City Rail Link Limited, PO Box 9681, Newmarket, Auckland 1149
Tel 0800 CRL TALK (275 8255)

27 August 2021

Plans and Places
Auckland Council
Level 24, 135 Albert Street Auckland Central

Attention: Chris Scrafton

Dear Chris,

Response to clarifications on Notice of Requirement to Alter City Rail Link Limited Designation 2501 in the Auckland Unitary Plan (Operative in Part)

We write in response to your 5 August 2021 request for clarifications in respect of the City Rail Link Limited (**CRLL**) 'Notice of a Requirement to Alter City Rail Link Limited Designation 2501 in the Auckland Unitary Plan (Operative in Part)'.

1. Construction Noise

Auckland Council request for clarification

A more robust consideration of a taller screen/barrier (higher than 2m) is needed as part of the BPO assessment rather than deferring this matter to when the site is established (as currently intended in Section 3.5 of CNMP). If a taller screen has been identified as the BPO, this will also require updates to the CNMP.

Response

The CRL project noise specialist (James Whitlock from Marshall Day Acoustics) confirms that a 10-metre high acoustic barrier (which is taller than would be practicable) was modelled. Soundsplash images for a 2-metre and 10-metre high barrier are shown respectively in Figure 1 and Figure 2 below. The images illustrate that even a 10-metre high barrier cannot achieve compliance on the façade of buildings on the north side of Tyler Street due to the geometry of the situation. As a higher barrier would not provide any additional benefit, it is considered that a 2-metre barrier is the best practicable option.

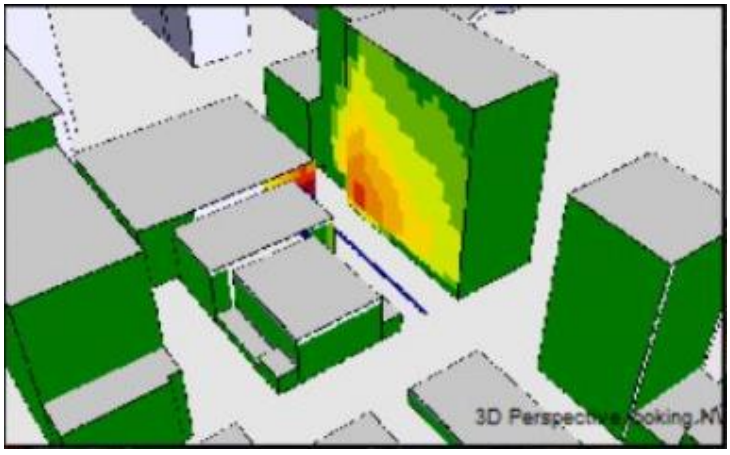

Figure 1 Soundsplash image for a 2 metre high noise barrier

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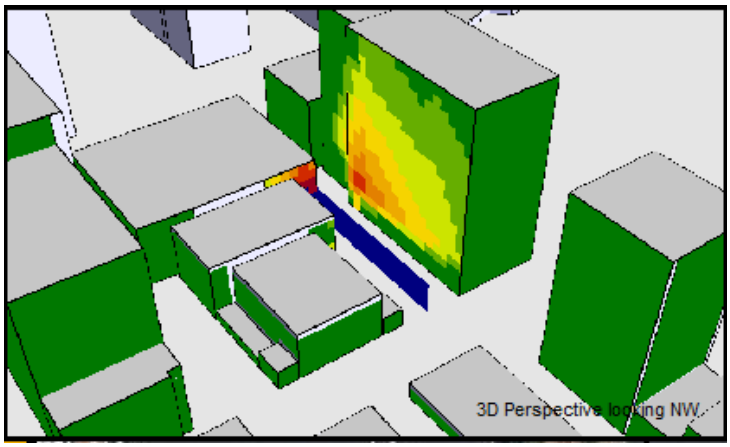

Figure 2 Soundsplash image for a 10 metre high noise barrier

A partial acoustic enclosure was not modelled by the noise specialist as the construction team have confirmed it is infeasible to establish an enclosure in this area of the proposed site compound, due to both vertical and horizontal space constraints. Within the same area, the construction team must allow for:

- Access space for the Britomart Station emergency fire panel that is located at the north-western corner of the Glasshouse.
- An access route and site entry point for construction staff entering the underground works via the north-eastern corner of the former Chief Post Office (CPO) building.
- A gantry structure to house the proposed ventilation fan at the northern end of the Glasshouse, which will double as storage space underneath.
- Available space for deliveries, concrete pumps and other equipment.
- Lifting equipment that requires vertical clearances to crane materials down into the underground works via the north-eastern corner of the Glasshouse.

These activities are described in detail in the Link Alliance 'Constructability Report' (25 June 2021) that accompanies and forms part of the CRLL Notice of Requirement (for example, the photograph in Figure 3.5 of the Constructability Report illustrates the vertical clearance required for major crane deliveries).

If a fixed structure such as a partial enclosure was to be introduced in this immediate area, it would hinder the construction team's ability to undertake the Works. Tyler Street is the main area for material deliveries and the aim of the proposed moveable site compound fence is to provide ease of access and the ability to manoeuvre in a constrained space. The acoustic barrier will be integrated with the site compound fence along Tyler Street.

In addition, as Tyler Street will remain open to other vehicles, we will need to ensure construction and general traffic in the area is safely managed. Introducing a fixed structure, that may need to extend out beyond the northern boundary of the site compound because of the space constraints described above, would restrict the ability of the construction team to safely manage traffic and maintain access in Tyler Street.

We refer to the Concrete Truck Tracking drawings in Attachment 2 of the section 92 response dated 26 July 2021, which further illustrate the space constraints of this part of the site. These drawings are reattached as **Attachment 1** for ease of reference.

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Updated copies of the Construction Noise Assessment and Construction Noise Management Plan are included as **Attachments 2** and **3** to address the amendment of the Saturday start time for concrete pumping activities to 7am (refer section 2.3 of the Noise Assessment and section 1.4 of the Management Plan). We note low noise generating site setup activities would commence at the earlier 6.30am time on a Saturday in accordance with the Auckland Unitary Plan standards.

2. Construction Traffic

Auckland Council request for clarification

Additional matters to be addressed by the CTMP:

- *Locations of any footpath closures and/or pram crossings to be closed*
- *Methods to be employed to avoid or minimise the effect of queuing generated at or beyond Tyler/Commerce intersection and into Quay Street, including interactions with bus and pedestrian/cyclist usage of Commerce Street and Quay Street*
- *Methods to be employed to avoid or minimise conflict with buses stopped in Commerce Street both at the mid-block signals and at the bus stops*
- *Details of the proposed construction traffic management techniques. This should include the location and mode of operation of the manual traffic controllers within Tyler Street and Commerce Street for when reverse manoeuvres of concrete trucks occur, to avoid or minimise effects on the public usage (all road users) of Tyler Street and Commerce Street.*

Response

The CRL project traffic expert (Ian Clark from Flow Transportation Specialists) and the Auckland Council traffic expert (Don McKenzie from Stantec) have discussed the matters raised relating to the Construction Traffic Management Plan (**CTMP**), and have agreed that these matters can be addressed by adding further detail within the CTMP conditions. Therefore, the following matters are included in a revised set of draft conditions, provided as **Attachment 4**:

- To ensure safety of all users, pedestrian movements during concrete delivery manoeuvring shall be controlled.
- The existing pedestrian access to Britomart Station, through the Chief Post Office building, shall be maintained.
- Vehicles associated with the Works shall not reverse into Tyler or Galway Streets during weekday peak traffic periods of 7.00am to 9.30am and 3.00pm to 6.00pm, unless agreed with the Auckland Transport corridor access team prior.
- Concrete delivery shall be coordinated to minimise impact on the functionality of all modes on Commerce Street and Tyler Street with priority given to pedestrians and public transport, essential movements including emergency services, access to properties and lastly private car travel.
- To avoid more than one concrete truck in the Station Plaza site compound and one in the Tyler Street concrete truck waiting area at any one time, any required remote waiting locations for concrete trucks shall be identified.

The CTMP will be updated to incorporate these and any additional points following stakeholder feedback and reissued once the anticipated Court mediation process is completed.

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3. Construction Environmental Management Plan

Auckland Council request for clarification

Additional matters to be considered in the CEMP:

- *Confirmation that the CCP Complaints process will apply to the works.*
- *Details of the measures to keep the construction area in a tidy condition including measures to ensure all temporary boundary / security fences associated with the construction of the Project are maintained in good order with any graffiti removed as soon as possible.*
- *Details of how the construction areas are to be fenced and kept secure from the public and the location of temporary acoustic fences and visual barriers*
- *Details of the methods to control the intensity, location and direction of artificial construction lighting to avoid light spill and glare onto sites adjacent construction areas.*
- *Details of the methods to ensure the prevention and mitigation of adverse effects associated with the storage, use, disposal, or transportation of hazardous substances.*

Response

As with the CTMP the Construction Environmental Management Plan (**CEMP**) will be updated and reissued once the anticipated court mediation process is completed. In the interim we confirm as follows:

- The process for addressing complaints is described in Sections 4 and 5.3.5 of the CEMP (dated 25 June 2021). CRLL will clarify the ongoing communication and engagement to be undertaken during the course of the Works (which needs to be co-ordinated with the communication and engagement for other CRL construction works at Britomart) and additional material will be included in the amended CEMP.
- Section 4.1.2 'Specific Roles and Responsibilities' and Section 4.2 'Training and Induction' of the CEMP describe the responsibilities and actions necessary to maintain the site compound and surrounding area in good order. The amended CEMP will include specific references to the requirement to keep the site tidy by undertaking daily inspections and carrying out remedial actions as necessary to remove graffiti and refuse.
- The site compound fence is generally identified by the green dashed line on Figure 2-2 of the CEMP (noting there will be no fence where the wall of an existing building denotes the boundary of the work site). The acoustic barrier will be integrated with the site compound fence and will extend along the Tyler Street boundary. The amended CEMP will specify the design of the compound fence and will clearly label its location, including the acoustic barrier locations, on Figure 2-2.
- The external perimeter of the site compound and surrounding streets will be appropriately illuminated at night, for security and wayfinding purposes. When artificial construction lighting is required in external workspaces, particularly during the winter months, management of glare and spill light will be required. The amended CEMP will include details of how the lighting of external workspaces is to be managed.
- Minimal amounts of hazardous substances will be stored on-site, and these will be kept in a dedicated 10-foot container within the Station Plaza Accommodation building. Hazardous substances will be limited to a 10-litre fuel container and oils for handheld power tools. Larger equipment brought to site for specific construction support activities (e.g. concrete pump) will

have its own fuel source and be removed at the completion of the task. The amended CEMP will include additional details of hazardous substances storage and management. It is noted that Section 5.3 of the CEMP already outlines 'Emergency and Incident Response' provisions, including spill response procedures.

Please do not hesitate to contact me should further clarification be required.

Yours sincerely,

Richard Jenkins
Principal Planner
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E: richard.jenkins@cityraillink.govt.nz

Enclosed:

Attachment 1: Concrete Truck Tracking drawings

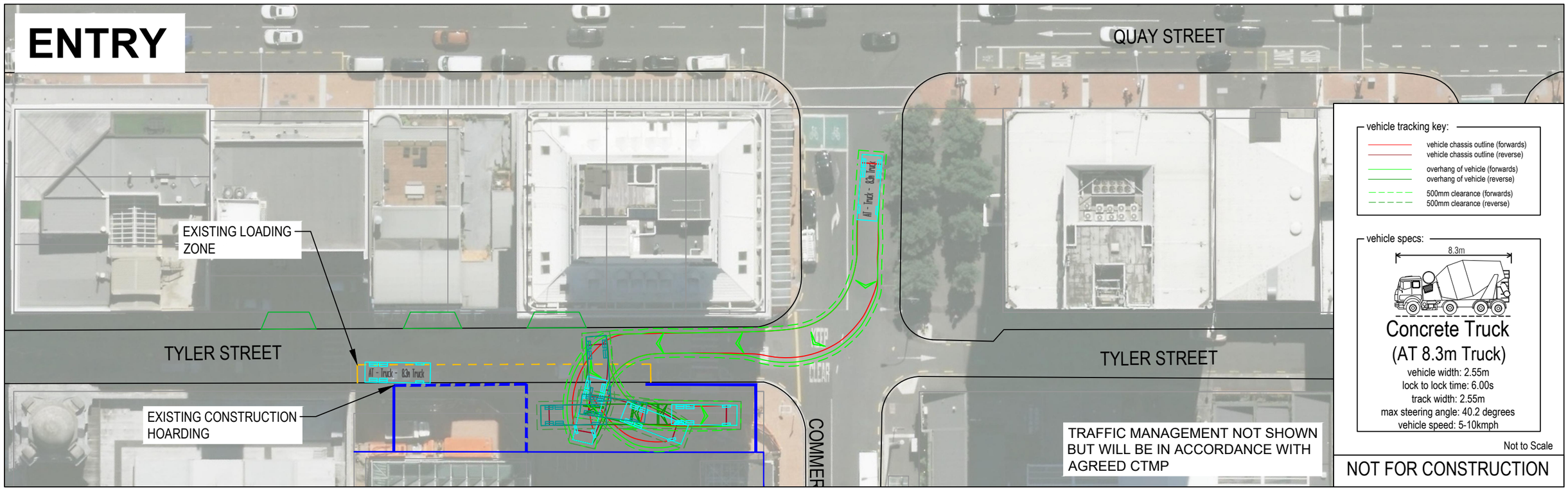
Attachment 2: Construction Noise Assessment, dated 21 August 2021, Revision 5

Attachment 3: Construction Noise Management Plan, dated 21 August 2021, Revision 5

Attachment 4: CRL BTC Draft NoR Conditions 23 August 2021

Attachment 1: Concrete Truck Tracking drawings

ENTRY



vehicle tracking key:

- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- 500mm clearance (forwards)
- 500mm clearance (reverse)

vehicle specs:

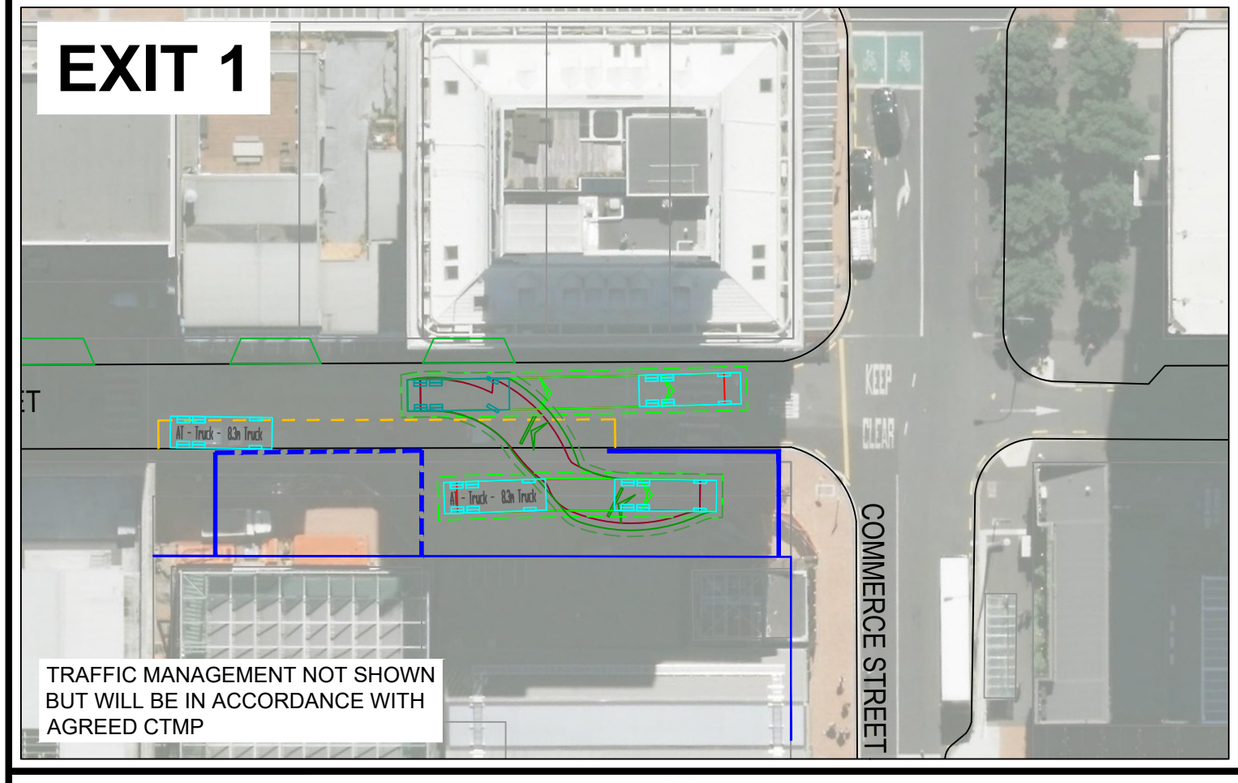
Concrete Truck (AT 8.3m Truck)

vehicle width: 2.55m
lock to lock time: 6.00s
track width: 2.55m
max steering angle: 40.2 degrees
vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION

EXIT 1



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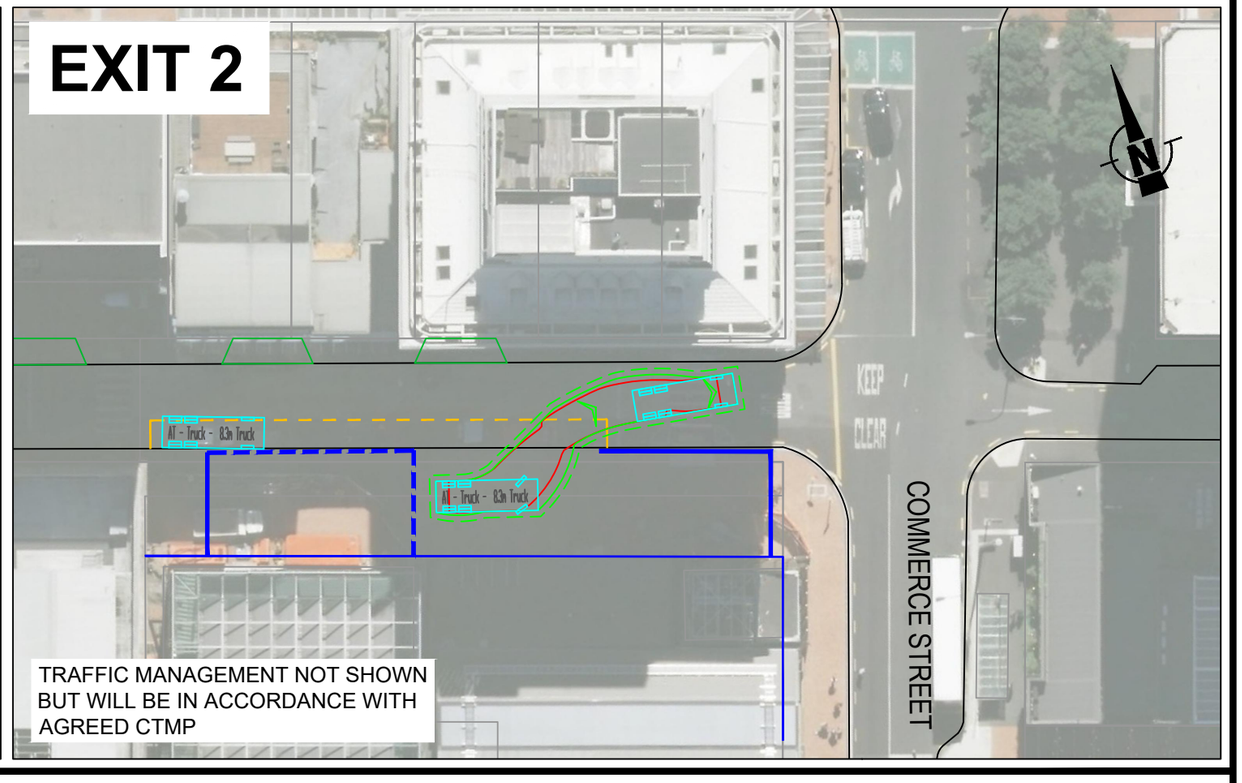

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ref: ATCR007-D001- drawn: cs
revision: 0 checked: ic

rev	status	issued
0	First Issue	16/07/2021

Britomart NOR CTMP
Concrete Truck Tracking (Peak)

flow
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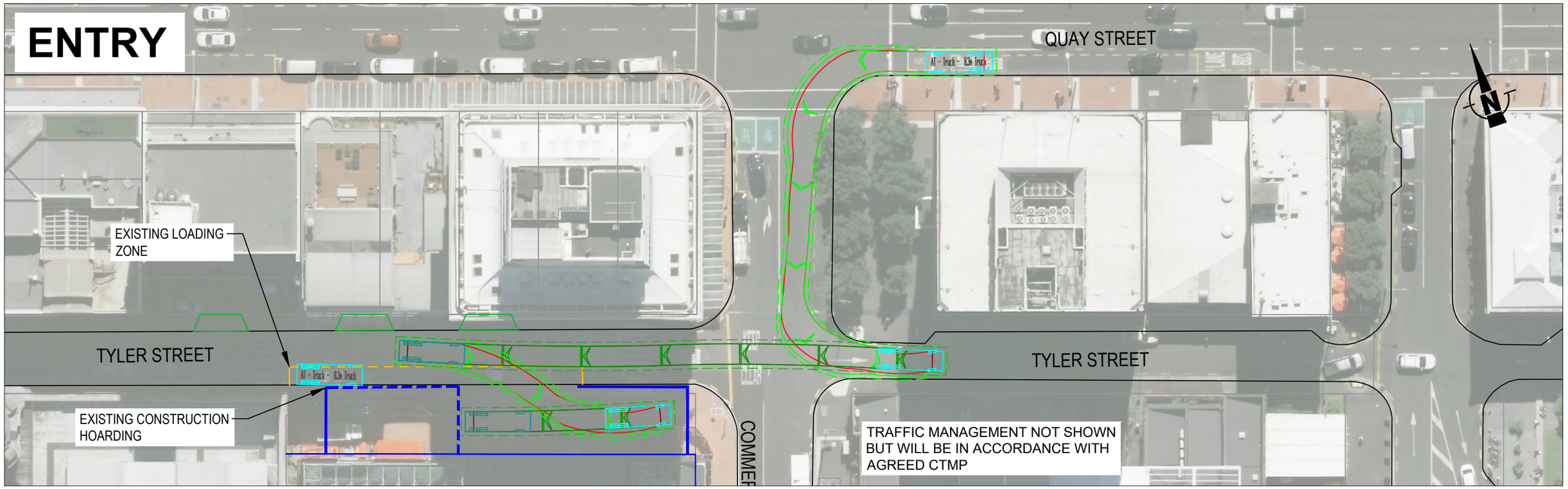
ENTRY



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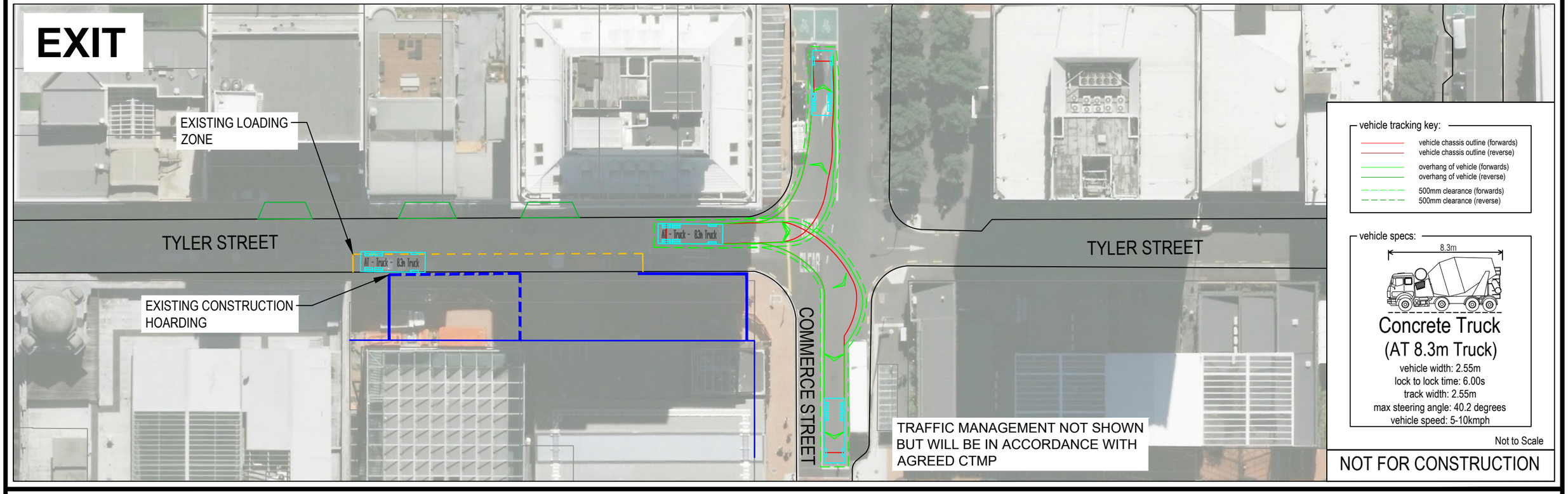

vehicle tracking key:

- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- 500mm clearance (forwards)
- 500mm clearance (reverse)

vehicle specs:

Concrete Truck
(AT 8.3m Truck)

vehicle width: 2.55m
lock to lock time: 6.00s
track width: 2.55m
max steering angle: 40.2 degrees
vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION

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02 of 02 sheets

scale:	1:500 @A3	design:	cs
ref:	ATCR007-D001-	drawn:	cs
revision:	0	checked:	ic

rev	status	issued
0	First Issue	16/07/2021

Britomart NOR CTMP
Concrete Truck Tracking (Interpeak)

flow
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Attachment 2: Construction Noise Assessment

MARSHALL DAY Acoustics

CRL BTC DESIGNATION ALTERATION CONSTRUCTION NOISE ASSESSMENT

Rp 001 20210287 | 21 August 2021

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Project: **CRL – BTC DESIGNATION ALTERATION NOISE ASSESSMENT**

Prepared for: **Aurecon**
PO Box 9762
Newmarket
Auckland 1149

Attention: **Helen McLean**

Report No.: **Rp 001 20210287**

Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Draft	-	For client comment	20 April 2021	James Whitlock	Craig Fitzgerald
Approved	r01	Following client review and methodology update	10 June 2021	James Whitlock	Consenting team
Approved	r02	Updated programme and concrete details	15 June 2021	James Whitlock	Consenting team
Approved	r03	Updated wording	22 June 2021	James Whitlock	-
Approved	r04	S92 response	20 July 2021	James Whitlock	Council expert
Approved	r05	Update working hours	21 August	James Whitlock	-

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1.0 SUMMARY

This noise assessment supports the City Rail Link Limited (CRLL) Notice of Requirement (NOR) to alter CRL Designation 2501 at Britomart Station pursuant to section 181(1) of the Resource Management Act 1991 (RMA).

The purpose of the alteration is to provide for retention of the Station Plaza Accommodation (SPA) building, so that the building and surrounding Station Plaza area can be used as a construction support facility for works in the CRL tunnels located within the adjoining Designation 2500-1 to the west.

A full description of the activities associated with the NOR is contained in the Assessment of Effects on the Environment (AEE), Form 18 and Constructability Report (Appendix A to the AEE).

This report on construction noise forms part of a suite of technical reports that accompany and form part of the NOR. Its purpose is to assess the potential construction noise effects of the NOR works within and outside Designation 2501, and to recommend mitigation and management measures to address potential adverse effects.

We predict that all construction support activities will comply with relevant noise limits, except concrete pumping which may marginally exceed at 2 – 4 apartments in the 148 Quay St apartments overlooking the site. These potential exceedances will be managed by a Construction Noise Management Plan (CNMP).

None of the proposed activities generate high vibration levels, and we predict compliance with all relevant cosmetic building damage (including heritage limits for the AUP Historic Heritage Overlay) and vibration amenity standards. So, in this report we have only addressed construction noise.

2.0 PROPOSED CONSTRUCTION SUPPORT ACTIVITIES

2.1 Site

In summary, the construction support activities associated with the NOR ('the Works') are:

- Site office, worker accommodation and some storage of materials within the SPA building
- Establishing and operating ventilation equipment in the Station Plaza area (to provide ventilation for workers in the CRL tunnels to the west)
- Access for workers and deliveries of equipment and materials via the Glasshouse and former Chief Post Office (CPO) building
- Receiving and pumping concrete into the CRL tunnels (to construct the railway track bed) from the Station Plaza area in Tyler Street

The location of the Works associated with the NOR is shown in Figure 1 overleaf.

2.2 High noise activities

Of the Works listed in Section 2.1, only the concrete pumping and ventilation fans are high noise activities. All other activities are predicted to generally comply with the construction noise rules (refer Section 3.0).

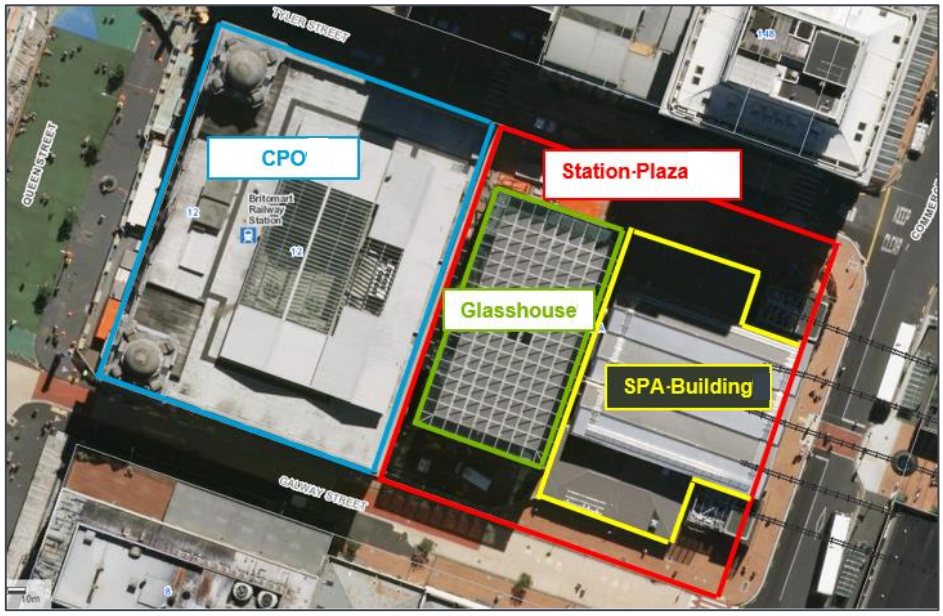
We sourced noise level data for concrete pumping from British Standard BS 5228-1:2009. The data includes a concrete truck, pump and agitator.

Noise level data for the ventilation fans were provided by the mechanical engineer. The fans are Cogemacoustic axial fans with an airflow of 28 m^3/s, fitted with an acoustic attenuator (1.6m x 1.6m x 1.5m).

The engineer stated each fan would generate 52.4 dB L_{Aeq} at 10 metres. This is not a particularly high noise level, but we assessed it because the fans will operate 24/7.

The noise level data for these sources are shown in Table 2 (Section 4.0).

Figure 1: Station Plaza and Station Plaza Accommodation (SPA) building at Britomart Transport Centre



2.3 Works timeframe and hours of operation

We understand that, subject to the NoR being confirmed, the Works will follow on directly from the current CRLL C1[1] project works in the area and extend through to Q4 2023.

Quiet work inside the SPA, Glasshouse, and down on track level will occur 24/7, as it does currently for the CRLL C1 project. This work readily complies with the limits in Section 3.0, is generally inaudible for neighbours, and will continue as such.

The ventilation fans will also run 24/7, so must comply with the night-time limits in Table 1.

The concrete delivery will be in two stages, as follows:

- Stage 1 – 50/50 split between Aotea Station end of the tunnels (already provided for by CRL Designation 2500-1) and Britomart Station. Assuming a worst-case scenario, Aotea Station delivery (15 days) would be Q4 2021 and Britomart delivery (20 days) would be in Q1 2022
- Stage 2 – Britomart delivery only in Q2 2022. Delivery would occur over 20 days, with deliveries every second day i.e. 10 delivery days

On concrete delivery days, pumping will occur between 6.30am – 9pm Monday to Friday and 7am – 9pm Saturday, but in the event of on-site delays could extend to 10.30pm Monday to Saturday i.e. still within the AUP daytime hours (refer Table 1). We understand that a peak day would involve up to 40 concrete truck loads (3 – 4 trucks per hour).

Note that truck arrival and departure is quieter than the concrete pouring activity itself.

3.0 NOISE PERFORMANCE STANDARDS

The Britomart Designation 2501 construction noise and vibration conditions don't apply to the Works, so we have assessed noise according to the permitted activity levels in the Auckland Unitary Plan (AUP).

[1] CRLL Contract 1 (C1) project is the construction contract name for CRL works in the CPO and lower Queen Street

The Station Plaza and all surrounding sites are zoned *Business – City Centre* in the AUP. This means that the construction noise levels from AUP Table E25.6.28.2 apply (at 1 metre from the façade of any neighbouring building) – refer Table 1 below. The most relevant limits are shown in bold font.

Table 1: Construction noise limits (from AUP Table E25.6.28.2)

Construction of 15 consecutive calendar days or more (total duration of works)		
Time	**$L_{Aeq(30\ min)}$**	**L_{AFmax}**
Monday to Friday 6.30am – 10.30pm	**75 dB**	90 dB
Saturday 7am – 11pm	80 dB	90 dB
Sunday 9am – 7pm	65 dB	85 dB
All other times (night-time)	**60 dB**	75 dB

4.0 PREDICTED NOISE LEVELS

4.1 Noise source data

Table 2 shows the noise source data for concrete pumping and ventilation fans, predicted levels at various distances and the setback distances needed to comply with the limits.

Table 2: Data for high noise equipment

Equipment	Sound Power Level (dB L_{Aeq})	Noise Level (dB L_{Aeq})			Setback (m)	
		10 m	20 m	50 m	Daytime 75 dB L_{Aeq}	Night-time 60 dB L_{Aeq}
Concrete truck and pump discharging	103	68	62	53	14	N/A
Ventilation fan (with attenuator)	77	52	46	37	1	4

4.2 Noise levels at neighbouring receivers

Table 3 shows the predicted noise levels at 1 metre from the façades of neighbouring buildings. The potential exceedances are shaded grey.

We understand that a 2 metre site hoarding is proposed along the Tyler St footpath and we have included this in the model. It helps to mitigate noise levels to the ground floor of adjacent buildings, and for passing pedestrians. It won't mitigate noise to upper levels because they are high enough to see over the barrier.

Table 1: Predicted noise levels

Receiver	Predicted noise level (dB L_{Aeq})		Compliant?
	Concrete pumping	Vent fan	
2 Queen St	63	36	Yes
152 Quay St	73	36	Yes
148 Quay St	76	41	No
8 Customs St East	59	36	Yes
10 Customs St East	59	40	Yes
2 Commerce St	64	< 35	Yes
25 Galway St	64	< 35	Yes

Appendix B shows indicative noise contour maps for each activity. The maps show how the sound propagates from source to receivers, and the neighbouring buildings are coloured according to the highest noise level incident on their façade. The insert in each plan shows a 3D 'soundsplash' of how the sound projects up the building façades.

The results show that concrete pumping may marginally exceed the construction noise limit at one building (148 Quay Street) and that operation of the ventilation fans will readily comply 24/7.

We understand that 148 Quay Street is an apartment building, with carparking and retail on the ground and first floor. Exceedance is only predicted to the first and second floors at the western end of the building – refer the soundsplash insert. These receivers (perhaps one or two apartments) are directly adjacent the concrete pump, and look over the 2m site hoarding.

4.3 Potential effects on neighbours

The apartments at 148 Quay Street don't have balconies. The façade is concrete with windows, some of which are openable.

A façade of this type would typically provide 25 – 30 decibels sound reduction. This means that the predicted 76 dB at the façade would translate to 46 – 51 dB inside the apartment.

The responses of building occupants vary person to person. In our experience we have found that with effective prior engagement, levels of around 45 – 50 dB L_{Aeq} are typically acceptable, but concentration and communication may begin to be affected.

4.4 Mitigation options

Our recommend mitigation measures are summarised in Section 5.0 below.

The primary mitigation tool is the CNMP, which sets out in detail how to manage noise from the site. In terms of other mitigation on site, the consenting team investigated the following:

- Alternative concrete delivery methods, including pumping all concrete from Aotea Station, gravity feeding and rail-based delivery at Britomart (refer Constructability Report (RS140621))
- Alternative barriers at the concrete pumping site, including an enclosure, cantilevered barriers and larger barriers on the ground
- Reorienting the concrete pump to facilitate better acoustic shielding

These options were dismissed for reasons including space constraints, risks around compromising the concrete's physical properties and cost-benefit – noting that we predict only a 1 decibel exceedance at 148 Quay St.

We note that Section 3.5 of the CNMP addresses the site hoarding, and says it should be 'higher than 2 metres if practicable (within space constraints) to block line-of-sight'. A taller barrier will require a wider base support structure, and the practicability of this must be assessed once the site is established.

We consider that the selected mitigation measures are the best practicable option, given the modest non-compliance we have predicted.

5.0 RECOMMENDATIONS

We predict that proposed Works activity will comply with the AUP permitted noise standards except concrete pumping. This activity may marginally exceed the AUP permitted construction noise levels at a few apartments on Tyler Street that overlook the site.

Concrete pumping will only occur during the daytime, and for a few weeks at a time, so despite the potential exceedances we consider that the effects will be reasonable.

The neighbours adjacent to these activities are the same as for the CRLL C1 project. The scale of construction activity, and therefore the noise levels, from the proposed Works will generally be less than from CRL C1.

However, the neighbours will be accustomed to a certain level of consultation and construction management. We understand that during the C1 works, the neighbours identified communication and consultation as a key measure for managing construction effects and expectations. So, despite likely changes in construction personnel and activity types, and lesser noise effects, we recommend transitioning to the proposed Works with the following mitigation and management measures in place:

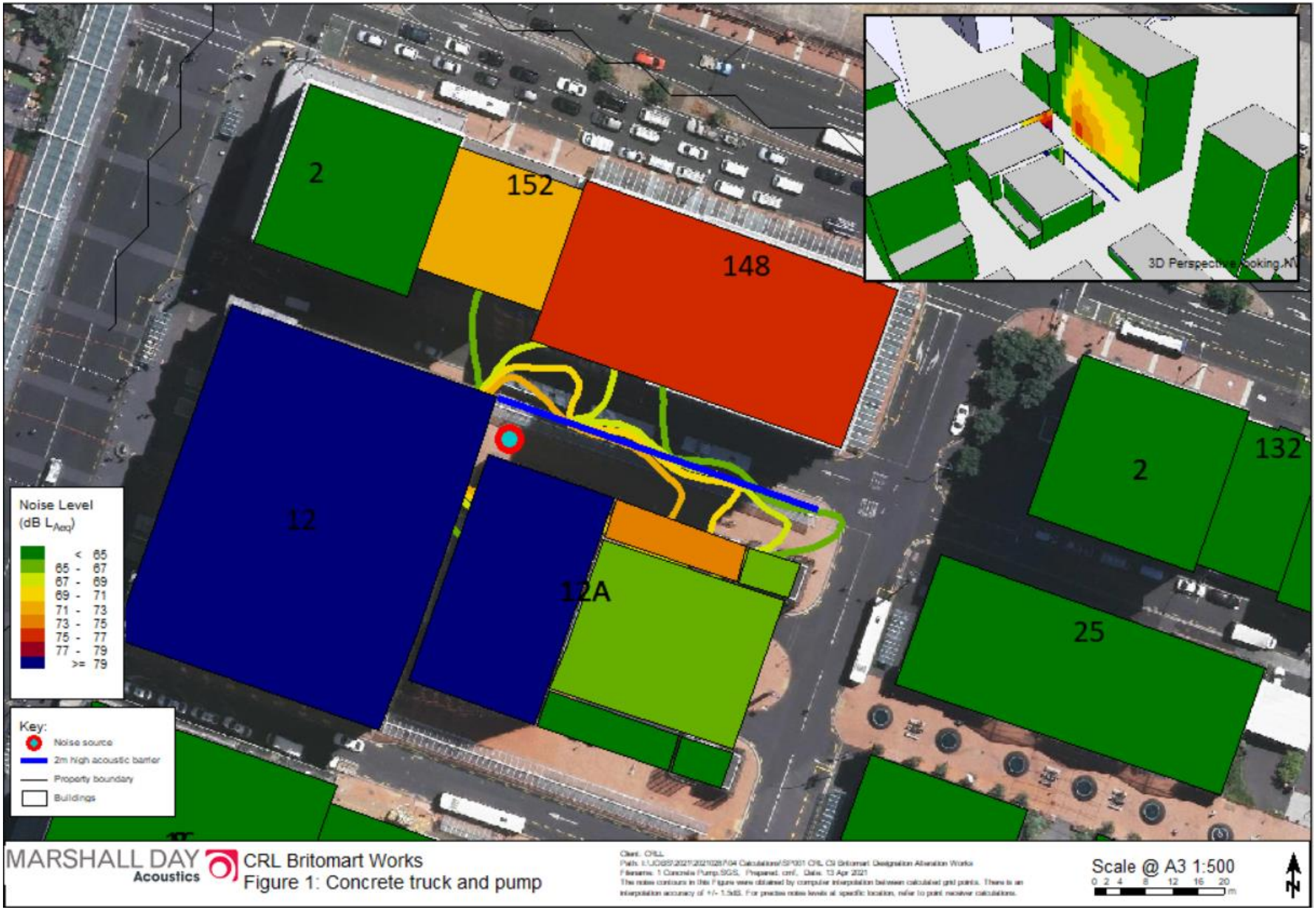
- A CNMP that sets out the mitigation and management framework to manage effects according to the best practicable option (BPO). A draft CNMP (dated 10 June 2021) accompanies the NoR (contained within the Construction Environmental Management Plan which is Appendix D to the AEE)
- Consultation with the south-facing occupants of 148 Quay Street, so they are aware of the proposed Works, their timeframes and potential noise levels. This will be particularly crucial if concrete pumping extends to 10.30pm on some nights because of on-site delays (refer Section 2.3)
- Written communication to other building occupants within 50 metres of the worksite, including:
  - Details of the overall Works, its timing and duration
  - Contact details and names of personnel whose job is to receive complaints and enquiries
  - Acknowledge that some activities (listed in this document) are predicted to generate high noise levels and may result in disturbance for short periods
- Physical mitigation as described in this report. Specifically:
  - A 2-metre site hoarding along Tyler Street
  - The attenuators recommended by the mechanical engineer for operation of the ventilation fans
- Install a fixed noise monitor at the same location on the first floor of 148 Quay Street as used to monitor the CRL C1 works. This is an ideal location for the key receivers identified in our assessment.

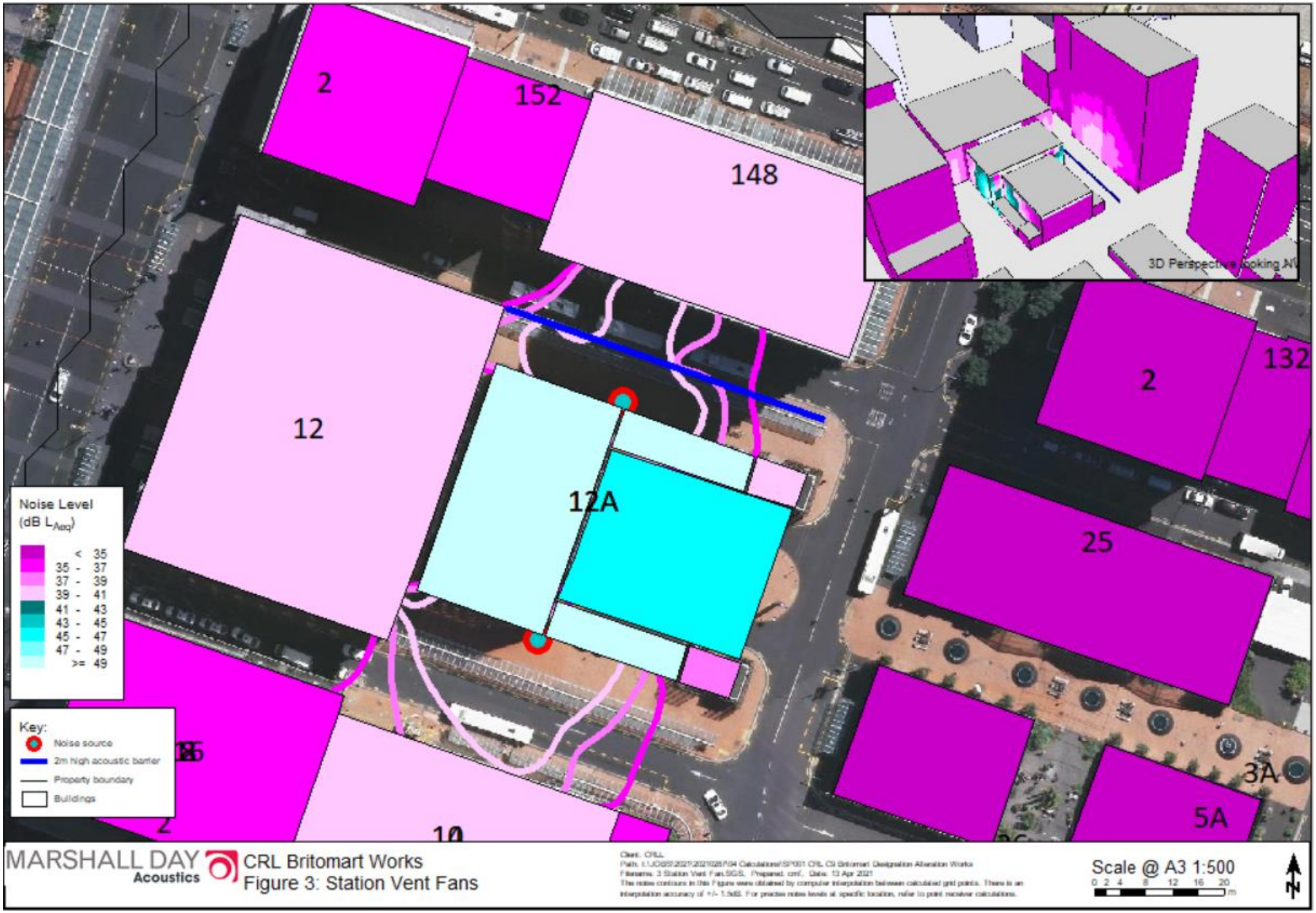
  It measures noise levels continuously and automatically uploads them to cloud software, and alerts contractor personnel of any exceedances

APPENDIX A GLOSSARY OF TERMINOLOGY

Noise	A sound that is unwanted by, or distracting to, a receiver.
dB	Decibel (dB) is the unit of sound level. Expressed as a logarithmic ratio of sound pressure (P) relative to a reference pressure (Pr), where dB = 20 x log(P/Pr).
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) to more closely approximate the frequency bias of the human ear. A-weighting is used in airborne acoustics.
$L_{Aeq\ (t)}$	The equivalent continuous (time-averaged) A-weighted sound level commonly referred to as the average level. The suffix (t) represents the period, 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_{AFmax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
NZS 6803:1999	New Zealand Standard NZS 6803: 1999 "Acoustics - Construction Noise"
Sensitive Noise and Vibration Receivers	Receivers that may be disturbed during rest, concentration, communication or prayer. These include (but are not limited to): • Dwellings • Offices • Schools, including Child Care Centres and tertiary facilities • Libraries • Hospitals • Rest Homes • Marae and other Cultural Centres • Churches • Hotels or other accommodation facilities

APPENDIX B NOISE CONTOURS





Attachment 3: Construction Noise Management Plan

MARSHALL DAY Acoustics

CRL BTC DESIGNATION ALTERATION CONSTRUCTION NOISE MANAGEMENT PLAN (CNMP)

Rp 002 20210287 | 21 August 2021

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Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Draft	-	For client review	20 Apr 2021	Craig Fitzgerald	James Whitlock
Draft	r01	Following client review and methodology update	10 June 2021	James Whitlock	Consenting team
Draft	r02	For consent	15 June 2021	James Whitlock	Consenting team
Draft	r03	Update wording	22 June 2021	James Whitlock	-
Draft	r04	S92 response	20 July 2021	James Whitlock	Council expert
Draft	r05	Update working hours	21 Aug 2021	James Whitlock	-

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HOW TO USE THIS DOCUMENT

This Construction Noise Management Plan (CNMP) will be read by people with different perspectives and levels of expertise. Constructors, CRLL, Auckland Council, experts and affected parties must all be able to extract the information they need from this document.

The primary function of this CNMP is to advise the constructor about the location of sensitive noise receivers, and what management and mitigation measures need to be used to reduce adverse effects. These measures have been chosen because they are the best practicable option (BPO) and/or because of agreements with certain parties.

If you are working for the constructor:

- Project noise standards are in Section 2.1
- High noise activities, and associated safe distances are in Section 2.2. Check to make sure all relevant activities have been included
- Best practice mitigation measures are in Section 3.0. Review construction methodology
- Engagement with affected receivers is Section 4.0. Ensure effective communication and be aware of community sensitivity

If you are involved in the regulatory process:

- Project noise standards are in Section 2.1
- Review Sections 2.2 for high noise activities, and safe distances
- Review Section 2.3 for affected receivers

If you are an affected party:

- Contact details of key personnel in Section 1.5. These are the people responsible for managing noise from the worksite
- Note Section 2.2 for high noise activities, and safe distances
- Note Section 2.3 for affected receivers. Check if your address is included
- Note Section 3.0 to understand the general mitigation that should be in place to manage noise

1.0 INTRODUCTION

1.1 Overview

This CNMP supports the City Rail Link Limited (CRLL) Notice of Requirement (NOR) to alter CRLL Designation 2501 at Britomart Station pursuant to section 181(1) of the Resource Management Act 1991 (RMA).

The purpose of the alteration is to provide for retention of the Station Plaza Accommodation (SPA) building, so that the building and surrounding Station Plaza area can be used as a construction support facility for works in the CRL tunnels located within the adjoining Designation 2500-1 to the west.

A full description of the activities associated with the NOR is contained in the Assessment of Effects on the Environment (AEE), Form 18 and Constructability Report (Appendix A to the AEE).

None of the proposed activities generate high vibration levels, so this management plan only addresses construction noise.

1.2 Project Description

In summary the activities associated with the NOR ('the Works') are:

- Site office, worker accommodation and some storage of materials within the SPA building
- Establishing and operating ventilation equipment in the Station Plaza area (to provide ventilation for workers in the CRL tunnels to the west)
- Access for workers and deliveries of equipment and materials via the Glasshouse and former Chief Post Office (CPO) building
- Receiving and pumping concrete into the CRL tunnels (to construct the railway track bed) from the Station Plaza area in Tyler Street

The location of the Works associated with the NOR is shown in Figure 1.

Figure 1: Station Plaza and Station Plaza Accommodation (SPA) building at Britomart Transport Centre

1.3 Purpose of this CNMP

This CNMP forms part of a suite of technical reports that accompany and form part of the NOR. Its purpose is to identify and provide for implementation of the Best Practicable Option (BPO) to avoid, remedy or mitigate adverse construction noise effects from the Works. This requirement aligns with CRL Designation 2500-1 condition 36 and BTC Designation 2501 condition 28, although different noise performance standards apply to these construction support works (refer Section 2.1).

This CNMP will be implemented throughout the Works period. It should be considered a 'living document' that will be expanded and updated as the Works progress. It is the primary tool for managing the Works' construction noise effects.

A glossary of terminology is included in 0.

1.4 Works timeframe and hours of operation

The Works period will follow on directly from the current CRL C1 works and extend through to Q4 2023.

Work inside the SPA, Glasshouse, and down on track level will occur 24/7 and is expected to comply with the noise limits. The ventilation fans will also run 24/7.

Concrete pumping will only occur during daytime hours (refer Table 2). There will be up to 40 truck deliveries per day.

The concrete delivery will be in two stages, as follows:

- Stage 1 – 50/50 split between Aotea Station end of the tunnels (already provided for by CRL Designation 2500-1) and Britomart Station. Assuming a worst-case scenario, Aotea Station delivery (15 days) would be Q4 2021 and Britomart delivery (20 days) would be in Q1 2022
- Stage 2 – Britomart delivery only in Q2 2022. Delivery will occur over 20 days, with deliveries every second day i.e. 10 delivery days

On concrete delivery days, pumping will occur between 6.30am – 9pm Monday to Friday and 7am – 9pm Saturday, but in the event of on-site delays could extend to 10.30pm Monday to Saturday i.e. still within the AUP daytime hours (refer Table 2).

1.5 Contact Details

Contact details for the relevant personnel are listed in Table 1. The Project Manager is responsible for implementing this CNMP.

Table 1: Contacts

Role	Name	Organisation	Phone	Email
Project Manager	TBC	TBC	TBC	TBC
Communications lead	TBC	TBC	TBC	TBC
Acoustic Specialist	James Whitlock	Marshall Day Acoustics	0212546651	james.whitlock@marshallday.co.nz

1.6 Document Review

This CNMP is a live document that will be reviewed at least annually, or:

- As a result of a material change to the Works
- To address unforeseen adverse noise effects arising from the Works

2.0 CONSTRUCTION NOISE

2.1 Performance Standards

The Station Plaza and all surrounding sites are zoned *Business – City Centre* in the AUP. This means that the construction noise levels from Auckland Unitary Plan (AUP) Table E25.6.28.2 apply (at 1 metre from the façade of any neighbouring building) – refer Table 2 below.

Table 2: Construction noise limits (from AUP Table E25.6.28.2)

Construction of 15 consecutive calendar days or more (total duration of works)		
Time	**$L_{Aeq(30\ min)}$**	**L_{AFmax}**
Monday to Friday 6.30am – 10.30pm	75 dB	90 dB
Saturday 7am – 11pm	80 dB	90 dB
Sunday 9am – 7pm	65 dB	85 dB
All other times (night-time)	60 dB	75 dB

2.2 High noise activities

Of the Works listed in Section 1.2, only the concrete pumping and ventilation fans are high noise activities. All other activities are expected to comply.

Noise level data for concrete pumping and ventilation fans are shown in Section 2.3.

2.3 Predicted Noise Levels

Table 2 shows the noise source data for concrete pumping and ventilation fans, predicted levels at various distances and the setback distances needed to comply with the limits.

Table 2: Data for high noise equipment

Equipment	**Sound Power Level (dB L_{Aeq})**	**Noise Level (dB L_{Aeq})**			**Setback (m)**	
		10 m	**20 m**	**50 m**	**Daytime 75 dB L_{Aeq}**	**Night-time 60 dB L_{Aeq}**
Concrete truck and pump discharging	103	68	62	53	14	N/A
Ventilation fan (with acoustic baffle)	77	52	46	37	1	4

Table 3 shows the predicted noise levels at 1 metre from the façades of neighbouring buildings. The potential exceedances are shaded grey. The table will be kept up to date by the Acoustic Specialist when new information becomes available, e.g. through noise monitoring (Section 5.0).

The predicted levels include shielding of ground floor receivers by a 2 metre site hoarding along the Tyler Street footpath.

Table 3: Predicted noise levels

Receiver	Predicted noise level (dB L_{Aeq})		Compliant?
	Concrete pump	Vent fan	
2 Queen St	63	36	Yes
152 Quay St	73	36	Yes
148 Quay St	76	41	No
8 Customs St East	59	36	Yes
10 Customs St East	59	40	Yes
2 Commerce St	64	< 35	Yes
25 Galway St	64	< 35	Yes

Appendix B shows noise contour maps for each activity. The neighbouring buildings are coloured according to the highest noise level incident on their façade. The insert in each plan shows a 3D 'soundsplash' of how the sound projects up the building façades.

The results show that concrete pumping may marginally exceed the construction noise limit at one building (148 Quay Street) and that operation of the ventilation fans will readily comply 24/7.

The exceedance at 148 Quay Street is limited to the lower two floors (not including ground floor) at the western end of the building – refer the sound splash insert (Appendix B). These receivers are directly adjacent the concrete pump, and look over the 2m site hoarding.

2.4 Potential noise effects

The 148 Quay Street is concrete with windows, some of which are openable.

A façade of this type would typically provide 25 – 30 decibels sound reduction, so the predicted 76 dB at the façade would translate to 46 – 51 dB inside the apartment.

The responses of building occupants vary person to person. Generally, with prior engagement (Section 4.0), levels of around 45 – 50 dB L_{Aeq} are typically acceptable, but concentration and communication may begin to be affected.

3.0 MITIGATION AND MANAGEMENT

Compliance is predicted for most receivers for most of the Works period, but best practice must still be used to ensure good site control and to ensure that other activities do not become noisy.

The following specific mitigation has been recommended:

- A 2 metre site hoarding along Tyler Street (refer Section 3.5)
- Attenuators for the ventilation fans (1.6m x 1.6m x 1.5m), as specified by the mechanical engineer

3.1 Training

All personnel will participate in an induction training session before commencement of the Works, with attention given to the following matters:

- Construction noise limits
- High noise activities
- Noise mitigation and management procedures
- Sensitive receivers and any agreements made through engagement

As the Works progress, any updates of noise matters will be addressed during regular site meetings and/or 'toolbox' training sessions.

3.2 Equipment Selection

When selecting construction equipment, the following are considered to be best practice:

- Use quieter construction methodologies where practicable and available
- Use electric motors rather than diesel engines where practicable
- Use equipment that is suitably sized for the task
- Maintain equipment well to minimise rattles, squeaks etc
- Fit engines with exhaust silencers and engine covers where practicable
- Avoid tonal reversing or warning alarms (beepers). Alternatives include broadband alarms (squawkers/quackers), flashing lights, proximity sensors, reversing cameras and spotters

3.3 Scheduling

Scheduling is an important management tool, particularly where a receiver expresses concern about construction works at a certain time of day. Where necessary, high noise activities will be programmed to minimise disturbance.

3.4 Best practice measures

Complaints can arise even if the noise levels comply with the Works limits. To minimise complaints, the following common mitigation measures are recommended:

- Avoid unnecessary noise. This means managing the site to ensure:
  - No shouting
  - No unnecessary use of horns
  - No loud site radios
  - No rough handling of material and equipment
  - No unnecessary steel on steel contact (e.g. during the loading of trucks)

  - No high engine revs. This includes choosing the right sized equipment and turning engines off when idle
- Minimise construction duration near sensitive receivers
- Locate any stationary equipment away from noise sensitive receivers and/or screen them behind site buildings and material stores
- Orient mobile machinery to maximise the distance between the engine exhaust and the nearest sensitive building façade
- Consultation should be complete prior to commencing high-noise activities (Section 2.2)
- Undertake noise monitoring (Section 5.0)

3.5 Noise Barriers

A temporary 2 metre site hoarding will be installed along the Tyler Street southern footpath – refer plans in Appendix B for its extent. The hoarding will be installed prior to works commencing and maintained throughout the Works.

If any other noisy activities are identified, barriers should be the first mitigation measure to be investigated. Effective noise barriers typically reduce the received noise level by 10 decibels.

Where practicable, the following guidelines will be used in designing and installing temporary noise barriers:

- The panels will have a minimum surface mass of 6.5 kg/m^2. Suitable panels include 12 mm plywood or the following proprietary 'noise curtains': proprietary
  - SealedAir 'WhisperFence 24dB' (www.sealedair.com)
  - Hushtec 'Premium Series Noise Barrier' (www.duraflex.co.nz)
  - Soundbuffer 'Performance Acoustic Curtain' (soundbuffer.co.nz)
  - Hoardfast 'Fast Wall Premium PVC partition panels' (www.ultimate-solutions.co.nz)
  - Safesmart 'Acoustic Curtain 6.5kg/m$^{2'}$ (www.safesmartaccess.co.nz)
  - Alternatives will be approved by a suitably qualified and experienced acoustic specialist
- The panels will be a minimum height of 2 m, and higher if practicable (within space constraints) to block line-of-sight
- The panels will be abutted, battened or overlapped to provide a continuous screen without gaps at the bottom or between panels
- Barriers will be positioned as close as practicable to the high-noise activity to block line-of-sight between the activity and noise sensitive receivers. A site hoarding at the boundary may not be effective for all receivers. Add extra barriers close to high-noise activities to ensure effective mitigation for sensitive receivers on upper floors.

4.0 ENGAGEMENT

4.1 Communication

4.1.1 Before Works

Written communication (e.g. newsletter) will be provided to building occupants within 50 m of the site at least 1 week prior starting the Works. It will include:

- Details of the overall Works, its timing and duration
- Contact details and names of personnel whose job is to receive complaints and enquiries - refer Section 1.5 of this CNMP
- Acknowledge that some activities (listed in this document) are predicted to generate high noise levels and may result in disturbance for short periods

4.1.2 During Works

Once the Works have begun, ongoing communication is important. Regular communication during the Works will include:

- Public site signage that includes contact details
- Details of upcoming activities that may result in disturbance
- Any changes to scheduled timing and duration of activities

4.2 Consultation

Consultation will be undertaken with the south-facing occupants of 148 Quay Street. These are the neighbours who overlook the noisiest activities, and where noise may exceed the limits.

The purpose of consultation is to address concerns about noise on a case-by-case basis. The Project Manager will address any concerns and complaints in accordance with this Section. A copy of all correspondence will be made available to Council upon request.

Some receivers may not want ongoing consultation, in which case they will be included in the communication list (Section 4.1).

The following process will be implemented by the Project Manager (or nominated person):

- Review the construction methodology, mitigation measures and management strategies to ensure they represent the BPO. The BPO considers:
  - Practicability
  - Predicted noise benefits
  - The interests of affected parties
  - Implications for Project timing and duration
  - Cost
- Consultation with affected parties to understand their sensitivities, including times they are home. The objective is to establish a collaborative approach to managing adverse noise effects
- A project representative will be contactable at all times during work hours
- A record of consultation will be kept at the site office and be available to affected parties and Council if requested
- Implement any measures agreed with the affected party in good faith
- Monitor the activity to verify the extent of any adverse effects

4.3 Complaints Response

All construction noise complaints will be recorded in a complaints file that is available to affected parties and Council on request. For each complaint, an investigation will be undertaken as soon as practicable using the following steps:

- Acknowledge receipt of the concern or complaint and record:
  - The name, address and contact details of the complainant (unless they elect not to provide)
  - Time and date the complaint was received and who received it
  - Time and date of the activity that caused the complaint (estimated where not known)
  - The complainant's description of the activity and its resulting effects
  - Any relief sought by the complainant (e.g. scheduling of the activity)
- Identify the relevant activity and review the activity log to verify the complaint (or otherwise)
- If a complaint relates to building damage, inform the on-duty site manager as soon as practicable and stop the offending works pending an investigation.

  In most cases, stopping the activity will provide immediate relief. But in some cases, this may not be practicable for safety or other reasons, in which case the complainant will be kept updated regularly during the time it takes to stop the activity
- Review data from long-term monitors to identify the time in question and, if possible, confirm exceedance
- Review the predicted noise levels to determine if the activity was identified as high-noise. Consider attended monitoring to verify the underlying reference level assumptions
- Review the mitigation and management measures in place to ensure the BPO has been applied. Review the relief sought by the complainant. Adopt further mitigation and management measures as appropriate
- Report the findings and recommendations to the Project Manager, implement changes and update this CNMP as appropriate
- Report the outcomes of the investigation to the complainant, identifying where the relief sought by the complainant has been adopted or the reason(s) otherwise

5.0 NOISE MONITORING

There are two types of noise monitoring:

- Attended monitoring: This is where a suitably qualified acoustic engineer visits the site and measures levels in real time. This enables immediate assessment of the activities, whether they are being carried out in the correct location, using the correct equipment, and whether any BPO measures are being correctly applied (refer Section 3.0).
- Long-term monitoring: This is where a fixed noise monitor measures continuously for a long period of time. Exceedance alerts are automatically sent to the Project Manager (or nominated person) for them to act on.

A long-term noise monitor is attached to the exterior of 148 Quay Street – southern (Tyler Street) side of the building at first floor level. It was installed to monitor noise from CRL C1 activities, and will be retained for the duration of the Works. It measures noise levels continuously and automatically uploads them to cloud software, and alerts construction team personnel of any exceedances.

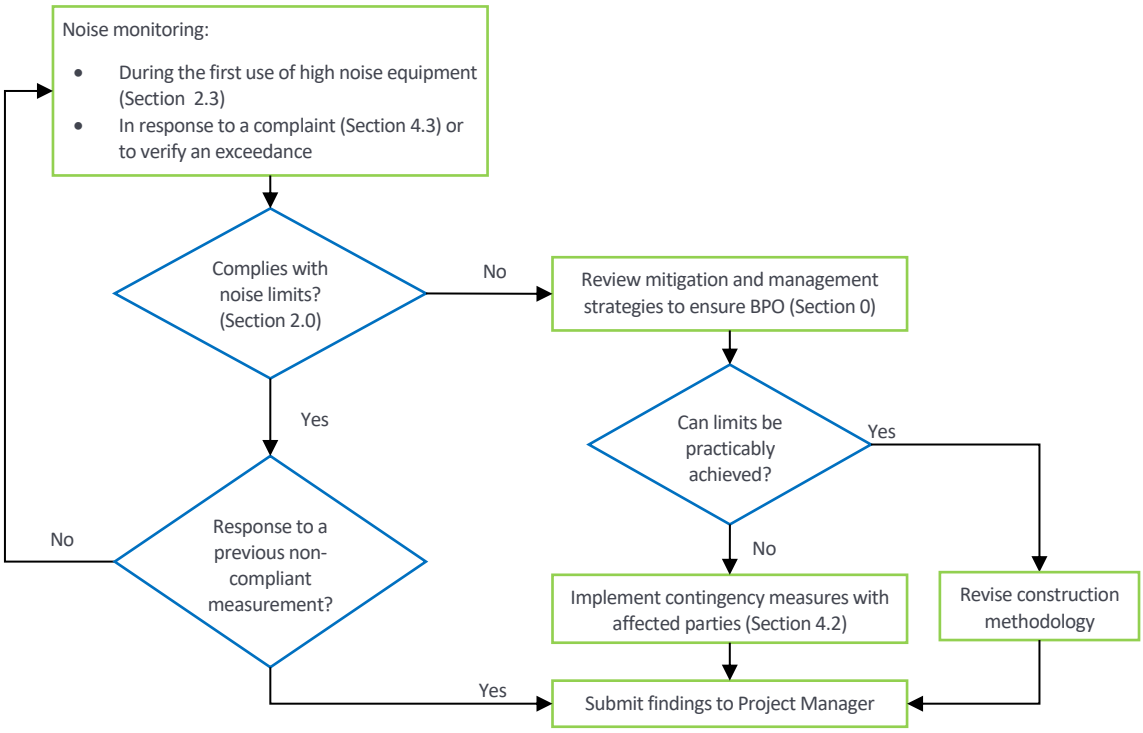
Attended monitoring will be used where the long-term noise monitor is unable to capture the noise source of interest.

Construction noise will be monitored:

- The first time a concrete delivery is undertaken on site
- In response to a reasonable noise complaint (Section 4.3)
- At 1m from the building façade facing the Station Plaza construction support area, or a proxy position adjusted for distance
- By a suitably qualified and experienced specialist (e.g. Member of the Acoustical Society of New Zealand) in accordance with the requirements of New Zealand Standard NZS 6803: 1999 *"Acoustics - Construction Noise"*
- For an appropriate duration, reported with the measured level (e.g. 65 dB $L_{Aeq\ (30min)}$)
- The results will be used to update Section 2.3 if appropriate

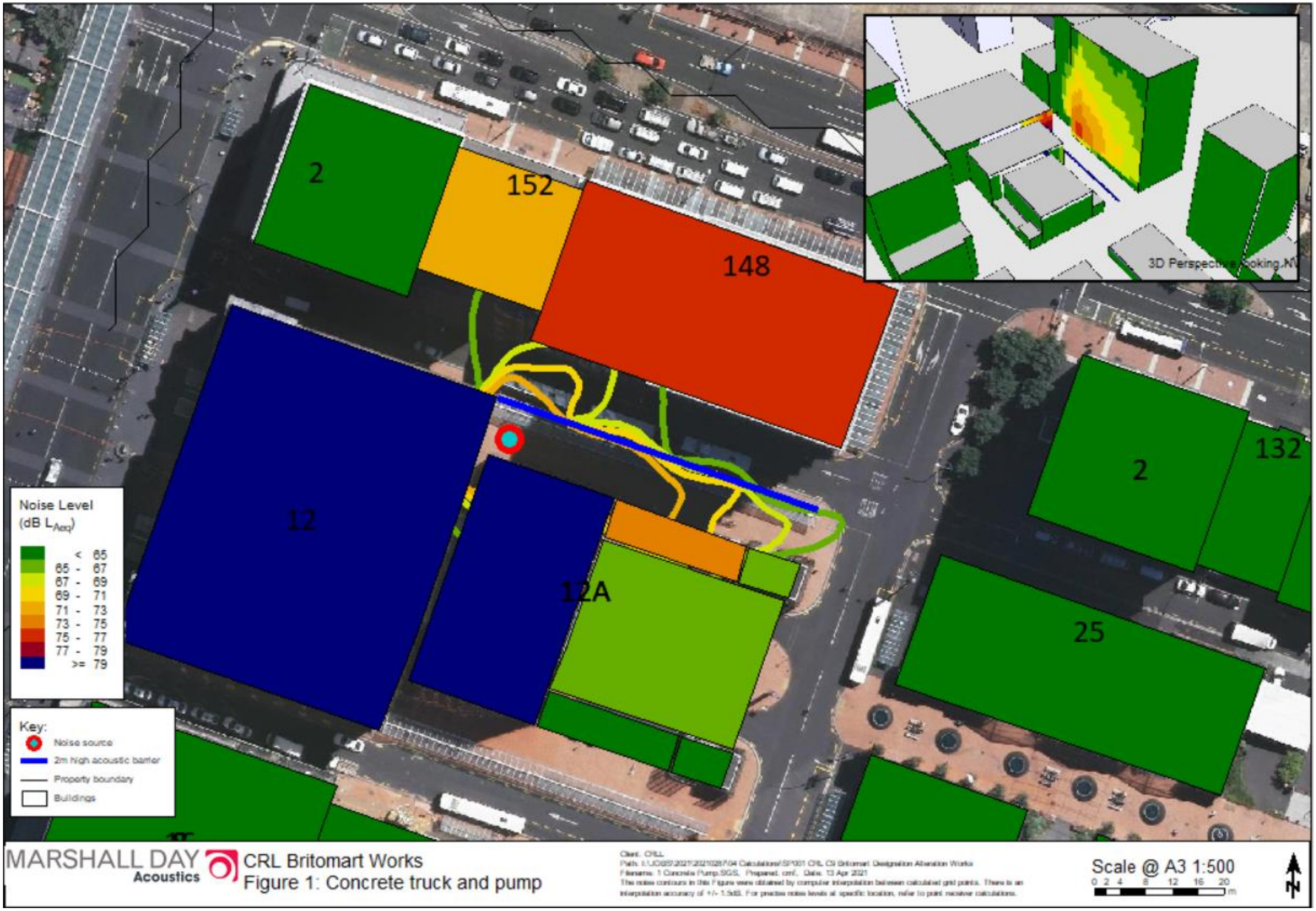
A noise monitoring flowchart is presented in Figure 2.

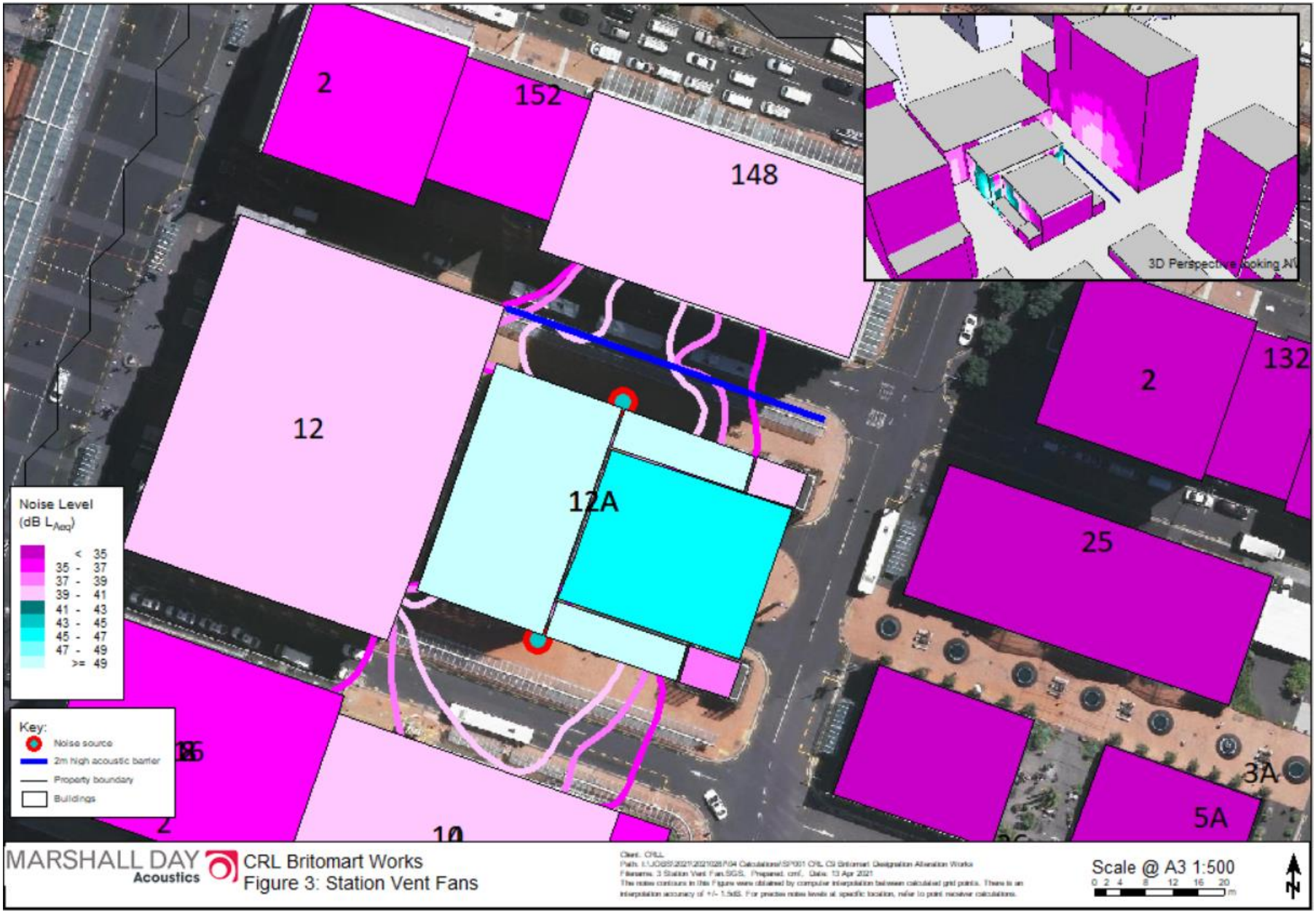
Figure 2: Noise Monitoring Flow Chart



APPENDIX A GLOSSARY OF TERMINOLOGY

Noise	A sound that is unwanted by, or distracting to, a receiver.
dB	Decibel (dB) is the unit of sound level. Expressed as a logarithmic ratio of sound pressure (P) relative to a reference pressure (Pr), where dB = 20 x log(P/Pr).
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) to more closely approximate the frequency bias of the human ear. A-weighting is used in airborne acoustics.
$L_{Aeq\ (t)}$	The equivalent continuous (time-averaged) A-weighted sound level commonly referred to as the average level. The suffix (t) represents the period, 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_{AFmax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
NZS 6803:1999	New Zealand Standard NZS 6803: 1999 "Acoustics - Construction Noise"
Sensitive Noise and Vibration Receivers	Receivers that may be disturbed during rest, concentration, communication or prayer. These include (but are not limited to): • Dwellings • Offices • Schools, including Child Care Centres and tertiary facilities • Libraries • Hospitals • Rest Homes • Marae and other Cultural Centres • Churches • Hotels or other accommodation facilities





Attachment 4: CRL BTC Draft NoR Conditions 23 August 2021

City Rail Link Ltd – Alteration of Designation 2501 Britomart Transport Centre – Proposed amendments and draft conditions – 23 August 2021

Insertions/amendments are in **bold** and **underlined**.

Amending the purpose of the designation as follows:

This designation provides for the construction, operation and maintenance of a transport centre and the provision of a rail system **(including the Works)**. The centre comprises an underground Railway Station, attendant facilities and public access to the station through the main portal of the former CPO and at other access points. Above-ground features of the centre include the glazed annex to the CPO building, a series of skylights, ventilation stacks and other servicing plant and equipment

Insert after the blue heading "Conditions":

The Works conditions

The following conditions apply to the Works.

DEFINITION

The Works

Construction support works to enable construction in adjoining City Rail Link Designation 2500-1, including site office, worker accommodation and storage of materials in the Station Plaza Accommodation, receiving and pumping concrete from the Britomart Transport Centre into the Designation 2500-1 tunnels, establishing and operating ventilation equipment in Station Plaza, and providing access for workers and delivery of materials to the Designation 2500-1 tunnels via the Glasshouse and former Chief Post Office.

CONDITIONS

Condition 1W

The Works shall be undertaken in general accordance with the information provided by the Requiring Authority in the Notice of Requirement being:

- **(a) CRLL Notice of Requirement for Alteration of BTC Designation 2501 – 25 June 2021, including:**
  - **(i) Form 18**
  - **(ii) Assessment of Effects on the Environment: Britomart Transport Centre Notice of Requirement Alteration of Designation 2501 Dated 25 June 2021**

Condition 2W

The concrete pumping activities associated with the Works shall be undertaken within the hours of 6.30am to 10.30pm Monday to Friday and 7am to 10.30pm Saturday.

Condition 3W

The ventilation fans installed at Station Plaza located as shown in figure 2.1 of the *Constructability Report*, prepared by *Link Alliance*, dated, *25/6/21*, shall be fitted with noise abatement measures as specified in the report *Britomart C7 Works Ventilation Management Plan, Revision A00*, dated *22/1/2021*, prepared by *Link Alliance*. The ventilation noise abatement measures shall remain in place while the ventilation fans are operational.

Construction Traffic Management Plan

Condition 4W

The Construction Traffic Management Plan titled, *City Rail Link: Britomart Transport Centre Construction Traffic Management Plan*, dated XXXX shall be implemented for the duration of the Works and shall include measures to ensure the following:

(a) **A general traffic lane of at least 3.0m wide shall be provided along the northern side of the construction zone on Tyler Street between lower Queen Street and Commerce Street, to maintain vehicle access to adjacent sites.**

(b) **A minimum 1.5m wide pedestrian access shall be maintained on the northern side of Tyler Street between lower Queen Street and Commerce Street to ensure safety and maintain access to public transport and adjacent sites.**

(c) **To ensure safety of all users, pedestrian movements during concrete delivery manoeuvring shall be controlled.**

(d) **The existing pedestrian access to Britomart Station, through the Chief Post Office building, shall be maintained.**

(e) **Vehicles associated with the Works shall not reverse into Tyler or Galway Streets during weekday peak traffic periods of 7.00am to 9.30am and 3.00pm to 6.00pm, unless agreed with the Auckland Transport corridor access team prior.**

(f) **Concrete delivery shall be coordinated to minimise impact on the functionality of all modes on Commerce Street and Tyler Street with priority given to pedestrians and public transport, essential movements including emergency services, access to properties and lastly private car travel.**

(g) **To avoid more than one concrete truck in the Station Plaza site compound and one in the Tyler Street concrete truck waiting area at any one time, any required remote waiting locations for concrete trucks shall be identified.**

Condition 5W

Notwithstanding Condition 3.2 of the Project conditions, the Station Plaza Accommodation shall be retained following completion of the Project in order to enable the Works (and any other contemporaneous works permitted under this designation).

The Station Plaza Accommodation shall be removed on the completion of the Works and Station Plaza reinstated in accordance with Conditions 33B.1(b) and 33B.4 of the Project conditions.

The Project conditions