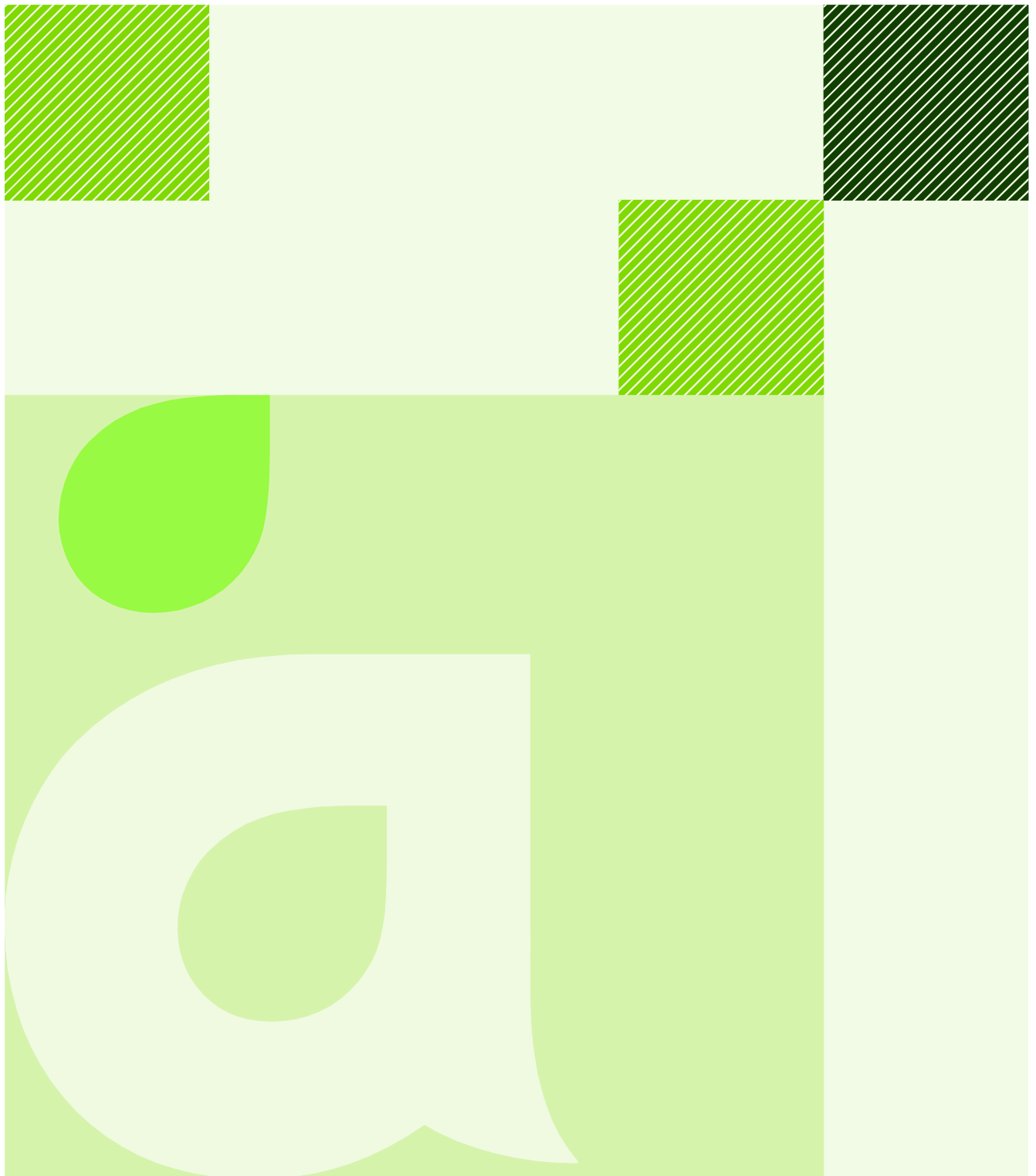


APPENDIX B

Lamberts North Operational Noise Assessment November 2017



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Project: Mt Piper Power Station Ash Placement

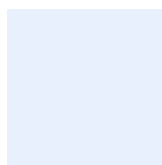
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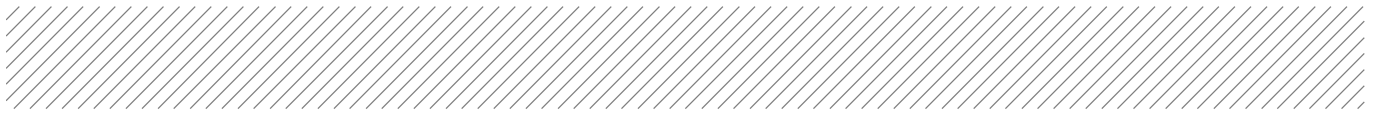
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1 Introduction

1.1 Project understanding

On 16 February 2012, Delta Electricity received Project Approval (09_0186) under delegation from the Minister of Planning for the Mt Piper Ash Placement Project (the Project) under Section 75J - *Environmental Planning and Assessment Act 1979* to permit the continued disposal of ash generated by the Mt Piper Power Station into the Lamberts North area, which is an extension of the existing Mt Piper Ash Repository. The Project Approval was granted subject to Conditions of Approval. EnergyAustralia NSW acquired Mt Piper Power Station and associated land holdings and infrastructure from the state-owned Delta Electricity in September 2013. As such the project is now owned by EnergyAustralia NSW.

This report has been developed in accordance with the Lamberts North Ash Placement Project Condition of Approval (CoA) E11 and the mitigation measures specified in the Operational Environment Management Plan (OEMP May 2013). The OEMP outlines the requirements of the ongoing noise monitoring program and operational noise review in accordance with CoA's E7, E8, E9 and E11.

1.2 Background to the Project

Lamberts North is located immediately east of EnergyAustralia NSW's existing Mt Piper Ash Repository, which is described as Area 1 in the Environmental Assessment (EA) (SKM, 2010). Ash placement at Mt Piper Ash Repository is still currently being undertaken, but alternates with ash placement at Lamberts North.

Both sites are located in an area characterised by both rural and industrial influences, with a number of coal mines in relatively close proximity. The project site is predominately surrounded by Ben Bullen State Forest, which lies to the north and south east of Mt Piper Power Station, together with open cut coal mines and coal washeries. Wallerawang Power Station which is also owned by EnergyAustralia NSW, lies to the south east of the project site, approximately 5 km away, but is no longer operational following the announcement in November 2014, that the power station would be closed.

Lamberts North ash repository is approximately 53 hectares.

Historically, the Lamberts North area has been highly disturbed as a result of extensive mining activities including underground working (from the 1950s to the early 1990s) and recent open-cut mining activities being carried out by Centennial Coal.

EnergyAustralia NSW has engaged a principal contractor (Lend Lease) to manage and operate both the Mt Piper (Area 1) and Lamberts North ash repositories. Operations at Lamberts North commenced on 2 September 2013.

1.3 Scope of work

In accordance with CoA E11, the scope of work includes noise assessment comprising of attended/unattended noise measurements at two sensitive receiver locations to determine potential noise impacts arising from the operational activities at Lamberts North ash repository.

1.4 Sensitive receivers

The sensitive receivers located within the vicinity of the Project and identified for noise impacts within the Operation Noise Management and Monitoring Plan (ONMMP), a sub plan of the OEMP, are described in Table 1 below. The two sensitive receivers closest to the site are located at Blackmans Flat approximately 1.4 km to the east of Lamberts North and at Wallerawang approximately 2.5 km south east of Lamberts North. Location 3 has been used as an additional location to measure the reference noise levels from the operational activities. The positions of the measurement locations are shown in Figure 1.

Table 1 | Sensitive receivers nearest to Lamberts North

Location ID ^a	Description	Map Coordinates	Noise monitoring location	Distance from Lamberts North Ash Repository
1	Blackmans Flat	33.36468°S 150.05904°E	Located at the western end of Noon Street on the southern side of the road. Positioned at the boundary of the residential property 90 m from the Castlereagh Highway.	1.4 km east
2	Wallerawang	33.37765°S 150.06073°E	Situated on a rural property southeast of Lamberts North, and approximately 1.3 km from Castlereagh Highway.	2.5 km south east
3	Lamberts North	33.35745°S 150.04206°E	Additional location at the south eastern boundary of the Lamberts North site	Within the Lamberts North site

^a Refer to Figure 1 for locations

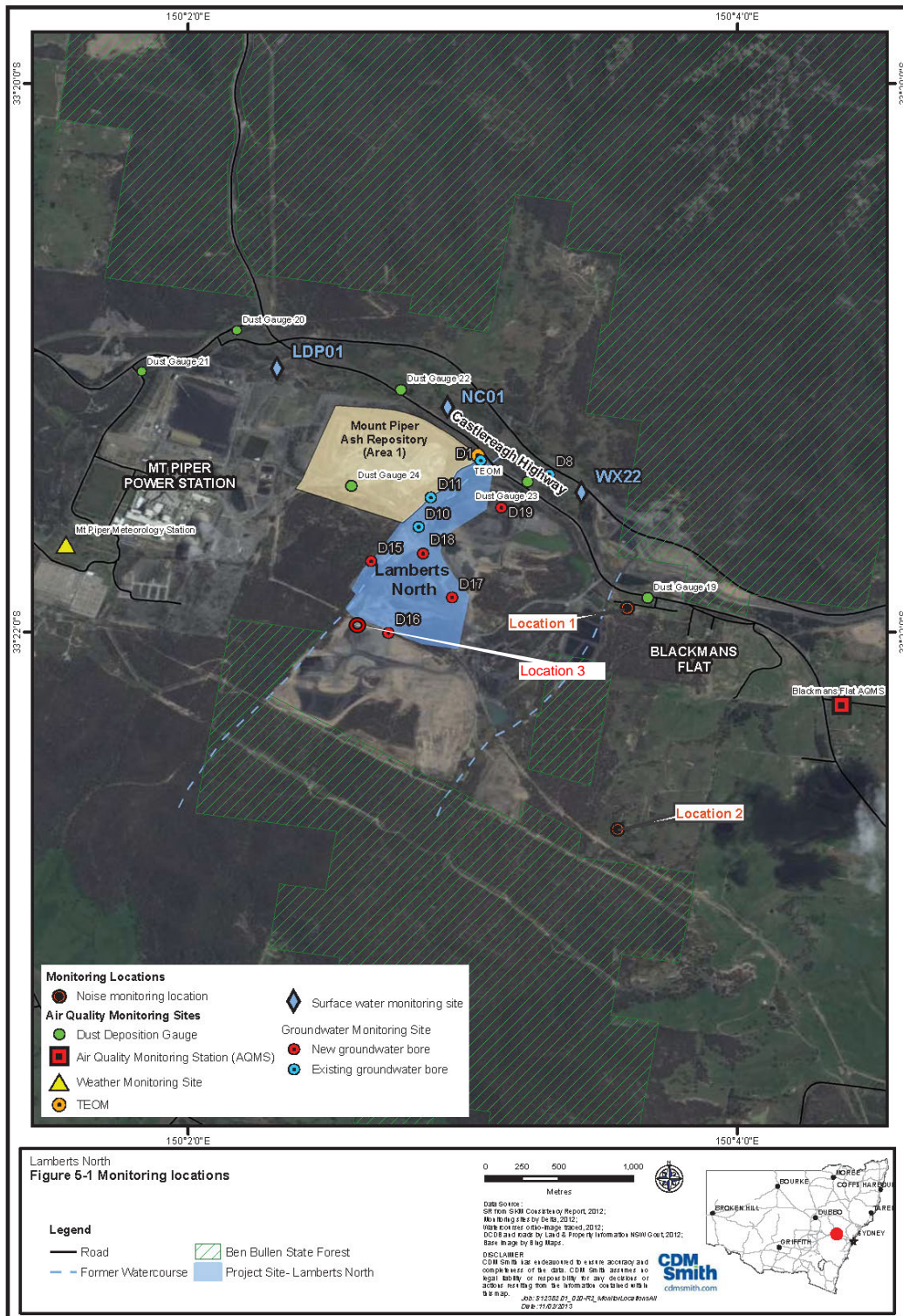


Figure 1 | Environmental noise monitoring locations



2 Operations at Lamberts North

2.1 Operation methodology

Key potential noise impacts during operational activities at Lamberts North and Mt Piper Ash Repository sites are listed below:

- Transporting fly ash and bottom ash to the ash repository using haulage trucks along the designated haul roads;
- Placing ash in stockpiles in designated areas before being spread out by a dozer;
- Compacting the ash using a dozer and roller;
- Maintenance on the haulage roads using a grader, roller, dozers and water carts;
- Dust suppression across the site using a series of techniques including but not limited to water carts and sprinkler systems;
- Developing and maintaining water management structures (containments, drains and sumps) using an excavator;
- Using various sized pumps on site to pump water from various water sources;
- Using light vehicles on occasion to inspect the ash repository and carry out environmental monitoring;
- The machinery and plant generate noise from the engine and drive line, hydraulics and reverse warning devices.

2.2 Activities at Lamberts North

The Mt Piper and Lamberts North sites are located adjacent to each other. Ash deposition at the Lamberts North site or Mt Piper site is dependent on many factors which are decided on a weekly basis by the Lend Lease environmental manager.

During the site visit from 19 – 21 November 2017, ash placement operations were occurring at Lamberts North site but no ash placement was occurring at Mt Piper Ash Repository (Area 1).

The equipment outlined in Table 2 was evident at Lamberts North during the site visit.

Noise generated from some of the equipment at a distance of seven metres was measured at Lamberts North by Aurecon in January 2013 (see Aurecon, 2013). Sound Power Levels (SWL) for the rest of the equipment were referenced from *AS 2436-2010 Guide to noise and vibration control on construction, demolition and maintenance sites*.

Below is the summary of activities identified at Lamberts North during the site visit:

- The day/ activities started at 06:00 for a 06:15 start which included the daily tool box talk and work related discussions.
- The equipment on site consisted of a dozer, a dump truck, a water cart and one light commercial vehicle based on the initial briefing provided to us by the Lend Lease security officer prior to attending the site. Appendix F shows the copy of site attendance sheet signed by plant operators.
 - The dump truck was being loaded with ash near the ash bins and was unloaded at the junction of Lamberts North and Mt Piper ash repository sites.

- The dozer was operating on the ash stock pile, but was not visible or audible at monitoring Location 3.
- One water cart was sighted but was only operating occasionally as required.
- The light commercial vehicle was occasionally being used to transport drivers.
- All activities ceased by 17:00. No activities occurred during the evening or night time period (18:00 – 06:00) at either the Lamberts North or Mt Piper sites.

Table 2 | Equipment sighted at Lamberts North and Mt Piper site during the site visit

Equipment type	Number of equipment on site during the site visit	Sound Power Level SWL for each equipment type dBA ^b
Dozer / Crawler tractor*	1	106
Dump Truck*	2	104
Water Cart / truck*	1	101
Light commercial vehicle	1	100

* Sound Power Levels (SWL) calculated based on noise measurements at a distance of 7 m which were carried out during a previous site visit (see Mt Piper Power Station Ash Placement Project – Lamberts North Construction Noise monitoring 14-15 January 2013, Revision 2, dated 11 February 2013).

2.3 Description of the surrounding environment

Lamberts North site is predominantly surrounded by Ben Bullen State Forest with open cut coal mines and coal washeries. Noise sources, other than those resulting from ash placement activities, were audible during the site visit (e.g. light to heavy vehicles on distant road, animal noises, etc.) and contributed to the cumulative noise at the measurement location (Location 2).

Activities at Springvale colliery which is operated by Centennial Coal and lies to the south east of the site includes, but is not limited to the transportation of coal via conveyors, operation of equipment and mobile plant, etc. may also contribute to the cumulative noise at the measurement locations. Pine Dale coal mine is located to the north east of the site, but is unlikely to contribute to the cumulative noise at the measurement locations as the mine is currently under care and maintenance (i.e. non-operational).

^b SWL includes adjustment for tonality.

3 Noise criteria

3.1 Conditions of Approval relating to noise

The ONMMP seeks to address the specific requirements of the CoA attached to the Project Approval for Lamberts North, insofar as they relate to noise and vibration during operation.

CoA E7 and CoA D3a(ii) define the operational noise requirements for the project, to ensure noise emissions from operational activities do not exceed the criteria shown in Table 3 below.

Table 3 | Operation noise criteria

Location	L _{Aeq} (15 minute) dBA		
	Day Time (7:00 – 18:00)	Evening Time (18:00 – 22:00)	Night Time (22:00 – 7:00)
All private receivers within the township of Blackmans Flat	42	38	35
All other residences	42	38	35

Note: These criteria do not apply where the Proponent and an affected landowner have reached a negotiated agreement in regard to noise, and a copy of that agreement has been forwarded to the Director-General and the NSW EPA.

3.2 Operational hours

In accordance with the CoA E1, operational activities associated with the project shall only be undertaken from 6:00am to 8:00pm Monday to Friday and 6:00am to 5:00pm Saturday and Sunday. Operations outside the hours stipulated above are only permitted in emergency situations.

4 Noise survey

4.1 Methodology

Attended and unattended noise measurements were conducted from 19 – 21 November 2017 at the boundary of the nearest residential properties (Location 1 and Location 2) likely to be exposed to noise from the ongoing ash placement operation.

The statistical noise measurements including the averaged A-weighted noise levels (L_{Aeq}), maximum A-weighted noise levels (L_{Amax}) and statistical A-weighted L_{A90} and L_{A10} noise levels^c were conducted using a Larson Davis 831 Type 1 sound level meter equipped with a LD PRM831 pre-amplifier and a PCB 377B02 ½” microphone. The microphone was set to ‘A’ frequency weighting, ‘F’ time weighting, and was fitted with an approved windshield.

Measurements were typically taken at a height of 1.2 m and at least 3.5 m from any reflecting structure other than the ground. Maximum wind speeds at the microphone position was predominantly less than 5 m/s. The measurement period at each location was 15 minutes. A Larson Davis CAL200 was utilised to calibrate the sound level meter before and after each series of measurements with no significant calibration drift noted. Measurements were typically taken in accordance with the Australian Standard *AS 1055 1997: Acoustics – Description and measurement of environmental noise*. Table 4 shows the equipment used for all the measurements undertaken on site.

Table 4 | Sound pressure level measurement equipment

Equipment	Make	Model	Serial No.	Type	Last Calibration	Calibration Due
Sound Level Meter	LD	831	0001595	1	19/08/2016	19/08/2018
Noise logger 1	LD	LXT	1718	1	1/09/2016	1/09/2018
Noise logger 2	RION	NL-21	00709529	2	29/09/2016	29/09/2018
Calibrator	LD	CAL200	6345	-	14/02/2016	14/02/2018

Noise measurements were conducted at three locations (as shown in Figure 1).

4.2 Weather data

Overcast sky and intermittent wind (less than 1.5 m/s) was prevalent at Location 3 over the attended monitoring period on both days. Overcast sky and wind speeds of less than 1 m/s was apparent over the monitoring period on 19 – 21 November 2017 at Location 1 and Location 2.

Weather data for the monitoring periods, as provided by the Mt Piper weather station, is shown in Appendix E. This data shows that wind speeds higher than 3 m/s were experienced during morning/ afternoon time on 20 November 2017. Noise measurement data was excluded from the assessment during that time.

As discussed in Section 2.2, there was no ash placement activity during the evening or night time period (18:00 – 06:00). In accordance with the NSW Industrial Noise Policy (INP), activities at the

^c For an explanation of the acoustic terms please refer to the attached Glossary of Terminology in Appendix A

Lamberts North site during 06:00 – 07:00 are not considered as night time activity as this time period falls within the defined shoulder period^d.

As per Appendix C (*Procedure of assessing noise increase due to temperature inversions*) of NSW INP, “if the development does not operate at night, there is no potential for noise impact due to inversions, and no further consideration of these effects is required”.

Below is the summary of weather conditions prevalent during the noise monitoring periods which complies with the CoA E7 and CoA D3a(ii):

- Wind speeds were less than 3 m/s at 10 m above ground level for most of time.
- Stability Category F temperature inversion conditions were not prevalent during the operational activities.

Stability Category G temperature inversion conditions were not prevalent during the operational activities.

4.3 Noise measurement results

During the current monitoring event both attended and unattended monitoring was undertaken.

- Unattended continuous monitoring was undertaken at Location 1 and Location 2 from 11:00 am on 19 November to 04:00 am on 21 November 2017. Detailed results of continuous noise measurements over each 15-minute period are shown in Appendix D and average sound pressure levels over the day, evening and night-time monitoring periods is provided in Table 5.

As noted in Appendix D and E, wind speeds greater than 3 m/s were experienced at the weather station for a few hours on 20 November 2017. The data during these periods was excluded from the overall measurements to ensure compliance with conditions CoA E7 and CoA D3a(ii). Excluded data had negligible effect on the overall noise measurements.

- Attended noise monitoring was also undertaken at all three locations. Multiple 15-minute measurements were undertaken and Table 5 provides a summary of the noise monitoring results for each location.

A list of operating equipment identified at the Lamberts North site is outlined in Section 2.

Table 5 | Results of environmental noise monitoring

Note: rows in grey are results of attended monitoring, rows in white are results of unattended monitoring

Location	Date	Time	Period	Measured sound Pressure Level, dBA				Note
				L _{Aeq, 15min} [#]	L _{A10, 15min} ^{^^}	L _{A90, 15min} [^]	L _{Amax, 15min} [*]	
Location 1 (Blackmans Flat)	19/11/2017	10:14	Day	56	59	48	67	Note 1
	20/11/2017	9:27	Day	57	60	46	71	
	21/11/2017	7:44	Day	54	58	45	67	
	19/11/2017	7am-6pm	Day	53	57	42	77	
		6pm-10pm	Evening	51	56	28	74	
		10pm-7am	Night	48	57	25	72	

^d As per NSW INP Section 3.3 (Dealing with ‘shoulder’ periods): For early morning (5am-7am) operations, it may be unduly stringent to expect such operations to be assessed against the night time criteria-especially if existing background noise levels are steadily rising in the these early morning hours.

Location	Date	Time	Period	Measured sound Pressure Level, dBA				Note
				L _{Aeq, 15min} [#]	L _{A10, 15min} ^{^^}	L _{A90, 15min} [^]	L _{Amax, 15min} [*]	
	20/11/2017	7am-6pm	Day	58	65	41	83	
		6pm-10pm	Evening	50	57	29	68	
		10pm-7am	Night	N/A	N/A	N/A	N/A	
Location 2 (Wallerawang)	19/11/2017	10:37	Day	45	47	38	62	Note 2
	20/11/2017	9:01	Day	39	41	32	61	
	21/11/2017	7:31	Day	39	41	32	64	
	19/11/2017	7am-6pm	Day	41	47	31	74	
		6pm-10pm	Evening	41	45	28	71	
		10pm-7am	Night	N/A	N/A	N/A	N/A	
	20/11/2017	7am-6pm	Day	42	46	32	78	
		6pm-10pm	Evening	40	45	29	63	
		10pm-7am	Night	N/A	N/A	N/A	N/A	
	Location 3 (South eastern boundary of Lamberts North)	19/11/2017	9:38	Day	45	49	34	
20/11/2017		10:11	Day	57	56	35	80	
20/11/2017		10:26	Day	59	57	42	81	

Measurements that were affected by rain and wind speeds higher than 3m/s were excluded from the assessment.

N/A refers to no recorded measurements from the noise logger due to equipment outage. As there was no activity during the night time period, the outage had no effect on the outcome of the final assessment.

L_{Aeq} refers to A-weighted equivalent continuous sound pressure level over measurement period. It is used to quantify the average noise level over a time period.

^^ L_{A10} refers to the A-weighted noise level which is exceeded for only 10% of the measuring period. It is usually used as the descriptor for intrusive noise level.

^ L_{A90} refers to the A-weighted noise level which is exceeded for 90% of the measuring period. It is usually used as the descriptor for background noise level during the measurement period.


* L_{Amax} refers to the maximum A-weighted noise level detected during the measuring period. It refers to the maximum background noise detected.

Note 1 (Residence - Location 1)

From site observations at residential Location 1 (i.e. Blackmans Flat) during the attended noise monitoring, the ambient noise was dominated by the traffic along Castlereagh Highway, local domestic and natural noises (e.g. insects, etc.). There was no audible noise from the westerly direction (i.e. Centennial Coal, Springvale Mine, etc.).

The maximum equivalent continuous sound pressure level over 15 minutes at Location 1 was measured at L_{Aeq (15minute)} 58 dBA. Instantaneous^e (attended) noise level in the range L_{AF} 39 - 63 dBA

^e See Appendix A – Glossary of terms



was measured when a vehicle was passing on Castlereagh Highway. Birds and insects contributed to the $L_{Amax\ 15\ minute}$ of 67-83 dBA in the day/ evening/ night time.

Note 2 (Residence - Location 2)

The background noise level (L_{A90}) at the rural residential Location 2 (i.e. Wallerawang) was relatively similar to the background noise level at Location 1, especially during the evening time measurements. Noise contribution during the day and evening time period included noise from insects and birds. Other sources of ambient sound at this site included natural sounds (from wind noise, etc.) and distant vehicle traffic noise.

Based on sound localisation using binaural hearing during the attended measurements, there was no evidence of noise originating from the north westerly direction, thus indicating that noise contribution from Lamberts North to the overall equivalent sound pressure level at this location was negligible. Given the buffer distance of at least 2.5 km between Location 2 and Lamberts North, and with the intervening topography, the operational noise impact during day time at this location is considered to be minimal or insignificant.

Maximum equivalent continuous noise over 15 minutes at Location 2 was measured at $L_{Aeq\ (15\ minute)}$ 45 dBA. Instantaneous^f (attended) noise level in the range of L_{AF} 29 - 48 dBA. Birds and insects contributed to the $L_{Amax\ 15\ minute}$ of 61-78 dBA in the day/ evening/ night time.

Note 3 (Lamberts North eastern boundary - Location 3)

From site observations at the south eastern site boundary of Lamberts North during attended noise monitoring, noise was clearly audible from the mobile plant operating on Lamberts North. The noise varied and included sources such as engine noise from the dump trucks, reverse beeps from dozer/ trucks, bucket bangs of the dozer, loading of ash in the dump truck, etc.

^f See Appendix A – Glossary of terms

5 Noise assessment

The results of the measured noise levels at the sensitive receivers (Location 1 and Location 2) can be found in Table 5 above. As discussed in Section 4, equivalent sound pressure levels (L_{Aeq}) at both the receiver locations were dominated by traffic noise, birds, insects, low hum from Mt Piper Power Station and noise from nearby coal mines. These measured equivalent sound pressure levels were in excess of the 42 dBA day time noise target as per Table 3.

However, operational noise from Lamberts North was inaudible at both the sensitive receivers. As the operational noise contribution from Lamberts North was inaudible, Aurecon undertook a desktop based noise prediction to estimate the noise contribution from the operational activities. This is described in more detail in the following section.

The operational activity at Lamberts North site commenced each day from approximately 06:00 until 17:00 during our site visit. There were no operational activities between 17:00 and 06:00.

5.1 Predicted noise contribution

For the purpose of this assessment, the worst case scenario of the following equipment operating simultaneously at the same location at Lamberts North, was considered.

- Dozer/ Crawler tractor x 1
- Dump truck x 2
- Water cart x 1
- Light commercial vehicle x 1

We note that the magnitude of the noise emission during the operation of the project may vary and will depend on the number and intensity of machines operating and the working location of the equipment. It is unlikely that all the plant and equipment will be running simultaneously in the same location. In addition the nature of activities onsite is expected to vary from day to day.

The predicted noise levels were calculated (based on sound propagation through geometric spreading) at a distance based on worst case noise emission levels (i.e. maximum sound power levels) without considering any barrier effects from the undulating surrounding terrain. However due to intermittent operational characteristics and constant change of distance between the source-receiver, a 50% operational efficiency (equipment operational for 50% of the time during each 15-minute measurement period) for each equipment type in the calculation has been used. The results of this calculation are shown in Table 6.

It should be noted that the predicted levels in this section are worst case for each of the above operational activities at the assessment locations and include adjustments for annoying activities as outlined in the Interim Construction Noise Guideline (ICNG). The above prediction methodology takes into account the number of individual machines operating as well as the percentage in use during a 15 minute period, with all scheduled equipment operating at the minimum distance from the nearest sensitive receiver.

The predicted levels in Table 6 provide a theoretical maximum cumulative noise impact. The distances shown in Table 6 are considered minimum between the operational works and the respective receiver zones. The calculation also assumes that each item of equipment is operating at maximum capacity (i.e. maximum sound power level). In reality the mobile plant operate at much lower capacity during its operation and hence the levels shown in Table 6 are considered conservative and should be interpreted as indicative worst case only.

Table 6 | Predicted noise emission from Lamberts North equipment

Equipment at Lamberts North	Sound Power Level (SWL), dBA	Predicted sound pressure level at indicated distance, L _{Aeq} dBA	
		1.4 km (Location 1)*	2.5 km (Location 2)*
Dozer / Crawler tractor	106	32	27
Dump Truck x 2	104	33	28
Water cart	101	27	22
Light commercial vehicle	100	26	21
Worst case predicted noise level from the operation of the above equipment		37	32

As shown in Table 7, results of our assessment revealed the following:

- Worst case modelling predicted that noise levels would comply with the day and evening time criteria at both Location 1 and Location 2 as shown Table 7.
- Worst case modelling indicates that the maximum predicted noise level will exceed the noise criteria during night time at Location 1. However CoA E1 for Lamberts North restricts any activities after 20:00 on weekdays and 17:00 on weekends (refer to Section 3.2 for more details), and therefore any predicted night time exceedance is not relevant.

Table 7 | Summary of maximum predicted noise level against the noise criteria (dBA)

Location*	Description	Maximum theoretical predicted noise	Day limit 42 dBA (07:00-18:00)	Evening limit 38 dBA (18:00-22:00)	Night limit 35 dBA (22:00-07:00) ^
1	Blackman's Flat	37	✓	✓	N/A
2	Wallerawang	32	✓	✓	N/A

✓ Complies with the stipulated noise criteria

^ No operational activity during night time periods.

* Refer to Figure 1 for receiver locations

As evident from Table 7 above, the worst case noise associated with the operational activities at Lamberts North is predicted to comply with the stipulated noise criteria at both the sensitive receptors for both the day and evening periods.



6 Recommendations

6.1 Noise management measures

Should complaints from the community be received, the following noise control measures could be applied to minimise environmental noise emission from Lamberts North during operation of the project:

- If possible avoid the coincidence of noisy plant/machine working simultaneously.
- Construction trucks and other heavy machinery to use loop tracks as much as possible on the site to minimise the amount of reversing activities, i.e. managed through the Operational Traffic and Transport Management Plan.
- Consider the use of alternative warning system to the conventional single tone reversing alarm, such as broadband sound reversing alarm (e.g. BBS-TEK Backalarms) and warning lights.
- Installation of additional silencer/mufflers on the engine exhaust for plant working at Lamberts North.

7 Conclusion

Attended and unattended noise monitoring at Lamberts North has been carried out by Aurecon from 19 – 21 November 2017 in accordance with Australian Standard “AS1055.1-1997 Acoustics – Description and measurement of environmental noise, Part 1: General procedures” using a Type 1 LD 831 sound level meter. Worst case noise predictions were also carried out to provide an estimate of the noise contribution from operational activities at Lamberts North.

7.1 Location 1: Blackman’s Flat

The environmental survey results revealed that the ambient noise at Location 1 (i.e. Blackmans Flat) was relatively high and the maximum equivalent continuous sound pressure level over 15 minutes at Location 1 was measured at $L_{Aeq(15\text{minute})}$ 58 dBA. The measured noise levels were dominated by the intermittent road traffic along Castlereagh Highway and some local domestic noises.

The maximum predicted noise contribution resulting from the operation of equipment/ plant at the Lamberts North site at Location 1 was determined to be 37 dBA as shown in Table 6.

7.2 Location 2: Wallerawang

The background noise level at Location 2 (i.e. Wallerawang) was relatively similar to the background noise level at Location 1 especially during evening time monitoring. The main sources of ambient sound at Location 2 were the natural sounds from wind noise, insects, bird/wildlife, etc. and distant vehicle traffic noise.

Based on sound localisation using binaural hearing during the attended measurement, there was no evidence of noise originating from the north westerly direction. This suggests that noise contribution from Lamberts North to the overall equivalent sound pressure level at this location is negligible. Maximum equivalent continuous noise over 15 minutes at Location 2 was measured at $L_{Aeq(15\text{minute})}$ 45 dBA.

The maximum predicted noise contribution resulting from the operation of equipment/ plant at the Lamberts North site at Location 2 was determined to be 32 dBA as shown in Table 6.

7.3 Summary

The ambient noise levels measured at Locations 1 and 2 exceed the 42 dBA day time noise target. However, it is not possible to conclusively determine the noise contribution from the operational ash placement activities at Lamberts North site at Locations 1 and 2 between 19 - 21 November 2017 due to the presence of other surrounding simultaneous noise sources and activities including surrounding coal mines, road traffic, insects, etc.

Based on the worst case noise modelling predictions undertaken, the noise resulting from the operation of equipment and mobile plant at the Lamberts North site comply with the *Lamberts North Ash Placement Project – Operational Environmental Management Plan (May 2013)* at the representative residential receivers Location 1 and Location 2.



8 References

Measurements and assessment of the construction activities were carried out in accordance with:

- Office of Environment & Heritage (OEH) *Interim Construction Noise Guideline (ICNG)*.
- Australian Standard *AS 1055 1997: Acoustics – Description and measurement of environmental noise*.
- Australian Standard *AS 2436-2000 Guide to noise and vibration control on construction demolition and maintenance sites*.
- Lamberts North Ash Placement Project – Operational Environmental Management Plan (OEMP) May 2013.
- *Delta Electricity Project Conditions of Approval for Mt Piper Power Station Ash Repository Extension Project (approved on 16 February 2012)*.
- *Mt Piper Power Station Ash Placement Project – Lamberts North Construction Noise monitoring 14-15 January 2013 (Revision 2, dated 11 February 2013)*

Appendix A

Glossary of terms

Term	Definition
Sound Pressure Level (Lp)	Sound or noise is the sensation produced at the ear by very small fluctuations in atmospheric pressure. The human ear responds to changes in sound pressure over a very wide range (from 20 microPascals to 60 Pascals). A scale that compresses this range to a more manageable size and that is best matched to subjective response is the logarithmic scale, rather than a linear scale.
Sound Pressure Level (Lp)	<p>Is defined as:</p> $L_p = 10 \log_{10} \left(\frac{p^2}{p_{ref}^2} \right) dB$ <p>In the above equation, p is the sound pressure fluctuation (above or below atmospheric pressure), and p_{ref} is 20 microPascals (2×10^{-5} Pa), the approximate threshold of hearing. To avoid a scale which is too compressed, a factor of 10 is included, giving rise to the decibel, or dB for short.</p>
A-Weighted Decibel (dBA) & Loudness	In some circumstances, the sound pressure level is expressed as C-Weighted decibels, instead of the more common A-Weighted. The C-Weighting filter is designed to replicate the response of the human ear above 85 dB, and places a greater weighting on low frequency noise.
L_{Aeq}	The time averaged C-weighted sound pressure level for a time interval, as defined in AS1055.1. It is generally described as the equivalent continuous C-weighted sound pressure level that has the same mean square pressure level as a sound that varies over time. It can be considered as the average sound pressure level over the measurement period.
L_{Ceq}	The time averaged C-weighted sound pressure level for a time interval, as defined in AS1055.1. It is generally described as the equivalent continuous C-weighted sound pressure level that has the same mean square pressure level as a sound that varies over time. It can be considered as the average sound pressure level over the measurement period.
L_{An}	The sound level, which, for a specified time interval, in relation to an investigation of a noise, means the A-weighted sound pressure level that is equalled or exceeded for n% of the interval. Commonly used percentages are 1, 10, 90 & 99%.

Term	Definition
L_{Cpk}	The peak C-weighted sound pressure level for a time interval.
$L_{Cmax,T}$	The average maximum C-weighted sound pressure level, which, for the specified time interval, means the C-weighted sound pressure level during the interval obtained by using the fast time weighting and arithmetically averaging the maximum sound levels of the noise during the interval. Under certain conditions the 10th percentile noise level, $L_{C10,T}$, can represent the average maximum C-weighted sound pressure level.
L_{A10}	A-weighted noise level which is exceeded for only 10% of the measuring period. It is usually used as the descriptor for intrusive noise level and represents ambient road traffic noise in general.
L_{A90}	A-weighted noise level which is exceeded for 90% of the measuring period. It is usually used as the descriptor for background noise level during the measurement period.
L_{AF}	Instantaneous A-weighted noise level is the noise displayed for each second of the measurement during the entire monitoring.
L_{Amin}	Minimum A-weighted noise level detected during the measuring period. It refers to the minimum background noise detected.
Octave	Frequency bands allow a representation of the spectrum associated with a particular noise. They are an octave wide, meaning that the highest frequency in the band is just twice the lowest frequency, with all intermediate frequencies included and all other frequencies excluded. Each octave band is described by its centre frequency.
Maximum Exposure Time (Hours)	The maximum possible time a person can be safely exposed to a specific noise level (L_{Aeq}).

Appendix B

Photos of noise monitored locations at Blackmans Flat and Wallerawang



Figure 2 | Photograph of Measurement Location 1 (Blackman's Flat)

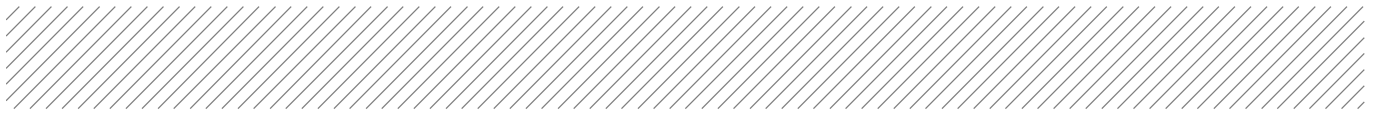


Figure 3 | Photograph of Measurement Location 2 (Wallerawang)

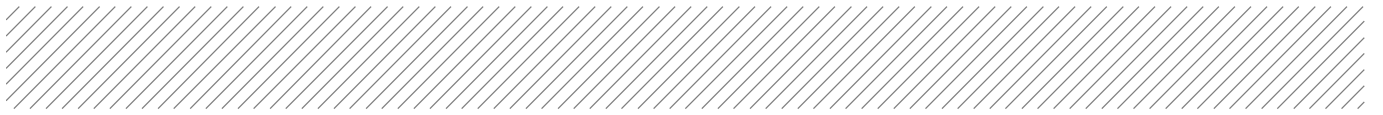


Figure 4 | Photograph of Lamberts North South eastern boundary

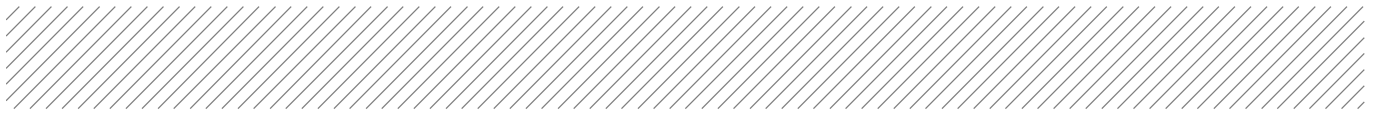
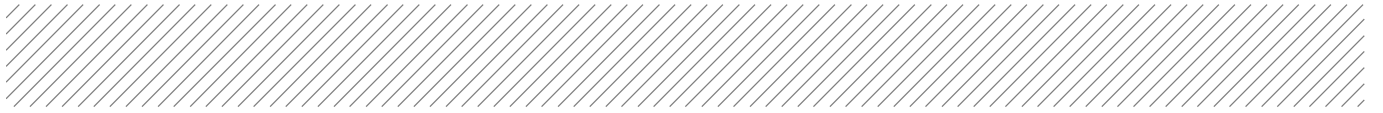
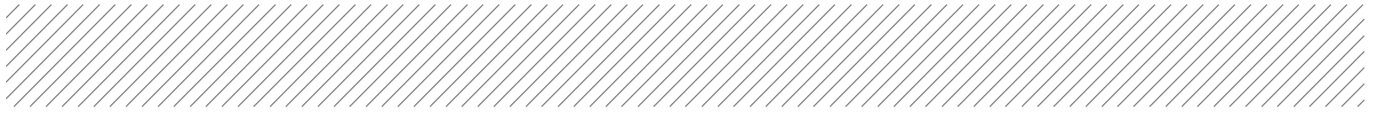


Figure 5 | Photograph of Lamberts North South eastern boundary with a Haul Truck operating (Location 3)



Appendix C

Lamberts North location map



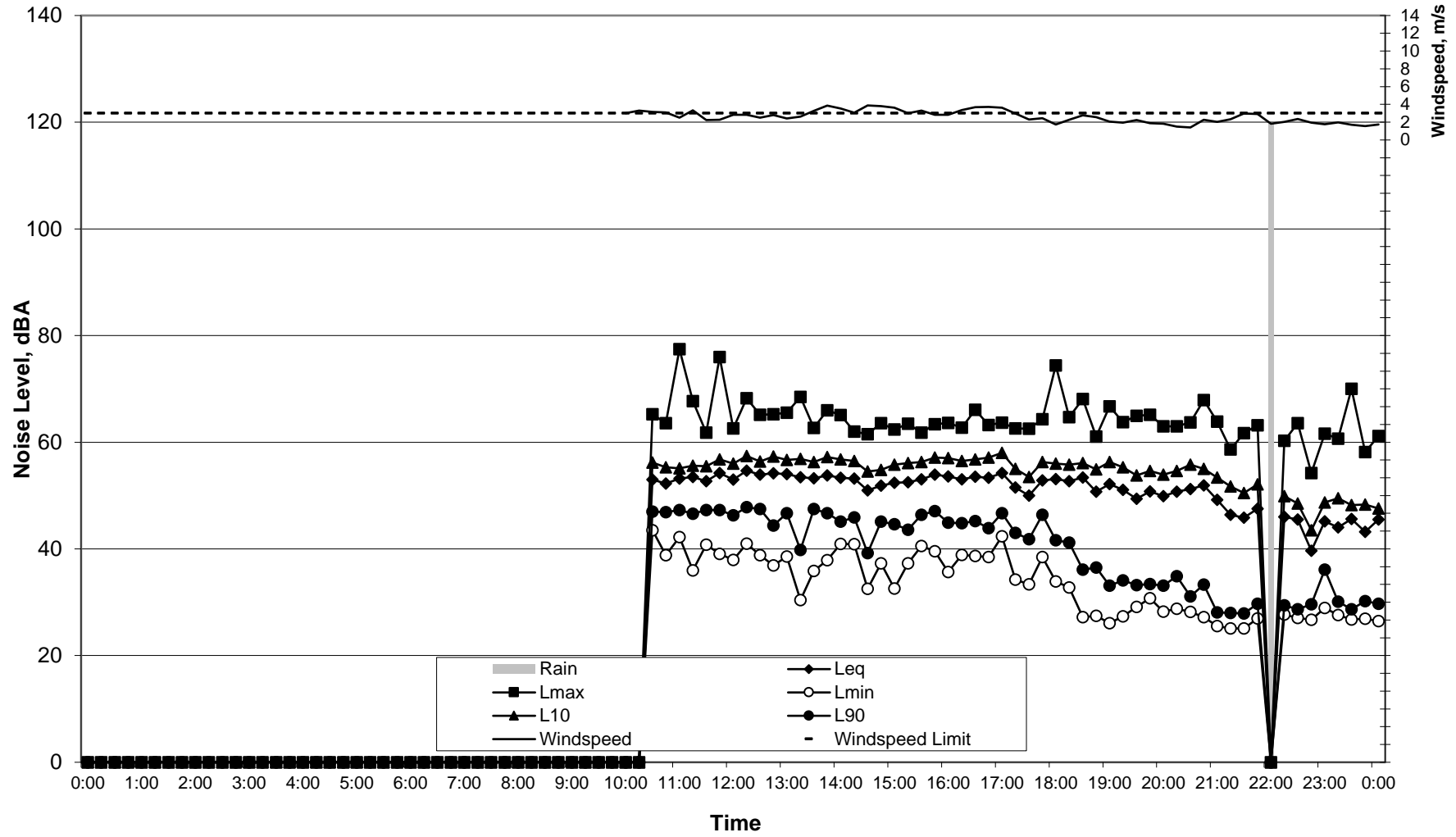
Appendix D

Noise monitoring graphs

Measured Ambient Noise Levels

Blackman's Flat

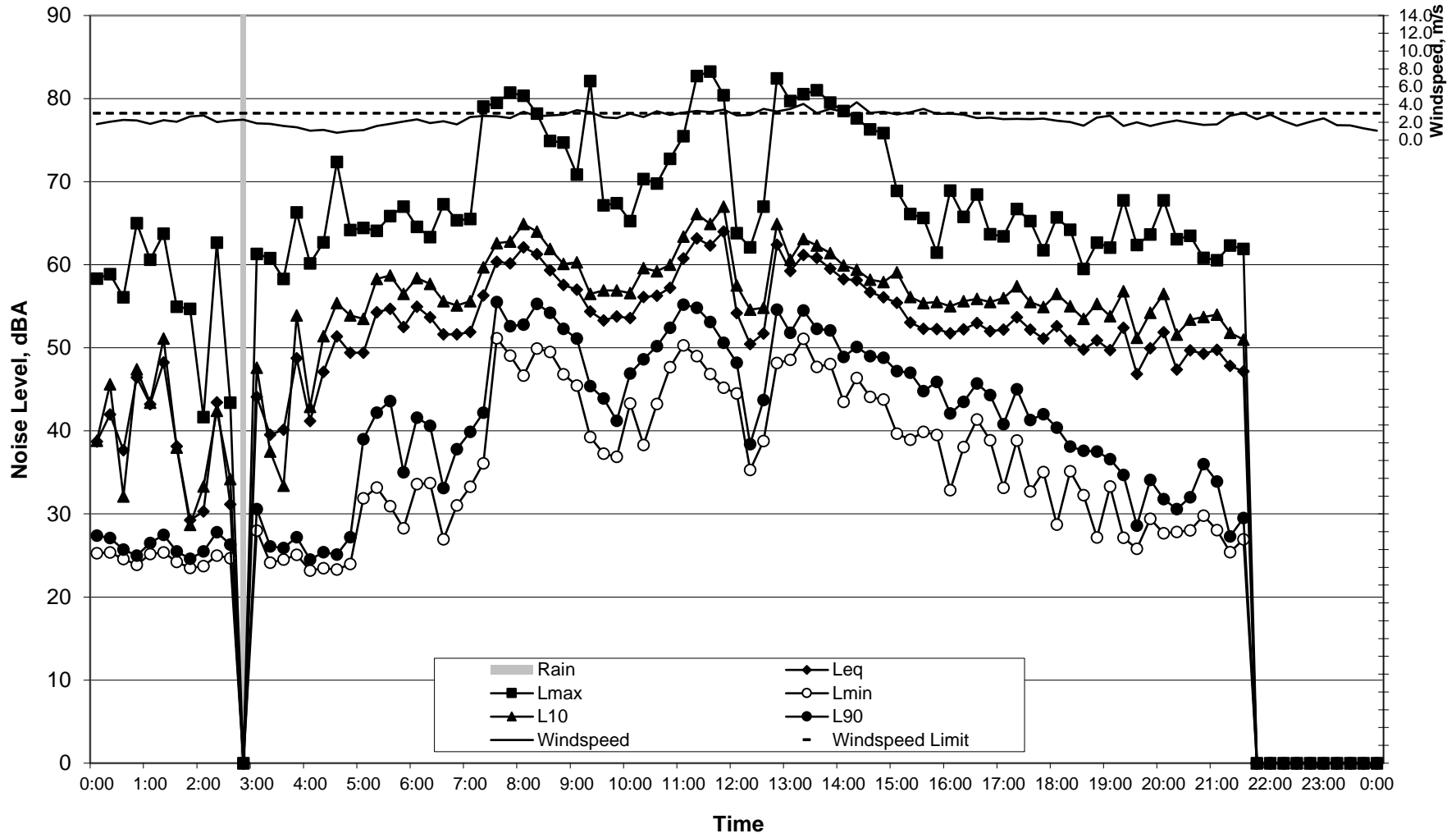
Sunday, 19 November 2017



Measured Ambient Noise Levels

Blackman's Flat

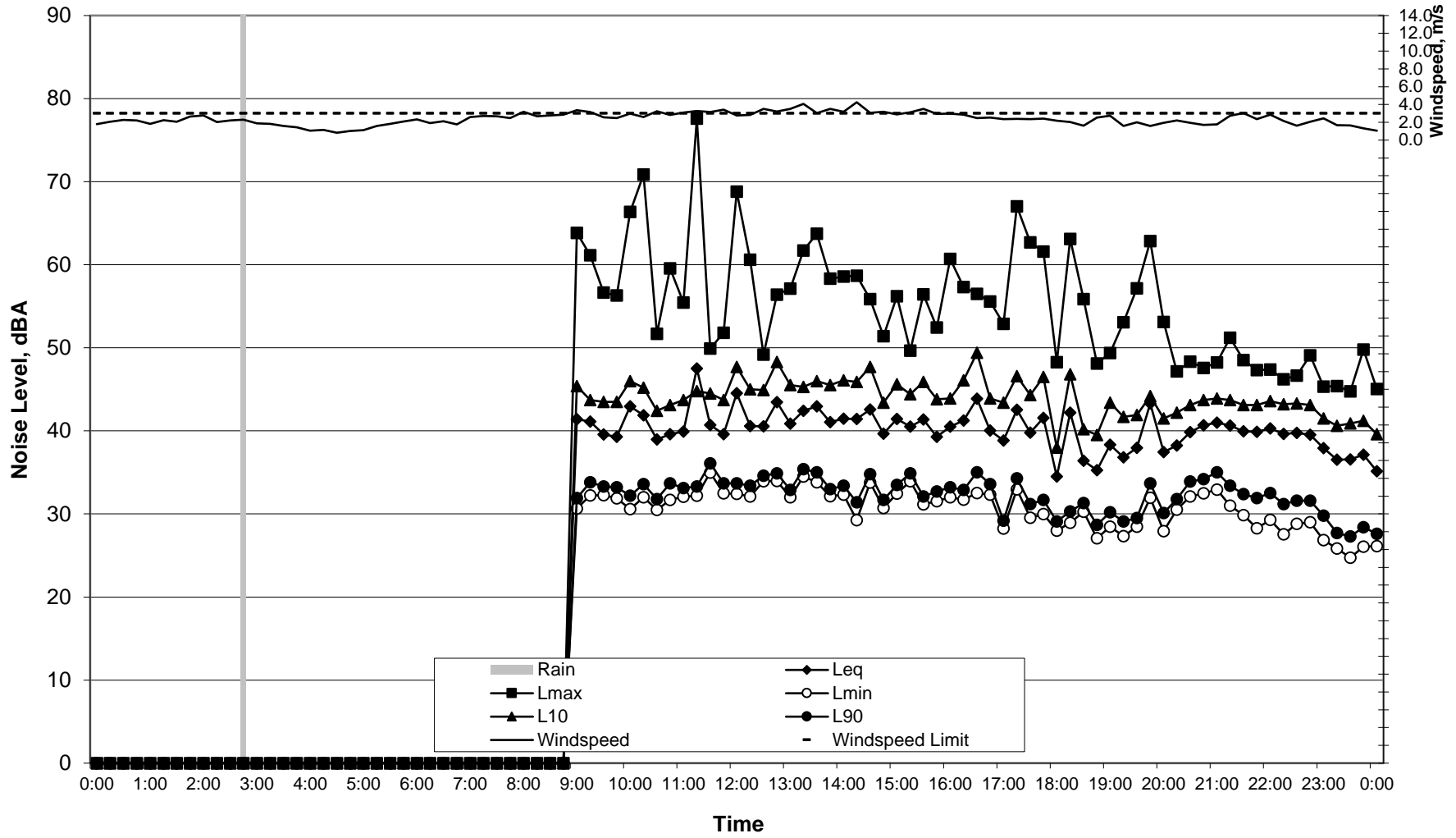
Monday, 20 November 2017



Measured Ambient Noise Levels

Wallerawang NSW

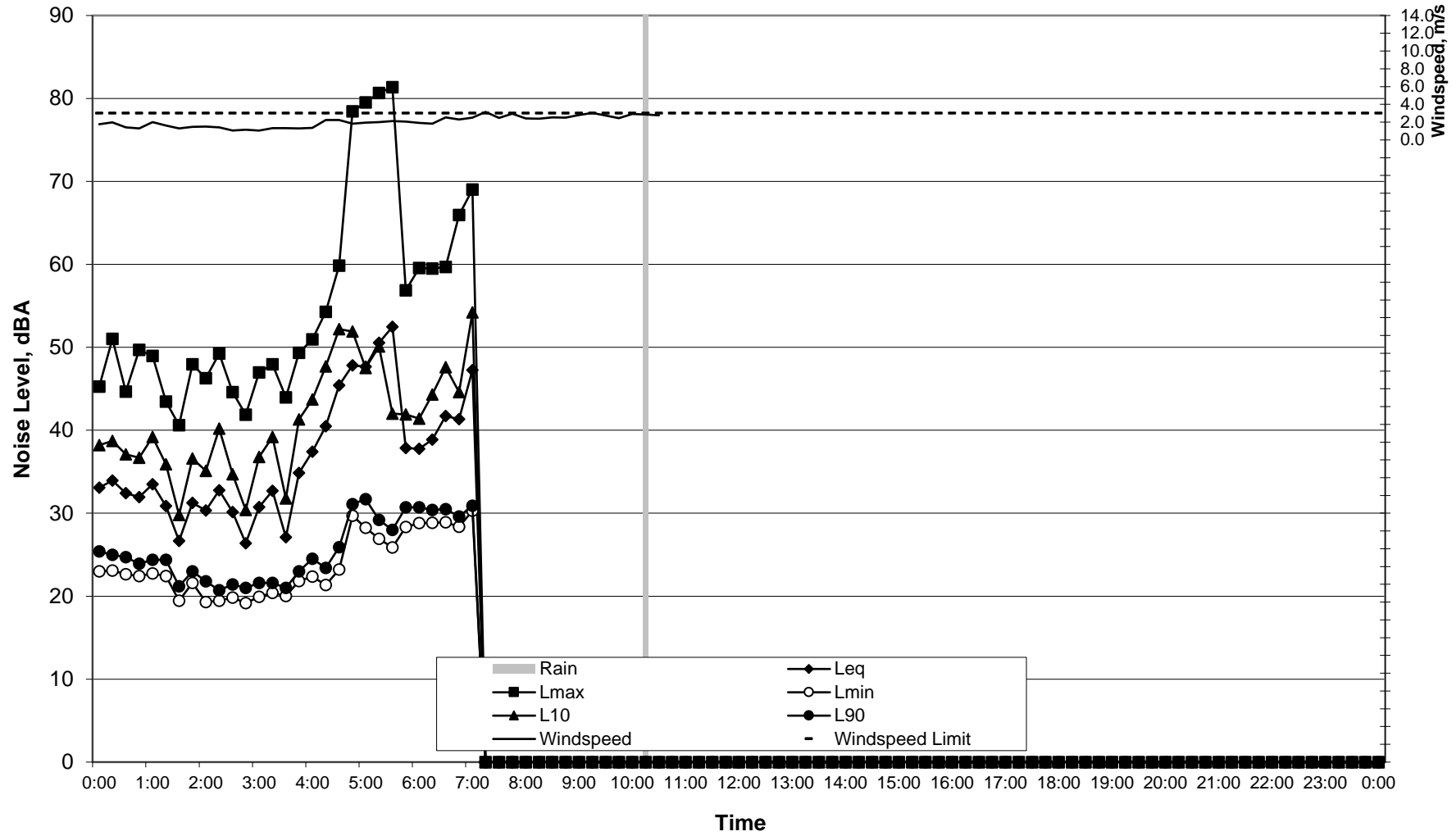
Monday, 20 November 2017



Measured Ambient Noise Levels

Wallerawang NSW

Tuesday, 21 November 2017



Appendix E

Weather summary

Table 8 | Meteorological conditions during noise survey

Date	Time	Rainfall (mm)	Wind Speed 10m above ground (m/s)	Wind Direction (deg.)	Temp (°C)	Relative humidity (%)
19/11/2017	10:00:00 AM	0.0	3.0	77	17.8	67.0
19/11/2017	10:15:00 AM	0.0	3.3	80	17.7	66.0
19/11/2017	10:30:00 AM	0.0	3.2	81	17.5	66.7
19/11/2017	10:45:00 AM	0.0	3.1	99	17.7	66.3
19/11/2017	11:00:00 AM	0.0	2.5	85	17.4	67.3
19/11/2017	11:15:00 AM	0.0	3.3	103	16.7	71.7
19/11/2017	11:30:00 AM	0.0	2.2	88	16.1	74.7
19/11/2017	11:45:00 AM	0.0	2.3	89	15.9	75.7
19/11/2017	12:00:00 PM	0.0	2.8	94	16.0	74.7
19/11/2017	12:15:00 PM	0.0	2.8	92	16.4	71.3
19/11/2017	12:30:00 PM	0.0	2.5	94	17.0	69.0
19/11/2017	12:45:00 PM	0.0	2.8	100	17.1	66.7
19/11/2017	1:00:00 PM	0.0	2.4	99	17.6	65.3
19/11/2017	1:15:00 PM	0.0	2.6	103	18.2	61.0
19/11/2017	1:30:00 PM	0.0	3.3	108	18.3	60.0
19/11/2017	1:45:00 PM	0.0	3.9	115	19.4	55.7
19/11/2017	2:00:00 PM	0.0	3.5	104	18.3	57.7
19/11/2017	2:15:00 PM	0.0	3.1	105	18.4	59.0
19/11/2017	2:30:00 PM	0.0	3.9	106	18.6	59.7
19/11/2017	2:45:00 PM	0.0	3.8	111	18.0	62.3
19/11/2017	3:00:00 PM	0.0	3.6	106	18.1	64.3
19/11/2017	3:15:00 PM	0.0	3.0	82	17.4	66.0
19/11/2017	3:30:00 PM	0.0	3.3	107	17.6	65.3
19/11/2017	3:45:00 PM	0.0	2.8	94	17.9	62.7
19/11/2017	4:00:00 PM	0.0	2.8	103	18.1	60.0
19/11/2017	4:15:00 PM	0.0	3.4	89	18.1	60.0
19/11/2017	4:30:00 PM	0.0	3.7	111	17.7	62.7
19/11/2017	4:45:00 PM	0.0	3.7	102	17.8	61.7
19/11/2017	5:00:00 PM	0.0	3.6	91	16.8	63.7
19/11/2017	5:15:00 PM	0.0	3.0	107	16.4	67.7
19/11/2017	5:30:00 PM	0.0	2.3	100	16.6	66.3
19/11/2017	5:45:00 PM	0.0	2.4	108	16.4	68.0
19/11/2017	6:00:00 PM	0.0	1.7	90	15.7	72.0
19/11/2017	6:15:00 PM	0.0	2.3	87	15.2	74.3
19/11/2017	6:30:00 PM	0.0	2.8	110	14.6	78.0

Note: Highlighted rows shows the evidence of rain or wind speeds higher than 3 m/s. Corresponding measured noise levels are excluded from the assessment.

Date	Time	Rainfall (mm)	Wind Speed 10m above ground (m/s)	Wind Direction (deg.)	Temp (°C)	Relative humidity (%)
19/11/2017	6:45:00 PM	0.0	2.6	108	14.2	81.0
19/11/2017	7:00:00 PM	0.0	2.1	105	13.8	82.7
19/11/2017	7:15:00 PM	0.0	1.9	105	13.5	84.3
19/11/2017	7:30:00 PM	0.0	2.2	98	13.5	85.0
19/11/2017	7:45:00 PM	0.0	1.9	95	13.5	86.0
19/11/2017	8:00:00 PM	0.0	1.8	100	13.3	87.0
19/11/2017	8:15:00 PM	0.0	1.5	99	13.4	87.0
19/11/2017	8:30:00 PM	0.0	1.4	119	13.2	88.3
19/11/2017	8:45:00 PM	0.0	2.3	100	13.4	88.7
19/11/2017	9:00:00 PM	0.0	2.0	106	13.3	90.0
19/11/2017	9:15:00 PM	0.0	2.3	115	13.0	93.3
19/11/2017	9:30:00 PM	0.0	3.0	131	12.4	96.0
19/11/2017	9:45:00 PM	0.0	2.9	127	12.1	97.0
19/11/2017	10:00:00 PM	0.1	1.8	120	11.9	97.7
19/11/2017	10:15:00 PM	0.0	2.0	102	11.9	98.0
19/11/2017	10:30:00 PM	0.0	2.3	100	12.1	97.3
19/11/2017	10:45:00 PM	0.0	1.9	98	12.1	96.0
19/11/2017	11:00:00 PM	0.0	1.8	88	12.1	95.0
19/11/2017	11:15:00 PM	0.0	2.0	95	12.1	94.0
19/11/2017	11:30:00 PM	0.0	1.7	109	12.0	94.7
19/11/2017	11:45:00 PM	0.0	1.6	111	11.9	95.0
20/11/2017	12:00:00 AM	0.0	1.7	127	11.7	95.3
20/11/2017	12:15:00 AM	0.0	1.8	119	11.6	96.0
20/11/2017	12:30:00 AM	0.0	2.1	109	11.7	94.7
20/11/2017	12:45:00 AM	0.0	2.3	113	11.7	94.3
20/11/2017	1:00:00 AM	0.0	2.2	117	11.5	95.7
20/11/2017	1:15:00 AM	0.0	1.8	120	11.4	96.0
20/11/2017	1:30:00 AM	0.0	2.2	117	11.4	95.7
20/11/2017	1:45:00 AM	0.0	2.1	107	11.2	94.0
20/11/2017	2:00:00 AM	0.0	2.7	113	11.1	93.0
20/11/2017	2:15:00 AM	0.0	2.8	117	10.9	93.0
20/11/2017	2:30:00 AM	0.0	2.0	109	10.4	93.0
20/11/2017	2:45:00 AM	0.0	2.2	104	10.1	93.3
20/11/2017	3:00:00 AM	0.1	2.3	117	9.8	93.7
20/11/2017	3:15:00 AM	0.0	1.9	125	9.6	93.7
20/11/2017	3:30:00 AM	0.0	1.8	130	9.2	94.3
20/11/2017	3:45:00 AM	0.0	1.6	133	8.9	95.0
20/11/2017	4:00:00 AM	0.0	1.5	149	8.8	95.0
20/11/2017	4:15:00 AM	0.0	1.1	135	8.7	96.0
20/11/2017	4:30:00 AM	0.0	1.1	126	8.6	96.0
20/11/2017	4:45:00 AM	0.0	0.8	141	8.7	96.0
20/11/2017	5:00:00 AM	0.0	1.0	138	9.4	96.3
20/11/2017	5:15:00 AM	0.0	1.1	141	9.9	94.3
20/11/2017	5:30:00 AM	0.0	1.6	130	10.2	92.0
20/11/2017	5:45:00 AM	0.0	1.8	132	10.5	91.0
20/11/2017	6:00:00 AM	0.0	2.1	127	10.7	91.3
20/11/2017	6:15:00 AM	0.0	2.3	139	10.9	92.0
20/11/2017	6:30:00 AM	0.0	1.9	121	11.5	91.7
20/11/2017	6:45:00 AM	0.0	2.1	108	11.9	90.0
20/11/2017	7:00:00 AM	0.0	1.8	98	12.4	88.7
20/11/2017	7:15:00 AM	0.0	2.6	108	12.8	87.7

Note: Highlighted rows shows the evidence of rain or wind speeds higher than 3 m/s. Corresponding measured noise levels are excluded from the assessment.

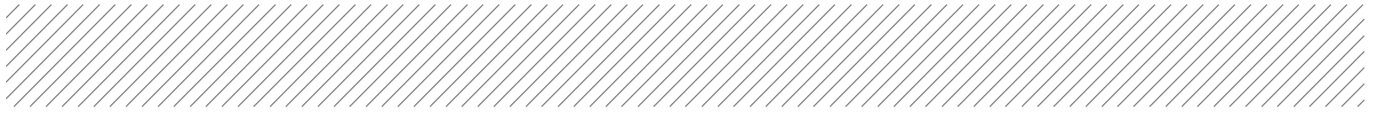
Date	Time	Rainfall (mm)	Wind Speed 10m above ground (m/s)	Wind Direction (deg.)	Temp (°C)	Relative humidity (%)
20/11/2017	7:30:00 AM	0.0	2.7	116	13.1	86.0
20/11/2017	7:45:00 AM	0.0	2.7	102	12.9	87.7
20/11/2017	8:00:00 AM	0.0	2.5	117	13.3	88.7
20/11/2017	8:15:00 AM	0.0	3.2	92	13.6	87.7
20/11/2017	8:30:00 AM	0.0	2.7	99	13.3	89.3
20/11/2017	8:45:00 AM	0.0	2.8	82	14.0	86.3
20/11/2017	9:00:00 AM	0.0	2.8	73	14.6	81.3
20/11/2017	9:15:00 AM	0.0	3.4	76	14.3	81.7
20/11/2017	9:30:00 AM	0.0	3.1	80	14.5	79.7
20/11/2017	9:45:00 AM	0.0	2.6	91	14.8	79.7
20/11/2017	10:00:00 AM	0.0	2.5	85	15.8	75.7
20/11/2017	10:15:00 AM	0.0	3.0	90	16.2	72.7
20/11/2017	10:30:00 AM	0.0	2.6	82	16.4	71.0
20/11/2017	10:45:00 AM	0.0	3.2	87	16.6	70.0
20/11/2017	11:00:00 AM	0.0	2.8	89	16.7	69.7
20/11/2017	11:15:00 AM	0.0	3.1	81	17.1	67.0
20/11/2017	11:30:00 AM	0.0	3.3	104	17.4	67.7
20/11/2017	11:45:00 AM	0.0	3.1	92	17.4	68.3
20/11/2017	12:00:00 PM	0.0	3.4	86	17.6	65.3
20/11/2017	12:15:00 PM	0.0	2.8	82	18.7	60.7
20/11/2017	12:30:00 PM	0.0	2.8	90	18.3	63.3
20/11/2017	12:45:00 PM	0.0	3.5	106	18.9	61.3
20/11/2017	1:00:00 PM	0.0	3.2	106	19.2	61.3
20/11/2017	1:15:00 PM	0.0	3.5	107	19.2	60.0
20/11/2017	1:30:00 PM	0.0	4.1	113	19.2	61.3
20/11/2017	1:45:00 PM	0.0	3.0	91	19.3	60.3
20/11/2017	2:00:00 PM	0.0	3.5	90	19.4	59.0
20/11/2017	2:15:00 PM	0.0	3.2	120	19.4	60.7
20/11/2017	2:30:00 PM	0.0	4.3	112	19.0	63.3
20/11/2017	2:45:00 PM	0.0	3.1	97	18.8	60.7
20/11/2017	3:00:00 PM	0.0	3.2	85	18.9	60.3
20/11/2017	3:15:00 PM	0.0	2.9	86	19.1	57.0
20/11/2017	3:30:00 PM	0.0	3.1	86	19.3	56.3
20/11/2017	3:45:00 PM	0.0	3.5	107	19.6	57.0
20/11/2017	4:00:00 PM	0.0	2.9	86	19.4	56.0
20/11/2017	4:15:00 PM	0.0	3.0	93	19.2	56.0
20/11/2017	4:30:00 PM	0.0	2.9	93	18.9	57.7
20/11/2017	4:45:00 PM	0.0	2.5	84	18.9	56.7
20/11/2017	5:00:00 PM	0.0	2.5	84	19.0	59.0
20/11/2017	5:15:00 PM	0.0	2.4	96	18.5	58.7
20/11/2017	5:30:00 PM	0.0	2.4	83	18.2	60.7
20/11/2017	5:45:00 PM	0.0	2.4	76	17.8	64.7
20/11/2017	6:00:00 PM	0.0	2.4	109	17.0	68.7
20/11/2017	6:15:00 PM	0.0	2.2	89	16.7	73.0
20/11/2017	6:30:00 PM	0.0	2.0	93	15.8	77.7
20/11/2017	6:45:00 PM	0.0	1.6	93	15.0	82.3
20/11/2017	7:00:00 PM	0.0	2.5	107	14.8	85.0
20/11/2017	7:15:00 PM	0.0	2.7	114	14.3	85.3
20/11/2017	7:30:00 PM	0.0	1.6	115	14.0	87.7
20/11/2017	7:45:00 PM	0.0	2.0	107	14.0	88.3
20/11/2017	8:00:00 PM	0.0	1.6	94	13.6	88.7

Note: Highlighted rows shows the evidence of rain or wind speeds higher than 3 m/s. Corresponding measured noise levels are excluded from the assessment.

Date	Time	Rainfall (mm)	Wind Speed 10m above ground (m/s)	Wind Direction (deg.)	Temp (°C)	Relative humidity (%)
20/11/2017	8:15:00 PM	0.0	1.9	99	13.3	88.7
20/11/2017	8:30:00 PM	0.0	2.2	108	13.0	89.0
20/11/2017	8:45:00 PM	0.0	2.0	102	13.1	88.0
20/11/2017	9:00:00 PM	0.0	1.7	113	12.9	89.0
20/11/2017	9:15:00 PM	0.0	1.8	109	12.9	89.0
20/11/2017	9:30:00 PM	0.0	2.7	128	12.9	88.0
20/11/2017	9:45:00 PM	0.0	3.0	132	12.7	88.0
20/11/2017	10:00:00 PM	0.0	2.4	111	12.6	88.0
20/11/2017	10:15:00 PM	0.0	2.9	117	12.3	88.0
20/11/2017	10:30:00 PM	0.0	2.2	124	11.8	89.0
20/11/2017	10:45:00 PM	0.0	1.6	118	11.8	89.7
20/11/2017	11:00:00 PM	0.0	2.0	125	11.8	89.0
20/11/2017	11:15:00 PM	0.0	2.4	114	11.5	90.0
20/11/2017	11:30:00 PM	0.0	1.7	108	11.1	90.7
20/11/2017	11:45:00 PM	0.0	1.7	98	10.9	92.0
21/11/2017	12:00:00 AM	0.0	1.3	138	10.6	92.0
21/11/2017	12:15:00 AM	0.0	1.1	188	9.4	94.3
21/11/2017	12:30:00 AM	0.0	1.8	108	9.9	96.7
21/11/2017	12:45:00 AM	0.0	2.0	100	10.5	94.0
21/11/2017	1:00:00 AM	0.0	1.4	134	10.3	92.0
21/11/2017	1:15:00 AM	0.0	1.3	152	9.3	94.0
21/11/2017	1:30:00 AM	0.0	2.0	129	9.8	96.0
21/11/2017	1:45:00 AM	0.0	1.6	116	10.3	93.3
21/11/2017	2:00:00 AM	0.0	1.3	120	10.0	93.0
21/11/2017	2:15:00 AM	0.0	1.5	132	9.5	94.0
21/11/2017	2:30:00 AM	0.0	1.5	117	8.9	95.3
21/11/2017	2:45:00 AM	0.0	1.4	116	9.2	96.0
21/11/2017	3:00:00 AM	0.0	1.1	158	7.8	95.3
21/11/2017	3:15:00 AM	0.0	1.1	185	7.1	97.3
21/11/2017	3:30:00 AM	0.0	1.1	215	6.8	98.0
21/11/2017	3:45:00 AM	0.0	1.3	232	7.0	99.0
21/11/2017	4:00:00 AM	0.0	1.3	181	7.0	99.0
21/11/2017	4:15:00 AM	0.0	1.3	161	7.3	99.0
21/11/2017	4:30:00 AM	0.0	1.4	128	7.1	99.0
21/11/2017	4:45:00 AM	0.0	2.2	137	7.9	99.0
21/11/2017	5:00:00 AM	0.0	2.3	129	8.9	99.0
21/11/2017	5:15:00 AM	0.0	1.8	120	9.5	98.3
21/11/2017	5:30:00 AM	0.0	2.0	134	10.1	97.7
21/11/2017	5:45:00 AM	0.0	2.0	139	10.5	96.3
21/11/2017	6:00:00 AM	0.0	2.1	130	11.0	94.7
21/11/2017	6:15:00 AM	0.0	2.1	118	11.5	92.7
21/11/2017	6:30:00 AM	0.0	1.9	102	12.1	89.3
21/11/2017	6:45:00 AM	0.0	1.8	115	12.8	87.3
21/11/2017	7:00:00 AM	0.0	2.5	84	12.8	83.7
21/11/2017	7:15:00 AM	0.0	2.3	85	13.6	81.0
21/11/2017	7:30:00 AM	0.0	2.5	85	13.4	79.7
21/11/2017	7:45:00 AM	0.0	3.2	96	13.7	78.0
21/11/2017	8:00:00 AM	0.0	2.5	95	13.8	76.7
21/11/2017	8:15:00 AM	0.0	2.9	83	14.4	74.0
21/11/2017	8:30:00 AM	0.0	2.4	91	15.2	70.7
21/11/2017	8:45:00 AM	0.0	2.4	81	15.8	68.0

Note: Highlighted rows shows the evidence of rain or wind speeds higher than 3 m/s. Corresponding measured noise levels are excluded from the assessment.

Date	Time	Rainfall (mm)	Wind Speed 10m above ground (m/s)	Wind Direction (deg.)	Temp (°C)	Relative humidity (%)
21/11/2017	9:00:00 AM	0.0	2.5	85	15.8	68.0
21/11/2017	9:15:00 AM	0.0	2.5	103	16.8	65.3
21/11/2017	9:30:00 AM	0.0	2.8	69	17.4	61.7
21/11/2017	9:45:00 AM	0.0	3.0	80	17.5	60.0
21/11/2017	10:00:00 AM	0.0	2.7	79	17.6	59.0
21/11/2017	10:15:00 AM	0.0	2.5	85	18.0	57.7
21/11/2017	10:30:00 AM	0.0	2.9	72	17.8	57.7
21/11/2017	10:45:00 AM	0.1	2.9	102	18.1	57.7
21/11/2017	11:00:00 AM	0.0	2.8	92	18.3	58.0

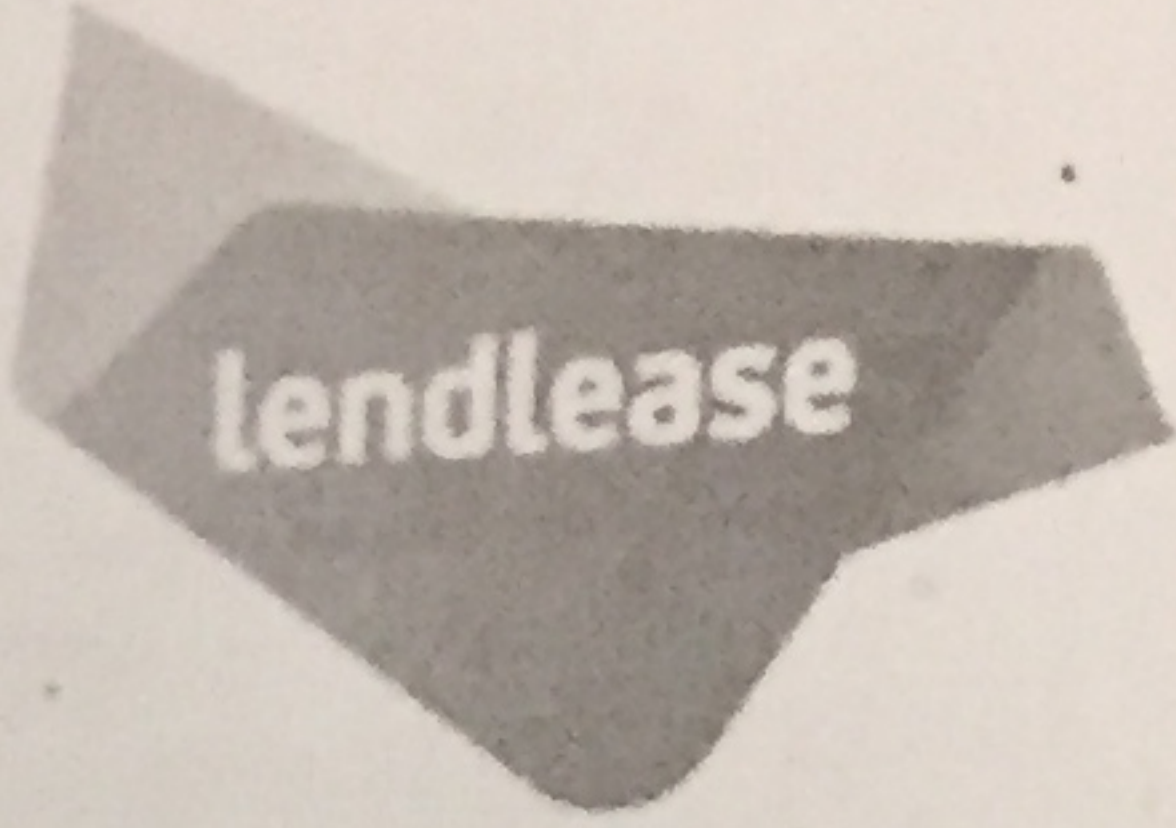


Appendix F

Site attendance sheets

Lendlease Services business

**MP-SF-733A – Site Communications Log Mt Piper
Ash Placement Area**



700 – Environmental Management

MT PIPER

DATE: 19/11/17

APA Operator Name	Verbal 103 and Time In	Communications Check				Time Out	Sign Out
		7:00am/pm	11:00am/pm	2:00am/pm	5:00am/pm		
Regulars	M. Lohman 6:00					1752	[Signature]
	S. Lohman 6:10					5:52	[Signature]
	S. Lohman 6:20					5:52	[Signature]
	P. Lohman 6:30						
	R. Lohman 8:00					5:00	R. Lohman
Others							
LL M/O Initials							
Time of Check							

SUB-CONTRACTOR MECHANICAL PERSONNEL

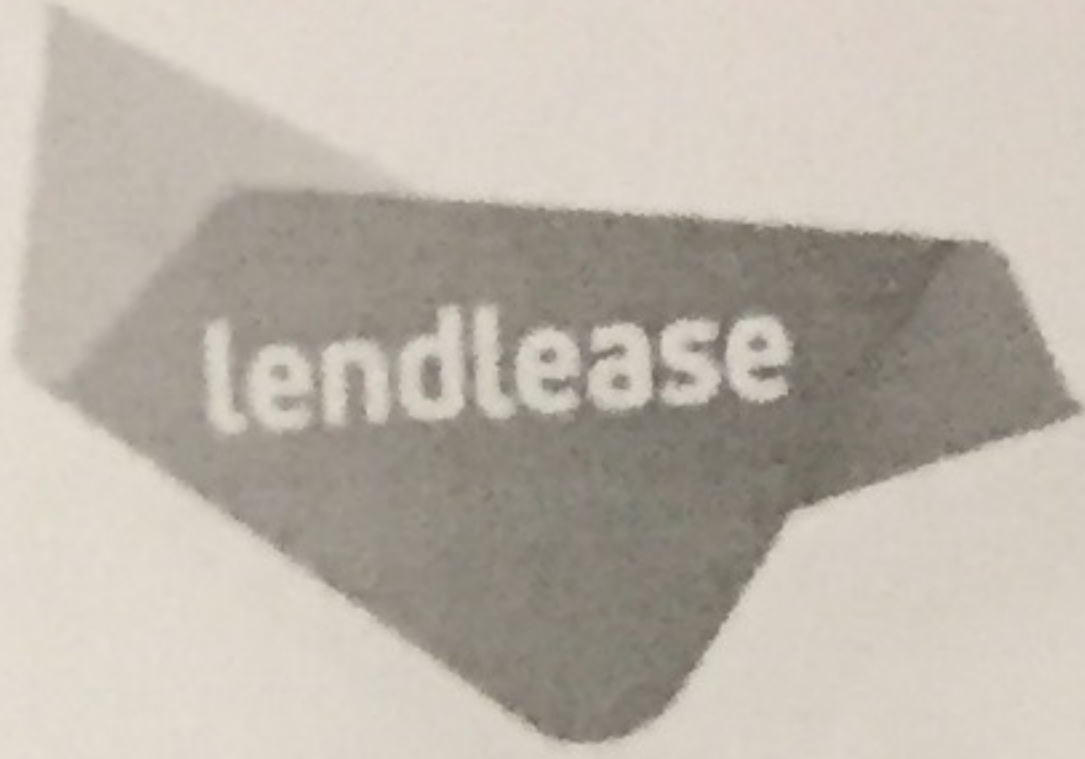
Mechanical Personnel	Time in	Plant/Equipment	Nature of Breakdown/Service	Time Out	Equipment/Plant Available Y/N
AKIL LAU	8:10			10:10	

Lendlease PERSONNEL COMMUNICATIONS LOG

Name	Time In	Time Out	Time In	Time Out	Time In	Time Out	Time In	Time Out
K. McManis	0630	0845						

Lendlease Services business

**MP-SF-733A – Site Communications Log Mt Piper
Ash Placement Area**



700 – Environmental Management

DATE: 20-11-17

MT PIPER

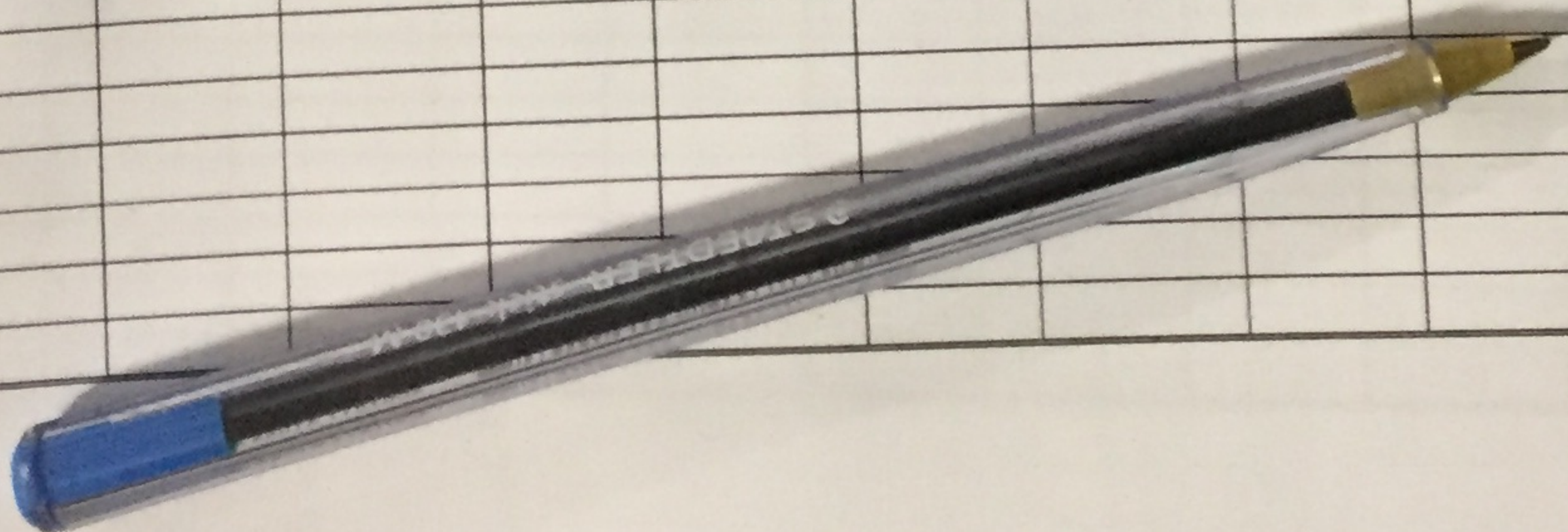
APA Operator Name	Verbal 103 and Time In	Communications Check				Time Out	Sign Out
		7:00am/pm	11:00am/pm	2:00am/pm	5:00am/pm		
Regulars	M. Gibson 6:00						
	St. John 6:00						
	D. Grant 6:20						
	P. Dick 6:20						
	S. Walsh 7:50						
Others	B. Smith 9:30						
LL M/O Initials							
Time of Check							

SUB-CONTRACTOR MECHANICAL PERSONNEL

Mechanical Personnel	Time in	Plant/Equipment	Nature of Breakdown/Service	Time Out	Equipment/Plant Available Y/N
AKU CAU	9:15				

Lendlease PERSONNEL COMMUNICATIONS LOG

Name	Time In	Time Out	Time In	Time Out	Time In	Time Out	Time In	Time Out





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