



LDA 2016/567 - 101-107 Waterloo Rd Macquarie Park Peer review and advice

June 2017

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1. Introduction

1.1 Brief

GHD has been engaged by Creative Planning Solutions, on behalf of City of Ryde Council, to review documentation and provide guidance relating to the proposed mixed use development at 101-107 Waterloo Road, Macquarie Park (LDA 2016/0567).

GHD was instructed to conduct the following brief:

- Review the following documents relating to the proposed development:
 - The submissions from AMP & Landerer P/L (on behalf of Holiday Inn) and peer review of the accompanying Acoustic Reports by EMM (submitted Acoustic Report for the proposal) and independent Acoustic report prepared by Acoustic Logic on behalf of AMP.
 - The response to the submissions by EMM (supplementary report dated 26 April 2017)
 - Acoustic Logic response (1 May 2017) to EMM's additional comments and AMP request for certain noise conditions to be placed on the consent
 - Email response from applicant with regard to the noise conditions proposed by Acoustic Logic
 - Council's Environmental Health Officer comments and recommendations
- Provide a summary report including:
 - Findings of the review and recommendations to Council with specific regard to whether Council's comments and recommendations are acceptable
 - Recommended conditions of consent that Council may impose on any consent issued.

1.2 Documents

GHD confirms that the following documentation has been provided and reviewed:

- Architectural drawings prepared by PTW Architects dated 8 August 2016
- *Acoustic assessment, 101 Waterloo Road, Macquarie Park* prepared by EMM dated 19 October 2016
- *101 Waterloo Road, Macquarie Park – Noise Impact from the Existing Macquarie Shopping Centre* prepared by Acoustic Logic dated 4 February 2017 and submitted to Council by AMP Capital with supporting email dated 15 February 2017
- Submission by Landerer Company and Wilkinson Murray dated 20 March 2017
- *101 Waterloo Rd, Macquarie Park – Response to EMM Letter* prepared by Acoustic Logic dated 1 May 2017
- JQZ / EMM email response to the above report dated 6 June 2017 and prepared by Jeremy Hung (AMP Capital) and Najan Ishac (EMM)
- *Environmental Health Report* dated 14 June 2017 prepared by Greg Lewin (City of Ryde Council)

2. Review of documentation

The following section provides a brief summary of the documentation provided to GHD relating to the mixed used development at 101-107 Waterloo Road, Macquarie Park.

2.1 101-107 Waterloo Road, Macquarie Park development – JQZ / EMM

EMM were engaged by the JQZ Pty Ltd to prepare an acoustic assessment for the Development Application (LDA2016/0567). Further to this assessment, EMM have provided further information and responses to issues raised by AMP Capital.

An outline of EMM's final recommendations are provided below (EMM letter dated 26 April 2017):

1. The following **internal** noise criteria that EMM propose is:
 - Leq 40 dBA for sleeping and living areas between 7 am and 10 pm
 - Leq 35 dBA for sleeping areas between 10 pm and 7 am

Where internal noise levels exceed the above levels, 6.38 mm thick laminated glass is proposed for bedrooms and living rooms.
2. The following **external** noise criteria that EMM propose is based on noise measurement results and intrusive criteria provided within the 2015 report *Macquarie Centre Redevelopment Stage 1 Concept DA Environmental Noise Impact Assessment*:
 - Leq(15 min) 62 dBA for the daytime period (7 am to 6 pm)
 - Leq(15 min) 57 dBA for evening period (6 am to 10 pm)
 - Leq(15 min) 52 dBA for the night-time period (10 pm to 7 am)
3. Where levels are shown to be above these noise levels for the day and evening, further acoustic design measures will be implemented (see point 5 of the letter for specific details). No assessment of night time levels is proposed as balconies are not normally occupied during the night-time period

2.2 Macquarie Shopping Centre – AMP Capital / Acoustic Logic

AMP Capital (AMPC) manage the Macquarie Shopping Centre on behalf of the owners, AMP Macquarie Pty Ltd and AMP Capital Funds Management Limited. AMPC have engaged Acoustic Logic Consultants to review the acoustic assessment prepared for the Development Application and provide information detailing the impact of the noise emission from the operation of the shopping centre on the proposed development.

Following their acoustic assessment, Acoustic Logic propose the following recommended consent conditions (as detailed in *101 Waterloo Rd, Macquarie Park – Response to EMM Letter* prepared by Acoustic Logic dated 1 May 2017):

1. **Internal Noise Criteria** - The noise level within the proposed dwellings measured in a typical furnished condition shall not exceed 35 dB(A) $L_{eq(15min)}$ in sleeping areas between 10 pm and 7am, 50 dB(A) $L_{1(1min)}$ in sleeping areas between 10 pm and 7 am, and 40 dB(A) $L_{eq(15min)}$ in other habitable rooms at any time. "Modifying Factor" adjustments for noise characteristics shall be applied in accordance with the EPA Industrial Noise Policy.
2. **External Noise Criteria** - External noise levels measured on balconies, terraces and the like accessible from a dwelling and exceeding 4m² in area shall not exceed 60 dB(A)

L_{eq} (7 am to 6 pm) and 55 dB(A) L_{eq} (6 pm to 10 pm). "Modifying Factor" adjustments for noise characteristics shall be applied in accordance with the EPA Industrial Noise Policy.

3. *Where internal noise levels exceed the "Internal Noise Criteria" by more than 10 dB(A) with windows/doors open to meet the minimum requirements of the Building Code of Australia for a naturally ventilated space, provide an alternative ventilation or air conditioning system complying with the recommendations of AS 1668.2.*
4. *Prior to the issue of a Construction Certificate, a suitably qualified acoustic consultant* (see definition below) is to prepare a written Acoustic Certification Report, to the satisfaction of the Principal Certifying Authority that:*
 - a. *Includes a detailed noise survey of the Shopping Centre (attended and long-term monitoring) to identify significant noise emission sources, and quantify the noise emissions from the Shopping Centre site under worst-case operating conditions i.e. when noise emissions are highest. All noise sources (including vehicles, plant and equipment) except atypical sources should be measured. (Typically, this would occur around Christmas, or post-Christmas when patronage is high and weather conditions typically cause plant to operate closer to maximum capacity. Where measurement at these times is not possible/practical it is acceptable either to simulate worst case conditions, or appropriately correct the measured levels for worst case conditions)*
 - b. *Using the results of the measurements, using a recognised computer model (eg Soundplan), predict and report noise levels outside all facades and on external spaces. Establish worst-case day, evening and night noise levels for the L_{eq} (15min) and L_{eq} (period) descriptors, as well as night time (10 pm to 7 am) L₁ (1min) descriptor which shall be adopted as the design external levels used to assess noise impacts. Also present octave band levels for the centre frequencies 63 Hz to 8 kHz.*
 - c. *Specifies the minimum facade performance requirements for all dwellings to meet the required internal noise levels specified in (1) above.*
 - d. *Specifies the treatment recommended for external spaces to meet the required external noise levels specified in (2) above.*
 - e. *Identifies the rooms requiring an alternative ventilation system and/or air conditioning system that complies with the requirement in (3) above.*
5. *The recommendations of the Acoustic Certification Report shall be implemented into the construction drawings.*
6. *Note: Suitably qualified Acoustic Consultant means a consultant who possesses the qualifications to render them eligible for membership of the Australian Acoustics Society, Institution of Engineers Australia or the Association of Australian Acoustic Consultants at the grade of member.*
7. *Prior to the issue of an Occupation Certificate, a suitably qualified acoustic consultant is to provide a written Acoustic Verification Report to the satisfaction of the Principal Certifying Authority that the development complies with the requirements set out in the Acoustic Certification Report and in (1) and (2) above. Verification shall (as a minimum) involve measurement of at least 10 worst impacted dwellings. Measurements shall be appropriately normalised to the worst case external level established in the Acoustic Certification report. The Verification Report shall include a statement of compliance with the Internal and External Noise Criteria.*
8. *Prior to the issue of an Occupation Certificate, a suitably qualified consultant is to provide a written Ventilation Verification Report to the satisfaction of the Principal Certifying Authority*

that the development complies with the ventilation requirements set out in the Acoustic Certification Report (Refer Condition 4e).

2.3 City of Ryde Council

Further to above proposed criteria and conditions, City of Ryde Council have provided their own response and recommended criteria. This included:

1. *Existing noise levels must be used when determining design measures to achieve internal and external noise goals. This may require further testing to ensure that any recommended design is adequate and certification after work is completed can be properly achieved.*
2. *Internal noise goal be based on acceptable levels in AS 2107.*
3. *In absence of any specific guidance for external balconies it is considered that the amenity criteria in the INP be used. This situation of a residential development being put into an existing commercial area means that the indicative noise amenity area of "Urban/Industrial Interface" is the most appropriate. The design goals for the external balconies would therefore be 65 dB(A) in the day and 55 dB(A) in the evening.*
4. *To ensure that the amenity is maintained any work or development on the Macquarie Shopping Centre subsequent to the development of 101 Waterloo Road would have to apply the INP, as would be required in normal circumstances anyway, considering 101 Waterloo Road as an existing residential neighbour in an 'Urban' noise amenity area.*

2.4 Summary

A summary of the proposed internal and external noise levels for each stakeholder is presented below in Table 2-1. The items that differentiate each stakeholder's position is as follows:

- The proposed external criteria for balconies and courtyards
- AMP Capital specify an internal L1(1min) criteria for sleep disturbance, which was agreed
- City of Ryde Council refer to AS2107 however do not refer specifically to an internal noise level

Table 2-1 Proposed internal and external noise criteria

		101-107 Waterloo Road, Macquarie Park development	Macquarie Shopping Centre – AMP Capital / Acoustic Logic	City of Ryde Council
Proposed internal noise criteria	7 am to 10 pm	40 dBA Leq for sleeping and living areas	40 dBA Leq(15 min) for sleeping and living areas	acceptable levels in AS 2107
	10 pm to 7 am	35 dBA Leq for sleeping and living areas	35 dBA Leq(15 min) and 50 dBA L1(1min) for sleeping and living areas	acceptable levels in AS 2107
Proposed external noise criteria	7 am to 6 pm	62 dBA Leq (7 am to 6 pm)	60 dBA Leq (7 am to 6 pm)	65 dBA Leq(7am to 6 pm)
	6 pm to 10 pm	57 dBA Leq (6 pm to 10 pm)	55 dBA Leq (6 pm to 10 pm)	55 dBA Leq(7am to 6 pm)

3. Discussion

3.1 Discussion on external criteria for the proposed development

For determining external criteria the INP has been referred to by all stakeholders, however agreement has not been reached on the level of noise. The INP states it *'is specifically aimed at assessing noise from industrial noise sources scheduled under the new Protection of the Environment Operations Act 1997.'* However it also goes on to state in the same section that *'Local government is an independent regulator for noise under the legislation, and thus has discretion in dealing with noise within its area of responsibility.....however, local government may find the policy helpful in the carrying-out of its land-use planning responsibilities.'*

The shopping centre is a commercial premise and produces similar types of noise sources dealt with in the INP.

Section 1.4 of the INP states:

'Judicious land use and project planning can often prevent potential noise problems from occurring. This policy should be used to consider the implications of proposing or allowing new noise-sensitive developments near noise generators'

As such, guidance provided by the INP is considered appropriate for consideration in land use planning for new residential developments near existing industrial noise sources (in this case, commercial premises). Council's Environmental Health Officer letter (14 June 2017) recommends the application of the 'Urban/Industrial Interface' INP receiver category for external areas (Acceptable 65 dBA LAeq(day) and 55 dBA Leq(evening)). The INP Application notes provide commentary on when to apply the urban/industrial interface criteria and states that it should only be used for existing receivers, which the proposed residential development is not:

'The urban/industrial interface amenity category applies only for existing situations (that is, an existing receiver near an existing industry)'

With this in mind, the 'urban' receiver category is considered a more appropriate criteria for residential apartments in a business/mixed use zone. The 'urban' category has an **acceptable** amenity criteria of 60 dBA LAeq(day) and 50 dBA Leq(evening). The **recommended maximum** amenity criteria for this category is 65 dBA Leq(day) and 55 dBA Leq(evening). Section 2.2 of the INP states:

*'Meeting the **acceptable** noise levels in Table 2.1 will protect against noise impacts such as speech interference, community annoyance and, to some extent, sleep disturbance. These levels represent current best practice for assessing industrial noise sources, based on research and a review of assessment practices used overseas and within Australia.'*

and;

*'**recommended maximum** values provide guidance on an upper limit to the level of noise from industry. In all cases it is expected that all feasible and reasonable mitigation measures would be applied before the **recommended maximum** noise levels are referenced.'*

Based on these two statements in the INP the **acceptable** amenity criteria should be considered in the first instance, and the **recommended maximum** amenity criteria should only be considered after all feasible and reasonable mitigation measures have been applied. Based on the information supplied by the proponent there is no evidence to confirm all feasible and reasonable mitigation measures have been considered. It is GHD's opinion that the **acceptable** amenity criteria are appropriate unless it can be demonstrated to the satisfaction of Council that all feasible and reasonable mitigation measures have been investigated.

The amenity criteria is 10 dBA lower during the evening period than the day period. This is because, '*The community generally expects greater control of noise during the more sensitive evening and night-time periods than the less sensitive daytime period.*' (INP Application notes (version 12 June 2013)). The INP provides external criteria at residential receivers to preserve amenity at residential premises and does not specifically refer to either indoor or outdoor areas. However, it is GHD's opinion that the intention of setting the evening criteria 10 dBA below the daytime criteria is not to protect amenity in outdoor areas, but rather amenity in indoor living areas, more commonly used during the evening period. There is no reason why the occupants of an external area (such as a balcony or courtyard) would be more sensitive to noise during the evening period than the daytime period, and one could argue that use of the outdoor area could be higher during the day-time period. As such it is recommended that the daytime amenity criteria are adopted for the external areas during the evening period. Keeping in mind the amenity of the internal areas (living rooms and bedrooms) would be maintained through applying the internal noise limits, and the implemented noise mitigation, agreed by both parties.

It is worth noting that other NSW noise guidelines (including the *Road Noise Policy (DECCW, 2011)*, *Rail Infrastructure Noise Guideline (EPA, 2013)* and *Development Near Rail Corridors and Busy Roads (DoP 2008)*) do not differentiate between the day-time and evening period and consider the day-time period as 7 am to 10 pm.

The INP amenity criteria assessment period is the average Leq noise level over the day-time and evening periods. As such it is recommended that these time periods are maintained for averaging. This is to prevent the potential for higher noise levels in the day above 60 dBA being offset by lower noise levels in the evening period. Therefore, the consent conditions for external areas (such as balconies or courtyards) are recommended to be set so that the noise level from Macquarie Shopping Centre does not exceed the following:

- 60 dBA Leq(7am to 6pm)
- 60 dBA Leq(6pm to 10pm).

The INP also provides the intrusive criteria which is background plus 5 dBA. The background noise environment is likely to change with the new residential development. GHD consider the amenity as more appropriate for establishing external noise criteria for new residential developments along with internal noise criteria to prevent intrusive noise impacts.

3.2 Discussion on future development in the area

It is agreed with Council's recommendations in the Environmental Health Officer letter (14 June 2017), that future commercial development in the area should be assessed by Council with consideration to the INP amenity criteria for an urban area considering the modifying factor adjustments in Table 2.2 of the INP. Council should also consider Section 10 of the INP policy which applies guidance for applying the policy for existing premises. If the situation arises where future development of existing commercial premises cannot comply with the INP criteria after all feasible and reasonable noise mitigation strategies are exhausted, Section 10 of the INP recommends, '*Negotiation between the regulator and the noise source manager to agree to achievable noise limits for the site.*' In this instance, Council may consider it appropriate to apply the same rationale to the evening amenity criteria by setting it to 60 dBA as the noise condition of consent within internal areas of the residences (7 am to 10 pm) should still be satisfied.

3.3 Discussion on proposed conditions

It is recommended that the Acoustic Logic recommended Conditions of Consent number 4 be modified. It is considered that the development should be designed to comply with the relevant internal and external noise criteria. The methodology as to how this is done should not be

conditioned by Council. The verification testing prior to the issue of an Occupation Certificate will ensure that the acoustic design has been suitably included into the development.

The following has been removed from Acoustic Logic's recommended Condition of Consent number 7:

'Measurements shall be appropriately normalised to the worst case external level established in the Acoustic Certification report'

GHD recommends that measurements be undertaken during typical operations of the adjacent shopping centre. It is deemed inappropriate to normalise any verification noise measurements to a worst case period.

There is general agreement between stakeholders for the other conditions, albeit the external noise condition which has been discussed in Section 3.1

3.4 Discussion on noise emission from the development to the Holiday Inn Express

The acoustic assessment prepared by EMM for the Development Application (LDA2016/0567) assesses the likely impacts on the surrounding land uses from the noise and vibration associated with the operation and construction of the proposed development.

Further to this, a review of this report has been conducted by Wilkinson Murray, who has been engaged by Pro-Invest Development. This specifically addresses the noise impact on the Holiday Inn Express (HIEX) located at Byfield Street.

The following issues are raised in this report:

- Background noise levels for the assessment of construction and operational noise emission are based on monitoring conducted at the proposal site. Wilkinson Murray has conducted noise monitoring which suggests that background noise levels at the HIEX site are lower than those measured at site of the proposed
- Construction noise management levels and project specific operational noise criteria should be based on these measured background noise levels
- The HIEX should be considered a residential premises for the purposes of the construction and operational noise assessment
- Appropriate mitigation should be incorporated to achieve the relevant acoustic criteria

3.4.1 Construction noise

The *Interim Construction Noise Guideline* (DECC, 2009) provides guidance on the assessment of noise emission from proposed construction activities. This guideline does not provide guidance on the classification of hotels or motels such as the Holiday Inn Express. As such it is recommended that the construction noise management level for commercial receivers of Leq(15min) 70 dBA be applied for construction noise during recommended standard construction hours.

However, GHD agrees that given the nature of the HIEX, it is considered appropriate to classify the hotel as a residential receiver for construction activities undertaken outside of recommended standard construction hours. It is recommended that for out of hours construction activities the background noise monitoring undertaken by Wilkinson Murray be applied as the measured location was on the HIEX site and considered more representative.

3.4.2 Operational noise

There is no guidance within the current *Industrial Noise Policy* relating to operational noise criteria from proposed development on hotels. However, the *Draft Industrial Noise Guideline* does provide the following guidance on suitable criteria for the assessment of noise on hotels.

Recommended amenity noise level - 5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day. For an urban area, the project amenity noise criteria at HLEX would be as follows:

Receiver	Noise amenity area	Time of day	LAeq, dB(A) Project ¹ amenity noise level
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks	Urban	Day	60
		Evening	50
		Night	45

Note 1: Project amenity noise level for industrial developments = recommended amenity noise level minus 5 dB(A)

GHD recommends that the above recommended amenity noise levels for the hotel would be suitable for the assessment of noise emission from the proposed development and could be included in the Conditions of Consent, if council deems appropriate.

4. Recommended conditions of consent

The following conditions of consent are recommended, it is noted that there is agreement between stakeholders for the proposed condition 1, 3, 4, 5, 6 below.

- The noise levels within the internal areas of the proposed development measured in a typical furnished condition shall not exceed:
 - 35 dBA Leq(15min) in sleeping areas between 10 pm and 7 am,
 - 40 dBA Leq(15min) in other habitable rooms at any time.
 - 50 dBA L1(1min) in sleeping areas between 10 pm and 7 am"Modifying Factor" adjustments for noise characteristics shall be applied in accordance with the EPA Industrial Noise Policy.
- The external noise levels from Macquarie Shopping Centre measured on balconies, terraces and the like accessible from a dwelling and exceeding 4 m² in area shall not exceed:
 - 60 dBA Leq(15hr) between 7 am and 6 pm
 - 60 dBA Leq(4hr). between 6 pm and 10 pm"Modifying Factor" adjustments for noise characteristics shall be applied in accordance with the EPA Industrial Noise Policy.
- Where internal noise levels exceed the internal noise criteria by more than 10 dB(A) with windows/doors open to meet the minimum requirements of the Building Code of Australia for a naturally ventilated space, provide an alternative ventilation or air conditioning system complying with the recommendations of AS 1668.2.
- Prior to issue of the Construction Certificate a suitably qualified acoustic consultant is to provide a written Acoustic Verification Report to the satisfaction of the Principal Certifying

Authority that the EMM recommendations contained with the EMM Acoustic Report (19 October 2016 and EMM Letter (26 April 2017), to achieve compliance with the internal and external noise goals in Conditions (1) and (2) above, have been incorporated into the construction drawings.

5. Prior to the issue of an Occupation Certificate, a suitably qualified acoustic consultant is to provide a written Acoustic Verification Report to the satisfaction of the Principal Certifying Authority that the development complies with the requirements set out in Conditions (1) and (2) above. Verification shall (as a minimum) involve measurement of at least 10 worst impacted dwellings. The Verification Report shall include a statement of compliance with the Internal and External Noise Criteria set out in Conditions (1) and (2) above.
6. Prior to the issue of an Occupation Certificate, a suitably qualified consultant is to provide a written Ventilation Verification Report to the satisfaction of the Principal Certifying Authority that the development complies with the ventilation requirements set out in the Acoustic Certification Report (Refer Condition 4e).
7. The external noise levels from the development at the HIEX boundary shall not exceed:
 - 60 dB(A) Leq(15hr) between 7 am and 6 pm
 - 50 dB(A) Leq(4hr). between 6 pm and 10 pm
 - 45 dB(A) Leq(9hr). between 10 pm and 7 pm"Modifying Factor" adjustments for noise characteristics shall be applied in accordance with the EPA Industrial Noise Policy.

Note: Suitably qualified Acoustic Consultant means a consultant who possesses the qualifications to render them eligible for membership of the Australian Acoustics Society, Institution of Engineers Australia or the Association of Australian Acoustic Consultants at the grade of member.

5. References

Industrial Noise Policy Application notes (version 12 June 2013)

Industrial Noise Policy (EPA, 2000)

Road Noise Policy (DECCW, 2011),

Rail Infrastructure Noise Guideline (EPA, 2013)

Development Near Rail Corridors and Busy Roads (DoP 2008))

Interim Construction Noise Guideline (DECC, 2009)

Draft Industrial Noise Guideline (EPA, 2015)

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