APPENDIX J INDEPENDENT NOISE ASSESSMENT

WILKINSON MURRAY

2 August 2013

WM Project Number: 12351
Our Ref: 12351 Ltr 020713NH (2)

Ben Lusher
Department of Planning & Infrastructure
Bridge Street
SYDNEY NSW 2000

Dear Ben

Re: Balmain Leagues Club - Rozelle Village Redevelopment: Review of Submission following Independent Review

Wilkinson Murray Pty Ltd (WMPL) completed an independent review of the Preferred Project Report Noise Assessment (the report) for the Rozelle Village Redevelopment (the project), prepared by AECOM Australia Pty Ltd (the consultant).

In response to the WMPL review of the report, the consultant has produced a version 7 of their report (the revised report), addressing the issued highlighted by the review.

Following is a summary of the areas of concern highlighted by the review, the consultant's response to the concerns, and WMPL's assessment of the responses.

1 TECHNICAL REVIEW

1.1 Noise Monitoring Locations

The review highlighted shortcomings in the adequacy of the consultant's background noise monitoring, upon which many noise criteria are established. WMPL did not consider that background noise levels had been sufficiently established at the most affected residential receivers.

WMPL recommended that the consultant conduct unattended background noise monitoring at the most affected residential receiver locations to the north and south of the development.

In response to the WMPL recommendation, the consultant has conducted subsequent background noise monitoring at the following locations:

- Waterloo Street, on the boundary of the Balmain Leagues Club; and
- 5 Wellington Street.

WMPL considers the additional noise monitoring to be adequate, and sufficient for the establishment of noise criteria.

Subsequently, WMPL recommends that the construction noise management levels and the environmental noise intrusive criteria, as shown in Tables 7 and 12 of the revised report respectively, be adopted as controls in any approval of the development. Tables 7 and 12 from the revised report are shown below.

Table 7 Construction noise management levels – Residential receivers

Residential Receivers location	Recommended Standard Hours RBL	Recommended Standard Hours Noise Management Levels L_{Aeq} dB(A)	Highly Noise Affected Level L_{Aeq} dB(A)
NC1 – based on environmental noise monitoring conducted at 5 Wellington Road	44	54	75
NC2 – based on environmental noise monitoring conducted at 9 Moodie Street	47	57	
NC3 - based on environmental noise monitoring conducted at Balmain Leagues Club, Waterloo Street	47	57	
NC4 - based on environmental noise monitoring conducted at Balmain Leagues Club, Waterloo Street	47	57	
NC5 - based on environmental noise monitoring conducted at Balmain Leagues Club, Victoria Road	59	69	
NC6 - based on environmental noise monitoring conducted at Balmain Leagues Club, Victoria Road	59	69	

Table 12 Environmental noise emission intrusiveness criterion

Period	RBL (L_{A90}), dB(A)	Intrusiveness Criterion (RBL + 5), dB(A)
NC1 – based on environmental noise monitoring conducted at 5 Wellington Road		
Day	44	49
Evening	39	44
Night	36	41
NC2 – based on environmental noise monitoring conducted at 9 Moodie Street		
Day	47	52
Evening	44	49
Night	38	43
NC3 and NC4 – based on environmental noise monitoring conducted at Balmain Leagues Club, Waterloo Street		
Day	47	52
Evening	47	52
Night	40	45
NC5 and NC6 – based on environmental noise monitoring conducted at Balmain Leagues Club, Victoria Road		
Day	62	67
Evening	60	65
Night	52	57

1.2 Unattended Monitoring of Traffic Noise Levels

The report was somewhat ambiguous with respect to the measurement methodology employed when establishing the existing levels of traffic noise. It was unclear if the noise monitoring equipment was deployed in locations that were affected by façade reflections of traffic noise.

The measured levels of traffic noise were used to establish the project specific amenity criteria; used in the assessment of operational noise. Accordingly, WMPL requested that the consultant provided further information, including photographs, relating to the monitoring locations. A further recommendation was offered relating to 2.5 dBA a correction factor that should be applied to façade traffic noise levels when establishing amenity criteria in areas of high traffic noise.

The revised report contains clear information, including photographs, for each monitoring location. The revised report clearly shows which measurements are taken near a façade, and subsequently applies the correction where appropriate.

WMPL considers that the traffic affected amenity criteria in the revised report have been established in accordance with relevant guidelines. The resultant environmental noise criteria as shown in table 15 of the revised report, as shown below, are correctly established and should be adopted as approval controls for this development.

Table 15 Summary of environment noise criteria

Period	Intrusiveness Criterion	Amenity Criterion	Final Environmental Criterion
NC1			
Day	49	60	49
Evening	44	50	44
Night	41	45	41
NC2			
Day	52	60	52
Evening	49	50	49
Night	43	45	43
NC3 and NC4			
Day	52	60	52
Evening	52	50	50
Night	45	45	45
NC5 and NC6			
Day	67	64	64
Evening	65	63	63
Night	57	60	57
Commercial			
When in use	N/A	65	65
Rozelle Public School (Internal)			
Noisiest 1-hour period when in use	N/A	35	35

1.3 Licensed Premises / Club Areas Noise Emission

WMPL considered the information in the report relating to the assessment of noise against the NSW Office of Liquor, Gaming and Racing (OLGR) current noise condition to be insufficient for the purposes of review. The consultant provided few details regarding the noise sources assessed, or the method of predicting receiver noise levels. Further, since questions were raised about the adequacy of the background noise monitoring; the validity of the criteria was unclear.

In addition to the recommendations provided for the background monitoring, WMPL recommended that the consultant provided clear details regarding the noise sources assessing the licences areas, and the method used for predicting receiver noise levels. WMPL also requested that the report clearly showed the predicted levels, in octave bands, listed against the OLGR criteria.

The revised report clearly outlines the noise sources assessed in the licensed areas, and the sound power levels of the sources. The revised report also details the method of noise prediction, and compares the results to the OLGR criteria. The consultant has predicted that exceedances of up to 9 dBA will occur at the most affected residential receiver. In addressing the exceedances, the revised report states that:

> *"Noise levels at NC4 due to the gaming terrace exceed the external criteria in the 4000Hz and 8000 Hz octave bands. However, it is noted that the external noise levels due to the gaming terrace at theses frequencies are 23 dB and 19 dB respectively. It is not likely that residents will outside [sic] at the most affected point in NC4 as terraces, verandas, gardens and other external spaces are not a feature of properties. It is considered that an open window results in a 10dB reduction from external to internal noise levels. This would result in noise levels of 13 dB and 9 dB respectively in internal residential areas of NC4. This is considered to be significantly low and not likely to affect to [sic] residents."*

WMPL does not consider that the above statement is an acceptable way to address the predicted exceedence of the OLGR criteria. The OLGR criteria, as established and shown in Table 17 of the revised report, should be met at the boundaries of nearby receivers, as required by the criteria.

Accordingly, the detailed design of the licensed areas of the development should be carried out in such a way that noise levels from gaming and other licensed activities meet the established criteria.

Notwithstanding compliance with the above, noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12.00 midnight and 7.00 am.

Table 17 of the revised report is shown below.

Table 17 Music and patron noise criteria

Time Period	OLGR Criteria, dB									Overall, dB(A)
	Octave Band Centre Frequency, Hz									
	31.5	63	125	250	500	1000	2000	4000	8000	
NC1										
7:00 am to 12 midnight	53	54	49	49	42	40	35	25	17	46
12 midnight to 7:00 am	42	42	39	40	34	33	26	16	10	36
NC2										
7:00 am to 12 midnight	56	56	51	45	44	46	39	30	27	48
12 midnight to 7:00 am	41	43	40	35	31	33	30	22	21	37
NC3 and NC4										
7:00 am to 12 midnight	56	56	52	47	44	49	44	30	20	51
12 midnight to 7:00 am	42	42	39	40	34	33	26	16	10	38
NC5 and NC6										
7:00 am to 12 midnight	65	70	65	60	57	58	55	47	36	62
12 midnight to 7:00 am	52	58	56	52	45	43	41	32	27	50

In addition to the above areas of concern with the consultant's previous report, WMPL considers the following items to either represent potential noise impacts which should be addressed further, or potentially be of concern to the community.

1.4 Operational Noise Emissions

The revised report predicts that noise emissions from the underground carpark access point along Waterloo Street exceed the night time criteria at NC2 by up to 3 dBA. This represents a significant noise impact. In addressing this impact, the revised report states:

> *"The noise levels at residential receivers in the NC2 catchment area are based on a worst case scenario with peak night time traffic flows. Noise criteria are expected to achieve the criteria outside the peak period. Additionally, the exceeding noise levels occur on a small section of the most affected residential receiver in NC2 directly adjacent to the development. The criteria are complied with at the house itself. Noise emission to other residential premises in NC2 are complied with at all times [sic]."*

The revised report is unclear as to the exact locations within NC2 where the predicted noise levels, due to the operation of the carpark, exceed the applicable criteria. Since the predicted noise levels from the operation of the carpark have assumed the adoption of a number of mitigation measures, and are in excess of the night time criterion, WMPL is not satisfied that the consultant has demonstrated the ability to comply with operational noise criteria in this instance.

Noise emissions from the carpark should comply with the established operational noise criteria, as shown in Table 15 of the revised report, at all nearby receivers. Accordingly, WMPL recommends that operational noise compliance monitoring be carried out at such a time when the carpark is operational. If the noise emissions from the carpark do not comply with the established criteria, taking into account the occupancy level of the development at the time of monitoring; further mitigation measured should be employed to achieve compliance, such as barriers or architectural treatments..

In addition to demonstrating compliance for noise emissions from the carpark, monitoring of all operational noise should be conducted and assessed for compliance with criteria. The assessment of operational noise should be inclusive of, but not limited to the following:

- Carpark noise;
- Mechanical services;
- Retail areas;
- Bistro and gaming (i.e. licensed) areas;
- Recreational facilities including tennis courts and swimming pools; and,
- Child care facilities.

1.5 Traffic Noise

The revised report predicts that traffic noise levels along Waterloo Street will increase during peak hours by up to 4 dB due to the development. The NSW Road Noise Policy (RNP) recommends that reasonable and feasible noise mitigation is considered if traffic noise increases by more than 2 dB in areas where the criterion is already exceeded. In response to the predicted exceedences, the report states:

> *"It should be noted that the road traffic noise levels in Waterloo Street comprise noise from traffic on Waterloo Street, Moodie Street, Darling Street and Victoria Road. Although the noise levels generated by traffic on Waterloo Street are likely to increase by more than 2 dB, subjectively the noise increase may be marginal due to the existing high levels of traffic noise perceptible from Victoria Road and other roads. Traffic noise levels on Victoria Road and most other roads are subject to minor increase only."*

WMPL does not agree that the justification above is an acceptable way to manage a noticeable traffic noise increase along Waterloo Street and recommends that the predicted traffic noise level increase is mitigated at all affected receivers. The commonly used method to mitigate road traffic noise levels is through architectural treatment of dwellings or possibly courtyard barriers.

1.6 Construction Noise

Since construction activities often result in strong community reaction, and are often expected to cause significant noise and vibration impacts; WMPL considers it worthwhile to comment of the construction noise assessment carried out by the consultant.

The establishment of construction noise management levels and the subsequent assessment of construction noise are both consistent with the *Interim Construction Noise Guideline (ICNG)* and considered appropriate by WMPL. The revised report clearly shows the predicted levels of construction noise at all nearby receivers and highlights the levels of exceedence where relevant.

The consultant has appropriately recommended that a detailed Construction Noise and Vibration Management Plan be developed prior to the commencement of construction works. Further, the consultant provides advice on typical measures that should be employed, where they are reasonable and feasible, to reduce any impacts caused by construction noise.

Most importantly, the consultant has recommended that respite periods be negotiated with the community in the case where construction noise levels reach or exceed the highly affected level of 75

dBA. It is important that these respite periods be developed in consultation with the community. Consultation between the developer, builder and the community is an important process and could be unintentionally undermined by overly prescriptive approval conditions.

2 RECOMMENDATIONS

With regard to noise there are three main noise issues, namely:

- Construction Noise;
- Operational Noise; and
- Traffic Noise generated by the proposed development.

It is WMPL's opinion that the Preferred Project Report Noise Assessment for the Rozelle Village Redevelopment, prepared by AECOM Australia Pty Ltd demonstrates that construction noise/vibration and operational noise can be managed to within NSW noise guidelines. However, some of the detail of the building still requires more detail design therefore Approval conditions are recommended in the Appendix to ensure that noise is managed appropriately, if consent was to be granted. The conditions contain noise limits that have been developed consistent with NSW guidelines and appropriate noise monitoring. Depending on the condition, certification from the independent certifier is required prior to the construction certificate and/or the occupation certificate being issued by the Principal Certifying Authority.

With regard to traffic noise impacts by traffic generated from the development the revised report predicts that traffic noise levels along Waterloo Street would increase by 4 dB, which would indicate a significant impact. The NSW Road Noise Policy (RNP) recommends that reasonable and feasible noise mitigation be considered for a maximum increases in peak hour road traffic noise of more than 2 dB. This review of reasonable and feasible noise mitigation has not been considered. WMPL recommends that the proponent either redesign the traffic access arrangements for the project to limit any noise impact on Waterloo Street to less than an increase of 2dB or provide any affected sensitive receiver on Waterloo Street with reasonable and feasible noise mitigation, such as architectural treatments like double glazing, courtyard barriers, etc. A recommended condition for the project approval ensuring that the issue is managed, if the project were to be approved, is presented in the Appendix.

I trust this information is sufficient. Please contact us if you have any further queries.

Yours faithfully
WILKINSON MURRAY

John Wassermann
Director

APPENDIX - RECOMMENDED NOISE CONDITIONS

OPERATIONAL NOISE CONDITIONS

C1. The Project shall be designed, operated and maintained to ensure that the equivalent noise level ($L_{Aeq\ (15\text{-}minute)}$) from the Project does not exceed the noise limits presented in Table 1. The noise catchments in the table are presented in Figure 1.

Table 1 Operational Noise Limits

Location*	Period	Noise descriptor**
NC1	Day	49 $L_{Aeq\ (15\text{-}minute)}$
	Evening	44 $L_{Aeq\ (15\text{-}minute)}$
	Night	41 $L_{Aeq\ (15\text{-}minute)}$
NC2	Day	52 $L_{Aeq\ (15\text{-}minute)}$
	Evening	49 $L_{Aeq\ (15\text{-}minute)}$
	Night	43 $L_{Aeq\ (15\text{-}minute)}$
NC3	Day	52 $L_{Aeq\ (15\text{-}minute)}$
	Evening	50 $L_{Aeq\ (15\text{-}minute)}$
	Night	45 $L_{Aeq\ (15\text{-}minute)}$
NC4	Day	52 $L_{Aeq\ (15\text{-}minute)}$
	Evening	50 $L_{Aeq\ (15\text{-}minute)}$
	Night	45 $L_{Aeq\ (15\text{-}minute)}$
NC5	Day	64 $L_{Aeq\ (15\text{-}minute)}$
	Evening	63 $L_{Aeq\ (15\text{-}minute)}$
	Night	57 $L_{Aeq\ (15\text{-}minute)}$
NC6	Day	64 $L_{Aeq\ (15\text{-}minute)}$
	Evening	63 $L_{Aeq\ (15\text{-}minute)}$
	Night	57 $L_{Aeq\ (15\text{-}minute)}$
Commercial	(When in use)	65 $L_{Aeq\ (15\text{-}minute)}$
Rozelle Public School (internal)	Noisiest one hour period	35 $L_{Aeq\ (15\text{-}minute)}$

* Noise from the Project is to be measured at the most affected point within the residential boundary.

** Applicable penalties for excessive tonality, low frequency noise, etc as outlined in the NSW Industrial Noise Policy (NSW Government, 2000) shall be applied if Applicable.

Figure 1 Site location and noise catchments.

C2. The Project shall be designed, operated and maintained to ensure that the equivalent noise level ($L_{A10\ (15\text{-}minute)}$) from licensed areas does not exceed the noise limits presented in Table 2. The noise catchments in the table are presented in Figure 1.

Table 2 Operational Noise Limits for licensed premises.

Location*	Period	OLGR Criteria, dB									dBA
		Octave Band Centre Frequency, Hz									
		31.5	63	125	250	500	1K	2K	4K	8K	
NC1	7am to 12midnight	53	54	49	49	42	40	35	25	17	46
	12midnight to 7am	42	42	39	40	34	33	26	16	10	36
NC2	7am to 12midnight	56	56	51	45	44	46	39	30	27	48
	12midnight to 7am	41	43	40	35	31	33	30	22	21	37
NC3	7am to 12midnight	56	56	22	47	44	49	44	30	20	51
	12midnight to 7am	42	42	39	40	34	33	26	16	10	38
NC4	7am to 12midnight	56	56	22	47	44	49	44	30	20	51
	12midnight to 7am	42	42	39	40	34	33	26	16	10	38
NC5	7am to 12midnight	65	70	65	60	57	58	55	47	36	62
	12midnight to 7am	52	58	56	52	45	43	41	32	27	50
NC6	7am to 12midnight	65	70	65	60	57	58	55	47	36	62
	12midnight to 7am	52	58	56	52	45	43	41	32	27	50

* Noise from the Project is to be measured at the most affected point within the residential boundary.

Notwithstanding compliance with the above, noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12.00 midnight and 7.00 am.

PRIOR TO ISSUE OF THE CONSTRUCTION CERTIFICATE

C3. On completion of the detail design of the building a detailed noise impact assessment of operational noise from the site including but not limited to:

i. Carpark noise;

ii. Mechanical services;

iii. Retail areas;

iv. Bistro and gaming (i.e. licensed) areas; (consistent with OLGR requirements)

v. Recreational facilities including tennis courts and swimming pools; and,

vi. Child care facilities.

shall be conducted by a suitably qualified and experienced acoustic consultant prior to the issue of construction certificate to determine acoustic treatments required to ensure noise does not exceed the relevant acoustic criteria (Table 1 and 2) and legislative requirements. A copy of the report shall be submitted to Principal Certifying Authority prior to the issue of a Construction Certificate.

PRIOR TO ISSUE OF THE OCCUPATION CERTIFICATE

C4. With regard to operational noise, all the noise mitigation measures specified in previous DA and CC Noise Assessment reports and all other relevant conditions of consent shall be validated by a Certificate of Compliance prepared by an acoustic consultant and submitted to the Principal Certifying Authority (PCA) prior to the issue of the Occupation Certificate. If Council is not the PCA, a copy shall be submitted to Council concurrently.

GENERAL CONSTRUCTION NOISE CONDITIONS

C4 Construction activities associated with the proposal shall be undertaken during the following standard construction hours:

a) 7:00am to 6:00pm Mondays to Fridays, inclusive; and

b) 8:00am to 1:00pm Saturdays;

c) at no time on Sundays or public holidays.

C5. High noise impact works and activities shall only be undertaken:

a) between the hours of 8:00 am to 4:00 pm Monday to Fridays;

b) between the hours of 8:00 am to 1:00 pm Saturday; and

c) in continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than two hour between each block.

High noise impact works and activities means jack hammering, rock breaking or hammering, pile driving. Operating hours may be varied after consultation with the community and documented in the CNVMP.

C6. Notwithstanding conditions C4 to C5, construction activities outside of the prescribed construction hours may be undertaken in any of the following circumstances:

a) construction works that generate air-borne noise that is not audible at the closest sensitive receivers;

b) where a negotiated agreement has been reached with affected receivers, where the prescribed noise and vibration levels can not be achieved;

c) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; and

d) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

PRIOR TO ISSUE OF THE CONSTRUCTION CERTIFICATE

C7. Prior to CC the proponent shall prepare a Construction Noise and Vibration Management Plan (CNVMP) to detail how construction noise and vibration impacts will be minimised and managed. The Plan shall be consistent with the guidelines contained in the Interim Construction Noise Guidelines (DECC, 2009), Assessing Vibration: a technical guideline (DEC, 2006) and DIN 4150-3:1999 Structural Vibration – Effects of Vibration on Structures. The Plan shall be developed in consultation with the local Council and shall include, but not be limited to:

i. identification of sensitive receivers and relevant construction noise and vibration goals applicable to the project stipulated in this approval;

ii. community consultation;

iii. Noise Management Levels in Table 3. The noise catchments in the table are presented in Figure 1;

iv. details of construction activities and an indicative schedule for construction works, including the identification of key noise and/or vibration generating construction activities (based on representative construction scenarios) that have the potential to generate noise and/or vibration impacts on surrounding sensitive receivers, particularly residential areas;

v. identification of feasible and reasonable measures proposed to be implemented to minimise and manage construction noise impacts (including construction traffic noise impacts);

vi. Identification of mitigation strategies for work activities that exceed the Highly Affected Noise Levels or consider negotiated agreements with sensitive receivers, where the prescribed noise criteria cannot be achieved.

vii. identification of feasible and reasonable procedures and mitigation measures to ensure relevant vibration criteria are achieved, including applicable buffer distances for vibration intensive works, use of low - vibration generating equipment or alternative construction methodology, and pre and post -construction dilapidation surveys of sensitive structures where vibration is likely to result in damage to buildings and structures (including surveys being undertaken immediately following a monitored exceedance of the criteria). Continuous vibration monitoring during excavation;

viii. a description of how the effectiveness of mitigation and management measures would be monitored during the proposed works, clearly indicating how often this monitoring would be conducted, the locations where monitoring would take place, how the results of this monitoring would be recorded and reported, and, if any exceedance is detected, how any non-compliance would be rectified; and

ix. mechanisms for the monitoring, review and amendment of this Plan.

Prior to the commencement of works the Certifying Authority shall be satisfied that the Construction Noise Management Plan has used all reasonable and feasible construction noise mitigation. A copy of the report shall be submitted to Principal Certifying Authority prior to the issue of a Construction Certificate.

Table 3 Construction Noise Management Levels

Location*	Period	Construction Noise Management Level**	Highly Affected Noise Level
NC1	Standard Construction Hours	54 $L_{Aeq\ (15\text{-}minute)}$	75 $L_{Aeq\ (15\text{-}minute)}$
NC2		57 $L_{Aeq\ (15\text{-}minute)}$	
NC3		57 $L_{Aeq\ (15\text{-}minute)}$	
NC4		57 $L_{Aeq\ (15\text{-}minute)}$	
NC5		69 $L_{Aeq\ (15\text{-}minute)}$	
NC6		69 $L_{Aeq\ (15\text{-}minute)}$	

* Noise from the Project is to be measured at the most affected point within the residential boundary.

** Applicable penalties for excessive tonality, low frequency noise, etc as outlined in the NSW Industrial Noise Policy (NSW Government, 2000) shall be applied if applicable.

GENERAL TRAFFIC NOISE CONDITIONS

C8. On completion of the detail design of the building a detailed traffic noise impact assessment of traffic noise from the development shall be conducted by a suitably qualified and experienced acoustic consultant prior to the issue of construction certificate to determine acoustic treatments required to ensure noise does not exceed relevant acoustic traffic noise guidelines and standards. A copy of the report shall be submitted to Principal Certifying Authority prior to the issue of a Construction Certificate. The following noise mitigation options should be considered for affected sensitive receivers:

i. Barriers;

ii. Courtyards;

iii. Architectural treatments; and

iv. Negotiated agreements with impacted sensitive receivers.