Air Noise Environment
Environmental Monitoring and Assessment

Compliance Noise Monitoring Tunnel Composting Facility Grafton - FINAL

JR Richards & Sons

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Where site inspections, testing or fieldwork have taken place, the report is based on the information made available by the client or their nominees during the visit, visual observations and any subsequent discussions with regulatory authorities. It is further assumed that normal activities were being undertaken at the site on the day of the site visit(s).

The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Air Noise Environment Pty Ltd for the purposes of this project is both complete and accurate.

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1 Introduction

1.1 Scope of Report

Air Noise Environment were commissioned by JR Richards & Sons, to undertake compliance noise monitoring of the Tunnel Composting Facility in Grafton during 'normal' operations in August 2013, for comparison with the Environmental Protection License for the facility issued by the Office of Environment & Heritage (OEH -formerly the Environmental Protection Authority (EPA) of NSW).

Noise monitoring was undertaken utilising fixed (unattended) noise monitors at each of three positions nominated in the Licence, as well as at various attended locations representative of the most affected point on the properties in accordance with the Licence.

The Tunnel Composting Facility site location and sensitive receptor positions are presented in Figure 1.1.

The noise monitoring and assessment of measured noise levels was undertaken by Beau Weyers BEng (Mech), RPEQ, MAAS, a qualified acoustic engineer. This report details the results and conclusions of the noise monitoring.

1.2 Operations at the Site

JR Richards have confirmed that the site was operating normally during the three days of noise testing.

During the daytime monitoring period, the site was operated in a typically manner with sorting and shredding of green-waste, movement of compost around the site, screening of compost, loading and despatch of the finished product, as well as fans, motors and pumps around the site. Typically the loudest activity (shredding) occurred from 7 am – 9 am. This activity also occurs on Friday afternoons if green-waste is delivered that day.

During the evening and night periods, the compost process, and associated fans, blowers and pumps (other than pond pumps), operated continuously.

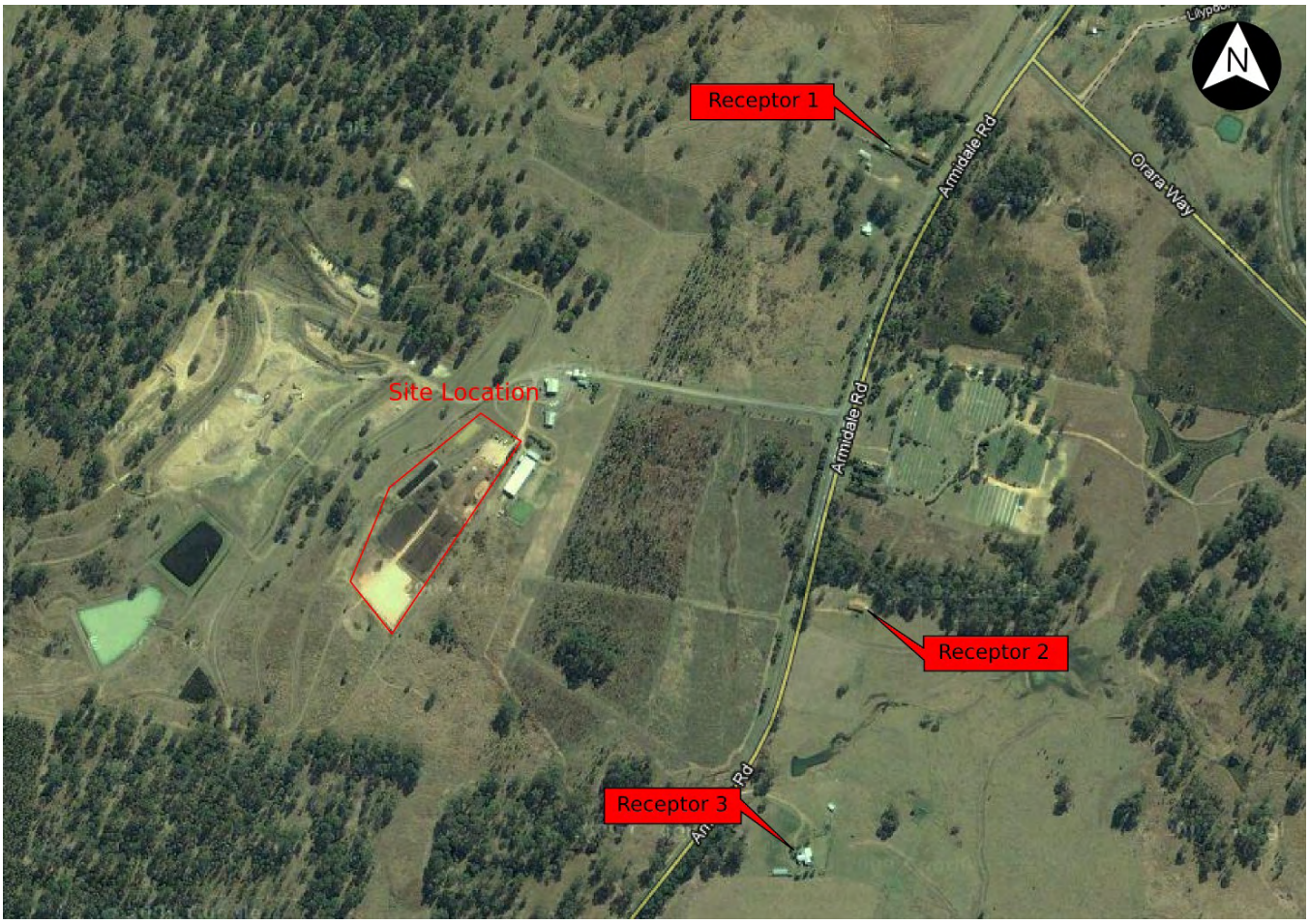

Figure 1.1 - Tunnel Composting Facility, Grafton and Sensitive Receivers (Labelled as Receptors)

[a] Based on 'Noise and Air Quality Assessment - Figure 6: Nearest Sensitive Receptors and Background Monitoring Position'

2 Licence Conditions

2.1 OEH License Conditions

Various license conditions have been issued for the operations of the facility (Attached in Appendix B), summarised as follows:

Noise emitted from the premises must not exceed the noise emission criterion in the Table 2.1 for the nearest residential dwellings from the north-east to south-east of the premises over a period of 15 minutes using “Fast”response on the sound level meter.

Table 2.1: Noise Limits (dB(A))

Locality	Day[a]	Evening[b]	Night[c]	
	$L_{Aeq\ (15\ minutes)}$	$L_{Aeq\ (15\ minutes)}$	$L_{Aeq\ (15\ minutes)}$	$L_{A1\ (1\ minute)}$
Any Residence	40	35	35	45

a – Day is defined as the period from 7 am to 6 pm Monday to Saturday and 6 am to 6 pm Sunday and Public Holidays
b – Evening is defined as the period 6 pm to 10 pm
c – Night is defined as the period from 10 pm to 7 am Monday to Saturday and 10 pm to 8 am Sunday and Public Holidays

The Locations referred to are indicated by Figure 6 in Noise and Air Quality Assessment (Figure 1.1 of this report).

To determine compliance the monitoring is to be completed:

- with the $L_{Aeq\ (15\ minute)}$ noise limits, the noise measurement equipment must be located;
    1. approximately on the property boundary, where any dwelling is situated 30 m or less from the property boundary closest to the premises; or
    2. within 30 meters of a dwelling facade, but not closer than 3 m where any dwelling on the property is situated more than 30 meters from the property boundary closest to the premises.
- With the $L_{A1\ (1\ minute)}$ noise limits, the noise measurement equipment must be located within 1 metre of a dwelling facade.

Monitoring is to be completed at each position during each day, evening and night period for a minimum of:

- 1.5 hours during the day;
- 30 minutes during the evening;
- 1 hour during the night.

The noise limits apply under all meteorological conditions except for the following;

- wind speeds greater than 3 metres/second at 10 meres above ground level; or
- stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- stability category G temperature inversions;

Data recorded by the meteorological station must be used to determine meteorological conditions; and Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

Noise and meteorological was completed for comparison with the License Conditions, as presented in the following sections.

3 Noise Monitoring Positions

3.1 Location of Monitoring Positions

In accordance with the Environmental Protection License for the facility, compliance noise monitoring was undertaken for the sensitive receptors located at each one of the locations identified in Figure 6 in '*Noise and Air Quality Assessment*', as follows:

- Position 1 – Northern Receptor at 694 Armidale Road;
- Position 2 – Eastern Receptor at 765 Armidale Road;
- Position 3 – South-eastern Receptor at 793 Armidale Road.

For each position, noise monitoring of the $L_{Aeq\ (15\ minute)}$ levels was completed in accordance with the requirements of the Environmental Protection License (described in Section 2), at the positions identified in Figures 3.1 and 3.2 below.

Noise monitoring of the $L_{A1\ (1minute)}$ facade levels were was using unattended environmental noise loggers installed at 1 m from the nearest affected facade (to the composting operations). Throughout the monitoring, observations were completed at nearby attended monitoring positions to allow identification of noise levels relating to activities at the composting site.

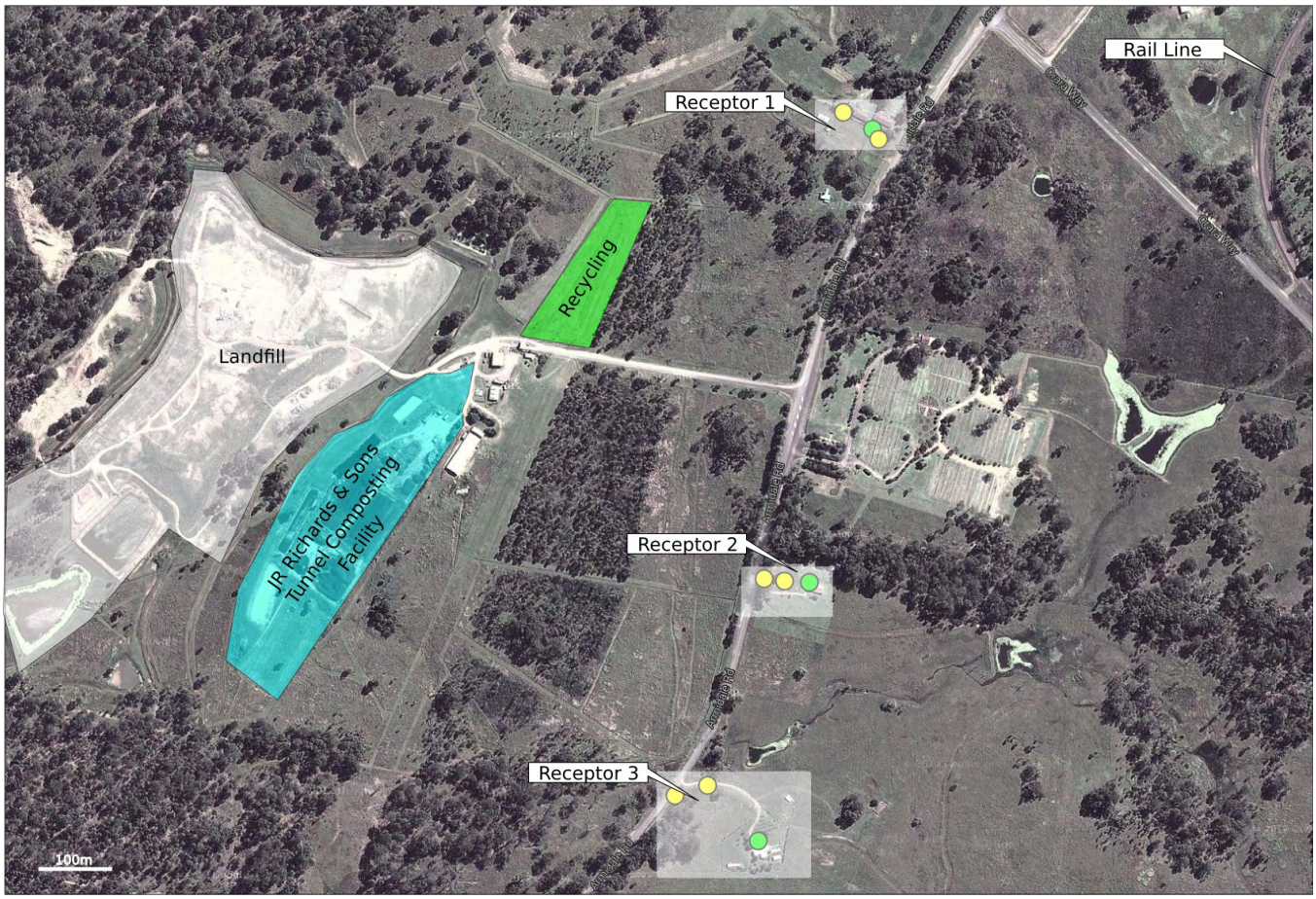

Figure 3.1 - Tunnel Composting Facility, Grafton, Surrounding Activities and Sensitive Receptor Locations

Figure 3.2 - Sensitive Receiver Noise Monitoring Positions

The Receptor 1 property (694 Armidale Road) is a single storey brick construction house at approximately 650 m to the north-east of the tunnel composting facility. The facade monitoring position was installed at 1 m from the boundary fence (Position 1), as access to the property was not able to be obtained from the resident/owner. Attended monitoring was completed at 3 m from the boundary fence (Position A), and at two locations along the fenceline to investigate the reduced influence of Armidale Road to the rear of the property. Position C is approximately 30 m from the house.

The Receptor 2 property (765 Armidale Road) is a single storey brick construction house at approximately 525 m to the east of the tunnel composting facility. The facade monitoring position was installed at 1 m from the worst-affected facade wall of the house (Position 2). Attended monitoring was completed at 6 m from Armidale Road (Position D) during evening and night-time periods and two daytime periods, and during one daytime period at approximately 35 m from the house (Position E) to investigate reduced influence of Armidale Road within the property

The Receptor 3 property (793 Armidale Road) is a single storey timber construction house on elevated pylons at approximately 650 m to the south-east of the tunnel composting facility. The facade monitoring position was installed at 1 m from the worst-affected facade wall of the house (Position 3). Attended monitoring was completed at 6 m from Armidale Road (Position F) during evening and night-time periods, and during daytime periods at approximately 35 m from Armidale Road (Position G) to investigate the reduced influence of Armidale Road inside the property boundary. Monitoring closer to the property was not possible due to the two dogs on the property that barked when people enter the property.

3.2 Noise Sources in the Area

The area surrounding the facility includes various operators and roadways contributing to the noise character of the area. These sources, identified noise generating activities, and position relative to the composting facility are presented in Table 3.1.

Table 3.1 - Noise Sources Defining Noise Character (other than Tunnel Composting Facility)

Noise Generating Source	Identified Noise Sources	Location Relative to Tunnel Composting Facility
Aircraft	Commercial aircraft movements (high above), light aircraft movements (lower).	Overhead
Armidale Road	Passenger and heavy vehicle traffic (typically a movement every minute during daytime, and evening)	East
Orara Way	Passenger and heavy vehicle traffic	North-east

Noise Generating Source	Identified Noise Sources	Location Relative to Tunnel Composting Facility
	(occasional traffic, intersection with Armidale Road)	
Grafton Commercial and Domestic Waste Landfill	Refuse Tip activities (passenger vehicles, heavy vehicles, dozers, watering trucks, compactors, reversing alarms).	West and North-west
J.R.Richards & Sons Recycling Facility	Trommel sorter, mobile plan, tipping of waste (including glass breakages), heavy vehicle movements, reversing alarms	North
Train line (Grafton – Braunstone Stations)	Occasional freight train movements	East

The selected monitoring positions are located along Armidale Road, and the majority of noise sources identified in Table 3.1 are audible at all locations. The majority of noise sources, were much more prominent at Receptor 1, 694 Armidale Road (north-east of the facility).

Attended noise measures have been completed (Section 4) which identify the contributions from the tunnel composting facility, and attempt to exclude the intermittent events dominating the area such as traffic, landfill and recycling activities, impacting on the monitoring positions.

4 Noise Monitoring Procedure

4.1 Methodology

Noise monitoring was undertaken during typical operations at the facility, over the course of 4 days (6th – 9th August, 2013) as the monitoring positions described in Section 3.

The noise monitoring was completed utilising the NATA calibrated, Type 1 (Type 2 in the case of ARL 315) equipment identified in Table 4.2. Microphones were fitted with windshields throughout the measurements periods, and situated 1.5 m above ground. All measurements were made using the 'Fast' time weighting.

Table 4.1 - Noise Monitoring Test Dates

Instrument	Model	Serial Number	NATA Calibration Current Until	Pre-Calibration dB(A)	Post-Calibration dB(A)
Position 1 Unattended	ARL Ngara	8780D6	25/06/14	94.3	94.1
Position 2 Unattended	ARL Ngara	87809C	17/05/14	94.2	94.4
Position 3 Unattended	ARL 315	15-004-032	30/08/14	93.2	93.0
Attended/Source Noise	Bruel and Kjaer 2250 Lt	2741104	15/09/13	Range: 93.8 – 94.4	
Calibrator	Svan03A	358	13/12/13	-	-

4.2 Meteorology

Meteorological data for the monitoring period were recorded on-site to establish the average wind speeds, stability category, and any incidents of rain during the noise monitoring. The data was utilised to identify periods of strong wind or rain, and stability categories falling outside those in the license limits, which may invalidate the monitored noise levels.

The complete meteorological data set is presented in Appendix B.

Utilising the sigma-theta calculation method identified in Part E4 of Appendix E of the NSW Industrial Noise Policy, it was found that no instances of Stability Category F or G were present during the

monitoring period. Therefore no data has been removed due to temperature inversion conditions.

No rain was recorded, or observed during the monitoring period.

For periods recorded to have winds greater than 3 m/s, noise levels may be wind affected , and not reliable in assessing the compliance of the site. Periods with wind higher than 3 m/s were as follows:

- On the 7 August 2013, between 12:00 and 15:00, 1hr and 15 minutes of data, was recorded to have increased winds.
- On the 8 August 2013, between 9:00 and midnight, the majority of data was recorded to have increased winds.
- On the 9 August 2013, between midnight and 13:30, 4.5 hours of data was recorded to have increased winds, however there were frequent breaks in the windy periods.

Due to the occurrence of wind during these periods, reference was made to the attended noise measurements for the purposes of determining compliance.

5 Noise Monitoring Results

5.1 Monitoring Results

Noise monitoring was undertaken from Wednesday 6th August 2013 – Friday 9th August 2013. The monitoring was organised to occur at each receptor (representative monitoring position) during various times of the day, evening, and night over the four days, to encompass the influence of each activity occurring on-site at that position. It is noted that the facade monitoring positions were unchanged, and recording data during all periods.

Table 5.1 describes the monitoring results, and the noisy industrial activities identified for each period. Vehicles along Armidale Road and Orara Road have not been discussed in the table, as they were the dominant source, and defined the L_{Aeq} levels throughout all measurements. For these two monitoring positions, vehicle noise occurred at noise levels above the criteria up to 40 seconds before and after they passed by the monitoring positions. For the purposes of assessing compliance, periods with reduced traffic influence have been considered and commented on.

The monitoring results in Table 5.1 present the $L_{Aeq,(15\ minute)}$ and $L_{A1\ (1\ minute)}$ results for the entire monitoring period, inclusive of extraneous noise sources. Where noisy activities were noted from the composting facility operations, and discernible from the extraneous noise sources, they have been specifically commented on in Table 5.1. Where exceedances were measured, they are discussed in Section 5.2.

Table 5.5.1 - Attended Noise Monitoring Positions / Times

Date	Period	Time	Monitoring Position	$L_{Aeq\ (15\ minute)}$	Maximum $L_{A1\ (1\ minute)}$	Minimum $L_{A1\ (1\ minute)}$	Compliance Status and On-Site Observations
06/08/13	Evening	20:00	A	46.7	n/a	n/a	**Site complied with the noise criteria.** No audible industrial noise from the composting site or other operations was observed during the measurement period. Insects and dogs defining noise levels in the area. . Horse in nearby holding pen, occasionally bumping poles, SPL up to 45 dB(A). Background levels approximately 20 dB(A)
		20:15		46.9	n/a	n/a	
		20:35	D	59.0	n/a	n/a	**Site complied with the noise criteria.** No audible industrial noise from the composting site or other operations was observed during the measurement period. Insects and dogs defining area, background levels approximately 25 dB(A).
		20:50		57.2	n/a	n/a	
		21:15	F	62.8	n/a	n/a	**Site complied with the noise criteria.** No audible industrial noise from the composting site or other operations was observed during the measurement period. Aeroplane audible far overhead up to 40 dB(A). Insects and dogs defining area, background levels below 25 dB(A).
		21:30		65.0	n/a	n/a	

Date	Period	Time	Monitoring Position	$L_{Aeq\ (15\ minute)}$	Maximum $L_{A1\ (1\ minute)}$	Minimum $L_{A1\ (1\ minute)}$	Compliance Status and On-Site Observations
07/08/13	Night	03:52	A	44.5	64.2	23.9	**Site complied with the noise criteria.** No audible industrial noise from the composting site or other operations was observed during the measurement period. Calm clear cold night, no audible noise sources other than vehicles, generally in the distance.
		04:07		42.1	60.6	26.7	
		04:22		47.3	63.2	28.7	
		04:37		38.9	62.4	27.0	
		04:55	F	60.8	56.2	31.3	**Site complied with the noise criteria.** No audible industrial noise from the composting site or other operations was observed during the measurement period. Calm clear cold night, no audible noise sources other than vehicles, generally in the distance. Very rare dogs in distance, and bird calls increasing after 5:30.
		05:10		64.9	65.1	34.9	
		05:25		66.1	64.1	32.8	
		05:40		67.9	68.1	41.3	
		05:58	D	60.5	64.1	44.9	**Site complied with the noise criteria.** Garbage truck ~ 50 dB(A), vehicles typically <70 dB(A). Bird noise increasing, typically 35 – 45 dB(A). From 6:27 mobile plant noise just audible during breaks in background noise, SPL 39 – 42 dB(A) occasionally, brief occurrences unlikely to influence 15-minute average - estimated to be from landfill but potentially some loader activity from the composting facility, however significantly below the vehicle/bird noise
		06:13		61.9	63.4	44.7	
		06:28		65.2	65.4	52.2	
		06:43		65.5	69.4	47.5	

Date	Period	Time	Monitoring Position	$L_{Aeq\ (15\ minute)}$	Maximum $L_{A1\ (1\ minute)}$	Minimum $L_{A1\ (1\ minute)}$	Compliance Status and On-Site Observations
							levels.
07/08/13	Day	07:00	D	64.5	n/a	n/a	**Site potentially exceeding the noise criteria.** 7:01, shredder turned on generally 38 - 42 dB(A) with some background influence. 7:14 loudest 'thump' from shredder 43.6 dB(A) L_{Amax}. traffic, trucks, aircraft all 55 dB(A) or greater. 8:29 shredder turned off.
		07:15		65.6	n/a	n/a	
		07:30		65.7	n/a	n/a	
		07:45		67.1	n/a	n/a	
		08:00		64.9	n/a	n/a	
		08:15		66.5	n/a	n/a	
		09:36	G	56.2	n/a	n/a	**Site potentially exceeding the noise criteria.** Reversing beeper from loader on nearest ridge (screening area), definitely from composting site, audible and measured up to 40.1 dB(A) L_{Amax}, typical levels of 38 dB(A) from reversing alarm. If operated prior to 7:00 could result in exceedances of L_{Aeq}, 15minute. Significant bird influence on measurements
		09:51		52.4	n/a	n/a	
		10:06		53.6	n/a	n/a	
		10:21		52.7	n/a	n/a	
		10:36		54.5	n/a	n/a	
		10:51		50.6	n/a	n/a	

Date	Period	Time	Monitoring Position	$L_{Aeq\ (15\ minute)}$	Maximum $L_{A1\ (1\ minute)}$	Minimum $L_{A1\ (1\ minute)}$	Compliance Status and On-Site Observations
07/08/13	Day	12:02	A	52.6	n/a	n/a	**Site potentially exceeding the noise criteria.** Reversing alarms and mobile plant engines audible during breaks in traffic, bird, and aircraft noise. Noted that banging noise, and close proximity/direction of mobile plant suggests more likely to be from recycling plant, than from the composting facility. Loader operator confirmed he was operating in the screening area to the rear of the facility. Mobile plant reversing noise up to 43.3 dB(A) L_{Amax}, generally 38 dB(A) when audible (background reduced).
		12:17		54.1	n/a	n/a	
		12:32		55.9	n/a	n/a	
		12:47		49.1	n/a	n/a	
		13:05	C	45.6	n/a	n/a	**Site complied with the noise criteria.** Position dominated by traffic noise from north and south, rarely dropping low enough to hear mobile plant noise. Reversing up to 40.5 dB(A) L_{Amax} on one occasion. Identified to more likely from recycling facility activities.
		13:20	B	46.6	n/a	n/a	**Site potentially exceeding the noise criteria.** Position shielded from traffic, more so than position C. Reversing maximum 42.3 dB(A). Generally 34 – 38 reversing and engine noise. Identified to more likely from recycling facility activities.
07/08/13	Evening	20:03	F	66.1	n/a	n/a	**Site complied with the noise criteria.** No audible

Date	Period	Time	Monitoring Position	$L_{Aeq\ (15\ minute)}$	Maximum $L_{A1\ (1\ minute)}$	Minimum $L_{A1\ (1\ minute)}$	Compliance Status and On-Site Observations
							industrial noise from the composting site or other operations was observed during the measurement period.
		20:18		60.7	n/a	n/a	Frogs and insects defining levels in lieu of traffic. Levels as low as 26 dB(A).
		20:36	D	56.5	n/a	n/a	**Site complied with the noise criteria.** No audible industrial noise from the composting site or other operations was observed during the measurement period.
		20:51		58.3	n/a	n/a	Insects and rustling of trees defining levels in lieu of traffic and aircraft. Levels as low as 24.1 dB(A).
		21:13	A	40.8	n/a	n/a	**Site complied with the noise criteria.** No audible industrial noise from the composting site or other operations was observed during the measurement period.
		21:28		45.7	n/a	n/a	Insects and rustling of trees defining levels in lieu of traffic and aircraft. Levels as low as 22.8 dB(A). Horse occasionally snorting and banging against holding pen up to 46 dB(A).
07/08/13	Night	22:00	F	59.8	59.5	26.9	**Site complied with the noise criteria.** No audible industrial noise from the composting site or other operations was observed during the measurement period.
		22:15		35.3	49.3	27.6	
		22:30		56.9	57.6	28.0	Train by pass 38 – 44 dB(A).

Date	Period	Time	Monitoring Position	$L_{Aeq\ (15\ minute)}$	Maximum $L_{A1\ (1\ minute)}$	Minimum $L_{A1\ (1\ minute)}$	Compliance Status and On-Site Observations
		22:45		56.9	54.9	28.4	Frogs defining levels in lieu of traffic. Levels often 23 dB(A).
		23:05	D	53.4	58.5	24.4	**Site complied with the noise criteria.** No audible industrial noise from the composting site or other operations was observed during the measurement period.
		23:20		58.1	62.5	25.8	
		23:35		58.6	61.0	25.4	Train by pass 41 dB(A) for 30 seconds, second train up to 45.5 dB(A) 10 minutes later.
		23:50		32.8	41.7	24.9	Frogs defining levels in lieu of traffic. Levels as low as 21 dB(A).
08/08/13	Night	06:00	A	50.7	63.9	45.0	**Site complied with the noise criteria.**
		06:15		57.5	72.4	59.0	Almost constant influence of birds and traffic. Occasional just perceptible noise from landfill mobile plant removing covers typically <40 dB(A). Potentially audible reversing alarm from loader at the facility, unconfirmed <40 dB(A).
		06:30		55.7	80.8	50.0	
		06:45		55.2	68.3	48.6	
08/08/13	Day	07:00	A	52.9	n/a	n/a	**Site potentially exceeding the noise criteria.**
		07:15		53.8	n/a	n/a	Shredder grinding typically 38 – 41 dB(A), however bangs and thumps vary from 42 – 48 dB(A). Two loud extended grinding events (10 seconds) up to 50 dB(A). Likely to result in $L_{Aeq,\ 15minute}$ raising above 40 dB(A) if occurring greater than 60

Date	Period	Time	Monitoring Position	$L_{Aeq\ (15\ minute)}$	Maximum $L_{A1\ (1\ minute)}$	Minimum $L_{A1\ (1\ minute)}$	Compliance Status and On-Site Observations
							seconds of 15 minute period. Noted that traffic noise significantly higher, and defining $L_{Aeq\ 15minutes}$.
		07:32	B	51.4	n/a	n/a	**Site potentially exceeding the noise criteria.** Checking more shredding at location less affected by traffic background influence. Grinding up to 45.8 dB(A), general shredding noise 40 dB(A) or less. No significant thumps audible during breaks in traffic. Traffic and birds still dominating averages and maximums at all times.
		09:45	A	53.0	n/a	n/a	**Site complied with the noise criteria.** Recycling facility industry audible, trommel and reversing alarms up to 43 dB(A). No activities from the composting facility. Traffic and birds dominant, some vegetation noise (wind) defining minimum background levels.
08/08/13	Day	11:13	G	54.7	n/a	n/a	**Site complied with the noise criteria.** No audible noise from composting facility, wind generating significant background noise through vegetation. Remaining periods of day, significantly affected by wind, and no measurements recorded.
08/08/13	Evening	20:00	D	62.5	n/a	n/a	**Site complied with the noise criteria.**

Date	Period	Time	Monitoring Position	$L_{Aeq\ (15\ minute)}$	Maximum $L_{A1\ (1\ minute)}$	Minimum $L_{A1\ (1\ minute)}$	Compliance Status and On-Site Observations
		20:15		62.3	n/a	n/a	Vegetation noise up to 50 dB(A) (from elevated winds), with occasional calm periods resulting in levels as low as 33 dB(A), with no audible plant noise from composting facility.
		20:35	A	42.4	n/a	n/a	**Site complied with the noise criteria.**
		20:50		45.2	n/a	n/a	Influence of wind reducing, and levels below 30 dB(A) regularly achieved, with no discernible noise from the composting facility. Insects, aircraft, vegetation defining background in lieu of traffic and vegetation.
		21:10	F	67.7	n/a	n/a	**Site complied with the noise criteria.**
		21:25		66.3	n/a	n/a	Influence of wind reducing, and levels below 30 dB(A) regularly achieved, with no discernible noise from the composting facility. Insects, aircraft, vegetation defining background in lieu of traffic and vegetation.
		21:45	D	55.2	n/a	n/a	**Site complied with the noise criteria.** Re-checking, vegetation noise still often 30 – 35 dB(A). No audible noise from the composting facility.
08/08/13	Night	22:00	D	55.1	59.2	32.4	**Site complied with the noise criteria.**
		22:15		57.1	58.8	32.7	Vegetation, train, aircraft all 40 - 45 dB(A). No audible noise

Date	Period	Time	Monitoring Position	$L_{Aeq\ (15\ minute)}$	Maximum $L_{A1\ (1\ minute)}$	Minimum $L_{A1\ (1\ minute)}$	Compliance Status and On-Site Observations
		22:30		53.7	56.6	35.4	
		22:45		53.5	59.1	33.8	from the composting facility.
08/08/13	Night	23:10	A	41.6	58.7	33.3	**Site complied with the noise criteria.** Vegetation 35 reducing to inaudible later in the hour, levels as low as 25.6 dB(A) measured with no audible noise from the composting facility. 00:10 Train engine/rail noise up to 40 dB(A), with rail wheel squeal up to 50 dB(A) for 10 seconds.
		23:25		45.4	61.4	32.5	
		23:40		43.0	60.6	25.5	
		23:55		27.9	47.8	26.6	
09/08/13	Night	06:00	F	56.6	71.9	66.7	**Site complied with the noise criteria.** Significant bird noise. Mobile plant noise measure up to 38 – 42 dB(A) on various occasions (when other noise reduced temporarily) however, composting facility not operational during these times, and identified as the landfill mobile plant.
		06:15		58.6	69.8	62.9	
		06:30		59.2	69.2	57.1	
		06:45		60.5	71.9	53.4	
09/08/13	Day	07:00	G	58.8	n/a	n/a	**Site potentially exceeding the noise criteria.** Temporary barrier installed to shredder. Shredding materials typically brief spikes to 35 – 42 dB(A), up to L_{Amax} 45 dB(A) on one occasion. Crows and traffic dominant

Date	Period	Time	Monitoring Position	$L_{Aeq\ (15\ minute)}$	Maximum $L_{A1\ (1\ minute)}$	Minimum $L_{A1\ (1\ minute)}$	Compliance Status and On-Site Observations
09/08/13	Day	07:18	A	54.7	n/a	n/a	Shredder idle just perceptible, however background typically >40 dB(A). Loud grinds 42 – 45 dB(A), loud clear thumps/bangs up to 48 dB(A) L_{Amax} on two occasions. Temporary barrier seem not to be shielding the thumps, but reducing the general idle noise.
		07:34	B	50.9	n/a	n/a	**Site potentially exceeding the noise criteria.** Shredder grinding noise up to 46 dB(A), thumps/bangs up to 48 dB(A). Measured $L_{aeq,\ 1minute}$ of 42.5 dB(A) with minimal traffic influence. Traffic result in much greater L_{Aeq} values.
		07:50	A	49.6	n/a	n/a	**Site potentially exceeding the noise criteria.** Shredder grinding noise up to 48 dB(A), thumps/bangs up to 48.6 dB(A). Measured $L_{aeq,\ 1minute}$ of 42.9 dB(A) with minimal traffic influence. Traffic and birds result in much greater L_{Aeq} values.
		08:05	A	55.7	n/a	n/a	**Site potentially exceeding the noise criteria.** Shredder frequently averaging 42 – 44 dB(A). Recycling plant becomes dominant from 8:30 am up to 43 dB(A), predominantly trommel noise. Birds and traffic defining
		08:20		54.3	n/a	n/a	
		08:35		54.3	n/a	n/a	

Date	Period	Time	Monitoring Position	$L_{Aeq\ (15\ minute)}$	Maximum $L_{A1\ (1\ minute)}$	Minimum $L_{A1\ (1\ minute)}$	Compliance Status and On-Site Observations
							averages and maximums.
09/08/13	Day	10:12	G	53.4	n/a	n/a	**Site complied with the noise criteria.** Loader engine and reversing just audible 30 – 35 dB(A). Vegetation noise increasing. Birds and traffic defining averages and maximums.
		10:27		51.7	n/a	n/a	
		10:42		51.2	n/a	n/a	
		10:57		52.3	n/a	n/a	
		11:12		53.4	n/a	n/a	
09/08/13	Day	11:30	E	56.5	n/a	n/a	**Site complied with the noise criteria.** Mobile plant and trommel noise from recycling plant just perceptible during background levels of 37 dB(A). Loader and reversing beeper just perceptible <38 dB(A) from composting facility. Vegetation noise, tractor at Residence, and traffic dominant.
		11:45		53.9	n/a	n/a	
		12:00		56.0	n/a	n/a	
		12:15		54.6	n/a	n/a	
		12:30		55.2	n/a	n/a	
		12:45		53.9	n/a	n/a	

5.2 Discussion of Measured Results

5.2.1 Daytime

During the daytime periods 7:00 – 18:00, the only audible activities from the site were from the shredder and loader (most prominently reversing) movements. It is noted that on many occasions it was hard to distinguish if reversing alarms and engine noise was from the Composting facility, or from the nearby landfill and recycling plant, however where possible these periods were identified through discussions with the loader operator.

Loading/reversing alarm noise was measured at the following levels;

- Receiver 1 – L_{Amax} <40 dB(A),
- Receiver 2 - L_{Amax} 39 – 42 dB(A),
- Receiver 3 - L_{Amax} 38 – 42 dB(A).

Although these noise measurements were typically only discernible from other noise in the area prior to 7:00 am (discussed in Section 5.2.2), they operate similarly during daytime periods.

Shredding noise was measured at the following levels:

- Receiver 1 – L_{Amax} 50 dB(A) from grinding, typically 38 – 45 during grinding, and measured as $L_{Aeq, 1minute}$ 42.9 without significant extraneous noise sources.
- Receiver 2 - L_{Amax} 43.6 dB(A), typically 38 – 42 dB(A),
- Receiver 3 - L_{Amax} 38 – 42 dB(A).

The measured grinding events at Receiver 1 indicate a likely exceedance of the Licence criteria of $L_{Aeq, 15minutes}$ of 40 dB(A), and mitigation options for this activity are discussed below.

It is noted that at the measurement positions, for the sensitive receivers identified, during all measurement periods, extraneous noise sources such as traffic along Armidale Road, bird calls, and trains to the east, were in excess of any noise generated from the site.

In an attempt to achieve the daytime criteria for shredding operations, a temporary barrier was installed to the northern end of the shredder (as exceedance of the criteria was only measured to Receiver 1 to the north). Details on the noise monitoring with inclusion of this barrier are presented in Section 5.3.

5.2.2 Evening and Night

During the evening and night periods 22:00 – 7:00, no audible/discernible noise was identified as coming from the Composting facility. Reversing alarms were audible at all three positions on occasion during the night (6:00 am – 7:00 am), but may have related to activities at any of the nearby industrial activities. Attended monitoring of the audible reversing alarm events indicated that they

were infrequent, were audible for a very brief period, and are:

a) unlikely to influence the $L_{Aeq, 15\text{-}minute}$ results; and

b) in most cases appeared to be from the landfill and recycling facility, as operation of the loader at the composting facility had not commenced at the times the events were identified.

c) For L_{Amax} levels of 42 dB(A) or less at the attended positions, facade $L_{A1, 1minute}$ levels would not exceed the 45 dB(A) criteria.

Additionally, review of audio recordings indicate that the $L_{A1, 1minute}$ facade noise levels are defined by bird and traffic noise, and reversing alarm noise is almost indistinguishable from background noise.

As the reversing alarm measurements were noted to be tonal in nature (clearly discernible from other noise in the area), a correction factor of 2 dB(A) is applicable to the measurements. Even with this correction, the noise levels are not likely to result in breaches of the Licence noise criteria.

Based on these measurements and observations, it is concluded that compliance for evening and night periods has been confirmed.

Provided shredding activities, or significant periods of loader activity do not occur from 6:00 am to 7:00 am, compliance with the Licence criteria is likely for all operations at the Composting facility.

It is advised that the loader should be fitted with a broadband/squawker types reversing alarm, as although the levels were not significant off-site, they were distinguishable, and may also be mistaken for activities at the landfill and recycling facility which were sometimes operating in closer proximity to the sensitive receivers and indistinguishable from the composting loader activities.

5.3 Mitigation

Based on the measurements of shredder noise at Receiver 1 on 8 August 2013, a representative mitigation investigation was undertaken on the following morning. In an effort to reduce the shredder noise impacting on the Receiver 1 monitoring positions, a large skip bin was placed to the northern end of the shredder with the cover in the raised position, as shown in Figure 5.1. The photos were taken approximately from the direction of the Receiver 1 property.

Figure 5.1 - Temporary Barrier

This resulted in a temporary barrier structure approximately 4.6 m tall, and 7 m wide.

It was noted that review of the installed temporary barrier structure, indicated that a partial line of sight to the Receiver 1 monitoring position was still likely from the main section of the shredder (generally resulting in the loud bangs/thumps), however much of the general motor noise and grinding was shielded. Mitigated shredding noise was measured at the following levels:

- Receiver 1 – L_{Amax} typically 42 – 45 during grinding, and measured as $L_{Aeq,\ 1minute}$ 42.9 without significant extraneous noise sources.

The results indicate that the general grinding noise seems to have reduced compared with previous days monitoring, likely as a result of partial shielding. However, it is likely to exceed the Licence limit of $L_{Aeq,\ 15minute}$ 40 dB(A) if the grinding was to occur consistently throughout the 15 minute period.

It is again noted that during all monitoring periods, bird and traffic noise far exceeded that of mobile plant and shredder noise at all positions..

Additionally the nearby recycling plant operates continuous noise sources (e.g. the trommel) up to 43 dB(A), as well as intermittent sources such as reversing alarms and mobile plant, in closer proximity to this receptor. The landfill operations were also noted to have audible reversing alarms at all receptor positions

6 Conclusion

Attended and unattended noise monitoring at the nearest sensitive receivers to the J R Richards & Sons Tunnel Composting facility were undertaken by Air Noise Environment in August 2013, for comparison to the sites licence criteria.

Based on comparison of the attended noise monitoring levels with the licence criteria, it is established that the Tunnel Composting facility may be exceeding the daytime noise criteria during operation of the shredder, and potentially for reversing of the loader. If the loader was operated consistently during the 6:00 am – 7:00 am period, there is potential to exceed the criteria, however at present, the occasional usage was not measured to exceed the licence criteria.

It is advised that the loader should be fitted with a broadband/squawker types reversing alarm, as although the levels were not significant off-site, they were distinguishable, and may also be mistaken for activities at the landfill and recycling facility which were sometimes operating in closer proximity to the sensitive receivers and indistinguishable from the composting loader activities.

It is noted that at the measurement positions, for the sensitive receivers identified, during all measurement periods, extraneous noise sources such as traffic along Armidale Road, bird calls, and trains to the east, were in excess of any noise generated from the site.

In an attempt to achieve the criteria, a temporary barrier was installed to the northern end of the shredding operations (as exceedance of the criteria was only measured to Receiver 1 to the north). This resulted in some reduction in the general shredding/grinding noise, however did not significantly reduce the intermittent bangs/thumps due to line of sight being only partially obstructed. Overall., non-compliance with the criteria was observed for this activity and acoustic mitigation will be necessary to achieve the licence requirements at Receptor 1.

In summary, the noise monitoring has demonstrated full compliance with the licence criteria with the exception of the following activities:

- noise from the shredder, and acoustic mitigation solutions should be developed;
- noise from the loader has potential to result in non-compliance, therefore it is recommended that a non-tonal reverse warning alarm is fitted to this vehicle.

It is noted that the licence requirement for monitoring over a three day period could be reduced, as the monitoring readily determined compliance with the criteria during a single monitoring period for day, evening and night as most activities from the site were consistent throughout the monitoring period.

Appendix A - Acoustic Glossary

APPENDIX A: GLOSSARY OF ACOUSTIC TERMINOLOGY	
A-Weighting	A response provided by an electronic circuit which modifies sound in such a way that the resulting level is similar to that perceived by the human ear.
dB (decibel)	This is the scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and the reference pressure ($0.00002 N/m^2$).
dB(A)	This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Facade Noise Level	Refers to a sound pressure level determined at a point close to an acoustically reflective surface (in addition to the ground). Typically a distance of 1 metre is used.
Free Field	Refers to a sound pressure level determined at a point away from reflective surfaces other than the ground with no significant contribution due to sound from other reflective surfaces; generally as measured outside and away from buildings.
Hertz (Hz)	A measure of the frequency of sound. It measures the number of pressure peaks per second passing a point when a pure tone is present.
L_{Aeq} Equivalent Continuous Sound Level	This is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over the given period. For a steady sound with small fluctuations, its value is close to the average sound pressure level.
$L_{A90,T}$	This is the dB(A) level exceeded 90% of the time, T.
$L_{A10,T}$	This is the dB(A) level exceeded 10% of the time, T.
$L_{A50,T}$	This is the dB(A) level exceeded 50% of the time, T.
L_{WA}	The A-weighted sound power level in dB.

Appendix B - Meteorological Data

Appendix B: Meteorological Data

Date/Time	Wind Direction	Wind Speed (m/s)	Rainfall (mm)
6/08/2013 18:00	36	1.5	0
6/08/2013 18:15	9	1	0
6/08/2013 18:30	2	0.7	0
6/08/2013 18:45	311	1.1	0
6/08/2013 19:00	265	1.3	0
6/08/2013 19:15	262	1.1	0
6/08/2013 19:30	324	0.6	0
6/08/2013 19:45	9	1.5	0
6/08/2013 20:00	18	1	0
6/08/2013 20:15	321	1	0
6/08/2013 20:30	271	1.7	0
6/08/2013 20:45	349	1	0
6/08/2013 21:00	10	1	0
6/08/2013 21:15	275	1	0
6/08/2013 21:30	291	0.6	0
6/08/2013 21:45	277	0.7	0
6/08/2013 22:00	251	1	0
6/08/2013 22:15	269	1.8	0
6/08/2013 22:30	246	1.7	0
6/08/2013 22:45	244	1.8	0
6/08/2013 23:00	269	1.6	0
6/08/2013 23:15	251	2.3	0
6/08/2013 23:30	201	0.4	0
6/08/2013 23:45	120	0.7	0
7/08/2013 0:00	348	0.5	0
7/08/2013 0:15	105	0.6	0
7/08/2013 0:30	330	1.1	0
7/08/2013 0:45	236	0.6	0

Date/Time	Wind Direction	Wind Speed (m/s)	Rainfall (mm)
6/08/2013 18:00	36	1.5	0
7/08/2013 1:00	262	1.2	0
7/08/2013 1:15	78	1.1	0
7/08/2013 1:30	240	0.4	0
7/08/2013 1:45	249	1.1	0
7/08/2013 2:00	234	1.7	0
7/08/2013 2:15	208	0.8	0
7/08/2013 2:30	227	0.8	0
7/08/2013 2:45	258	1	0
7/08/2013 3:00	206	0.4	0
7/08/2013 3:15	2	0.3	0
7/08/2013 3:30	9	0.3	0
7/08/2013 3:45	239	0	0
7/08/2013 4:00	215	0.7	0
7/08/2013 4:15	179	0.2	0
7/08/2013 4:30	168	0.3	0
7/08/2013 4:45	139	0.9	0
7/08/2013 5:00	46	0.2	0
7/08/2013 5:15	77	0.6	0
7/08/2013 5:30	218	1	0
7/08/2013 5:45	226	0.5	0
7/08/2013 6:00	316	0.3	0
7/08/2013 6:15	257	0.7	0
7/08/2013 6:30	325	0.2	0
7/08/2013 6:45	100	0.6	0
7/08/2013 7:00	134	0.5	0
7/08/2013 7:15	165	0.9	0
7/08/2013 7:30	159	0.6	0
7/08/2013 7:45	252	0.5	0
7/08/2013 8:00	265	0.6	0

Date/Time	Wind Direction	Wind Speed (m/s)	Rainfall (mm)
6/08/2013 18:00	36	1.5	0
7/08/2013 8:15	221	0.4	0
7/08/2013 8:30	208	1.3	0
7/08/2013 8:45	247	1	0
7/08/2013 9:00	214	1.4	0
7/08/2013 9:15	216	0.9	0
7/08/2013 9:30	17	0.5	0
7/08/2013 9:45	321	0.7	0
7/08/2013 10:00	279	1.5	0
7/08/2013 10:15	354	1.1	0
7/08/2013 10:30	293	1.3	0
7/08/2013 10:45	157	0	0
7/08/2013 11:00	327	0.5	0
7/08/2013 11:15	248	2.8	0
7/08/2013 11:30	281	2.2	0
7/08/2013 12:15	281	4.1	0
7/08/2013 12:30	267	3.7	0
7/08/2013 12:45	268	2	0
7/08/2013 13:00	267	2.3	0
7/08/2013 13:15	250	2.6	0
7/08/2013 13:30	291	2.1	0
7/08/2013 13:45	351	2.3	0
7/08/2013 14:00	303	4.6	0
7/08/2013 14:15	296	3.8	0
7/08/2013 14:30	287	3	0
7/08/2013 14:45	284	3.9	0
7/08/2013 15:00	318	2.3	0
7/08/2013 15:15	0	2.7	0
7/08/2013 15:30	302	2.9	0
7/08/2013 15:45	19	1.4	0

Date/Time	Wind Direction	Wind Speed (m/s)	Rainfall (mm)
6/08/2013 18:00	36	1.5	0
7/08/2013 16:00	1	1.3	0
7/08/2013 16:15	338	1.2	0
7/08/2013 16:30	338	2.8	0
7/08/2013 16:45	350	1	0
7/08/2013 17:00	355	1.1	0
7/08/2013 17:15	11	1.2	0
7/08/2013 17:30	1	1.1	0
7/08/2013 17:45	16	1.2	0
7/08/2013 18:00	8	1.1	0
7/08/2013 18:15	339	2	0
7/08/2013 18:30	353	1.8	0
7/08/2013 18:45	26	1	0
7/08/2013 19:00	9	1.8	0
7/08/2013 19:15	25	1.1	0
7/08/2013 19:30	5	1.1	0
7/08/2013 19:45	315	1.6	0
7/08/2013 20:00	339	0.6	0
7/08/2013 20:15	284	0.3	0
7/08/2013 20:30	330	0.8	0
7/08/2013 20:45	298	1.3	0
7/08/2013 21:00	313	1.3	0
7/08/2013 21:15	330	1	0
7/08/2013 21:30	344	1.3	0
7/08/2013 21:45	5	1	0
7/08/2013 22:00	322	3	0
7/08/2013 22:15	298	1.1	0
7/08/2013 22:30	321	1.2	0
7/08/2013 22:45	304	1.2	0
7/08/2013 23:00	287	0.8	0

Date/Time	Wind Direction	Wind Speed (m/s)	Rainfall (mm)
6/08/2013 18:00	36	1.5	0
7/08/2013 23:15	298	0.5	0
7/08/2013 23:30	72	0.2	0
7/08/2013 23:45	70	0.2	0
8/08/2013 0:00	347	0.6	0
8/08/2013 0:15	254	0.4	0
8/08/2013 0:30	186	0.1	0
8/08/2013 0:45	172	0.3	0
8/08/2013 1:00	210	0.3	0
8/08/2013 1:15	291	0.4	0
8/08/2013 1:30	30	0.3	0
8/08/2013 1:45	89	0.5	0
8/08/2013 2:00	227	1.3	0
8/08/2013 2:15	238	0.7	0
8/08/2013 2:30	217	0.9	0
8/08/2013 2:45	358	0.1	0
8/08/2013 3:00	285	0.3	0
8/08/2013 3:15	52	0.7	0
8/08/2013 3:30	212	0.5	0
8/08/2013 3:45	293	0.7	0
8/08/2013 4:00	150	0.3	0
8/08/2013 4:15	202	0.5	0
8/08/2013 4:30	191	1	0
8/08/2013 4:45	174	0.6	0
8/08/2013 5:00	188	0.3	0
8/08/2013 5:15	268	0.4	0
8/08/2013 5:30	228	0.7	0
8/08/2013 5:45	226	0.4	0
8/08/2013 6:00	245	0.9	0
8/08/2013 6:15	77	0.9	0

Date/Time	Wind Direction	Wind Speed (m/s)	Rainfall (mm)
6/08/2013 18:00	36	1.5	0
8/08/2013 6:30	340	0	0
8/08/2013 6:45	329	0.2	0
8/08/2013 7:00	334	0.9	0
8/08/2013 7:15	268	0.4	0
8/08/2013 7:30	288	0.4	0
8/08/2013 7:45	245	0.8	0
8/08/2013 8:00	275	0.7	0
8/08/2013 8:15	327	0.5	0
8/08/2013 8:30	322	1.6	0
8/08/2013 8:45	263	2.3	0
8/08/2013 9:00	299	2.3	0
8/08/2013 9:15	264	4.1	0
8/08/2013 9:30	282	4.1	0
8/08/2013 9:45	317	3.7	0
8/08/2013 10:00	254	5.4	0
8/08/2013 10:15	260	4.4	0
8/08/2013 10:30	281	9.7	0
8/08/2013 10:45	291	5.2	0
8/08/2013 11:00	227	4.8	0
8/08/2013 11:15	244	5.6	0
8/08/2013 11:30	222	5.8	0
8/08/2013 12:00	233	4.7	0
8/08/2013 12:15	248	3.7	0
8/08/2013 12:30	235	5.4	0
8/08/2013 12:45	257	7.3	0
8/08/2013 13:00	204	7.9	0
8/08/2013 13:15	253	7	0
8/08/2013 13:30	235	3.7	0
8/08/2013 13:45	247	3.4	0

Date/Time	Wind Direction	Wind Speed (m/s)	Rainfall (mm)
6/08/2013 18:00	36	1.5	0
8/08/2013 14:00	223	4	0
8/08/2013 14:15	227	3.8	0
8/08/2013 14:30	227	6.3	0
8/08/2013 14:45	226	4.2	0
8/08/2013 15:00	237	4.9	0
8/08/2013 15:15	214	6.4	0
8/08/2013 15:30	234	6.2	0
8/08/2013 15:45	230	6	0
8/08/2013 16:00	243	7.9	0
8/08/2013 16:15	229	12.9	0
8/08/2013 16:30	242	7.7	0
8/08/2013 16:45	216	6.7	0
8/08/2013 17:00	228	5.6	0
8/08/2013 17:15	250	3.7	0
8/08/2013 17:30	235	5.9	0
8/08/2013 17:45	243	4.1	0
8/08/2013 18:00	251	3.9	0
8/08/2013 18:15	232	6.9	0
8/08/2013 18:30	258	3.8	0
8/08/2013 18:45	263	5.8	0
8/08/2013 19:00	246	5.5	0
8/08/2013 19:15	271	4.9	0
8/08/2013 19:30	248	7.7	0
8/08/2013 19:45	235	4.8	0
8/08/2013 20:00	278	5.3	0
8/08/2013 20:15	253	4.1	0
8/08/2013 20:30	270	2.6	0
8/08/2013 20:45	282	2.5	0
8/08/2013 21:00	285	3.4	0

Date/Time	Wind Direction	Wind Speed (m/s)	Rainfall (mm)
6/08/2013 18:00	36	1.5	0
8/08/2013 21:15	289	2.3	0
8/08/2013 21:30	268	1.3	0
8/08/2013 21:45	300	2	0
8/08/2013 22:00	265	2.9	0
8/08/2013 22:15	271	4.8	0
8/08/2013 22:30	258	4	0
8/08/2013 22:45	264	3.7	0
8/08/2013 23:00	258	4.3	0
8/08/2013 23:15	280	2.5	0
8/08/2013 23:30	249	3.3	0
8/08/2013 23:45	262	2.6	0
9/08/2013 0:00	271	3.4	0
9/08/2013 0:15	260	1.4	0
9/08/2013 0:30	280	1.4	0
9/08/2013 0:45	268	2	0
9/08/2013 1:00	257	1.5	0
9/08/2013 1:15	265	3.4	0
9/08/2013 1:30	276	2.1	0
9/08/2013 1:45	250	3.2	0
9/08/2013 2:00	262	2.3	0
9/08/2013 2:15	242	3.9	0
9/08/2013 2:30	263	1.8	0
9/08/2013 2:45	268	1.6	0
9/08/2013 3:00	254	2.2	0
9/08/2013 3:15	270	1.8	0
9/08/2013 3:30	271	2	0
9/08/2013 3:45	271	2	0
9/08/2013 4:00	253	1.7	0
9/08/2013 4:15	263	1.8	0

Date/Time	Wind Direction	Wind Speed (m/s)	Rainfall (mm)
6/08/2013 18:00	36	1.5	0
9/08/2013 4:30	275	2.6	0
9/08/2013 4:45	262	3.1	0
9/08/2013 5:00	247	3.3	0
9/08/2013 5:15	265	1.9	0
9/08/2013 5:30	273	1.8	0
9/08/2013 5:45	247	1.2	0
9/08/2013 6:00	249	1.7	0
9/08/2013 6:15	262	1.5	0
9/08/2013 6:30	250	2.2	0
9/08/2013 6:45	239	2.2	0
9/08/2013 7:00	235	3.2	0
9/08/2013 7:15	237	3.9	0
9/08/2013 7:30	233	4.5	0
9/08/2013 7:45	244	3.5	0
9/08/2013 8:00	231	2.9	0
9/08/2013 8:15	250	2.1	0
9/08/2013 8:30	236	3.1	0
9/08/2013 8:45	231	3.4	0
9/08/2013 9:00	228	2.3	0
9/08/2013 9:15	241	2.2	0
9/08/2013 9:30	211	3.1	0
9/08/2013 9:45	147	1.5	0
9/08/2013 10:00	176	3.2	0
9/08/2013 10:15	229	2.5	0
9/08/2013 10:30	168	2.1	0
9/08/2013 10:45	244	0.2	0
9/08/2013 11:00	139	3.6	0
9/08/2013 11:15	213	1.6	0
9/08/2013 11:30	184	2.9	0

Date/Time	Wind Direction	Wind Speed (m/s)	Rainfall (mm)
6/08/2013 18:00	36	1.5	0
9/08/2013 11:45	127	0.4	0
9/08/2013 12:00	178	3	0
9/08/2013 12:15	143	3.7	0
9/08/2013 12:30	184	4.2	0
9/08/2013 12:45	129	1	0
9/08/2013 13:00	146	3.1	0
9/08/2013 13:15	174	2.5	0
9/08/2013 13:30	160	3.7	0
9/08/2013 13:45	130	0.9	0
9/08/2013 14:00	35	1	0