

Technical Advisor Review – Noise and Vibration

Proposed Building 110 Jervois Quay Wellington

Michael Fowler Centre Car Park

Title	Acoustic Advisor Report 110 Jervois Quay Wellington	Report No	2
SR	510418	Status	WCC Issued
Date	14 March 2022	Discipline	Acoustics (Noise)
Authors	Lindsay Hannah Whitney Cocking	Issued to	Angela Jones Resource Consents Planner

The Acoustic Team has reviewed the Application by **MFC Development Limited Partnership** (the Applicant) who proposes to construct a new Central Area building on the former Michael Fowler Centre (MFC) carpark, currently the site of a temporary building occupied by the Royal New Zealand Ballet (RNZB).

A group of supporting documents have been submitted as part of the Resource Consent Application for review this includes the Resource Consent and Assessment of Effects (AEE). A preliminary noise assessment report has been prepared by Marshall Day Acoustics (MDA) as Appendix 13 to the Application. We have also considered other supporting documents including the draft Construction Management Plan. An architectural drawing set has also been provided by Athfield Architects.

The site is zoned **Central Area** under the Operative Wellington City District Plan. Adjacent sites are also zoned **Central Area** under the Operative District Plan. Sites that are zoned **Residential** are at significant buffer distances from the site. The activity is a Discretionary (Restricted) Activity. Regardless of residentially zoned sites being at a significant buffer distance, it is noted that there is a number of residential apartments and other noise and vibration sensitive sites within close proximity to the development that must still be considered. These sites include (but are not limited to) the Market Lane Apartments, Anvil House Apartments, Civic Chambers Apartments, Amora Hotel (currently undergoing construction works), Wellington Town Hall (currently undergoing construction works), Te Wharewaka O Pōneke, Te Papa, cafes, restaurants, retail and various other commercial sites that lay within a close radius of the proposed works.

The area surrounding the site being central city has an elevated background sound level for both daytime and nighttime activity from sound sources associated with the inner city such as people, traffic, plant, construction and general business activity.

The Michael Fowler Centre Carpark development site is approximately flat in contour and triangular-shaped area located between Jervois Quay and Wakefield Street, to the east of the Michael Fowler Centre. The site is currently occupied by what would be described as a low-rise (9 to 10m) pitched-roof building tenanted by the Royal New Zealand Ballet (RNZB), with the remainder of the site being car parking and landscaped open space.

Buildings in the surrounding area range from older low-rise buildings that are one or two storeys high through to medium-rise and high-rise blocks of ten storeys or more. As noted above this area of Wellington has seen a host of redevelopments in recent years which continues at the time of preparing this review

One of the newest buildings adjacent to the site is No 1 Market Lane, which was completed in 2015, and contains residential apartments and related amenities. No 1 Market Lane sites adjacent No 3 Market Lane. Work is also currently being completed on the refurbishment of the Wellington City Council Buildings surrounding Civic Square, further to the west of the site as well as at the Amora Hotel.

The development proposal involves the construction of an eight-storey building around 37m tall. The proposal involves three principal building components referred to as 'The Lantern', 'The East Wedge' and 'The West Wedge'. The Lantern is a ground plus 7 levels component and is the highest and most prominent part of the building. The East Wedge is a ground plus 5 levels component located within the 'sharper' eastern portion of the site. The West Wedge is a ground plus 3 levels component with a roof terrace.

Marshall Day Acoustics (MDA) has provided a noise report. The report is specifically noted by the Applicant as being **preliminary only** the MDA report states ***"we have carried out a provisional assessment on the ability for this project to meet the relevant noise requirements of the Wellington City Council District Plan (the "District Plan"), based on information received to date. Additionally, we have recommended noise conditions to be included in the consent documentation"***.

Plant Noise

The MDA report notes that the main noise sources associated with the operation of the site will be mechanical plant to service the building. Within the plant room, there would be pumps and HVAC equipment (for example, Air Handling Units). Outside the plant room, there would be two chillers and two outdoor units. There may also be other smaller plant items associated with the operation of the building, for example, extract fans for ancillary spaces. The MDA report states with respect to plant noise that ***"the noise levels are predicted to easily comply with the District Plan fixed plant noise limit of 55 dB $L_{Aeq(15mins)}$. For fixed plant, the L_{AFmax} is typically 1 -2 dB above the L_{Aeq} noise level. Therefore, the L_{AFmax} limit of 70 dB would be comfortably complied with"***.

Importantly the MDA report also notes that ***"should the plant noise contain special audible characteristics (SACs) as defined by NZS 6802:2008), a +5 dB adjustment would be added to the predicted noise levels. Regardless of the presence of SACs, noise from fixed plant would remain compliant with District Plan noise limits"***. Because the MDA review is preliminary and fixed plant subject to change, we recommend a condition below to confirm the final plant design complies with the District Plan limits.

The Applicant through the MDA report have also recommended a condition for fixed plant noise; we agree such a condition should be adopted. MDA has further also recommended an Acoustic Design Certificate. We agree in principle with the adoption of the conditions however recommend different wording to that set out in the MDA report.

Construction Noise

The MDA report notes that as the report is preliminary a detailed construction methodology has not been developed sufficiently to carry out a noise assessment and specifics of any exceedances cannot be reliably determined. However, the report does note that it is ***"highly unlikely that the construction noise limits would be complied with at all times"***. We agree. We note that construction noise has the potential for adverse noise effects if not suitably managed.

Construction Vibration

The MDA report notes that the Contractor is considering installing piles using a bottom driven impact methodology. The report notes that this specific method has been selected as it provides the highest level of resilience for the building.

We note that bottom driven impact piling can potentially cause high vibration levels and is well known that such methods can cause higher vibration levels than other methods such as bored piling.

The MDA report states that on previous projects of this nature and scale they (MDA) have implemented protocols to monitor and limit the effect of vibration on the surrounding environment. The MDA report however notes that **“based on the results of the previous projects, we expect that the limits of DIN 4150-3:2016 would be comfortably complied with”**. We note where the MDA report makes reference to previous projects they are discussing the Tākina and Victoria Lane Apartments. Both authors of this report were involved with noise and vibration compliance works associated with Victoria Lane Apartments. In this case, we note that vibration monitoring was undertaken by MDA, which resulted in full compliance. It is also noted however regardless of compliance being achieved at all times, due to people's sensitivity to vibration a number of ongoing complaints were received by Wellington City Council for these projects with respect to vibration effects in both residential and commercial buildings which were also deemed to be a good buffer distance from the vibration sources. The takeaway is that construction vibration has the potential for adverse noise effects if not suitably managed and can still cause concern for the community when compliant with the vibration standards.

The MDA report notes final protocols for the management of vibration will need to be developed prior to the commencement of piling operations. We agree that such measures would be a key vibration management method for a project of this nature and scale and should be implemented through a draft Construction Noise and Vibration Management Plan (CNVMP), that can provide a final assessment of both noise and vibration levels as well as a Best Practical Option (BPO) assessment for vibration.

In our opinion, the CNVMP is a key measure to ensure noise and vibration achieves compliance with s.16, s.17 and BPO duties under the Act. The MDA report is preliminary only and as noted in the report for example construction noise, the MDA report states their assessment is based on limited construction methodology and as such has not been developed sufficiently to carry out a detailed noise assessment. We agree. Construction noise and vibration will be a key noise effect for a project of this nature and scale and as such must be suitably managed at all times to limit both potential noise and vibration effects.

Roof Top Terrace Noise

The MDA assessment has assessed activity noise from people noise on the level 4 rooftop terrace. For the purposes of the MDA assessment, MDA has assumed a large congregation of 50 people on this terrace. The MDA report notes that the predicted noise levels ‘comfortably comply’ with the District Plan activity noise limit of 60 dB $L_{Aeq(15mins)}$.

MDA also notes that for people noise, the L_{AFmax} would be no more than 10 dB above the L_{Aeq} noise level. Therefore, the L_{AFmax} limit of 85 dB would also be comfortably complied with (as noted in the MDA report).

Finally, MDA has also calculated that up to 200 persons can use the rooftop terrace and this complies with the District Plan noise limits. We note however this assessment is based only on people noise and does not consider any other noise sources, for example, the potential use of amplified sound or performance. We assume as only an assessment of people noise has been undertaken by MDA that no additional noise sources would be operated in this area otherwise their assessment would have covered this.

No assessment of noise mitigation measures in line with RMA BPO duties are provided nor is any noise effects statement or assessment provided.

Overall the Applicant provides only a **limited preliminary assessment only** of both operational noise effects and constriction and vibration effects. We agree with the Applicant that a number of conditions are required. As such we recommend the following noise conditions.

We recommend the following noise conditions:

Boundary Noise Emission Limits

(...) Boundary Noise Emissions

The Consent Holder must ensure noise emission levels when measured at or within the boundary of any fee simple site or at the outside wall of any building on any site, other than the site from which the noise is emitted, shall not exceed the following:

At all times: 60 dBA $L_{Aeq(15\ min)}$

At all times: 85 dBA L_{AFmax}

Advice Note: Measurements shall be measured and assessed in accordance with NZS 6801:2008 "Acoustics – Measurement of environmental sound" and NZS 6802:2008 "Acoustics - Environmental Noise"

(...) Fixed Plant Noise Boundary Noise Emissions

The Consent Holder must ensure noise emission levels from fixed plant must not exceed the following at or within the boundary of any land parcel, or at the outside wall of any building on any site, other than the building or site from which the noise is emitted:

At all times: 55 dBA $L_{Aeq(15\ min)}$

10pm to 7am: 70 dBA L_{AFmax}

Advice Note: Measurements shall be measured and assessed in accordance with NZS 6801:2008 "Acoustics – Measurement of environmental sound" and NZS 6802:2008 "Acoustics - Environmental Noise"

(...) Fixed Plant Noise Certification (Acoustic Design Certificate)

The Consent Holder must ensure that noise emission levels emanating from all fixed plant and equipment must be monitored at the commissioning stage (prior to occupation) by a qualified and experienced acoustic expert suitable to Council. Written certification in the form of an acoustic compliance and commissioning report shall be provided to the Compliance Monitoring Officer. The certificate must certify that commutative worst case fixed plant operations and noise emissions comply with the noise limits set out in Condition **(xxx)** above.

Construction and Demolition Conditions

(....) Construction Noise Hours

The Consent Holder must ensure that construction, earthworks and any demolition activities operate between the hours of 7.30am and 6.00pm Monday to Saturday only. No construction work shall be permitted on site outside these hours. The Consent Holder must ensure that construction, earthworks and any demolition activities do not occur on any Public or stat holidays.

(....) Construction Noise

The Consent Holder must ensure that construction, earthworks and any demolition activities are managed and controlled so that the noise received at any residential or commercial site does not exceed the limits set out in Table 2 and Table 3 of 'NZS6803:1999 Acoustics – Construction' Noise when measured and assessed in accordance with that Standard. Where a specific construction activity cannot comply with the limits set out in Table 2 or Table 3 of 'NZS6803:1999 Acoustics – Construction' Noise, the Consent Holder must provide Wellington City Councils Compliance Monitoring Officer (CMO) an assessment of physical and managerial vibration control methods that must be adopted. The assessment shall be in line with s.16 Best Practical Option (BPO).

(....) Construction Vibration

The Consent Holder must ensure construction, earthworks and demolition activities must be controlled to ensure any vibration does not exceed the vibration limits set out in German Standard 'DIN 4150-3:1999 "Structural Vibration – Part 3: Effects of vibration on structures'. Where a specific construction activity cannot comply with the limits set out in DIN 4150-3:1999 "Structural Vibration – Part 3: Effects of vibration on structures' the Consent Holder must provide Wellington City Councils Compliance Monitoring Officer (CMO) an assessment of physical and managerial vibration control methods that must be adopted. The assessment shall be in line with s.16 Best Practical Option (BPO).

(....) Construction Noise and Vibration Management Plan (CNVMP)

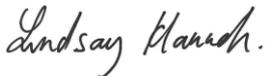
The Consent Holder must ensure that not less than 30 working days prior to commencing any construction, earthworks and any demolition activities authorised by this consent, the Consent Holder must submit to Wellington City Councils Compliance Monitoring Officer (CMO) a draft Construction Noise and Vibration Management Plan (CNVMP) for approval. The draft Construction Noise and Vibration Management Plan must be prepared by a suitably qualified and experienced acoustic expert acceptable to Council. The CNVMP must be amended, where directed by the CMO to address proven deficiencies in its operation at any stage of the works. The Construction Noise and Vibration Management Plan must include but not be limited to:

- a. *Background and purpose of Construction Noise Management Plan*
- b. *Objectives of Construction Noise Management Plan*
- c. *Description of the project (nature and scale)*
- d. *Description of site, designated areas and construction work areas*
- e. *Description and location of noise sensitive sites (commercial and residential)*
- f. *Construction and vibration sequences*
- g. *Noise and vibration sources*
- h. *Project period(s), sequencing and staging*
- i. *Performance noise and vibration standards*
- j. *Hours of operations (all activity types and activity area)*
- k. *Construction noise and vibration assessment (levels at adjacent sites)*
- l. *Physical noise and vibration mitigation measures*
- m. *Managerial noise and vibration mitigation measures*
- n. *Auxiliary noise control measures*
- o. *Community consultation and communication procedures*
- p. *Consultation and communication procedures with Council re: noise complaints*
- q. *Contact details of person in charge of noise management*
- r. *Construction noise and vibration monitoring and reporting*
- s. *Non-compliance contingency planning and monitoring*
- t. *Methods to review the CNVMP with respect to changes in program*
- u. *Construction Noise Management Plan approval and sign off*

(....) Construction Noise and Vibration Management Plan Approval

The Consent Holder must not undertake any activities authorised by this consent until the draft Construction Noise Management Plan (CNVMP) has been signed off by Councils Compliance Monitoring Officer as final and is denoted by Council as being 'approved for use' as the final Construction Noise and Vibration Management Plan (CNVMP).

Please advise if you require any further information or the Applicant wishes to discuss any changes to the recommended noise conditions.



Lindsay Hannah
MPhil (Sc) (Acoustics) (dist). PGDipSc (Acoustics) (dist). BBSc.
Acoustic Engineer
City Consenting and Compliance: Wellington City Council

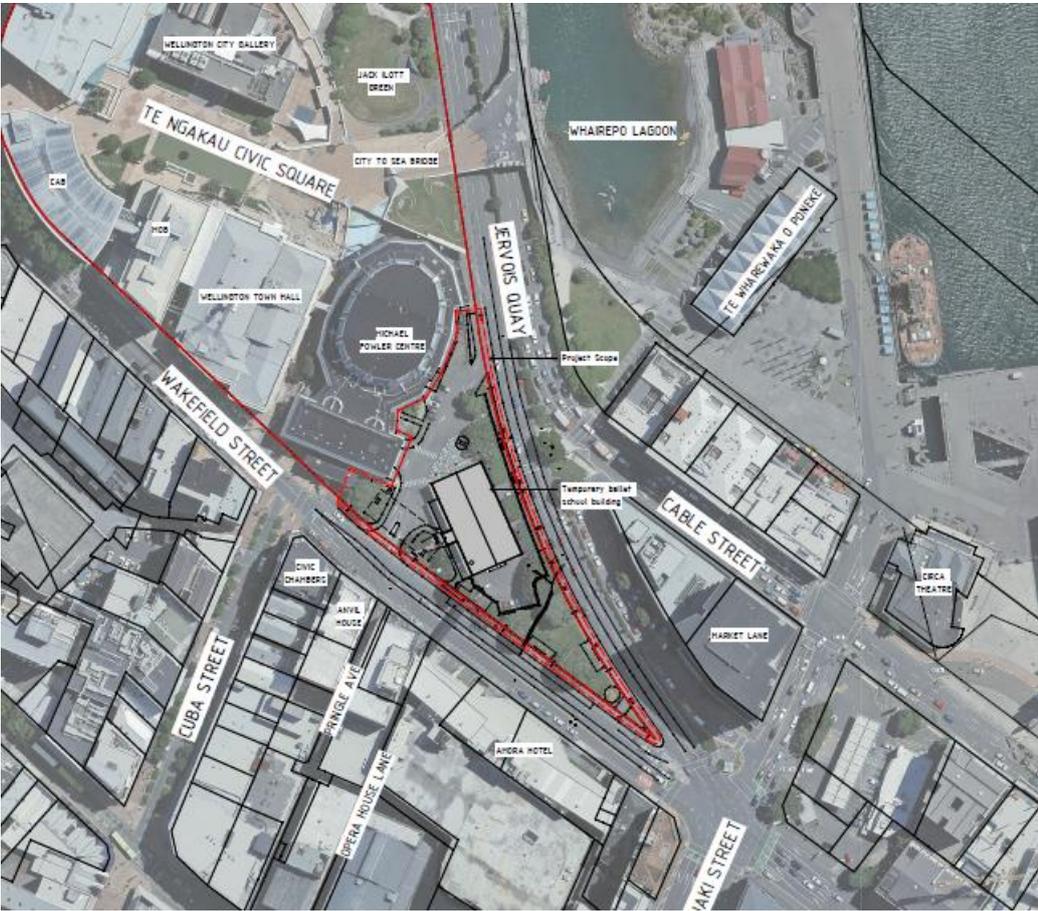


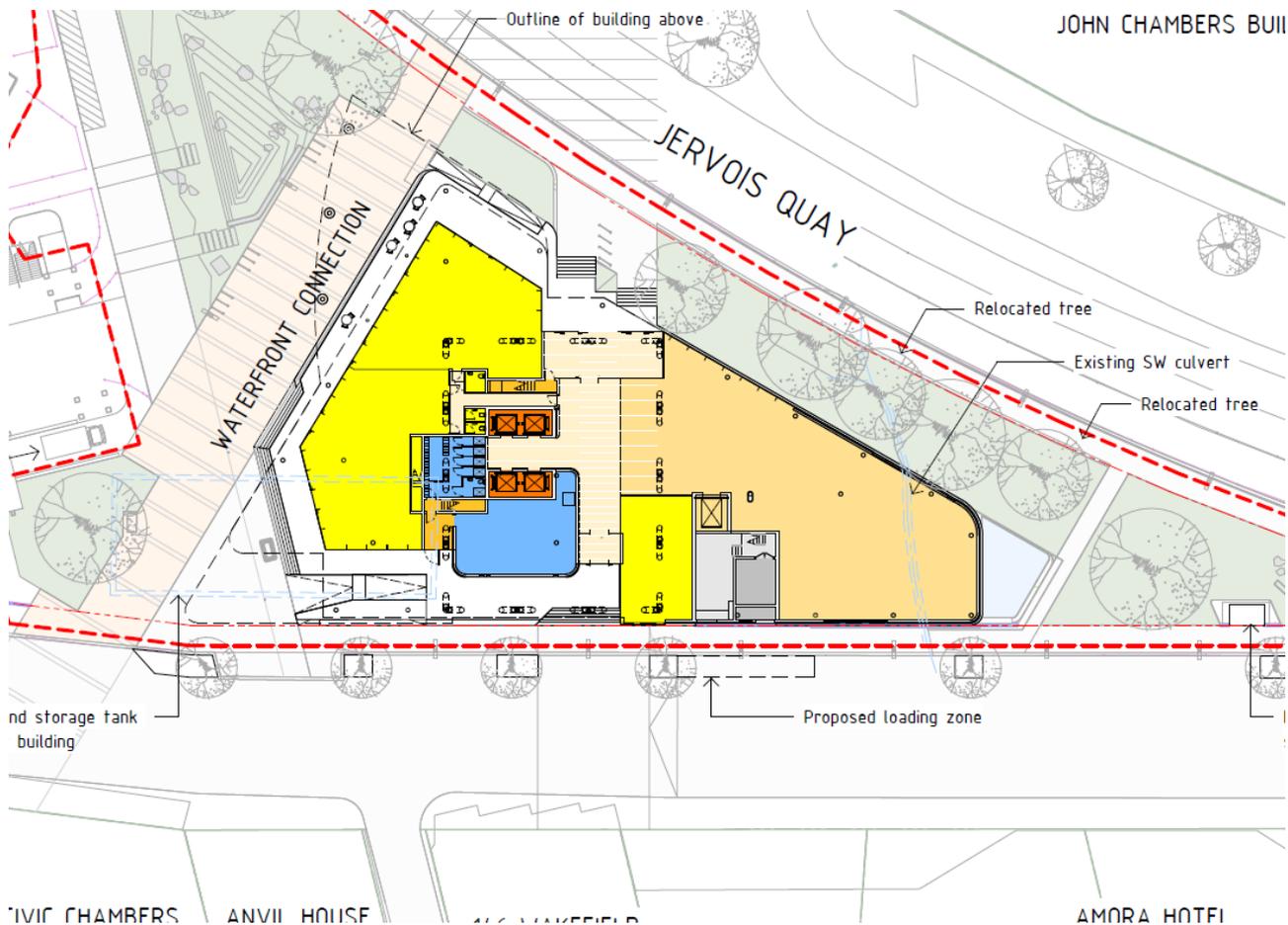
Whitney Cocking.
Environmental Noise/Compliance Officer.
City Consenting and Compliance: Wellington City Council

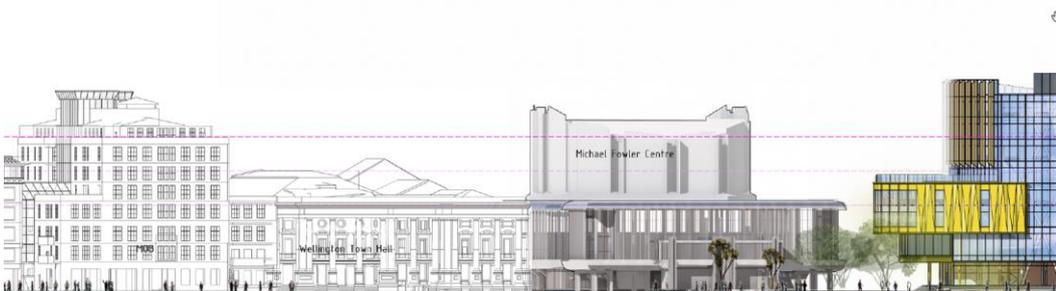
14 March 2022

Appendix A: Supporting Information









Wakefield St Context Elevation
1:500 @ A1, 1:1000 @ A3

