

of the

**PROPOSED COMMUNITY SHOPPING CENTRE
31 MAIDA VALE ROAD, MAIDA VALE WA 6057**



prepared for

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REFERENCES:

- A. Environmental Protection Act (Noise) Regulations 1997
- B. EPA Guidance for the Assessment of Environmental Factors - Environmental Noise No 8 draft, dated May 2007, page 19 Default Meteorological Conditions (re CONCAWE).
- C. Reserved.
- D. Rapid Tilt Construction, Development Application drawings, Revision D, dated 151218:

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A0	COVER PAGE	NA	A1
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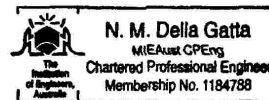
REVISIONS:

Revisions to the report compared to the previous report, if any, are contained in italics for the paper copy and in blue italics text for the PDF copy of the report.

Revision N°:	Date:	Comment	Status
0	21 January 2019	Development Application	Current

AUTHOR:

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EXECUTIVE SUMMARY

- 0.1 ND Engineering's opinion is that the Loading Dock, Mechanical Services and Refrigeration Equipment can comply with Reference A subject to the 'Assumptions, Limitations and Exclusions' and the implementation of the 'Recommendations'.
- 0.2 The following is a summary of principle outcomes of the assessment for the:
- a. **COMPACTOR**, there is no compactor briefed for this IGA store.
- b. **LOADING DOCK**, see Annex L for full and additional details, relates to the following:
- (1). Provide a 3000 mm high noise wall to the residential Units 6 & 7 Maida Vale Road; and
 - (2). The medium rigid body trucks shall follow the operation sequence contained in Annex L Table L1; and
 - (3). Engines and refrigeration equipment shall be shut down during unloading; and
 - (4). Signage to be provided for loading dock staff and service vehicle operators advising them to take care with regards to noise events; and
 - (5). Loading dock staff and service vehicle operators shall need to be trained to take care with regards to noise events; and
 - (6). Radios and other similar devices are not permitted within the loading dock area; and
 - (7). Refrigeration trucks that are capable of operating off mains power be provided with mains power in order to minimise truck engine operating noise when in the loading dock; and
 - (8). The metal deck roof and walls of the loading dock undercover shall have acoustic treatment applied to the surfaces; and
 - (9). The following shall be noted with regards to the loading dock being expected to:
 - (a). Comply for: Monday to Saturday 7am to 7pm; and
 - (b). Not comply for: Evenings, Night time, Sundays and Public Holidays.
- c. **MECHANICAL SERVICES**, see Annex M for full and additional details, relates to the following:
- (1). Provide a noise wall enclosure to the two central roof platforms; and
 - (2). All roof top condenser fans for air conditioning equipment shall be continuously modulating variable speed drive or inverter drive. Two step speed or Multi step speed or On/Off condenser fan speed control is not permitted; and
 - (3). All roof top air conditioning equipment shall be resiliently mounted to minimise the transmission of noise and vibration into the supporting roof structure; and
 - (4). All roof top ventilation fans be either variable speed drive or two step speed or multi step speed all under thermostatic or timer control or manual control. Single speed On/Off ventilation fans' speed control is not permitted; and
 - (5). Sound Power Levels shall not exceed that contained in Table M1; and

- (8). *A second acoustic report be undertaken at the time of Building Permit Application once the proposed details of the mechanical services are more fully documented.*
- d. **REFRIGERATION EQUIPMENT**, see Annex R for full and additional details, relates to the following:
 - (1). Provide a noise wall enclosure to the two central roof platforms; and
 - (2). Two step or Multi step speed or On/Off condenser fan speed control is not permitted; and
 - (3). All roof top refrigeration equipment shall be resiliently mounted to minimise the transmission of noise and vibration into the supporting roof structure; and
 - (4). Sound Power Levels shall not exceed that contained in Table R1; and
 - (5). *A second acoustic report be undertaken at the time of Building Permit Application once the proposed details of the refrigeration equipment are more fully documented.*
- 0.3 **NOISE MANAGEMENT PLAN** for the construction phase to be prepared by the Builder's acoustic consultant.
- 0.4 **FUTURE TENANCIES** will each require acoustic assessments to be provided at fitout to assess their particular requirements. Preliminary advice has been provided in Annex F. Also some of the recommendation for the mechanical services (Annex M) and refrigeration (Annex R) can be utilised.
- 0.5 Further details are contained in the recommendations in the report including the relevant annexes.

INTRODUCTION

Preamble

- 1.1 This report covers noise emissions for the Loading Dock, Mechanical Services and Refrigeration Equipment associated with the proposed IGA supermarket.
- 1.2 Preliminary advice has also been provided for:
 - a. Future tenancies; and
 - b. A construction Noise Management Plan.

Building Description

- 1.2.1 The site location is located at the corner of Maida Vale Road and Pinker Crescent Maida Vale WA 6057.
- 1.2.2 The proposed development comprises:
 - a. IGA Supermarket (Unit 2 Front of House & Back of House);
 - b. Future tenancies in the North block inclusive of Unit 2 IGA:
 - Unit 1 - Liquor Store
 - Unit 3 – Tavern
 - c. Future tenancies in the South block on the corner of Maida Vale Road and Pinker Crescent:
 - Unit 4 - Cafe
 - Unit 5 - Pharmacy
 - Unit 6 - Medical Centre
 - Unit 7 - Office
 - Unit 8 - Office.
- 1.2.3 The nearest noise sensitive premises, for the purposes of this acoustic assessment, are the noise sensitive premises:
 - a. Residential premises adjoining to the West and North of the site (with the main residences of interest are #6 and #7 Maida Vale directly opposite the loading dock);
 - b. Residential premises across to the East of Maida Vale Road;
 - b. Residential premises across to the South of Pinker Crescent.
- 1.2.4 See Annex B for more details of the proposed Community Shopping Centre.

ASSUMPTIONS, LIMITATIONS AND EXCLUSIONS

- 2.1 The following assumptions, known limitations and conditions are made:
- a. The proposed building is correctly constructed, and maintained in good ongoing condition, in accordance with the Building Code of Australia and State Regulations, and
 - b. That building components are fabricated and installed in accordance with suppliers and/or manufacturer's requirements; and
 - c. That equipment and plant are installed and operated in accordance with suppliers and/or manufacturers requirements; and
 - d. Reversing beepers on loading dock vehicles is a mandatory work related safety requirement and are therefore excluded from the noise regulations assessment; and
 - e. The assessment is limited to the generic mechanical services details as per Annex M; and
 - f. The assessment is limited to generic refrigeration equipment details as per Annex R; and
 - g. Other assumptions, limitations and exclusions contained within the annexes; and
- 2.2 The report is limited to the
- a. Future Tenancies see Annex F (NB preliminary advice only).
 - b. Loading Dock see Annex L.
 - c. Mechanical Services see Annex M.
 - d. Noise Management Plan see Annex N (NB preliminary advice only).
 - e. Refrigeration Equipment see Annex R.

ASSESSMENT

3.1 The assessment comprises:

Assigned Noise Level	see Annex A.
Future Tenancies	see Annex F (NB preliminary advice only).
Loading Dock	see Annex L.
Mechanical Services	see Annex M.
Noise Management Plan	see Annex N (NB preliminary advice only).
Refrigeration Equipment	see Annex R.

3.2 Please note that where ND Engineering provides advice or expresses an opinion with regards to compliance with all or part of Reference A the Noise Regulations this advice/opinion is always subject to the 'Assumptions, Limitations and Exclusions' and the implementation of the 'Recommendations'

Assigned Noise Levels - Assessment

3.2.1 Essentially the assigned noise levels of interest are:

- a. LA10 = 49 dB(A) which occurs during the Daytime 0700-1900 hours Monday to Saturday; and
- b. LA10 = 44 dB(A) which occurs during the Daytime 0900-1900 hours Sunday & Public holidays and Evenings 1900-2200 hours all days; and
- c. LA10 = 39 dB(A) which occurs during the Night 2200-0700 hours Monday to Saturday and 0900-1900 hours Sunday & Public holidays.

3.2.2 See Annex A for details.

Future Tenancies - Assessment

3.3 See Annex F for details and preliminary recommendations regarding base building arrangements noting that a separate acoustic assessment will be required by each tenant to suit their particular fitout requirements. Preliminary advice has been provided in Annex F noting that some of the recommendations for the mechanical services (Annex M) and refrigeration (Annex R) can be utilised

Loading Dock - Assessment

3.4 See Annex L for details and recommendations.

Mechanical Services - Assessment

3.5 See Annex M for details and recommendations.

Noise Management Plan - Assessment

- 3.6 The noise management plan is essentially in outline format, for guidance purposes, with the final details to be complete by the Builder's acoustic consultant. See Annex N for more details and recommendations.

Refrigeration Equipment - Assessment

- 3.7 See Annex R for details and recommendations.

CONCLUSION

4. ND Engineering's opinion is that the Loading Dock, Mechanical Services and Refrigeration Equipment can comply with Reference A subject to the 'Assumptions, Limitations and Exclusions' and the implementation of the 'Recommendations' contained within this report including the relevant annexes.

RECOMMENDATIONS

5.1 The following recommendations are made:

- a. Future Tenancies. see Annex F (NB Preliminary advice only).
- b. Loading Dock, see Annex L.
- c. Mechanical Services, see Annex M.
- d. Noise Management Plan, see Annex N (NB preliminary advice only).
- e. Refrigeration Equipment, see Annex R.

5.2 The recommendations presented in this report are in outline format only and require:

- a. Detailed final design of components by appropriately experienced persons in accordance with the current relevant editions of Australian Standards, Regulations, Gas Code/s and the NCC/BCA.
- b. Completion of minor details on site by competent and qualified tradesmen and technicians.
- c. New materials and equipment: shall be installed in accordance with the manufacturer's and/or supplier's instructions; and shall also comply and be installed in accordance with the NCC/BCA.
- d. Installer of materials and/or equipment shall comply with: Regulatory safety requirements. The safety procedures on the relevant Materials Safety Data Sheets (MSDS). The site safety requirements including the wearing of protective clothing such as safety boots, safety glasses, safety goggles and hard hats.
- e. A site inspection to fully determine the extent of the work and the nature of the site.
- f. A professional Structural Engineer shall be engaged to provide structural advice on any recommendations that impose additional loads on the building structure.
- g. A Building Designer and/or Builder shall be engaged to arrange for development application, building licence and any documentation and submissions required by the local government authority.

ANNEXES:

- A. ASSIGNED NOISE LEVELS.
- B. BUILDING DRAWINGS.
- F. FUTURE TENANCIES (NB preliminary advice only).
- L. LOADING DOCK.
- M. MECHANICAL SERVICES.
- N. NOISE MANAGEMENT PLAN (NB preliminary advice only).
- R. REFRIGERATION EQUIPMENT.

ANNEX A – ASSIGNED NOISE LEVELS

- A1. The Assigned Noise Level (ANL) comprises a Base Noise Level (BNL) and Influencing Factor (IF) calculated in order to account for increases over the BNL associated with the local environment associated with commercial and industrial premises. The IF is based on Shire of Kalamunda planning scheme zoning. The resulting IF is for the noise sensitive premises immediately surrounding the shopping centre and is shown in the table below.

INFLUENCING FACTOR CRITERIA			ASSESSMENT		
Item	Criteria	Value	Criteria	Value	Totals
Major Road within the					4 (Transport Factor ≤ 6)
- 100 m radius inner circle	veh/day > 15000	6 dB	-	0	
- 450 m radius outer circle		2 dB	Kalamunda Rd 19,738 v/d 2015/16	2	
Secondary (Minor) Road within the					
- 100 m radius inner circle	15k > veh/day > 6k	2 dB	Maida Vale Rd 7156 v/d 2015/16	2	
Type A 'Industrial and Utility premises' within the					0.6 (≤ 30)
- 100 m radius inner circle	1/10 x Area%	≤ 10	0 %	0	
- 450 m radius outer circle	1/10 x Area%	≤ 10	0 %	0	
Type B 'Commercial premises' within the					
- 100 m radius inner circle	1/20 x Area%	≤ 5	12.7 %	0.6	
- 450 m radius outer circle	1/20 x Area%	≤ 5	0.6 %	0.0	
INFLUENCING FACTOR = 4 dB(A)					

- A2. The following ANL table for the immediate surrounding residences of the proposed supermarket includes an IF = 4 dB(A).

Noise sensitive premises at locations within 15 m of a building directly associated with a noise sensitive use.	Time of day		Assigned Noise Levels dB(A)		
			L _{A10}	L _{A1}	L _{Amax}
	Day	0700-1900 hrs Monday to Saturday	49	59	69
			72 hrs/wk		
	Evenings	0900-1900 hrs Sunday, Public holidays	44	54	59
			31 hrs/wk		
	Night	1900-2200 hrs all days			
		2200-0700 hrs Monday to Saturday	39	49	
		2200-0900 hrs Sunday, Public holidays	65 hrs/wk		

End Annex A

Annex B – BUILDING DRAWINGS

B1. This annex contains the following drawings:

SHEET No.	SHEET NAME	SCALE	SIZE
A0	COVER PAGE	NA	A1
~~A1~~	~~FEATURE SURVEY~~	~~1:200~~	~~A1~~
A2	SITE – GROUND FLOOR PLAN	1:200	A1
A3	FIRST FLOOR PLAN	1:200	A1
A4	ELEVATION 1-2	1:100	A1
A5	ELEVATIONS 2-2	1:100	A1
~~A6~~	~~LANDSCAPING PLAN~~	~~1:200~~	~~A1~~

B2. The drawings do not show any recommendations.

B3.1 The proposed community shopping centre comprises two significant building components being the:

- a. North block (Units 1 to 3) with a varying perimeter wall height from 5.3m to 7.0m; and
- b. South block (Units 4 to 8) with a varying perimeter wall height from 8.0m to 8.5m.

B3.2 The effect of the high perimeter wall heights is that centrally positioned roof mounted equipment is to a large degree visually shielded from the residences.







End Annex B

Annex F - FUTURE TENANCIES

- F1.1 The assessments contained in this report, other than Annex F, are mainly for the purposes of the IGA facilities and are not intended to be applied to the future tenancies.
- F1.2 All future tenancies will require their own acoustic assessment to be done as part of their fitout and tenancies operating during the Evenings, Sundays and Public holidays will also need a Noise Management Plan.
- F1.3 Future tenancies could include but are not limited to the following:
- Unit 1 - Liquor Store;
 - Unit 3 – Tavern;
 - Unit 4 – Café (similar to Panda & Co Bulwer Street Perth);
 - Unit 5 – Pharmacy;
 - Unit 6 - Medical Centre;
 - Unit 7 – Office;
 - Unit 8 – Office.
- F3.1 The following preliminary advice is provided regarding refrigeration and mechanical services:
- a. Non-food associated uses (Units 5, 6, 7 & 8) should not have any significant impact as is assumed that they will only have:
- (1) A toilet ventilation system with fan speeds below 960 RPM with fans located on the roof; and
 - (2) Split INVERTER air conditioning systems located on the central platforms over the North Block and South Block;
- b. Food associated uses (Units 1, 3, 4) will have the same requirements as for non-food associated uses but with the following additional considerations:
- (1) Kitchen exhaust fans will need to be vertical discharge, low fan speed below 960 RPM, have two speed operation with fans located on the roof; and
 - (2) Refrigeration equipment, to be located on the North Block central platform, will need to be low noise type suitable for use in a residential environment, vertical condenser fan discharge, variable speed condenser fans' head pressure controlling all condenser fans simultaneously, reciprocating compressors are not permitted, compressors shall be rotary type; and
 - (3) Alfresco areas will require a Noise Management Plan to include addressing music and patron behaviour in particular for evening (or night usage if permitted by Liquor Licensing); and
 - (4) Any mechanical services if they cannot be placed on the central platform, such as fans, they shall be positioned as far away as possible from the perimeter parapet walls with a low profile (minimal height)
- c. Sound power levels have currently been set a 70 dB(A) for Air-Conditioning units for the purposes of noise modelling with indicative noise contours are contained in Annex M – Mechanical Services.

End of Annex F

Annex L – LOADING DOCK

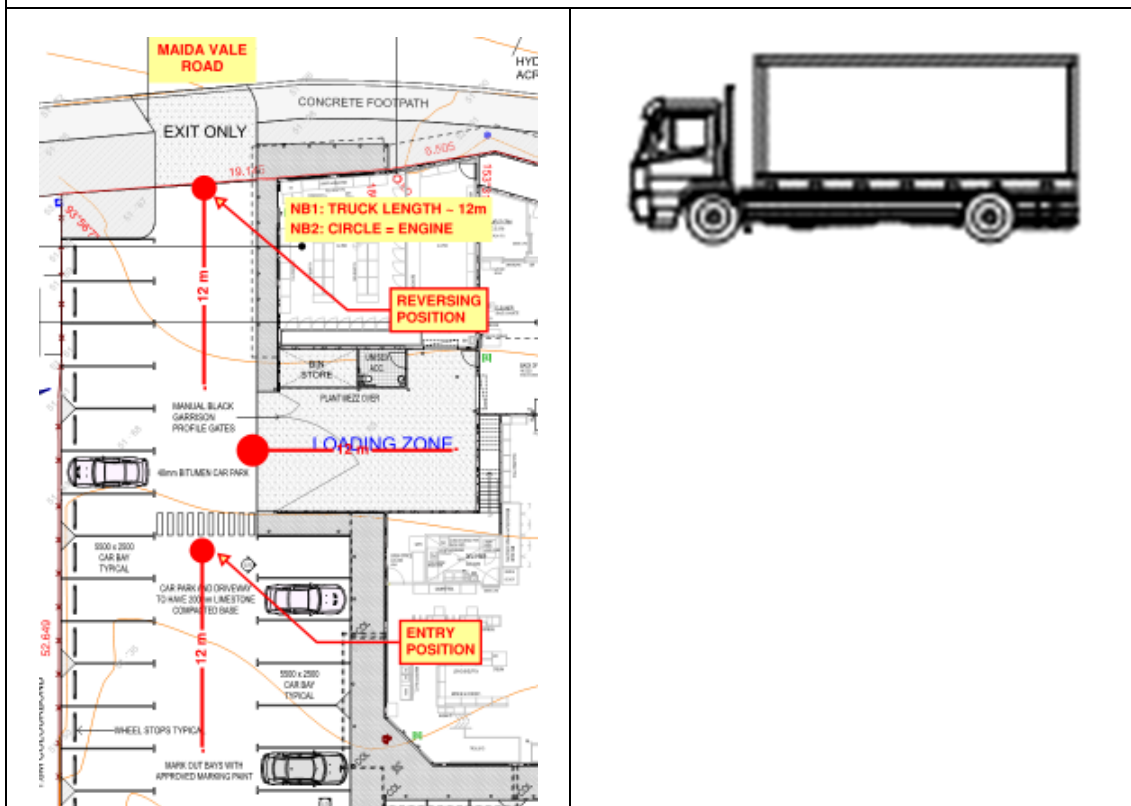
L1.1 The Loading Dock (LD) assessment is based on the following:

- a. The following activities being exempt from Reference A:
 - (1) Noise emissions from vehicles on footpaths, cross overs and public roads all as defined in Section 5(1) of the Road Traffic Act 1974. Refer Reference A Regulation 3 (a).
 - (2) Reversing beepers on vehicles is a warning device required by Acts and Regulations in particular those associated with Worksafe. Refer Reference A Regulation 3 (c).
- b. The operating sequence for a large medium rigid truck (~ 12m length but up to 14.5m) as per the following tabulation:

TABLE L1 – OPERATION SEQUENCE (MEDIUM RIGID TRUCK)

From	To	Motion	Distance	Velocity	Time Allocation
Entry at mid boundary residential Units 6 & 7	Reversing position	Forward	22 m	2.2 m/s	10 seconds
Reversing position	Loading Dock	Reversing	14 m	1.4 m/s	10 seconds
Loading Dock	Exit to MV Rd	Forward	14 m	1.4 m/s	10 seconds

Total time from ENTRY to LOADING DOCK = **30 seconds**



- L1.2 The assessment is based on a medium rigid body truck approximately 12 metres long either with or without a refrigeration unit utilising the loading dock from 7am to 7pm Monday to Saturday. This excludes all other times including Evenings, Night time, Sunday and Public Holidays.
- L1.3 The assessment is based on the minimum representative assessment period of 15 minutes as required by Reference A, Noise Regulations, however the total cycle time could be as high as 40 minutes during unloading which means that the tonality penalty applied to the assessment figures would be removed resulting in all noise levels to drop by 5 dB(A).
- L1.4 The assessments are subject to a sensitivity analysis of comparing the LA10 assessment with a L_{Amax} assessment because as the operational time frame from entry to loading dock decreases the LA10 becomes less critical.
- L2.1 The following discussion points are made:
- a. There are a variety of vehicles providing a delivery service to the Loading Dock (LD). The most critical vehicles would be a medium rigid body truck with a Sound Power Level (SWL or L_w) of L_w = 85 dB(A) or Sound Pressure Level (SPL or L_p) of L_p = 57 dB(A) @ 10 metres in an open area. Other vehicles such as small trucks and light vehicles would have substantially lower noise levels and provided they adhere to the same regime as for the medium rigid trucks then there should be no issues associated with these vehicles.
 - b. The delivery vehicles are to enter the loading dock area from the South West entry at a signed speed limit of 8 kilometres per hour (kph) which is equivalent to 2.2 metres per second (m/s). Reversing movements into the loading dock is expected to be at walking speed of 5 kilometres per hour (kph) which is equivalent to 1.4 metres per second (m/s).
 - c. Observations at other loading docks shows that the from the moment the delivery vehicle commences reversing and then final shut down is usually less than 1 minute with a driver experienced with the loading dock.
 - d. Behavioural issues for the loading dock during movement along the service road, departure, reversing and unloading need to managed. Behavioural issues including excessive revving of engines, rapid acceleration, exceeding the speed limit, shouting, playing radios, dropping pallets into the ground are often the source of complaint as they will often create high noise level events that annoy and in particular cause startling of the nearby residences from their sleep.
- L3.1 The following LOADING DOCK recommendations are made:
- a. The medium rigid body trucks shall follow the operation sequence contained in Table L1; and
 - b. Total time from time of entry to reversing into the loading dock and shut down shall be less than 30 seconds; and
 - c. Engines and refrigeration equipment shall be shut down immediately prior to and during unloading; and
 - d. Signage to be provided for loading dock staff and service vehicle operators advising them to take care with regards to noise events such as shouting, revving of truck engines, banging, dropping of pallets, slamming of vehicle doors, etc; and
 - f. Loading dock staff and service vehicle operators shall need to be trained to take care with regards to noise events such as shouting, revving of truck engines, banging, dropping of pallets, slamming of vehicle doors, etc; and
 - g. Radios and other similar devices are not permitted within the loading dock area; and

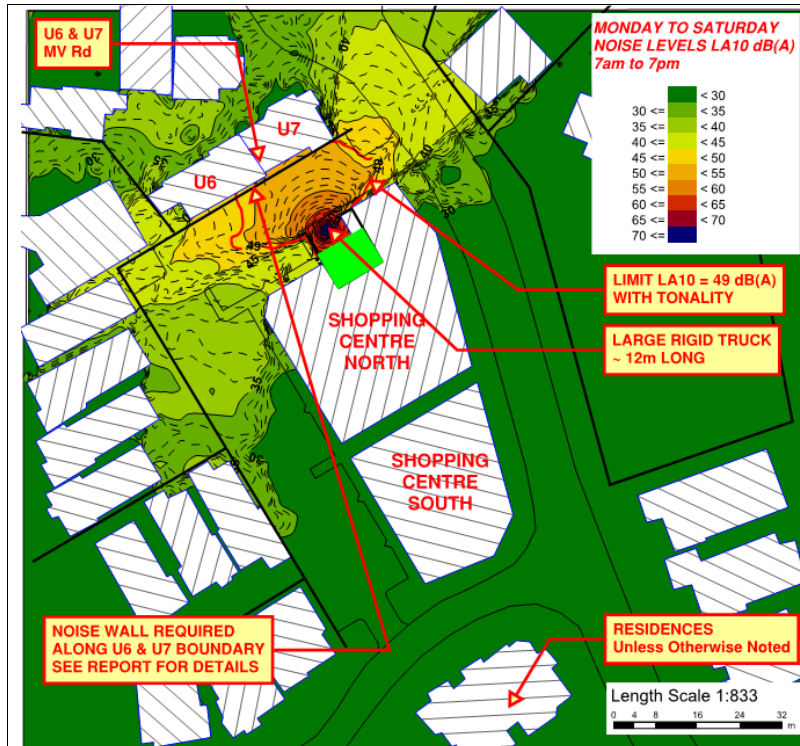
- h. Refrigeration trucks that are capable of operating off mains power be provided with mains power in order to minimise truck engine operating noise when in the loading dock; and.
- i. The metal deck canopy roof of the loading dock shall have a minimum of 50 mm anticon applied to the underside of the roof, in direct contact with the metal roof. The walls of the loading dock undercover of the canopy roof shall be internally lined with minimum 50 mm thick insulation with a perforated foil facing from 2100 mm above floor level up to the roof; and
- j. Provide a 3000 mm high noise wall to the residential Units 6 & 7 Maida Vale Road with the:
- lower opaque 1800 portion to have a surface density of not less than 15 kg/m² noting that colour bond is not acceptable; and
 - upper clear 1200 portion constructed from clear polycarbonate having a surface density of not less than 15 kg/m²; and



FIGURES L.1 – LOADING DOCK NOISE WALLS

- L4.1 The noise modelling outcomes are contained in
- a. Appendix L1 – LA10 ASSESSMENT; and
 - b. Appendix L2 – LAmax ASSESSMENT.
- L4.2 The following, as a result of the assessment, shall be noted with regards to the loading dock being expected to:
- a. Comply for: Monday to Saturday 7am to 7pm; and.
 - b. Not comply for: Evenings, Night time, Sundays & Public Holidays.

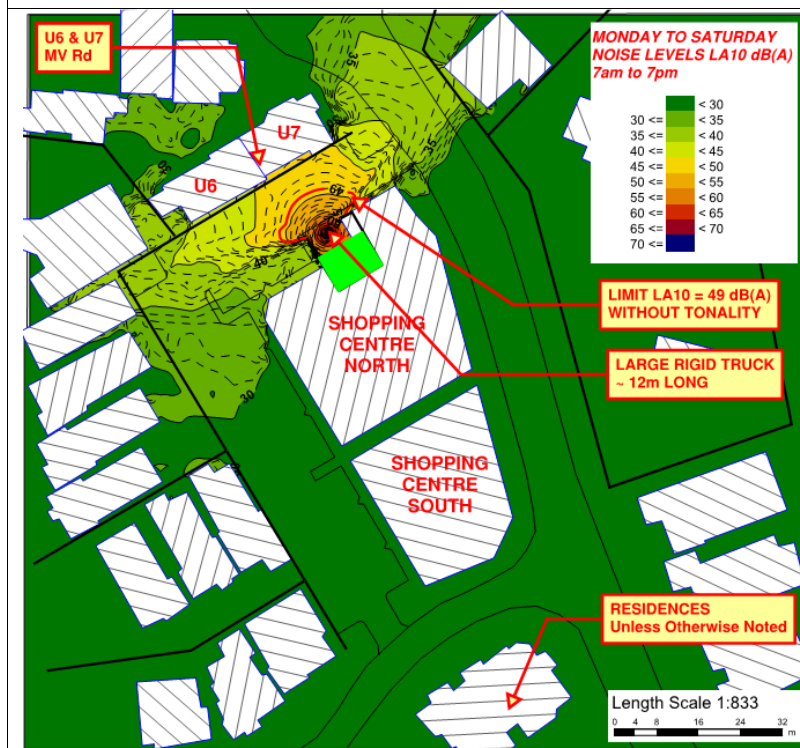
Appendix L1 – LA10 ASSESSMENT



The noise model shows that with the application of tonality there is a non-compliance occurring between the existing colorbond fencing and residential U6 and U7 to the North.

Therefore a 3000 mm noise wall is required to match the height of the U7 store room boundary wall.

The upper 1200 portion of the wall will need to be clear polycarbonate with a minimum surface density of 15 kg/m² while the lower 1800 mm portion will need to be of a heavier construction, than colourbond fencing, with a minimum surface density of 15 kg/m²



The noise model shows that without the application of tonality that compliance is potentially achievable however there is no guarantee that noise emissions will be non-tonal.

Therefore the preceding assessment, above, applies.

FIGURES L2 – LOADING DOCK LA10x WITHOUT & WITH TONALITY

Appendix L2 – L_{Amax} ASSESSMENT



FIGURES L2 – LOADING DOCK L_{Amax} WITHOUT & WITH TONALITY

ANNEX M – MECHANICAL SERVICES

- M1. The assessment is carried out in the following figures:
- a. TABLE M.1 GENERIC MECHANICAL SERVICES EQUIPMENT DATA
 - b. FIGURE M.2 SUNDAY, PUBLIC HOLIDAYS & EVENINGS ASSESSMENT.
 - c. FIGURE M.3 NIGHT TIME ASSESSMENT.
- M2. ND Engineering's opinion is that the generic mechanical services currently assessed comply with the Reference A the Noise Regulations at all times subject to 'Assumptions, Limitations and Exclusions' and 'Recommendations':
- M3. The following MECHANICAL SERVICES recommendations are made:
- a. The main mechanical services shall be located on nominally central platforms over the shopping centre North block and South block; and
 - b. The central platforms shall each be provided with an acoustic wall, typically constructed from cool room panels, with the top of the walls to be 300 mm higher than the tallest piece of mechanical equipment, with a minimum height of 1800 mm, so that there is no direct line of sight to the roof top mounted equipment from any of the noise sensitive premises (residences) to the equipment; and
 - c. All roof top condenser fans for air conditioning equipment shall be continuously modulating variable speed drive or inverter drive; and
 - d. Two step speed or Multi step speed or On/Off condenser fan speed control is not permitted; and
 - e. All roof top air conditioning equipment shall be resiliently mounted to minimise the transmission of noise and vibration into the supporting roof structure; and
 - f. All roof top ventilation fans be either variable speed drive or two step speed or multi step speed all under thermostatic or timer control or manual control; and
 - g. Single speed On/Off ventilation fans' speed control is not permitted; and
 - h. Sound Power Levels shall not exceed that contained in Table M1; and
 - i. *A second acoustic report be undertaken at the time of Building Permit Application once the proposed details of the mechanical services are more fully documented.*

- M4. The mechanical services data, based on a generic design, and associated comments are contained in following table.

TABLE M1 – GENERIC MECHANICAL SERVICES EQUIPMENT DATA	
DESCRIPTION	COMMENT
Back of House exhaust	Exact details unknown at Development Application Stage with details to be fully developed at Building Permit Stage. Minor fans for staff, store and toilet are expected to be low risk fans. Major fans for Back of House, Cold Aisle and Hoods are high risk and would require a separate assessment but essentially would require fans to be located below parapet wall height, multi or variable speed operation, fan speeds 6 pole ~960 rpm or lower. <i>ND Engineering recommends that a second acoustic report be undertaken at the time of Building Permit Application once the proposed details of the development are more fully documented.</i>
Cold Aisle Return Air Fan	
Kitchen Hood/s Exhaust fan	
Kitchen Hood/s Supply fan	
Managers Office AC unit	
Meat prep fan	
Mezzanine plantroom fan	
Staff Room Exhaust	
Store Room Exhaust	
Tea prep exhausts	
Toilet Exhausts	
UNIT 1 – LIQUOR STORE	2x 14 kW horizontal discharge AC units Sound Power Level 70 dB(A) each
UNIT 2 IGA Front of House	2x 44 kW large packaged ducted AC units Sound Power Level 78 dB(A) each
UNIT 2 IGA Back of House	1x 14 kW horizontal discharge AC unit Sound Power Level 70 dB(A) each
UNIT 3 – TAVERN	4x 14 kW horizontal discharge AC units Sound Power Level 70 dB(A) each
UNIT 4 - CAFE	1x 14 kW horizontal discharge AC units Sound Power Level 70 dB(A) each
UNIT 5 - PHARMACY	2x 14 kW horizontal discharge AC units Sound Power Level 70 dB(A) each
UNIT 6 – MEDICAL CENTRE	4x 14 kW horizontal discharge AC units Sound Power Level 70 dB(A) each
UNIT 7 - OFFICE	2x 14 kW horizontal discharge AC units Sound Power Level 70 dB(A) each
UNIT 8 OFFICE	2x 14 kW horizontal discharge AC units Sound Power Level 70 dB(A) each

- M5. The outcomes of the noise modelling assessment are shown in Figure M1 and Figure M2 on the following pages.

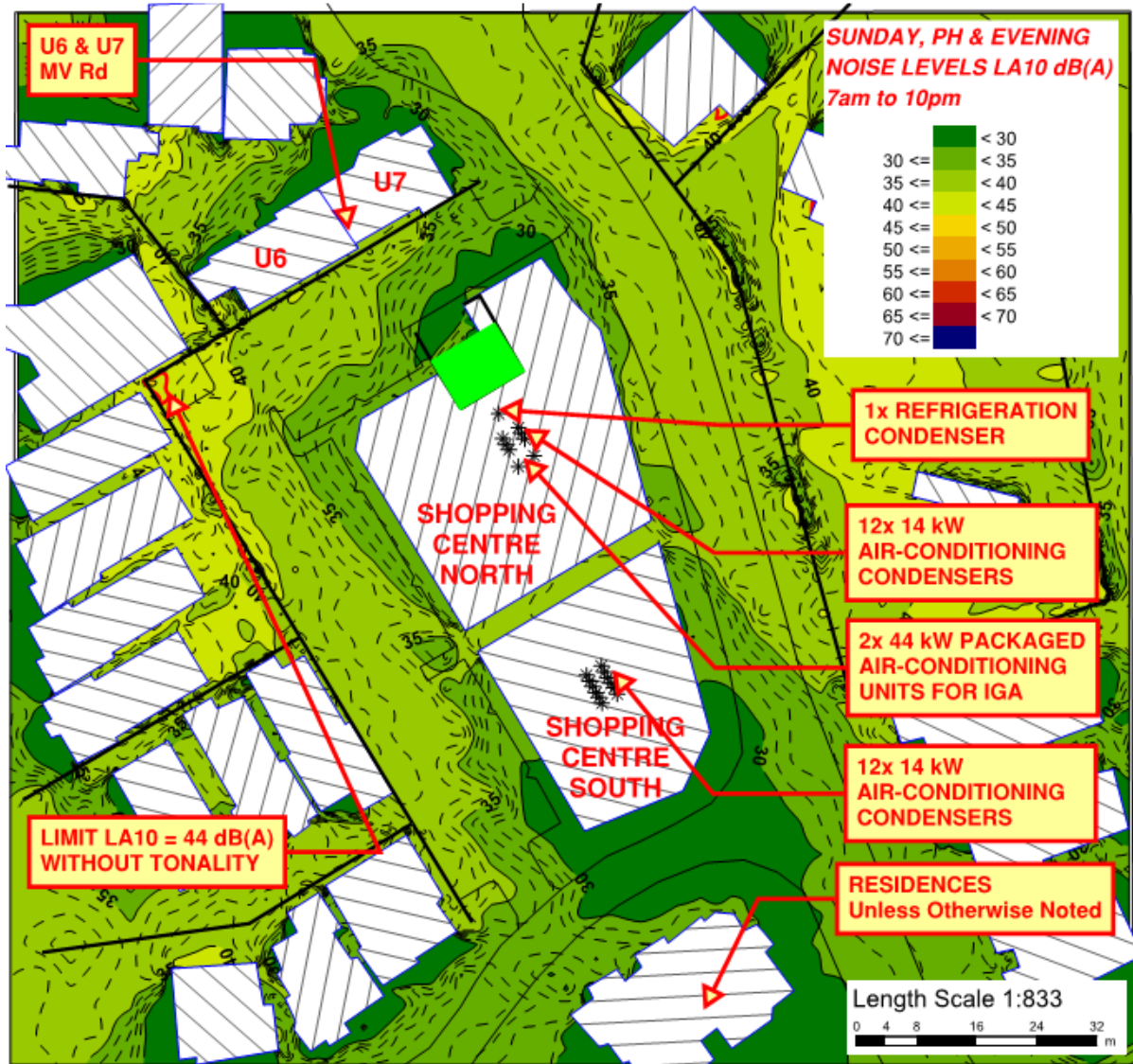


FIGURE M1 – SUNDAY, PUBLIC HOLIDAYS & EVENINGS ASSESSMENT

NB1: Sundays, Public Holidays & Evening are more critical as noise levels are 5 dB(A) lower than Monday to Saturday 7am to 7pm;

NB2: Tonality has not been applied due to the large distances to the residences, the use of variable speed drives and the presence of a noise wall surrounding the two central roof platforms;

NB3: The noise modelling has been based upon rated data for 35oC to 45oC days which typically occur for less than 10 days per annum. As a result the use of variable speed drives will cause rotating equipment speed to slow down a produce significantly less noise.

NB4: Figure M1 is also applicable to the Refrigeration services.

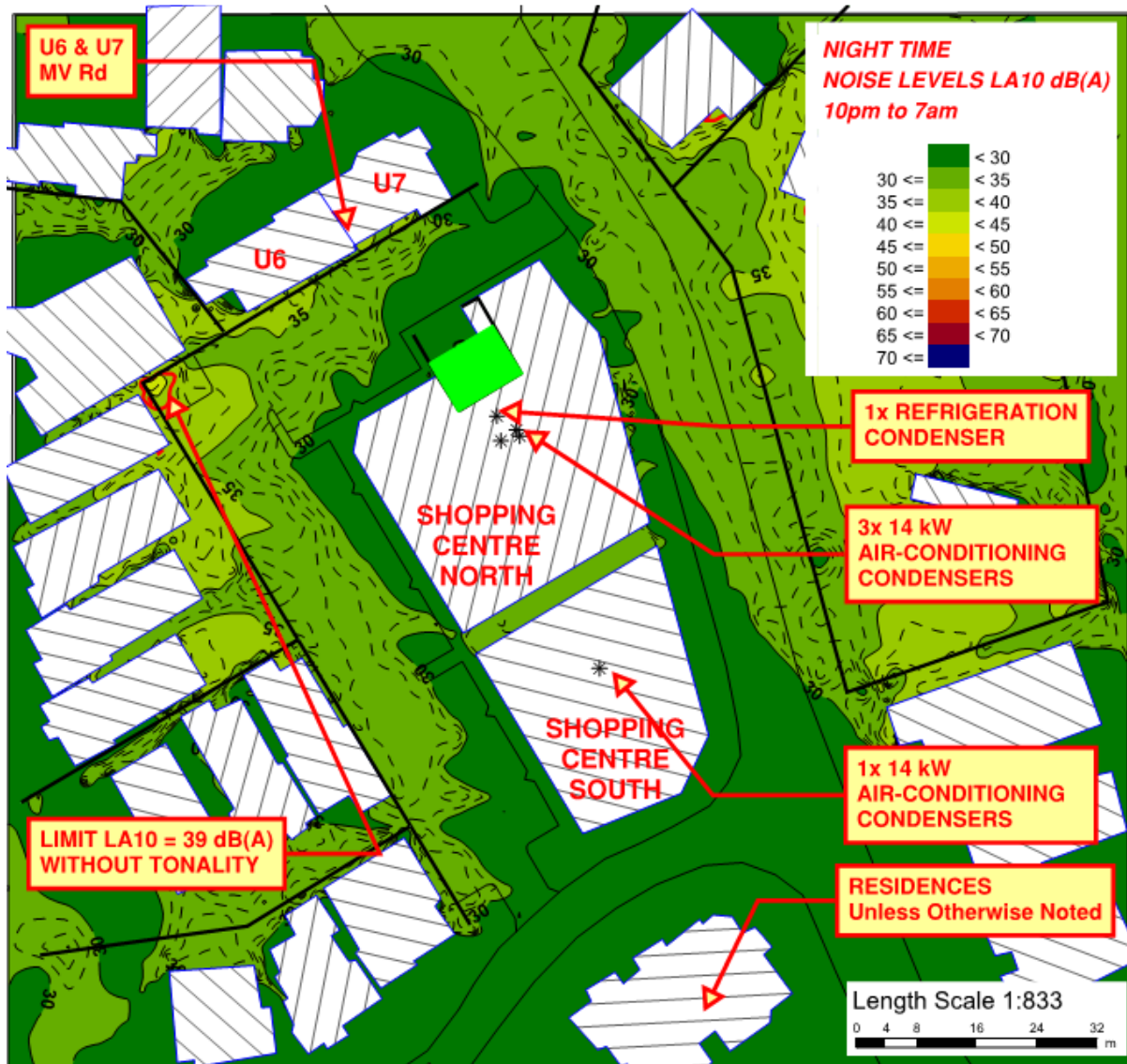


FIGURE M2 – NIGHT TIME ASSESSMENT

NB1: Figure M2 is also applicable to the Refrigeration services.

NB2: Tonality has not been applied due to the large distances to the residences, the use of variable speed drives and the presence of a noise wall surrounding the two central roof platforms;

NB3: The noise modelling has been based upon rated data for 35oC to 45oC days which typically occur for less than 10 days per annum. As a result the use of variable speed drives will cause rotating equipment speed to slow down a produce significantly less noise. This noise modelling being based on high ambient temperatures is very conservative as lower night time temperatures will significantly reduce the noise level.

End of Annex M

ANNEX N – NOISE MANAGEMENT PLAN

- N1. This annex outlines preliminary requirements, and as further amended by the Council, for a construction Noise Management Plan to be submitted by the Builder.
- N2. Table N2 outlines the NMP requirements in accordance with Regulation 13 of the Environmental Protection (Noise) Regulations 1997:-

TABLE N2 – OUTLINE REQUIREMENTS		
ITEM	CATEGORY	DESCRIPTION
1.	GENERAL	Construction work being undertaken should comply with the control of environmental noise practices set out in Section 6 of the AS 2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites; The equipment used for the construction work or demolition work must be the quietest reasonably available; The work must be carried out in accordance with a Noise Management Plan (NMP) - (prepared by a suitably qualified acoustic consultant).
2.	WORKS OUT OF HOURS	If it is anticipated that there will be any requirement to work outside the hours of 7am to 7pm Monday to Saturday, then an application will need to be submitted to Council, for approval of the work, at least fourteen (14) days prior to the construction work commencing. The application will need to include a suitably prepared Noise Management Plan. A sample Out-of-Hours NMP is provide in this Annex.
3.	DAY TIME WORKS	Notwithstanding the requirement for a Noise Management Plan (NMP) to address after hours work, large scale demolition and construction projects/sites are also required to submit a NMP for works conducted during the hours of 7am to 7pm. The NMP will need to address construction noise which may cause nuisance or disturbance as a result of the close proximity of any noise sensitive premises and/or the particular scope of the development or the equipment being employed. A NMP should be provided for demolition work and for potentially noisy building construction activities such as piling, compacting and concrete pouring processes.

- N3. The construction Noise Management Plan needs to meet the minimum requirements, and as further amended by the Council, tabulated below.

TABLE N3 - MINIMUM REQUIREMENTS FOR A NOISE MANAGEMENT PLAN	
ITEM	DESCRIPTION
1.	Noise Management Plan (NMP) to be in accordance with the requirements of the Environmental Protection (Noise) Regulations 1997.
2.	Engage a suitably qualified acoustic consultant to develop the Noise Management Plan.
3.a	Provision of a construction program including details of and the duration of activities.
3.b	Identify the likely periods of noise and vibration.
4.	Provide prediction of noise emissions on the construction site, in particular of the piling, rock breaking, jack hammering and compaction processes.
5.	Identify all noise sensitive premises located in the near vicinity.
6.	Specify control measures for noise and vibration – i.e. equipment design/ site and work practices.
7.	Submit procedures to be adopted for monitoring noise emissions – i.e. verifying actual noise levels
8.	Provide details of complaint response procedure e.g. Provisions to provide notification to identified noise sensitive premises.
9.	Detail follow up procedures– investigation of ongoing or unresolved noise issues. Include contact details of persons who will be available to receive reports relating to noise issues during work time and after hours.

- N4. A sample Out-of-Hours NMP as utilised by the City of Fremantle for domestic dwellings or similar is provided on the following pages. The purposes of the sample is to provide an indication of what is expected to be provided as part of the Builders Out-of-Hours NMP to be submitted in the absence of any specific requirement by the Local Government Authority.

SAMPLE ONLY

TYPES OF WORK PERMITTED UNDER THE PLAN

GENERAL FOR ALL WORKERS BEFORE 7AM

Prohibited -

- Radios
- Deliveries of materials (apart from concrete)
- Workers on site before 6am
- Scaffolding erection or dismantling
- Work where the contractor needs less than 2 hours to complete the job

Controlled -

- All out-of-hours work is to be done-
(a) Using the quietest reasonably available equipment; and
(b) According to Australian Standard 2436-1981, Section 6. Control of Noise
- Interior workers to keep windows closed
- Voice levels to be kept to a minimum

PERMITTED ACTIVITIES FOR SPECIFIC TRADES BETWEEN 6 – 7AM

SITE WORKER

- Peg out site
- Machines not to be unloaded or used before 7am

CONCRETER/PLUMBER

- Set out job
- No mini excavators to be unloaded or used before 7am
- Concrete deliveries and pour (excluding suspended slabs)

BRICKLAYER

- Electric mixers only
- Petrol mixers not to be used before 7am
- Electric Hoist

ROOF CARPENTER

- Set out job and placement of materials
- Minimum use of saws, nailguns etc
- No cranes before 7am

ELECTRICIAN/PLUMBER/ROOF PLUMBER

- No chasing of brickwork before 7am
- No angle grinders before 7am
- Set out job and placement of materials
- Oxy acetylene, welding work
- Gutters, flashings and downpipes can be prepared for installation

ROOF COVER - TIN AND TILED

- No chainsaws before 7am
- No angle grinders before 7am
- Set out job and placement of materials
- Minimum use of saws, nail-guns, hoists etc
- Petrol hoist not to be used before 7am

PLASTERER

- Electric mixers only
- Petrol mixers not to be used before 7am
- Petrol hoist not to be used before 7am

CEILING FIXER

- Set out job and placement of materials
- Minimum use of screw-guns before 7am

BRICK CLEANER

- Machines not to be used before 7am

SITE CLEANER

- Machines not to be unloaded or used before 7am

TILER

- Electric mixers only
- Petrol mixers not to be used before 7am
- No angle grinders or mechanical cutters to be used outside before 7am

PAINTER

- No scaffold deliveries before 7am

GRANOWORKER

- Machines not to be used before 7am

PAVING

- Screeding
- Lay paving
- No cutting or compacting before 7am

SAMPLE ONLY

SAMPLE ONLY



Environmental Health Services

Noise Management Plan Application

FOR OUT-OF-HOURS CONSTRUCTION WORK ON DOMESTIC DWELLINGS OR SIMILAR

PREAMBLE

- The purpose of this noise management plan ("the Plan") is to minimise the disruption to nearby residents resulting from construction work taking place before 7am in the summer months (1st Nov-30th April), while recognising the need for workers to reduce their exposure to the sun.
- Under regulation 13 of the *Environmental Protection (Noise) Regulations 1997*, all construction work to be carried out between the hours 6am to 7am Monday to Friday, excluding Saturdays and Sundays and public holidays, shall be in accordance with this approved Plan.
- This Plan has been developed by HIA in consultation with the Department of Environmental Protection and local governments.
- If construction work is necessary on Sundays and public holidays (or outside the above hours), a separate noise management plan should be prepared and submitted for approval.

SITE DETAILS

Site Address

Building Company

Contact Person

Phone (Work) (Home) Fax

Builders Address Post Code

Type of Construction (e.g. new home)

Out of Hours Work:

6am – 7am Monday to Saturday from 1st October to 30th April

Start Date Completion Date

REASONS FOR OUT-OF-HOURS WORK

Western Australian workers are at risk of over exposure to ultraviolet radiation (UVR), which penetrates the skin and injures cells, causing sunburn and skin cancer. Australia has the highest rate of skin cancer in the world and two out of three Australians will require treatment for skin cancer in their lifetime. Over 150,000 are treated for skin cancer each year at a cost of \$326 million, and 1200 Australians die from skin cancer each year.

Exposure to UVR is greatest from 10am to 3pm when the sun is directly overhead – 70 per cent of the day's total ultraviolet radiation is received during this time. There are other major concerns raised when construction workers are limited to starting work at 7am such as heat stress and product failure due to temperatures being above 32 degrees Celsius.

Above information supplied by WorkSafe WA, The Cancer Foundation of WA and Standards Australia.

SAMPLE ONLY

SAMPLE ONLY

PREDICTION AND MONITORING OF NOISE EMISSIONS

Noise emission levels when measured at 7m from any machinery permitted under this Plan are predicted to be within the range of values for typical construction equipment given in the Table.

Plant	Sound pressure level at 7m – dB(A)	Plant	Sound pressure level at 7m – dB(A)
Concrete mixers – 10/7 electric	< 68	Hoists – Electric	< 67
Electric hand tools – Electric drill	< 69 76 – 87	Hydraulic hand tools – Breaker, 36kg	83 – 87
Hammer drill	51 – 70	Welders – Oxy-acetylene	< 71
Screwdriver (2–4kW)			

The above Table is based on Table D2 of Australian Standard 2436-1981, with sound pressure levels at 7m taken to be 25dB(A) less than the sound powers given in AS2436.

Regular noise monitoring is not required under this Plan. However, when requested by an authorised person from the local government, the builder will arrange noise monitoring of specified machinery by a competent person.

NOTIFICATION OF NEAREST AFFECTED RESIDENTS

The following is a suggested form of words for notifying neighbours of the work to be done during the 6 – 7am period.

CONSTRUCTION WORK	
Dear Resident,	
This note is to advise you that construction work will be taking place at (<i>Address of site</i>), starting on or about (<i>Date</i>). Because the work will be done during the warmer months, and to reduce the effects of the sun, some work will commence at 6am. In order to minimise noise and disturbance, these activities are strictly controlled under a Noise Management Plan approved by the (<i>Name of local government</i>). Normal work will start at 7am.	
Some general features of the Noise Management Plan are – ▪ No work before 6am or on Sundays; ▪ No deliveries of materials (apart from concrete) before 7am; ▪ No radios before 7am; and after this time the volume is to be maintained at a reasonable level ▪ No car radios allowed at any time.. ▪ No scaffolding erection or dismantling before 7am.	
The Noise Management Plan also places restrictions on the activities of each trade between 6 and 7am. A copy of the Noise Management Plan is available from the council or the builder. Should you be disturbed by activities on the site, require further information or have any comments with regards to health condition of any of the occupants of the residence that may be affected by the earlier start, please contact –	
(Name)	of (Company) on (Mobile No.)

SAMPLE ONLY

SAMPLE ONLY

MANAGEMENT OF NOISE

Out-of-hours contact for complaints

Name Phone

Affected neighbours to be notified at least 24 hrs before the job starts –

Name of street House numbers

Name of street House numbers

Name of street House numbers

FAILURE TO COMPLY WITH THE PLAN

Failure to adhere to this noise management plan renders regulation 13 of the *Environmental Protection (Noise) Regulations 1997* inapplicable, in which case the noise emissions must meet regulations 7 and 8 of those regulations.

Any breach of this noise management plan which causes excessive noise may be treated as an emission of "unreasonable noise" by the local government, with the following possible consequences -

- An "Infringement Notice" may be issued to either the builder or the contractor, imposing an "on-the-spot" fine of \$250 for a first offence and \$500 for a second offence;
- A "Noise Abatement Direction" may be issued requiring work to cease for a specified time (up to 7 days); and
- If a Noise Abatement Direction is not being complied with, equipment may be seized and impounded for a specified time (up to 7 days).

APPROVAL

This Plan must be given to the Local Government Authority for approval at least 7 days before the start of 6am construction work.

Approved by: (Name)

Signature Date

☐ Chief Executive Officer

☐ Authorised Person under the Environmental Protection Act 1986

CITY OF FREMANTLE

Submit Form

SAMPLE ONLY

End of Annex N

ANNEX R – REFRIGERATION EQUIPMENT

- R1. The assessment is carried out in the following figures:
- a. TABLE R1 GENERIC REFRIGERATION EQUIPMENT DATA.
 - b. Annex M FIGURE M1 – SUNDAY, PUBLIC HOLIDAYS & EVENINGS ASSESSMENT
 - c. Annex M FIGURE M2 – NIGHT TIME ASSESSMENT
- R2. ND Engineering's opinion is that the generic refrigeration services currently assessed comply with the Reference A the Noise Regulations at all times subject to 'Assumptions, Limitations and Exclusions' and 'Recommendations':
- R3. The following **REFRIGERATION EQUIPMENT recommendations** are made:
- a. The refrigeration services, collocated with the main mechanical services, shall be located on nominally central platforms over the shopping centre North block and South block; and
 - b. The central platforms shall each be provided with an acoustic wall, typically constructed from cool room panels, with the top of the walls to be 300 mm higher than the tallest piece of mechanical equipment, with a minimum height of 1800 mm, so that there is no direct line of sight to the roof top mounted equipment from any of the noise sensitive premises (residences) to the equipment; and
 - c. Two step speed or Multi step speed or On/Off condenser fan speed control is not permitted; and
 - d. Provide head pressure controls to all condenser fans so that all fans on each condenser set operate simultaneously (in unison) via a variable speed drive;
 - d. All roof top refrigeration equipment shall be resiliently mounted to minimise the transmission of noise and vibration into the supporting roof structure; and
 - e. Sound Power Levels shall not exceed that contained in Table R1; and
 - f. Mezzanine Plant Room;
 - (1) The metal deck roof of the mezzanine plant room shall have a minimum of 50 mm anticon applied to the underside of the roof, in direct contact with the metal roof; and
 - (2) The walls of the mezzanine plant room shall be internally lined with minimum 100 mm thick insulation with a perforated foil facing. The insulation at low level up to 1500 mm above floor level shall have a thin light weight metal 'Expamet' protective covering; and
 - (3) Any roller doors shall have a solid sliding door fitted to the rear constructed from a cool room sliding door and panelling system to completely enclose the roller door from floor slab to roof level; and
 - (4) Refrigeration compressors shall be of a variable speed rotary type. Reciprocating refrigeration compressors are not acceptable; and
 - (5) Ventilation of the plant room shall be via the roof via a supply air or exhaust air fan with a makeup or relief air cowl with both fan and cowl of the mushroom type.
 - g. *A second acoustic report be undertaken at the time of Building Permit Application once the proposed details of the refrigeration equipment are more fully documented.*

- R4. The refrigeration equipment data, based on a generic design, and associated comments are contained in Table R1 on the following page.
- R5. The refrigeration equipment platform section preliminary details are contained in Annex M – Mechanical Services.
- R6. The outcomes of the noise modelling assessment are shown in Annex M – Mechanical Services.

TABLE R1 – GENERIC MECHANICAL SERVICES EQUIPMENT DATA	
DESCRIPTION	COMMENT
Supermarket Refrigeration Units	The radiated Sound Pressure Level (SPL or Lp), and equivalent Sound Power Level (SWL or Lw), of each of these condensers is as follows:- Refrigeration compressor rack; SPL = 59 dB(A) at 3 meters; SWL = 76.5 dB(A). The compressor rack is typically tailor made equipment. The compressor rack includes a double insulated enclosure which is specifically designed for application and has been installed in many stores the roof or machine rooms. <i>NB: If the refrigeration equipment is located inside a plant room then:</i> - The walls and ceilings of the plantroom shall be acoustically treated; and - The the plant room doors shall be solid doors fitted with acoustic seals and door closers; and - The plant rooms doors shall be in and be accessible from the internal loading dock area; and - All ventilation shall be via the roof and wall mounted louvres are not permitted. Once details of the equipment are confirmed conduct a detailed acoustic assessment of the plantroom to determine construction of walls, floors and roof/ceiling which will most likely be heavy weight construction. Refrigeration condenser with variable fan speed control condenser; SPL = 56 dB(A) @ 3 meter; SWL = 73.5 dB(A). Refrigeration switchboard; SPL = Nil dB(A) @ 3 meter; SWL = Nil dB(A).

End of Annex R