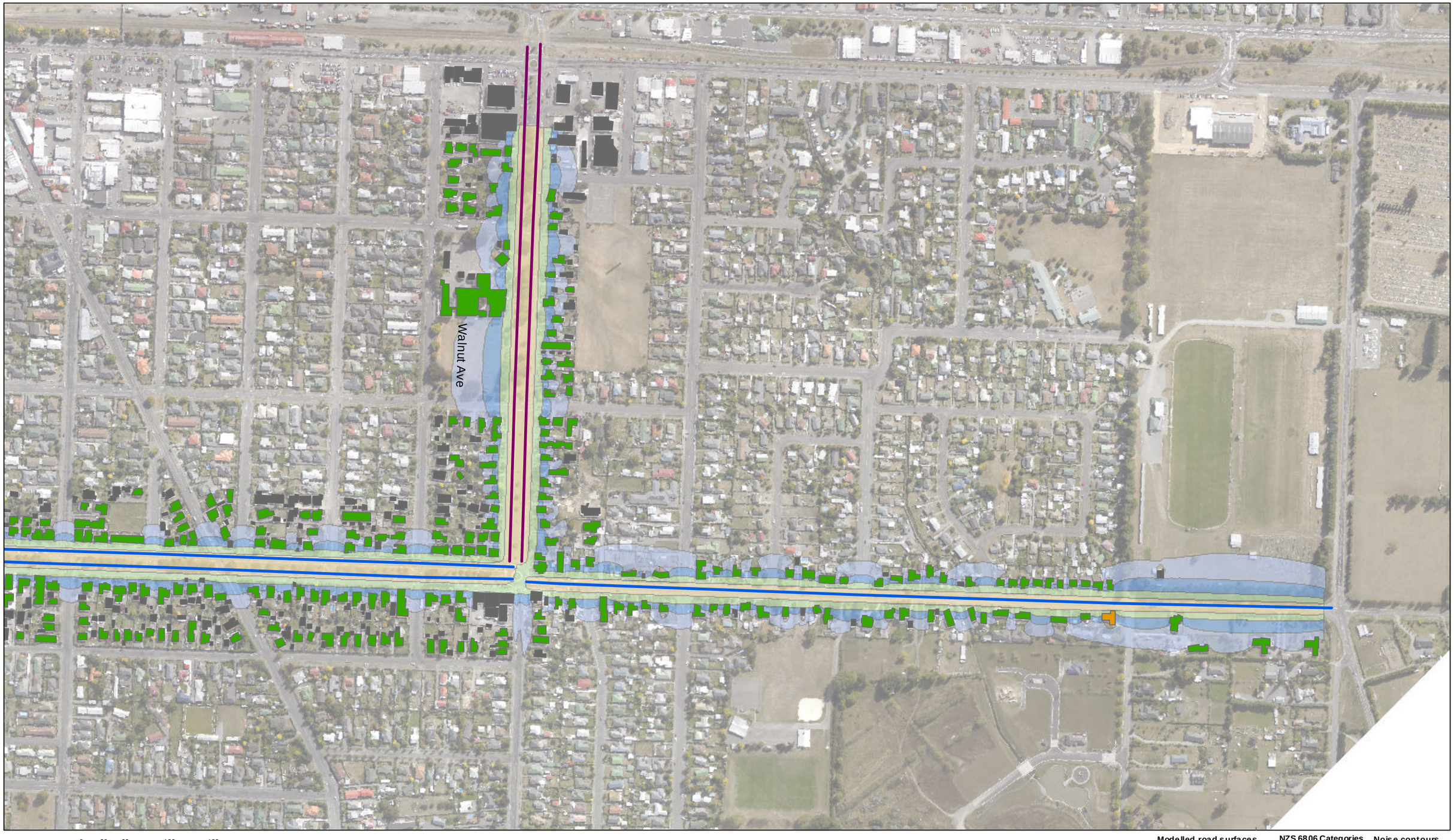

0 30 60 120 180 Metres

Scale: 1:5,000 (A3)
NZGD 2000 New Zealand Transverse Mercator

Source: J:\CHC\42188320\5 Works\GIS\G003 Ashburton NoR.mxd

Modelled road surfaces
- Chip seal
- Asphalt

Other symbols
- Designation boundary

NZS 6806 Categories
- Category A
- Category B
- Category C

Noise contours
- 50 - 55 dB
- 55 - 60 dB
- 60 - 65 dB
- 65 - 70 dB
- 70 - 75 dB

BRIDGE STREET

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ASHBURTON SECOND URBAN BRIDGE / PREDICTED NOISE LEVELS (2026)

Drawn: MS Reviewed SC Date: 12/09/2013

Figure: A3

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