Appendix J:
Noise Management Plan

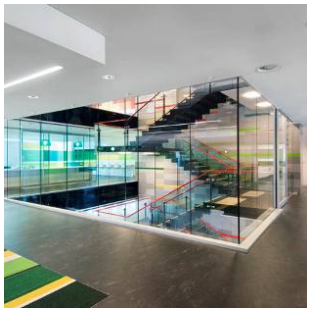
Rudds Acoustics











Noise Management Plan

Capital Recycling Solutions Materials Recycling Facility And Rail Freight Terminal

Report Number: R318010AC R6 18-02-07

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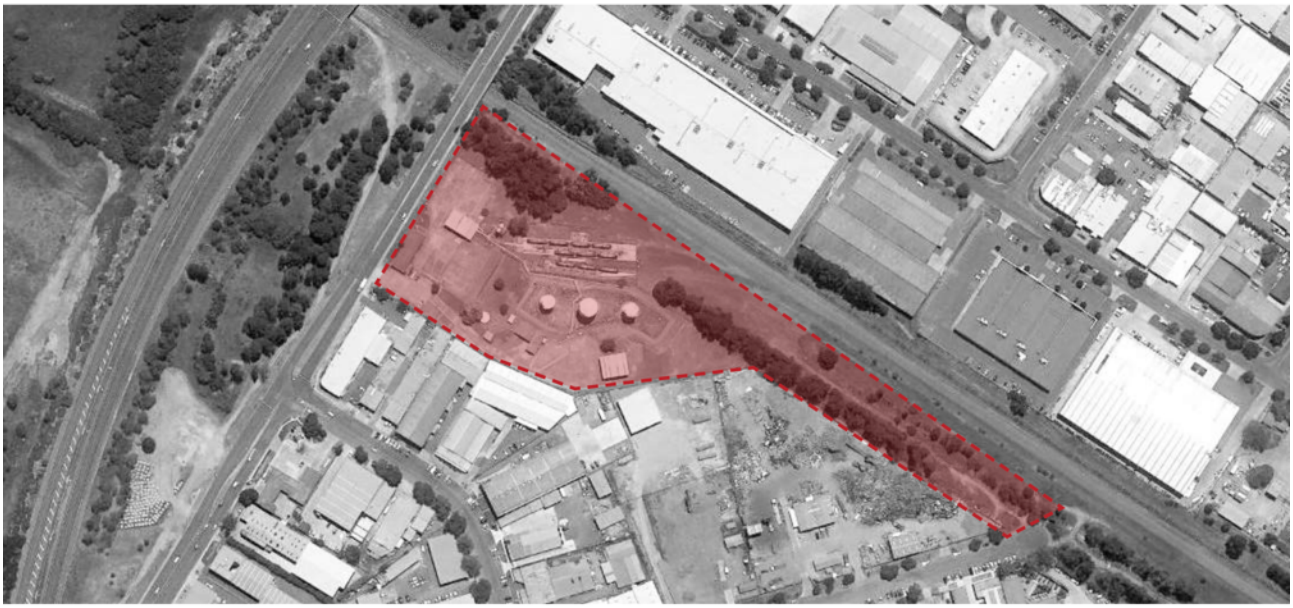
Section 1 - Introduction

Capital Recycling Solutions (CRS) proposes to construct a Materials Recycling Facility (MRF) and a Rail Freight Terminal on Blocks 9 and 11 Section 8, 16 Ipswich Street, Fyshwick ACT. This will involve the construction of a building to be used for handling and storage of waste, two weighbridges (incoming and outgoing), associated roads and parking areas and a hardstand for storage and transport of shipping containers.

The proposed site location is shown in Table 1.

TABLE 1 LOCATION PLAN



The area is surrounded by commercial and industrial zoned land on all four sides. The nearest residential receivers are in Matina Street Narrabundah, approximately 620 metres from the nearest boundary of the site to the south-west and the Southside Village caravan park on the southern side of Canberra Avenue on Block 1, Section 1 Symonston, approximately 450 metres from the nearest edge of the development site.

Rudds is pleased to provide a Noise Management Plan (NMP) for the proposed development. This assessment has been undertaken with reference to the following standards and codes:

1. Industrial Zones Development Code
2. The Australian Capital Territory Environment Protection Regulation (2005), Part 3 Noise.
3. *ACT Commercial Waste Industry Code of Practice* (CWIC).

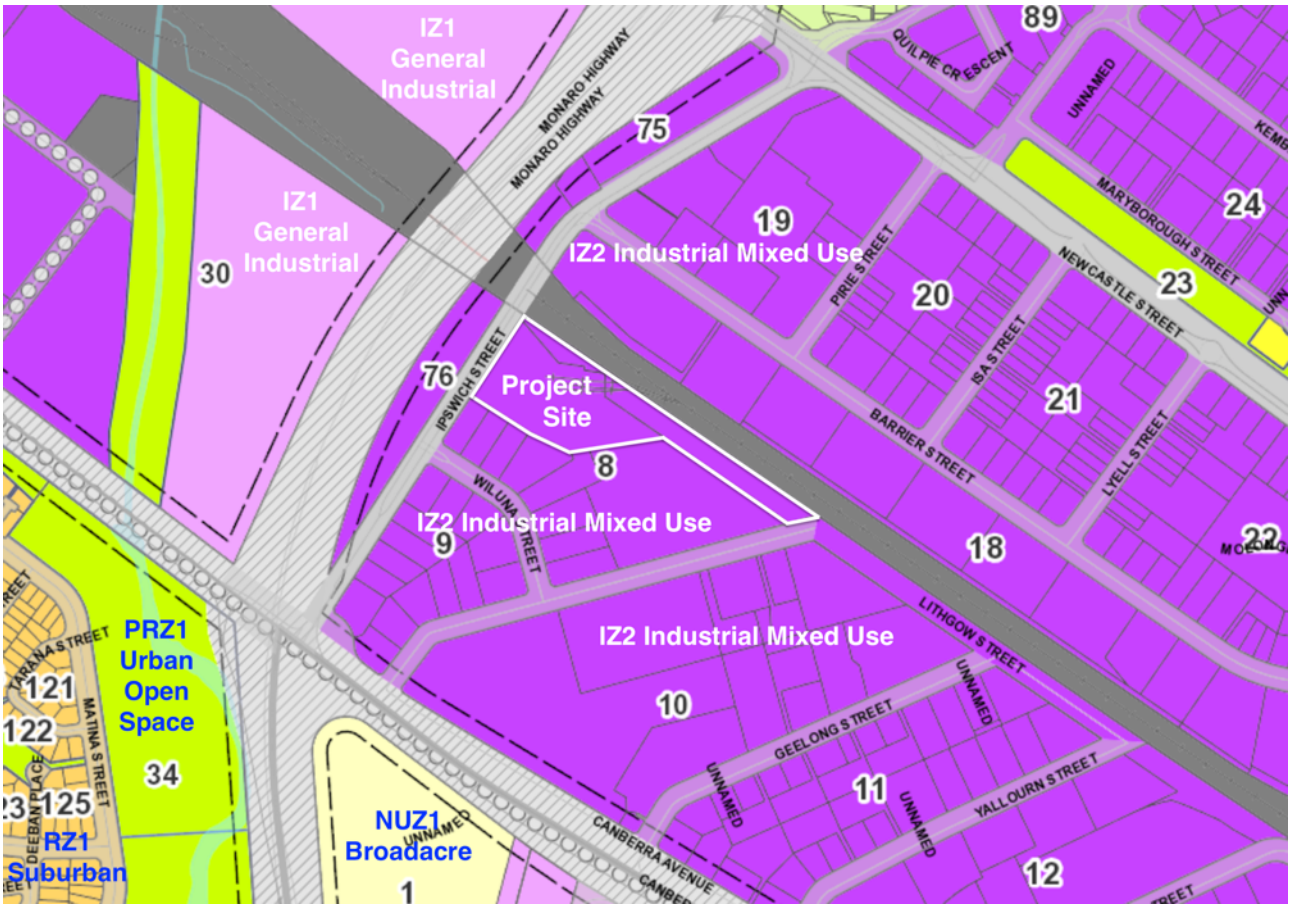
This NMP deals with site operations only. Any noise associated with the rail siding and rail transport is to be addressed as a separate component and is outside the scope of this document.

Section 2 - Design Noise Levels

2.1 Territory Plan Requirements

The site is located within a IZ2 Industrial Mixed-use zone of the Fyshwick industrial area. It is bounded to the North by the Canberra railway line then more IZ2 land, to the east by IZ2 land and to the west by Ipswich Street, more IZ2 land, the Monaro Highway then IZ1 general industrial land and to the south by IZ2 land, as shown in Table 2. Therefore, the Industrial Zones Development Code will be applicable.

TABLE 2 TERRITORY PLAN ZONING



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Rule 5.2 of the Industrial Zones Development Code is provided in Table 3.

TABLE 3 INDUSTRIAL ZONES DEVELOPMENT CODE RULE 23

Rules	Criteria
6.1 Noise	
There is no applicable rule	C33 Where the proposed use is adjacent to, or is, a noise producing activity, noise attenuation measures are utilised to protect the amenity of the area and promote compatibility of uses.
R34 A Noise Management Plan, prepared by an accredited acoustic specialist who is a member of the Australian Acoustical Society, endorsed by Environment Protection is provided for the	C34 If an endorsed Noise Management Plan is not provided, the application will be referred to the relevant agency in accordance with the requirements of the *Planning and Development ACT 2007*.

following uses: ○ *club* ○ *drink establishment* ○ *hotel* ○ *industry (except light industry)* ○ *indoor entertainment facility* ○ *restaurant* The noise management plan details the design, siting and construction methods, which will be used to minimise the impact of noise on neighbours.	

2.2 ACT Environment Protection Regulation 2005 – Part 3 Noise

The Australian Capital Territory Environment Protection Regulation (2005), Part 3 *Noise* sets environmental noise limits based upon noise zones. A detailed description of the Noise Zones and Noise Standards is located in Schedule 2 of the Regulation. The zones are based upon the Territory Plan in the ACT and associated LEP zones in NSW where the site borders NSW. The zoning and noise limit requirements are shown in Table 4.

TABLE 4 ACT NOISE ZONES

Item	Noise Zone	ACT Land	NSW Land	Noise Standard	
				Day	Night
1	Zone A	land in an industrial zone	land in the Queanbeyan city industrial zone	65	55
2	Zone B	land in the city centre and town centres land in the Central National Area (City Hill Precinct)	land in the Queanbeyan city business zone	60	50
3	Zone C	land in group centres, corridor sites and office sites land in the Central National Area (The Parliamentary Zone and Other Areas)		55	45
4	Zone D	land (other than land in the city centre, town centres and group centres) in a commercial CZ4 zone		50	35
5	Zone E	land (other than land in the city centre, town centres and group centres) in – • a restricted access recreation zone • a broadacre zone		50	40
6	Zone F	land (other than land in the city centre, town centres and group centres) in – • a commercial CZ5 zone • a TSZ2 services zone • a community facility zone • a leisure and accommodation zone	land in the Queanbeyan city special uses zone	same as the noise standard for the adjoining noise zone with the loudest noise standard for the time period	
7	Zone G	all other land, other than that land in the Central National Area (Fairbairn)	Other NSW land	45	35

In each case, the following applies:

- Day is defined as Monday-Saturday 7am-10pm, Sunday and public holiday 8am-10pm.
- Night is defined as Monday-Saturday 10pm-7am, Sunday and public holiday 10pm-8am.
- The compliance point for leased land is any point as near as practicable to the boundary of the parcel of land.
- The compliance point for unleased land is any point as near as practicable to 5 metres from the source of the noise.
- The compliance limit for units within the same lease boundary is 5 dBA lower than the Zone Noise Standard for the appropriate time period.
- The compliance point for units within the same lease boundary is any point within any unit in the units plan, other than the unit generating the noise.
- The noise standard on the boundary between 2 or more noise zones is the average of the noise standards for the noise zones for the time when the noise is emitted, rounded up to the nearest dBA.
- The Noise Standard limit is to be used as an assessment limit for noise from all noise sources on the site, excluding the following:
    - A train;
    - An aircraft;
    - A person using his or her body (without any form of mechanical or electronic Commonwealth jurisdiction amplification);
    - An animal;
    - A motor vehicle being driven on a road unless it is being used in reliability tests or speed trials and has been exempted under the road transport legislation from the provisions of that legislation about attaching silencers to the exhaust pipes of motor vehicles, rules of the road and speed limits during the trials or tests.
- Other exclusions apply for special cases. In this case, none of the exclusions are considered relevant to the proposed development.

The site is located within a IZ2 Industrial Mixed-use zone of the Fyshwick industrial area. It is bounded to the North by the Canberra railway line then more IZ2 land, to the east by IZ2 land and to the west by Ipswich Street, more IZ2 land, the Monaro Highway then IZ1 general industrial land and to the south by IZ2 land. Based upon the foregoing, the appropriate noise limits for the site would be as shown in Table 5.

TABLE 5 SITE SPECIFIC NOISE STANDARDS

Location	Noise Zone	Noise Standard (L_{10} dBA)	
		Daytime	Night-time
All site boundaries	Zone A	65	55

It is important to note that a road or road related area cannot be considered an affected place for the purpose of noise assessments. Where there is an intervening road, Rudds considers the appropriate compliance location to be the nearest leased boundary on the opposite side of the road to the project site.

2.3 Commercial Waste Collection

Noise associated with commercial waste collection has the ability to cause disturbance to residential areas in the vicinity of the collection point. For this reason the Environment Protection Act 1997, Instrument No. 238 of 1998 *ACT Commercial Waste Industry Code of Practice* (CWIC) was introduced. The CWIC states that:

> *"Provided the other conditions specified in this agreement are met, commercial wastes collected during the hours specified in Table 1 will not be required to comply with the Zone Noise Standard, as permitted under Environment Protection Regulation 29.*

The CWIC Table 1 is as shown in Table 6.

TABLE 6 CWIC TABLE 1 NOISE ZONES AND OPERATING HOURS

Noise Zone	Operating Hours
Zone A	Any time
Zone B	2 am to 10 pm
Zone C and F (excluding Manuka and Kingston Group Centres)	6 am to 10 pm
Manuka and Kingston Group Centres	5 am to 10 pm
All Other Zones	7 am to 10 pm

This site is located within Noise Zone A. Therefore, operation can occur any time of the day or night.

However, the CWIC is primarily written to protect the waste industry when operating within residential or commercial areas, where waste collection is infrequent (commonly only for a short period once or twice a week). It is not intended to be used for a site such as this, which is primarily a receival and distribution site that could operate on a 24 hour per day, 7 day per week basis. Therefore, waste receival and other activities on the site will be required to comply with the Environment Protection Regulation 2005.

2.4 Construction Noise

2.4.1 Construction Noise Limits

In accordance with the ACTEPR (2005), Section 29, the following apples:

Noise—other exceptions

Under section 25 (1), noise is not taken to cause environmental harm in an affected place if it is noise mentioned in schedule 2, table 2.3, column 2 and the conditions (if any) mentioned in column 3 for the noise are met.

In accordance with the ACTEPR (2005), Schedule 2, Part 2.3, the noise limits relating to noise emitted in the course of building work "*for which a building approval under the Building Act 2004, division 3.3 is required*", relevant to this particular site, the conditions relating to Section 29 are as follows:

(a) all of the following:

(i) the noise is emitted from a place in noise zone A or B; and

(ii) all relevant noise reduction measures mentioned in AS 2436, as in force from time to time, are implemented; and

(iv) the noise is emitted between 6 am and 8 pm.

This effectively means that the noise zone standards can be exceeded between the hours of 6 am and 8 pm, but the noise zone standards must be met at all other times.

Therefore, the noise limits shown in Table 7 will apply to construction noise emissions at the site.

TABLE 7 DEVELOPMENT SPECIFIC CONSTRUCTION NOISE LIMITS

Location	Noise Standard (L_{10} dBA)		
	6 am to 8 pm	8 pm to 10 pm	All other times
All site boundaries	Exempt	65	55

*Note: A road or road related area cannot be considered an affected place for the purpose of noise assessments. Where there is an intervening road Rudds considers the appropriate compliance location to be the nearest leased boundary on the opposite side of the road to the project site.

2.4.2 AS2436 – 2010 Noise from Construction Work

AS2436 – 2010 *Guide to noise and vibration control on construction, demolition and maintenance sites* provides a series of recommendations to minimise noise and vibration from construction activities. The engineering principles commonly used to control noise fall into the following broad categories:

1. Controlling noise at the source. This includes selecting quiet equipment where possible and maintaining the equipment in accordance with manufacturers specifications.
2. Controlling the spread of noise. This includes siting potentially noisy equipment in a location that minimises noise spill to adjoining sites and providing shielding, where necessary, to further reduce noise from equipment.
3. Controlling noise at the receiver. This includes providing acoustic shielding near the residences. Where this is insufficient, further noise mitigation may be necessary to achieve a satisfactory outcome for the residents.

The principle control measure should always be to control the noise at the source, followed by controlling the spread of noise and then finally controlling noise at the receiver should be the last option chosen of all other options are not sufficient to reduce noise to within acceptable levels.

2.5 Road Noise

Design noise levels relating to road traffic noise are provided in the ACT Noise Management Guidelines (Draft) 1996 (hereafter referred to as the DNMG). These guidelines were repealed under the Planning and Assessment Act 2007, A2007-24, s 428 (2), however as there is no other legislation provided to replace the DNMG, Rudds still considers the use of the DNMG as being appropriate for assessment purposes.

The DNMG primarily provided guidance on the following:

1. New (noise sensitive) developments on existing roads.
2. Development of new roads in new areas.
3. Upgrading or building of roads in existing areas.

There is no specific guidance on new traffic generating developments on existing roads, which will be the case for this development.

Section 3 of the Guideline provides detailed information relating to traffic noise. Of importance to this project are the definition of a noise-sensitive receiver and appropriate target noise levels. Table 3.1 of the guideline identifies the following noise sensitive land uses:

- Apartment Attached house Boarding house Detached house Guest house
- Caravan park / camping ground
- Child care centre
- Community activity centre (except community halls)
- Educational establishment

- Hospital Health facility
- Retirement complex
- Special care establishment Special care hostel Special dwelling

Based upon these definitions, and taking into account other land uses that are not noise sensitive, Table 3.2 of the Guideline sets the maximum $L_{A10(18\ hour)}$ external road traffic noise level limits are shown in Table 8.

TABLE 8 MAXIMUM EXTERNAL TRAFFIC NOISE LEVELS (L_{10}, DBA)

Land use	Maximum noise level ($L_{10(18hour)}$)[1]
Residential and community facilities (i.e. all noise-sensitive land uses as defined above)	63 dBA
Private open space[2]	58 dBA
Pedestrian plaza[3]	69 dBA
Commercial facilities	75 dBA

Notes:

1. The compliance noise level is to be measured/predicted at a point 1 metre from the building facade at a height of 1.2 to 1.5 metres above ground level, including 2.5 dBA facade reflection. Where the measurement is free-field, a 2.5 dBA facade reflection is to be added to allow for future dwellings.
2. At a point 1 metre from the nearest boundary of the private open space.
3. This is the $L_{A10(1\ hour)}$ between 12:30 and 13:30 on an average weekday.

Section 3 - Proposed Operation

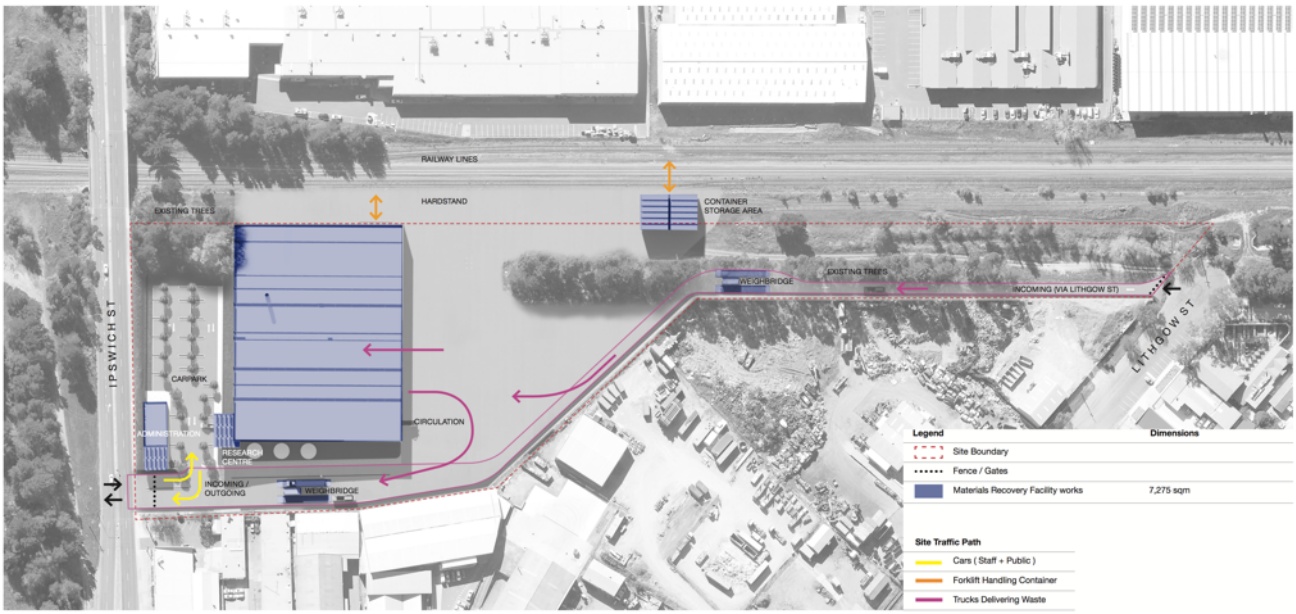
The proposal is to construct and operate a Materials Recovery Facility (MRF) with Rail Freight Terminal.

The proposed site layout is shown in Figure 1. Entry for heavy vehicles will be off Lithgow Street with exit via Ipswich Street. Vehicles will enter the site in a forward direction, cross the weighbridge, enter the recycling building in a forward direction, deliver load, then exit the sorting building in a forward direction, cross the second weighbridge and leave the site.

All sorting activities will take place in the recycling building, which will be sealed to minimise odour emissions. This means there will be high speed roller doors opening and closing when trucks enter and leave, minimising noise emissions to the environment.

Activities that will occur outdoors will include container storage and container handling between the hardstand and the rail siding.

FIGURE 1 PROPOSED SITE LAYOUT



3.1 Proposed Hours of Operation

The proposed hours of operation are as follows:

1. Gate Opening Hours 6:00 am to 10:00 pm Monday to Saturday, 8 am to 2 pm Sundays.
2. MRF Operation – Two Shifts from 6:00 am to 10:00 pm Monday to Saturday.
3. MRF Operation on Sundays, only if required
4. The majority of the waste receival from trucks is expected to occur between 10 am and 4 pm so that peak traffic times are avoided.
5. Rail loading will occur during the daytime only, between 7 am and 10 pm. Loading is expected to take approximately 2.5 hours to load 55 wagons.

Section 4 - Existing Acoustical Environment

The existing acoustical environment includes significant existing road traffic and industrial noise sources. Canberra Avenue, Ipswich Street, Lithgow Street and the Monaro Highway receive a high proportion of heavy vehicles and all except Lithgow Street see very high through-traffic volumes.

At the northern end of Lithgow Street is a Holcim concrete batching plant and during the site visit there were many concrete agitators entering and leaving the site, some travelling onto Ipswich Street.

To the south of the site on Block 13, Section 8 is an existing recycling facility which handles scrap metal and the like, with most being stockpiled outside. During the site visit a large excavator was operating, moving waste materials around the site. The large stockpiles to the north of this site almost totally obscured the excavator, apart from the top of the arm. To the west of this site the adjoining properties are all industrial and warehousing facilities with access off Wiluna Street.

To the north of the site across the rail line on Barrier Street are commercial buildings, including a Harvey Norman retail outlet, Nick Scali furniture and Herzog Steel Manufacturing. At the time of the site visit, there was a heavy vehicle delivery at Herzog that was clearly audible at the eastern end of the CRS site.

The site itself has had a history of heavy industry and currently contains a number of large storage silos.

When considering the past usage of the site, and existing usage of adjoining sites, the proposed development is in-character with the area, which seems to mostly be heavy industrial in nature. The roads that will be utilised already receive significant road traffic numbers and a large proportion of heavy vehicles and the acoustical environment is typical of an industrial area with relatively constant urban hum and regular noise from road traffic and other industrial sites.

4.1 Operator Attended Measurement Results

Rudds undertook some short-term measurements at the site to gain an appreciation of the noise levels experienced. These are presented in **Error! Reference source not found.**.

TABLE 9 NOISE LEVEL MEASUREMENTS

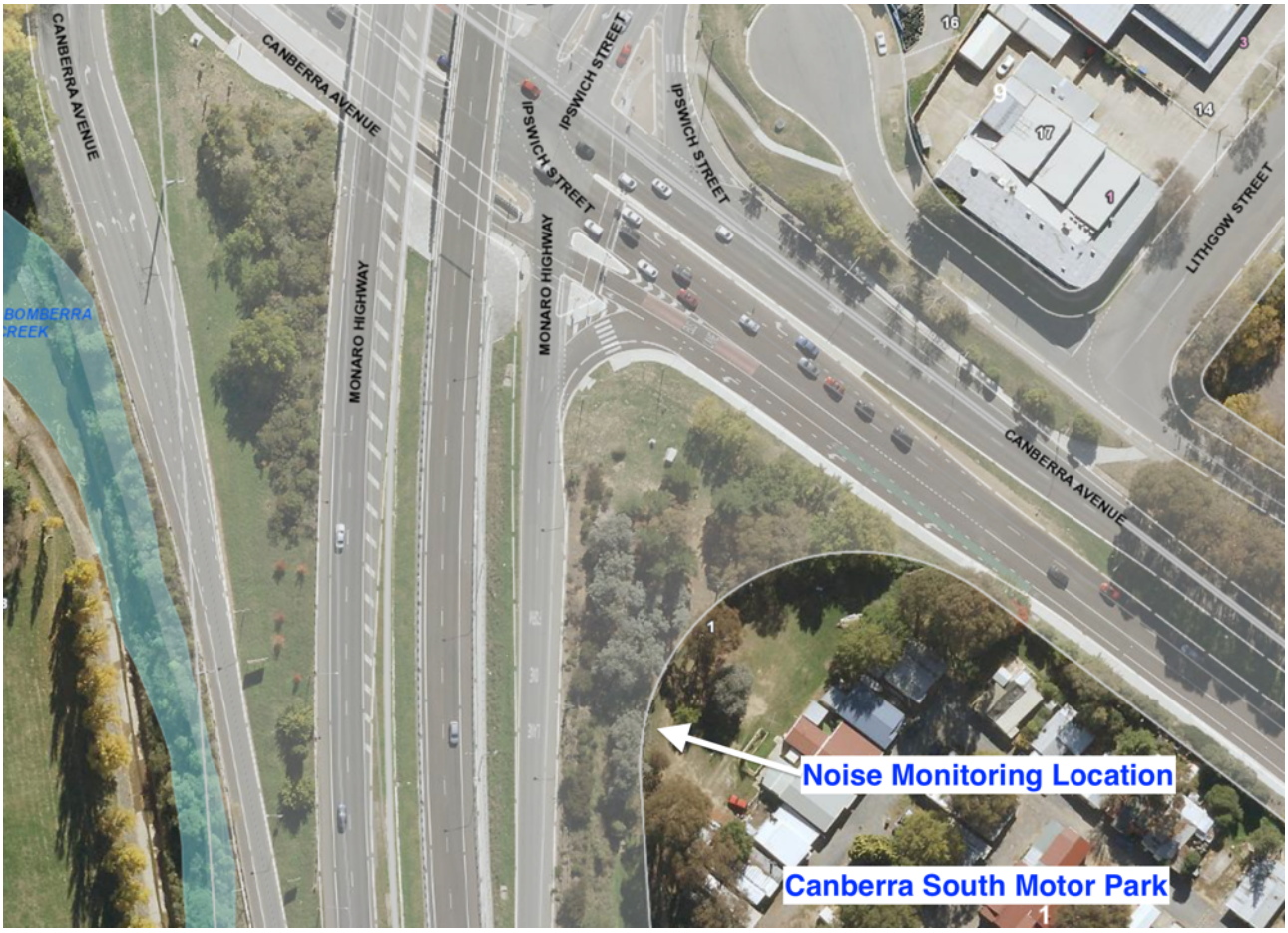
Location Date & Time	Measured Noise Levels			
	LA1	**LA10**	**LAeq**	**LA90**
Ipswich Street at front boundary of site 13/11/2017 2:30 pm to 2:40 pm	78	74	70	57
	Comments: All noise was due to road traffic on Ipswich Street. This included several heavy vehicles, including B-Doubles, semi-trailers, rigid trucks and concrete agitators.			
Lithgow Street at rear boundary of site 13/11/2017 3:08 pm to 3:13 pm	65	59	56	51
	Comments: Some noise was due to road traffic on Newcastle Street, including occasional concrete agitators. There was significant industrial noise from the adjoining recycling site and across the rail line at Herzog Steel.			
Canberra South Motor Park North-western corner of site near Monaro Highway on-ramp 17/11/17 1:51 pm to 2:06 pm	66	63	61	56
	This site was chosen to determine whether there was a significant contribution from traffic at the on-ramp. While traffic noise was clearly dominant, there is an earth bund providing acoustic shielding to the long-term resident's locations on this north-western corner of the site.			

	68	63	60	55
Matina Street Narrabundah near the Tarana Street intersection 17/11/17 2:18 pm to 2:28 pm	This site was chosen to determine whether there was a significant contribution from traffic at the off-ramp. Heavy vehicles at the off-ramp were occasionally audible, but did not result in significant noise. The background noise level was set by road traffic hum from the Monaro Highway, Canberra Avenue and wind in trees from a gentle breeze. Peak events were due to local road traffic on Matina Street, which was regular, but intermittent and bird calls which occurred regularly near the monitor. The measurement was stopped when a person began riding a motorcycle on the park grounds, which would have affected the measurements. This measurement was seemingly affected by weather enhancement, with a thunderstorm approaching from the north-west.			

4.2 Long-term Measurement Results

Long-term noise logging was undertaken at the Canberra South Motor Park. The noise monitoring position was the same as the short-term operator attended noise monitoring location, which is shown in Figure 2

FIGURE 2 ROAD TRAFFIC NOISE MONITORING LOCATION



The long-term noise monitoring results for the Canberra South Motor Park are shown in Table 10 and are presented as daily graphs in Appendix B.

TABLE 10 LONG-TERM NOISE MONITORING RESULTS

Date	$L_{10(18\ hour)}$	$L_{eq(15\ hour)}$ Day	$L_{eq(9\ hour)}$ Night	$L_{eq(1\ hour)}$ Day	$L_{eq(1\ hour)}$ Night
Friday, 17 November 2017				66	
Saturday, 18 November 2017	60	59	54	61	57
Sunday, 19 November 2017	58	57	52	60	56
Monday, 20 November 2017	61	60	55	63	62
Tuesday, 21 November 2017	61	60	56	63	62
Wednesday, 22 November 2017	61	61	56	63	62
Thursday, 23 November 2017			55		61
Overall	**60**	**60**	**55**	**63**	**62**
Overall (excluding weekend)	**61**	**60**	**56**	**63**	**62**

Section 5 - Site Noise Assessment

5.1 Equipment Noise Levels

The equipment noise levels shown in Table 11 have either been provided by the client or sourced from a Rudds database of similar equipment.

TABLE 11 EQUIPMENT NOISE LEVELS

Equipment	Sound Level
Lindner Jupiter Shredder	Lp 86.2 dBA at 3 metres
Lindner Ecostar Dynamic Screen	Lp 86.2 dBA at 3 metres
Waste Compactors (2 of) SIS (US) 4500 EX	Lw 112 dBA
Front End Loader. Volvo L150 or CAT 966 or equivalent	Lw 111 dBA
2 tonne Gas Powered Forklift	Lw 98 dBA
Container Handler – Clark Equipment Omega 54 (or similar)	Lw 110 dBA
Delivery Trucks	Lw 98 dBA
Air extraction and filtering equipment associated with the shed. Fantech 45 kW fan or similar.	Lw 93 dBA - Fan
81 class locomotives (or similar)	Lw 100 dBA

An assessment of operations at the site has been undertaken based upon the following operational scenarios:

1. Daytime operation will include receival of waste and train loading and unloading activities and operation of the MRF. This includes a single locomotive located near the western end of the site at the rail siding, container handler and trucks entering and leaving the site and trucks at weighbridges (3 trucks every 10 minutes assumed).
2. Night-time operations (hereafter referred to as the morning shoulder period from 6 am to 7 am) will involve operations within the MRF shed and receival of waste (approximately 1 truck every 10 minutes expected) only and no other external operations will occur. There will be no train loading during the night-time period.
3. There will be no site operations occurring between 10 pm and 6 am.

The noise assessment was undertaken using current site contours. The plan has not been developed to a stage where finished levels are confirmed for the noise modelling.

Several noise assessment locations have been used for the assessment. These locations are adjacent to the highest potential noise sources on the site. The receiver height was considered to be 1.5 metres above ground level because this is where a person is expected to be standing outside any of the commercial/industrial buildings. The noise source and receiver locations are shown in Figure 3.

FIGURE 3 NOISE MODEL SETUP

The noise levels were modelled under the following meteorological conditions:

1. Daytime, 10^{O}C, 70% relative humidity and calm conditions
2. Morning Shoulder, 0^{O}C, 90% relative humidity and calm conditions under neutral meteorological conditions.

There is an unusual situation with this particular operation in that the container handler and train loading will occur within the rail corridor, not on the CRS block. Rudds has treated this assessment assuming all noise sources within the rail corridor are associated with the development, but the compliance point is the northern side boundary of the rail corridor.

Rudds has also assumed that there will be no acoustic shielding due to container transport or storage. In actual fact, the containers will provide shielding to the container handler, so for the majority of the time, Rudds expects noise levels will actually be lower than predicted to the north of the site.

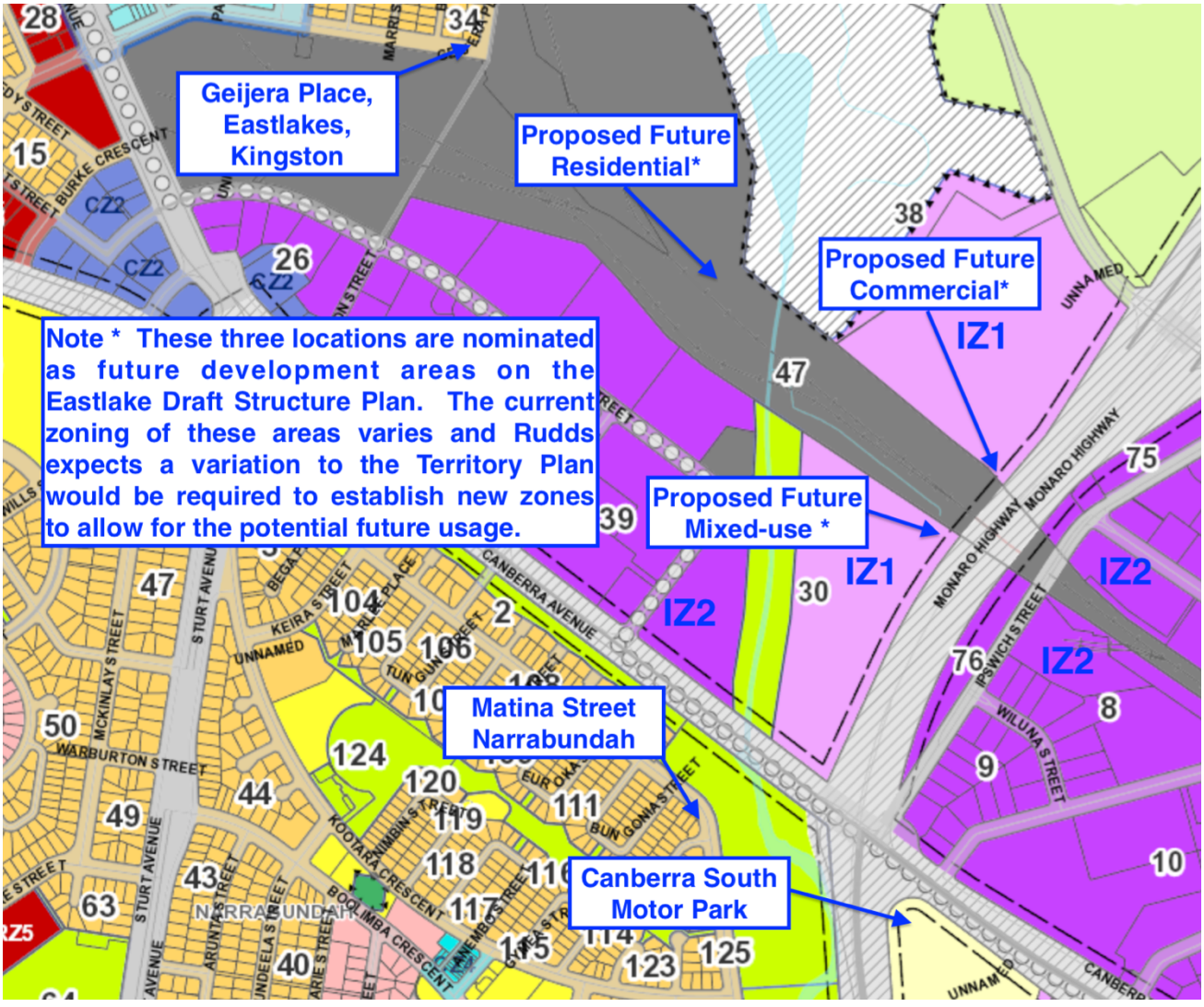
5.2 Receiver Locations

Rudds has undertaken predictions to the northern, eastern, southern and western boundaries of the site as required by the ACT EPR(2005). Rudds has also extended this assessment to the industrial sites to the north of the rail line and also to several potentially noise-sensitive existing, and proposed future receiver locations, which include:

1. Canberra South Motor Park – Existing residential usage
2. Matina Street Narrabundah – Existing residential usage
3. Geijera Place Kingston – Existing residential usage
4. Three locations nominated within Figure 18 of the East Lake Draft Structure Plan as being potential future development sites. For each of these, the nearest part of the development to the proposed CRS site has been used as the receiver location, including:
    a. The proposed future residential area to the north of the rail line, approximately 800 metres from the CRS site (Currently zoned TSZ1 and Designated land (Part of the Central National Area)
    b. A proposed future commercial area to the north of the rail line directly west of the Monaro Highway (Currently zoned IZ1)
    c. A proposed future mixed-use area to the south of the rail line directly west of the Monaro Highway (Currently zoned IZ1)

The locations used in the modelling are shown in Figure 4. All modelling was undertaken to 1.5 metres above existing ground level.

FIGURE 4 ADDITIONAL NOISE MODELLING LOCATIONS



5.3 Predicted Operational Noise Levels

Based upon these two scenarios, the noise levels shown in Table 12 are predicted at the compliance points for the site, at 1.5 metres above ground level, and at the nearest residential receiver locations.

TABLE 12 PREDICTED OPERATIONAL NOISE LEVELS

Location	Operational Scenario	Predicted $L_{10(10\ minute)}$ Noise Level, dBA	Noise Level Limit	Compliance Achieved?
Northern Boundary across from container handler (Harvey Norman carpark)	Day Shoulder	73 52	65 55	No Yes
Eastern Boundary at Lithgow Street entry	Day Shoulder (inversion)	69 69	65 55	No No
Across Lithgow Street at Holcim Concrete property	Day Shoulder	55 54	65 55	Yes Yes
Southern Boundary beside inbound weighbridge (Access Recycling)	Day Shoulder	78 78	65 55	No Yes
Southern Boundary beside outbound weighbridge (Access Recycling)	Day Shoulder	77 77	65 55	No No
Western Boundary to Ipswich Street	Day Shoulder	55 55	65 55	Yes Yes
Matina Street Narrabundah	Day Shoulder	33 <30	N/A	N/A
Canberra South Motor Park	Day Shoulder	37 34	N/A	N/A
Geijera Place, Eastlakes Kingston	Day Shoulder	<30 <30	N/A	N/A
Proposed Future Residential	Day Shoulder	<30 <30	N/A	N/A
Proposed Future Commercial	Day Shoulder	45 42	N/A	N/A
Proposed Future Mixed-Use	Day Shoulder	43 36	N/A	N/A

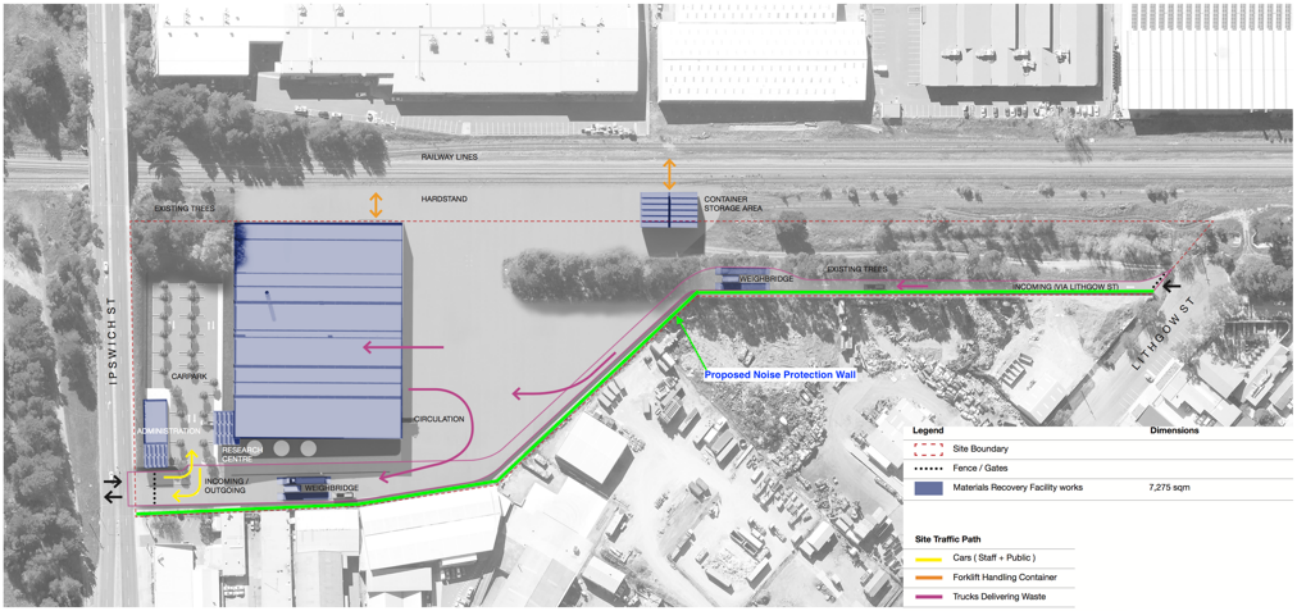
Based upon the noise modelling results, non-compliances were typically achieved due to the close proximity of the equipment to the boundary compliance locations, with morning shoulder (night-time) exceedances of the noise limits up to 22 dBA and daytime exceedances of the noise limits up to 12 dBA.

Based on the noise levels predicted in Table 12, the following noise mitigation measures were considered:

1. To minimise this impact, Rudds recommends providing a boundary fence along the Southern boundary that has a top height not less than 2.7 metres above finished ground level. In the case of the south-western end of the site, where there is a significant step-up to the neighbour, this fence must be built from the upper concrete level.
2. To achieve compliance at the northern rail corridor boundary, The container handler operational noise level must be reduced from Lw 110 dBA to Lw 102 dBA. This is being investigated with the manufacturer of the equipment, who has indicated that there are equipment silencing kits available for these container handlers. It should be noted that the typical loudest area around a container handler will be the radiator end, which is the rear of the vehicle. In this case, the rear of the vehicle will typically point south, and when carrying a container there will be some shielding of noise due to the container. Therefore, the actual operational noise level of the container handler at the northern side of the rail line is expected to be significantly quieter than modelled.

Assuming a quieter container handler can be obtained, the location of the proposed noise protection walls on the southern boundary are shown in Figure 5.

FIGURE 5 PROPOSED NOISE PROTECTION WALL



With these noise mitigation measures implemented, Rudds is predicting the noise levels shown in Table 13

5.4 Noise Levels After Noise Mitigation

TABLE 13 PREDICTED NOISE LEVELS

Location	Operational Scenario	Predicted $L_{10(10\ minute)}$ Noise Level, dBA	Noise Level Limit	Compliance Achieved?
Northern Boundary across from container handler (Harvey Norman carpark)	Day Shoulder	65 47	65 55	Yes Yes
Eastern Boundary	Day	54	65	Yes

Location	Operational Scenario	Predicted $L_{10(10\ minute)}$ Noise Level, dBA	Noise Level Limit	Compliance Achieved?
at Lithgow Street entry	Shoulder	54	55	Yes
Across Lithgow Street at Holcim Concrete property	Day Shoulder	50 49	65 55	Yes Yes
Southern Boundary beside inbound weighbridge (Access Recycling)	Day Shoulder	64 64	65 55	Yes No[1]
Southern Boundary beside outbound weighbridge (Access Recycling)	Day Shoulder	64 64	65 55	Yes No[1]
Western Boundary to Ipswich Street	Day Shoulder	55 55	65 55	Yes Yes
Matina Street Narrabundah	Day Shoulder	33 <30	N/A	N/A
Canberra South Motor Park	Day Shoulder	37 34	N/A	N/A
Geijera Place, Eastlakes Kingston	Day Shoulder	<30 <30	N/A	N/A
Proposed Future Residential	Day Shoulder	<30 <30	N/A	N/A
Proposed Future Commercial	Day Shoulder	45 42	N/A	N/A
Proposed Future Mixed-Use	Day Shoulder	43 36	N/A	N/A

Note 1: As this is an LA10 assessment, if the entry, weighing and departure from the weighbridge takes less than a minute over a 10 minute period, then the trucks may not actually contribute significantly to the LA10(10 minute) noise level. It is also important that the likely number of vehicle deliveries during the morning shoulder period is approximately one truck every 10 minutes.

Based upon the implementation of noise barriers, Rudds predicts that compliance can be achieved at 1.5 metres above ground level at the nearest commercial/industrial receiver locations, except for those southern boundary locations beside the weighbridges, where exceedances of the $L_{A10\ 55}$ dBA night-time noise limit during the morning shoulder period may occur.

There may still be some exceedances of the noise limits at the southern boundary of a night-time (6 am to 7 am) due to the close proximity of the traffic route to this boundary. These exceedances may be considered acceptable given the industrial nature of the area, and the fact that the current adjoining operations mean this are cannot be accessed due to the stockpiles of recycling materials, which in themselves act as a substantial acoustic barrier to operational areas on this site. Some additional screening may occur that will reduce noise levels to the east and north of the site when containers are stacked on the hardstand area.

5.5 Road Traffic Noise Assessment

The primary haulage route to the site will be split between the Monaro Highway, Canberra Avenue, Ipswich street, Wiluna Street and Lithgow Street.

The AECOM road traffic report indicates that the maximum predicted daily arrivals under the 2020/21 scenario are as shown in Table 14 for the waste stream. This totals 230 inbound heavy vehicle movements per day. Rudds has modelled both inbound and outbound movements along their respective transport routes, meaning the total number of vehicle movements modelled is 460 (230 inbound and 230 outbound) for a peak day.

TABLE 14 PREDICTED 2020/21 ADDITIONAL DAILY WASTE VEHICLE MOVEMENTS

Direction of Travel	**Number of inbound/outbound movements per maximum day.**
Off Monaro Highway from South	47
Off Ipswich Street from North	138
Off Canberra Avenue via Ipswich Street from the west	9
Off Canberra Avenue via Lithgow Street from the east	36
Total Arrivals	**230**

The primary receivers in the vicinity of the CRS site are commercial and/or industrial in nature, thus allowing road traffic noise levels up to $L_{10(18\ hour)}$ 75 dBA. There are two noise sensitive residential receivers on this route. These are the Canberra South Motor Park to the south of Canberra Avenue, east of the Monaro Highway and residences in Matina Street, west of the Monaro Highway.

In the Canberra South Motor Park, the nearest dwellings are approximately 25 metres from the Monaro Highway southbound on-ramp. In Matina Street, the nearest dwellings are approximately 200 metres from the Monaro Highway northbound off-ramp.

A detailed road traffic assessment has been conducted by AECOM. Under the 2020/21 scenario, based upon return journeys for each of the trucks shown in Table 14, Rudds has undertaken an assessment based upon the following vehicle pass-by sound power levels:

- Truck pass-by – Leq 99 dBA per pass-by (used for truck exiting Monaro Highway down off-ramp).
- Truck accelerating up to road speed – Leq 106 dBA per pass-by (used for all other assessment levels).

As the assessment is required to be undertaken as an L_{A10} assessment, Rudds has used standard methodology for road traffic assessment and has added 3 dBA to the overall predicted $L_{Aeq\ (18\ hour)}$ noise level to convert to $L_{A10(18\ hour)}$.

Based on these pass-by noise levels, the predicted road traffic noise level due to the development is presented in Table 15.

TABLE 15 PREDICTED ROAD TRAFFIC NOISE LEVELS

Location	Distance from nearest trafficable lane	Predicted Project Related Noise Level ($L_{10(18\ hour)}$ dBA)
Nearest Residential Premises		
Matina Street, Narrabundah	200 metres to nearest houses (approximately)	Less than 30
Canberra South Motor Park	25 metres to nearest buildings (approximately)	Less than 53.6
Nearest commercial properties[1]		
Ipswich Street north of CRS site	Not less than 10 metres	68.0
Ipswich Street south of CRS Site	Not less than 10 metres	64.4
Wiluna Street	Not less than 10 metres	67.6
Lithgow Street north of Wiluna Street	Not less than 10 metres	64.2

Note 1: This assumes every truck leaving the site and accelerating heavily to get up to road speed. Therefore, this is likely to be a worst-case situation and actual levels are likely to be lower than predicted at most properties along the haulage route. This is especially the case for properties at the northern end of Lithgow Street, where vehicles will be decelerating for entry into the CRS facility.

In all cases, the predicted road traffic noise levels are below the allowable $L_{A10(18\ hour)}$ noise levels for each of the roads.

Based upon these predicted noise levels, Rudds undertook a preliminary screening test to determine the influence of CRS road traffic on the noise sensitive residential receivers. This assessment is as shown in Table 16.

TABLE 16 PREDICTED ROAD TRAFFIC NOISE INCREASE

Location	Measured Noise Level (L_{A10})	Predicted CRS Noise Level ($L_{A10(18\ hour)}$)	Total Road Traffic Noise Level	Compliance Limit $L_{A10(18\ hour)}$ dBA
Matina Street	Short-term 63[1]	<30	63[1] (Short-term)	63
Canberra South Motor Park	$L_{A10(18hour)}$ 60.3 including weekend $L_{A10(18hour)}$ 61.1 excluding weekend	<53.6	<61.1 including weekend <61.8 weekday	63

Note 1: This was a short-term measurement. Based upon our experience with road traffic noise measurements, Rudds expects the long-term $L_{A10(18\ hour)}$ noise level will be lower than this. Given the distance to this location from the off-ramp and the predicted CRS road traffic level, the likelihood of increasing overall noise levels was minimal, so a detailed long-term assessment was not considered necessary.

The assessment of the Canberra South Motor Park shows that the existing road traffic noise level will not increase significantly with the inclusion of CRS road traffic movements.

Section 6 - Conclusion

Rudds has prepared a Noise Management Plan for the establishment and operation of the Capital Recycling Solutions (CRS) Materials Recycling Facility (MRF) and a Rail Freight Terminal on Blocks 9 and 11 Section 8, No.16 Ipswich Street, Fyshwick ACT.

The area is surrounded by industrial zoned land on all four sides (excluding the rail corridor). The nearest residential receivers are in Matina Street Narrabundah, approximately 620 metres to the south-west and the Southside Village caravan park on the southern side of Canberra Avenue on Block 1, Section 1 Symonston, approximately 450 metres from the nearest edge of the development site. An assessment to the Eastlakes Development, with the closest block to the site being Block 12, Section 34 Kingston, approximately 1400 metres from the MRF has also been undertaken.

This Noise Management Plan has included prediction and assessment of noise emissions from the site and from the increase in road traffic numbers from the site to the Monaro Highway past potentially noise-sensitive receiver locations.

This assessment has been undertaken with reference to the following standards and codes:

1. Industrial Zones Development Code
2. The Australian Capital Territory Environment Protection Regulation (2005), Part 3 Noise.
3. *ACT Commercial Waste Industry Code of Practice* (CWIC).

This NMP deals with site operations only. Any noise associated with the rail transport is to be addressed as a separate component and is outside the scope of this document. Nevertheless, operation of the container handler within the rail corridor and a standing locomotive have been included in the model for completeness.

The assessment has been conducted to the nearest compliance points, being the property boundaries, at a height of 1.5 metres above ground level. This method was used because this is the approximate ear height of a person standing on the ground on neighbouring lots. Above this, it is likely they would be within buildings that would provide protection from noise.

The operation also involves container handling on the rail siding, which is outside the property boundaries, so Rudds has assessed to the nearest boundary on the north of the rail line, which is the nearest industrial boundary to operations on the side of the hardstand area.

The findings of this study are as follows:

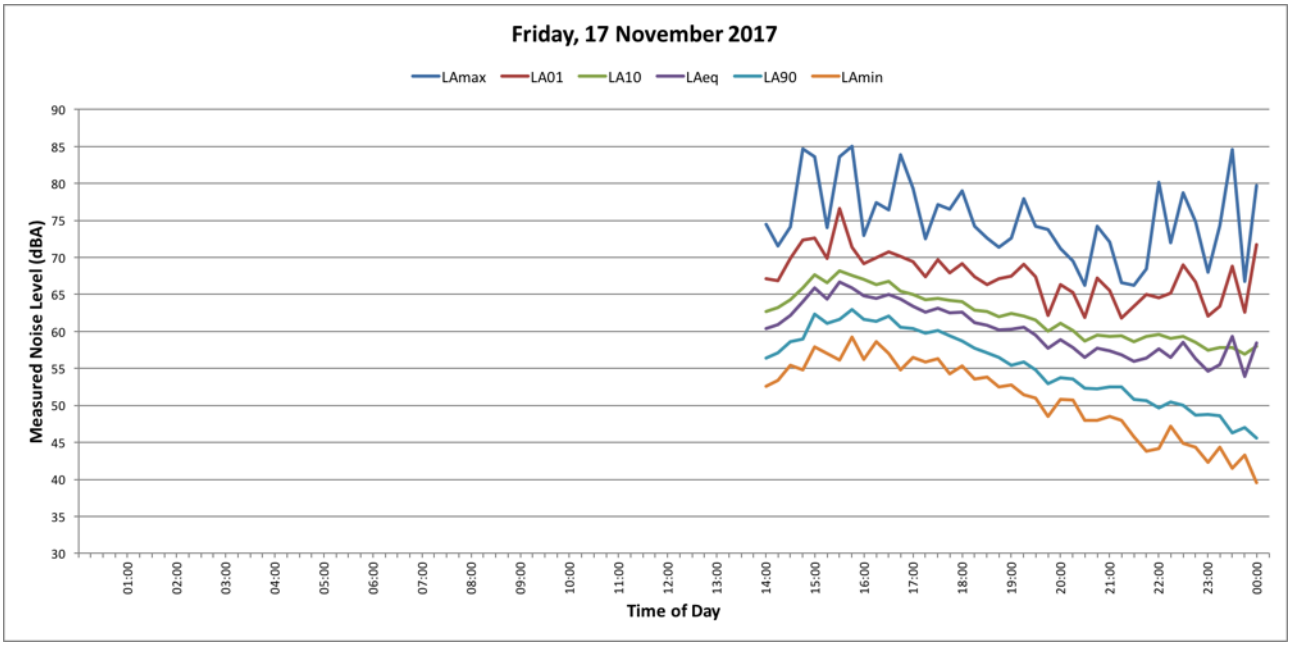
1. The proposed location is already an area that has heavy industry, including a large metal recycling facility a sawmill and a two concrete batching plants and the proposed development is in-character with the area.
2. The MRF building can be constructed to minimise noise emissions to the environment, thus achieving compliance with the ACT Zone Noise Standards at the property boundaries.
3. Trucks and the container handler manoeuvring on the site are the primary outdoor noise sources. These pieces of equipment are predicted to exceed the Zone Noise Standard noise limits on some occasions without some noise mitigation being provided.
4. Rudds has provided advice as to the construction of an acoustic fence along the southern boundary of the site to shield the neighbouring properties from noise associated with these activities. The sound level of the container handler will also need to be reduced. After construction of the southern fence, and the noise mitigation to the container handler, it is possible that some exceedances of the night-time criteria may occur only between 6 am and 7 am due to heavy vehicle movements across the site.
5. The proposed haulage routes all use existing major highways or roads that already have significant heavy vehicle movements, including the Monaro Highway and Ipswich Street (a designated B-Double haulage route) and the expected increase in road traffic noise at the nearest noise-sensitive receiver locations are within acceptable limits.

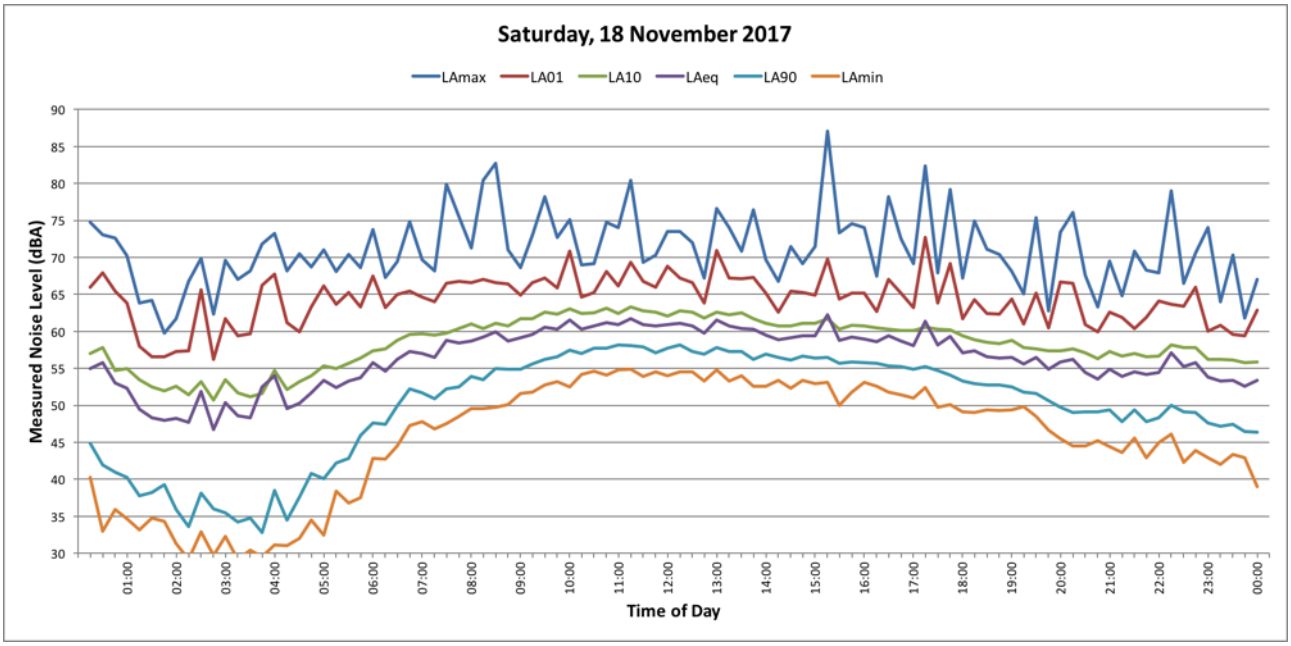
Appendices

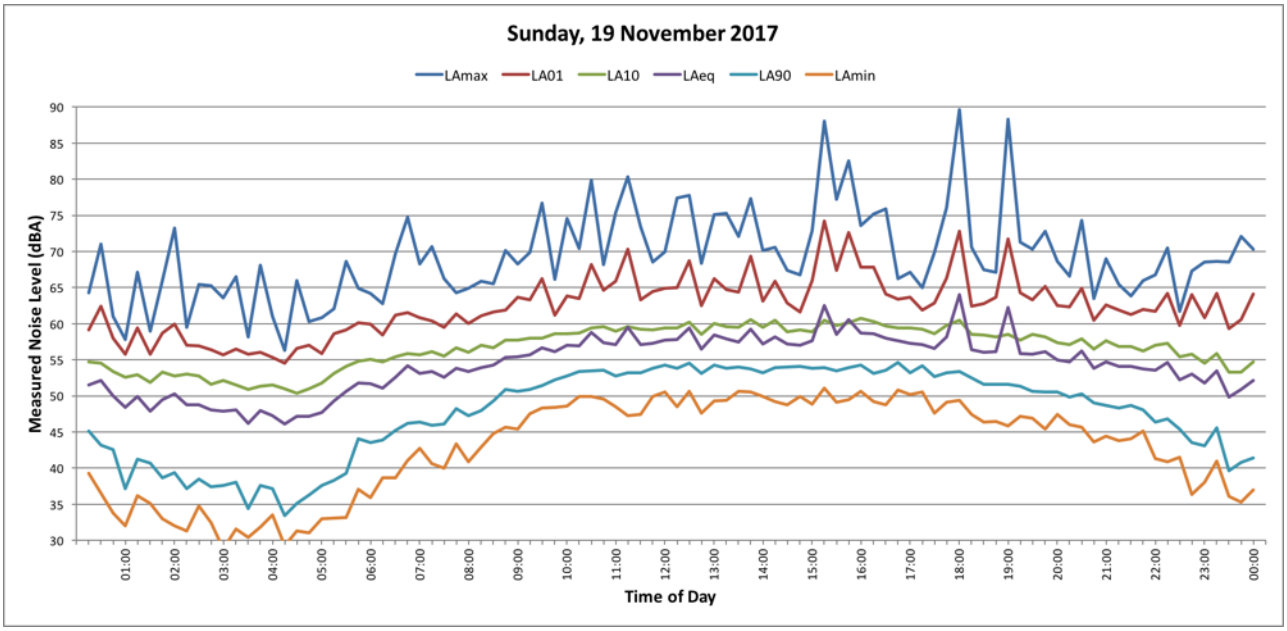
APPENDIX A GLOSSARY OF TERMS

dB	Decibel. This is the unit measurement of sound.
dBA	A weighted decibel is the most commonly used descriptor. The A weighting is an adjustment to the raw sound level to approximate what the average human ear can hear, which is less sensitive at very low and very high frequencies.
Lw or SWL	Sound power level. This is the total radiated sound energy.
Lp or SPL	Sound pressure level. This is the measurable sound level at a given distance from an item.
L_{max}	The RMS maximum noise level of a measurement
L_{10}	90^{th} percentile sound level of a measurement. Often called the average maximum noise level
L_{eq}	The energy average noise level of a measurement.
L_{90}	10^{th} percentile sound level of a measurement. Often called the average background noise level
L_{min}	The minimum noise level of a measurement
$L_{eq(T)}$	The time (T) equivalent energy noise level. The time interval is often in blocks of 10 or 15 minutes for short term measurements, or hours for long-term measurements. Common increments for long term measurements are 1 hour, day, night, 18 hours and 24 hours.
$L_{eq(8h)}$	The 8 hour equivalent energy noise level. Primarily used for occupational noise assessments
LC_{peak}	The C weighted peak noise level. Primarily used for occupational noise assessments
Dw	The Weighted Level Difference as defined in AS/NZS ISO 717.1:2004. This is the single number rating describing the ability of a partition to reduce noise as measured in the field with no standardisation or normalisation.
Rw	The Weighted Sound Reduction Index. This is the single number rating describing the ability of a building element to reduce noise as measured in a laboratory. Assessed in accordance with AS/NZS ISO 717.1:2004.
NRC	Noise Reduction Coefficient. The NRC defines how much sound is absorbed by a surface. An NRC of 0 means it absorbs no sound while an NRC of 1 means it will absorb most sound.
CAC	Ceiling Attenuation Class. The CAC determines how much cross-talk will occur between one room and another through the ceiling cavity where both rooms have the tested ceiling tile. This is an ideal situation, with no wall head leaks and no services penetrations in the ceiling. Therefore, it defines the ideal, best possible result as tested in a laboratory.

APPENDIX B LONG-TERM NOISE MONITORING RESULTS



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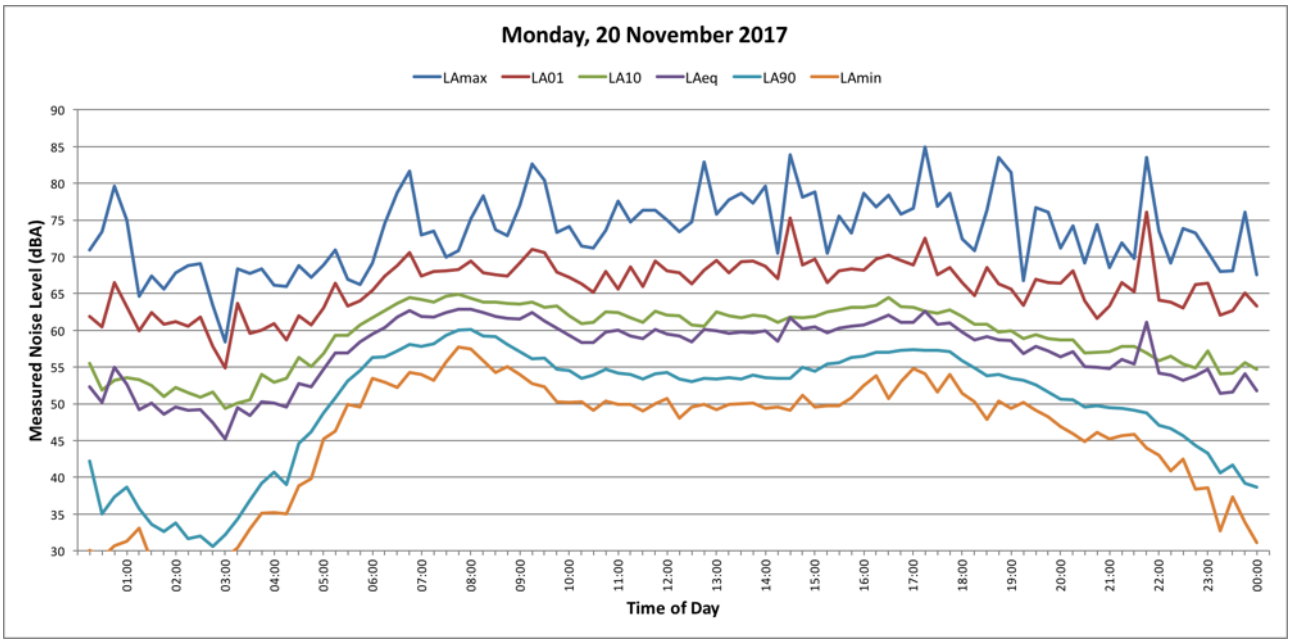
LAmax
LA01
LA10
LAeq
LA90
LAmin
Measured Noise Level (dBA)
Time of Day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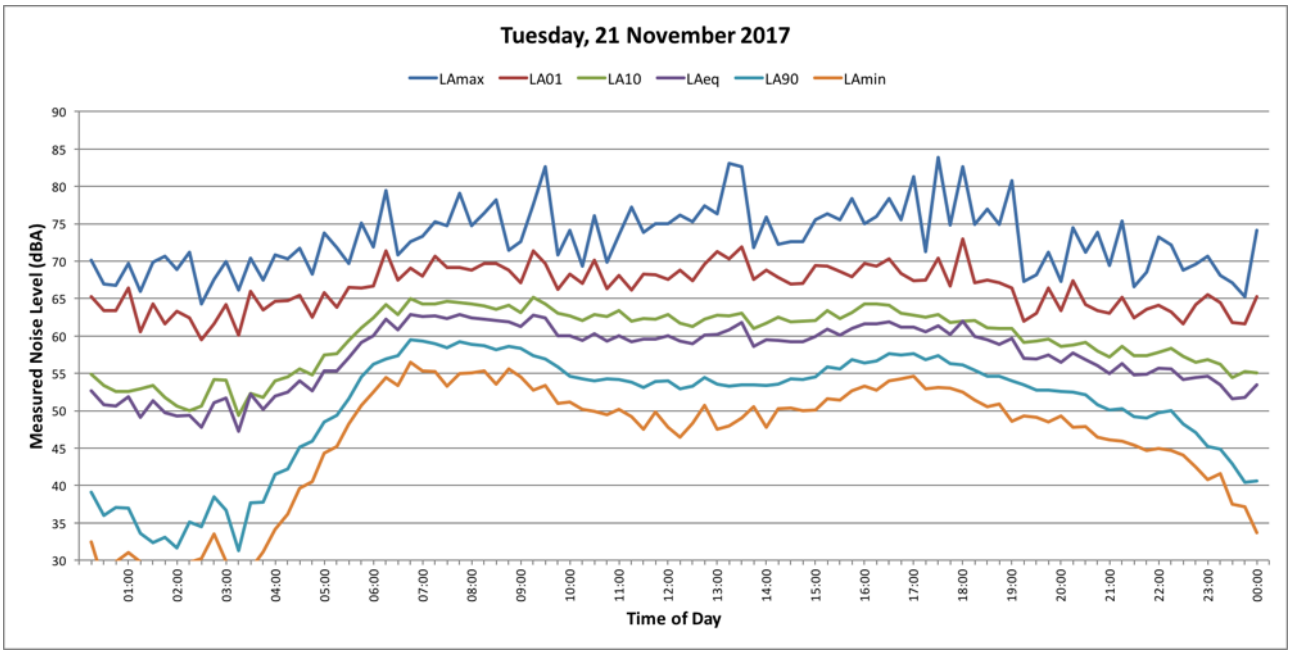
LAmax
LA01
LA10
LAeq
LA90
LAmin
Measured Noise Level (dBA)
Time of Day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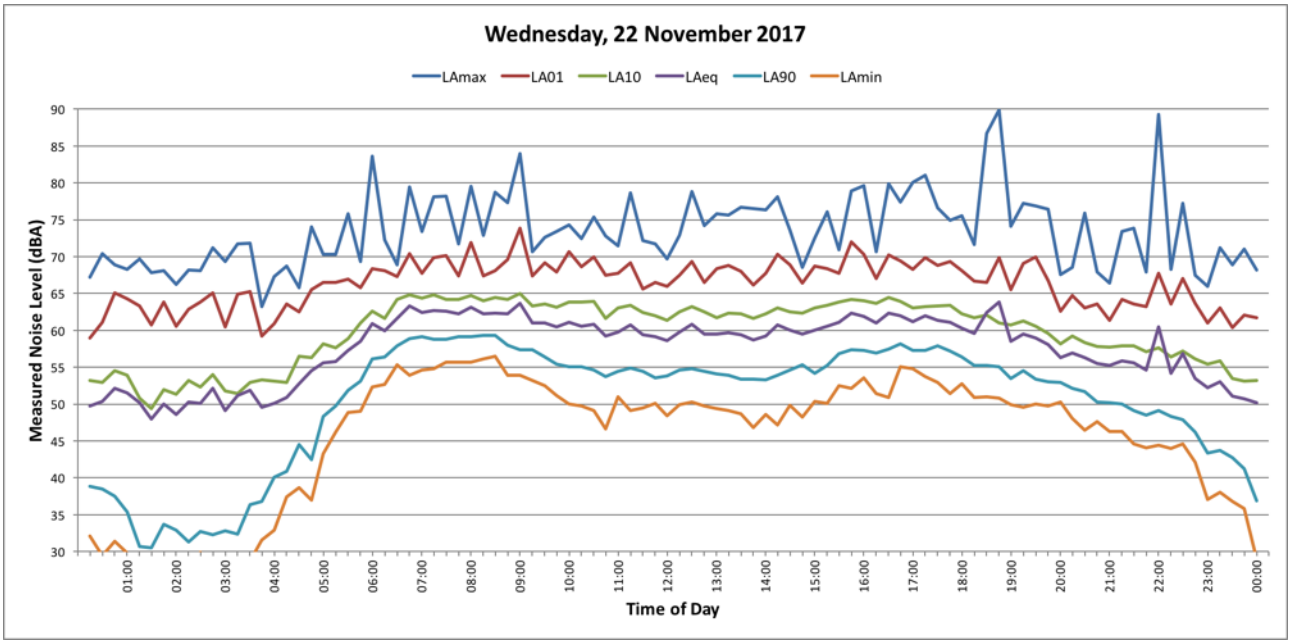
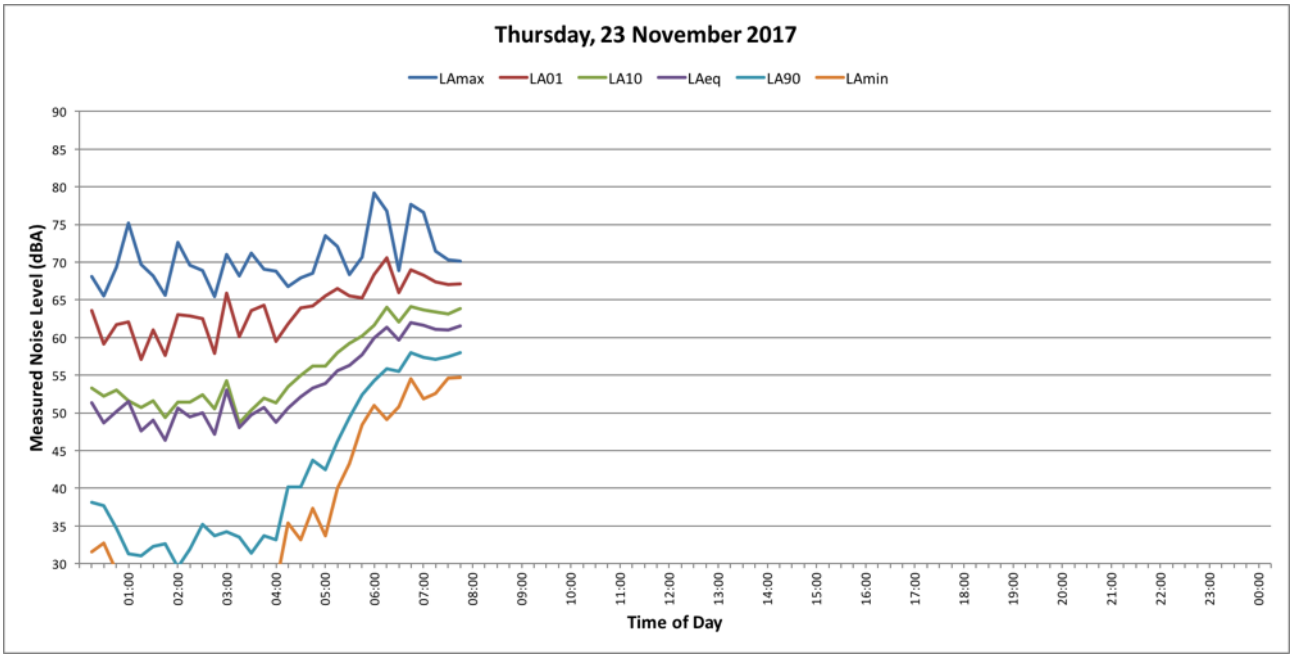
LA01
LA10
LAeq
LA90
LAmin
Measured Noise Level (dBA)
Time of Day


Wednesday, 22 November 2017
LAmax
LA01
LA10
LAeq
LA90
LAmin
Measured Noise Level (dBA)
Time of Day


Thursday, 23 November 2017
LAmax
LA01
LA10
LAeq
LA90
LAmin
Measured Noise Level (dBA)
Time of Day