CMTP BRANXHOLM SAWMILLS

Environmental Noise Assessment

Report No. 421243-01

VIPAC Engineers & Scientists Ltd
PO Box 506
Kings Meadows TAS 7249
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Prepared for
CMTP Branxholm Sawmills
1628 Warrentinna Rd
Branxholm
Tasmania 7216

Contact Mr Dale Jessup
☎ +61 3 63546171
Mobile
Email djessup@cmtp.com.au

Prepared by
VIPAC Engineers & Scientists Ltd
PO Box 506
Kings Meadows
Tasmania 7249

Contact Dr A. McLeod
☎ +61 3 6343 2077
Fax +61 3 6343 4849
Email alex.mcleod@tarkarri.com

Author	Alex McLeod Senior Consultant Tas Office	Date: 9 May 2013
Reviewed by		Date:
Authorised by	Peter Bunker Manager, Tasmania	Date: 9 May 2013
Approved by		Date:

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1 Introduction

VIPAC was commissioned by CMTP Branxholm Sawmills to undertake an environmental noise assessment as a part of an Environmental Effects Report (EER) of a proposed production increase and installation of a new gas fired kiln.

VPAC proposed a two-step approach to provide information relevant to the EER guidelines provided by the EPA as follows:-

- Conduct an environmental noise survey to provide measured noise emission levels from the mill during current operations (*noise emission levels resulting from the production increase are unlikely to be significantly different from existing levels. The same equipment would be operating with increased through put*).
- Prediction of noise emissions from the new gas fired kiln installation with recommendations for noise reduction and potential controls if necessary (*the kiln would operate on a 24 hr basis and any noise emissions would need to meet the sites noise emission limit for night. Processing operations occur during the day period only*).

2 Site description and measurement positions

The CMTP Branxholm Sawmills site is located approximately 400 m north of the centre of Branxholm along Warrentinna Rd. The site is bounded to the north, east and west by rural land and the south by residential properties along Edwards Pl (approx. 80 m away).

The mills main production involves the processing of softwood timber into sawn timbers. Harvested logs are transported to site where they are debarked, sawn to relevant dimensions and air dried and/or fumigated. The addition of the new gas fired kiln would allow the drying process to be expedited.

The major existing noise sources identified at the site include the following:-

- Scragg saw
- Chipper
- Saw dust extraction blowers (X 4)

Table 1 lists the locations of the five measurement positions selected for the environmental noise survey and Figure 1 an aerial view with each position marked.

Measurement positions		
Position number	Location	Position (Eastings and Northings) (Datum: GDA94, Zone 55)
1	Southern Boundary	564921E / 5442636N
2	Pearce St	562164E / 5442422N
3	Station Rd	561543E / 5442682N
4	Northern boundary	561811E / 5443033N
5	Extended measurement	561909E / 5442684N

Table 1 – Measurement locations.

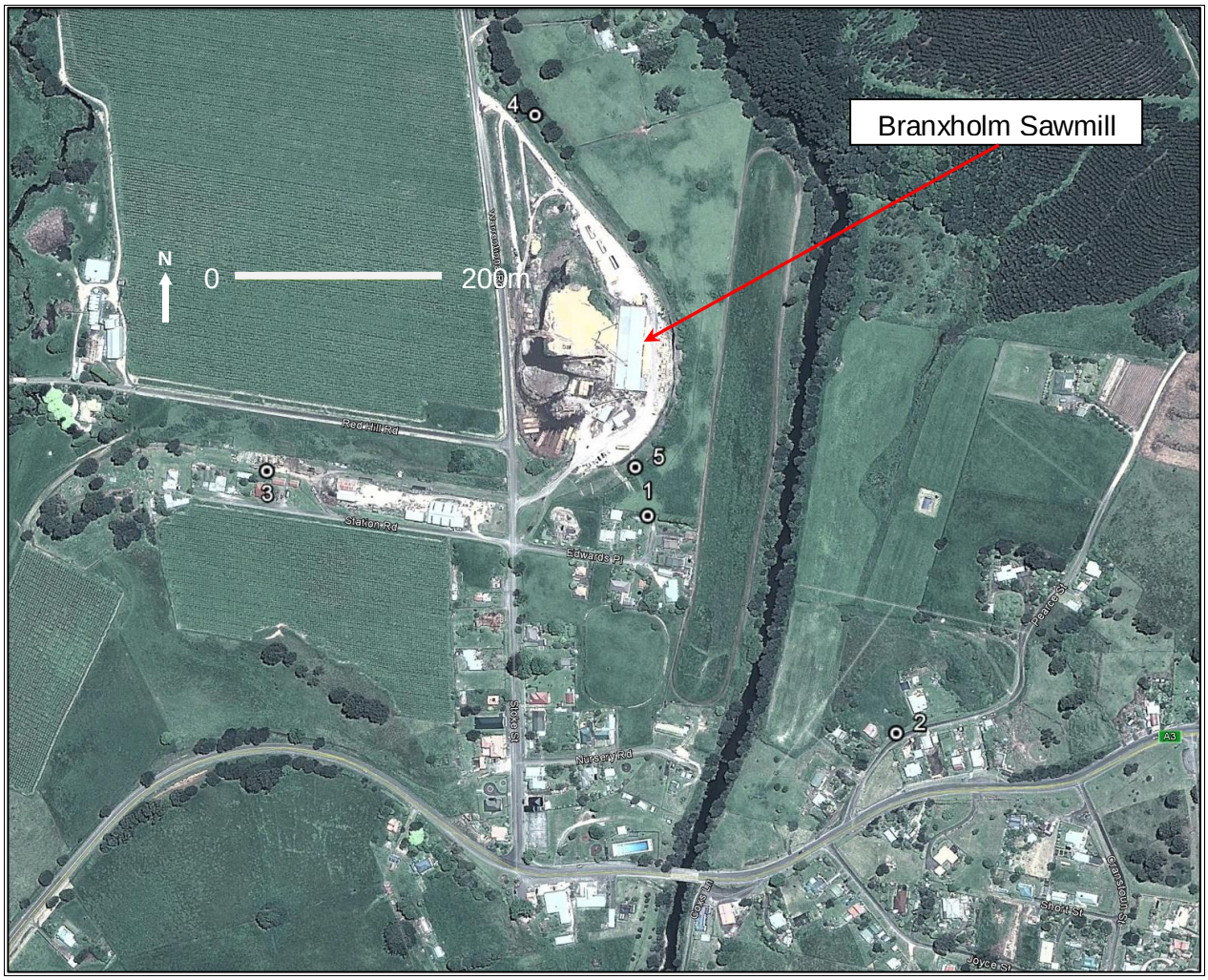

Figure 1 – Aerial view of Branxholm Sawmill and its surrounds with environmental noise survey positions marked.

3 EPN conditions

As per EPN 7768/2 N2;

1 Noise emissions from the activity when measured at any noise sensitive premises in other ownership and expressed as the equivalent A-weighted sound pressure level must not exceed:
   1.1 50 dB(A) between 0700 hours and 1800 hours (Day time); and
   1.2 40 dB(A) between 1800 hours and 0700 hours (Night time).

2 Where the combined level of noise from the activity and the normal ambient noise exceeds the noise levels stated above, this condition will not be considered to be breached unless the noise emissions from the activity are audible and exceed the ambient noise level by at least 5 dB(A).

3 The time interval over which noise levels are averaged must be 10 minutes or an alternative time specified in writing by the Director.

4 Measured noise levels must be adjusted for tonality, impulsiveness, modulation and low frequency in accordance with the Tasmanian Noise Measurement Procedures Manual.

5 All methods of measurement must be in accordance with the Tasmanian Noise Measurement Procedures Manual.

4 Environmental noise survey

4.1 Instrumentation

The following instrumentation was used during the survey:-

- Spectrum analyser Larson Davis 2900 s/n 2900A0343
- Environmental noise analyser Larson Davis 870B s/n 1189
- Acoustic Calibrator CA250 s/n 2706

All instruments were field calibrated prior to use.
Wind socks were used at all times on microphones.

4.2 Noise measurements

All noise measurements were made in general accordance with noise survey conditions provided by the EPA for this project and the *Tasmanian Noise Measurements Procedures Manual*.

A 10-minute time interval was selected for measurement of all statistical noise data and observed measurements were obtained over a 30-minute periods at each location. Observed measurements were conducted during the day period only with on-site activity not occurring during the evening and night. The 10-minute data has been averaged for the measurement period and summarised in table format for each location. Relevant observations are also noted in these tables. All observed data is presented in Appendix 1.

Spectral data for each observed measurement is shown graphically in 3 data sets as follows:-

- 1/3-octave band spectra
- Narrow band 0 - 600 Hz (0.78 Hz resolution).
- Narrow band 0 - 1200 Hz (1.56 Hz resolution).

Where appropriate, significant tones have been marked in these spectra and potential sources noted.

Unobserved extended measurements were conducted at position 5 and a graph of selected 10-minute Ln statistical data is provided as follows:-

- L_{Aeq}
- L_{A10}
- L_{A90}

For sake of clarity the other 5 data sets are not shown in these graphs.

4.2.1 Position 1

Position 1 is located to the south of the mill adjacent to a group of houses on Edwards Pl. Direct line of site is available to the southern end of the mill where the scragg saw and chipper are located.

Measured noise levels were controlled by emission from the mill with the scragg saw, chipper and sawdust extraction blowers clearly audible and the dominant sources.

Figure 2 – Position 1

1 – 7 Position 1												
Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Comments
Day	12 Mar	10:20	56.8	66.2	48.7	62.8	60.0	55.4	51.3	49.5	Fine wind 1 m/s NNE 2/8 cloud	Chipper , scragg saw, log loader, log impacts, Hwy traffic, insects, fauna, saw blade, blowers.

Table 2 – Position 1 - Summary of observed measurements.

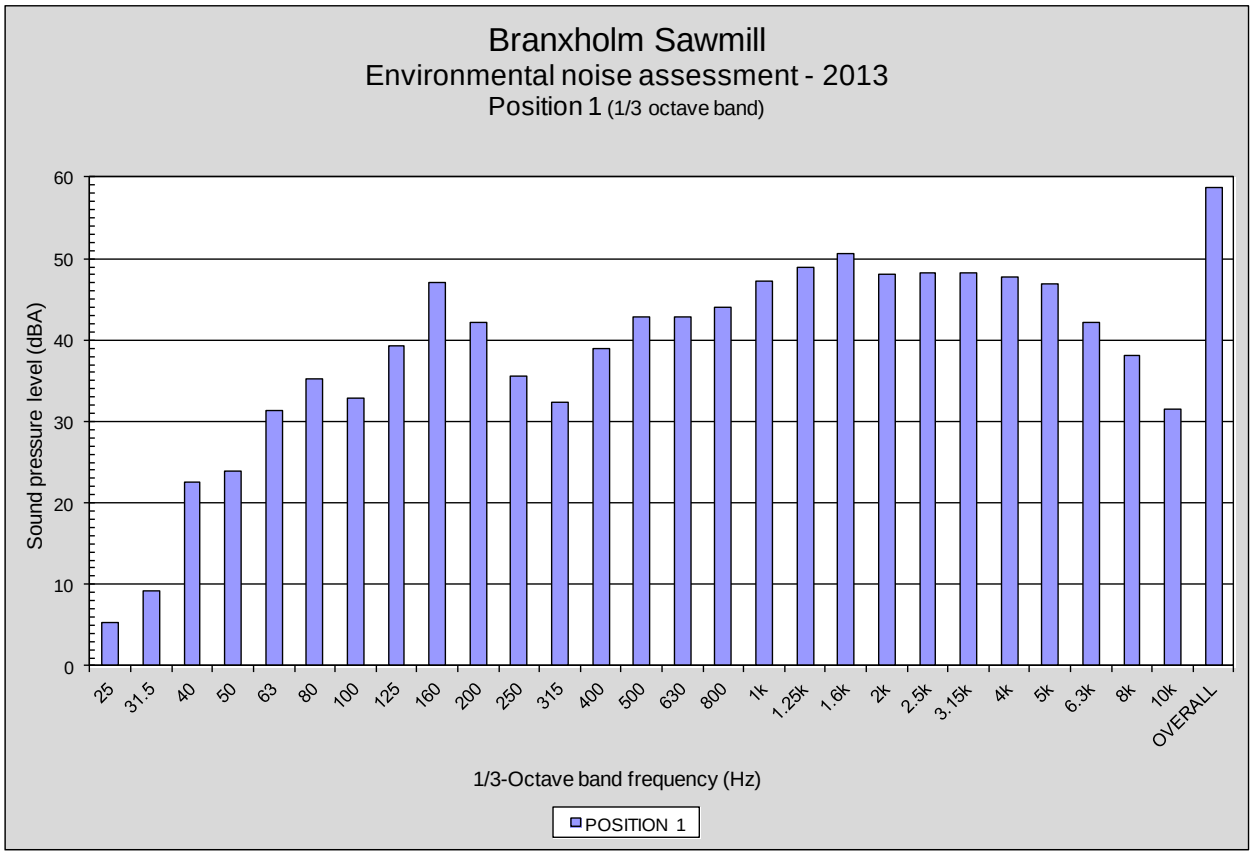

Figure 3 – Position 1 1/3-octave band spectra.

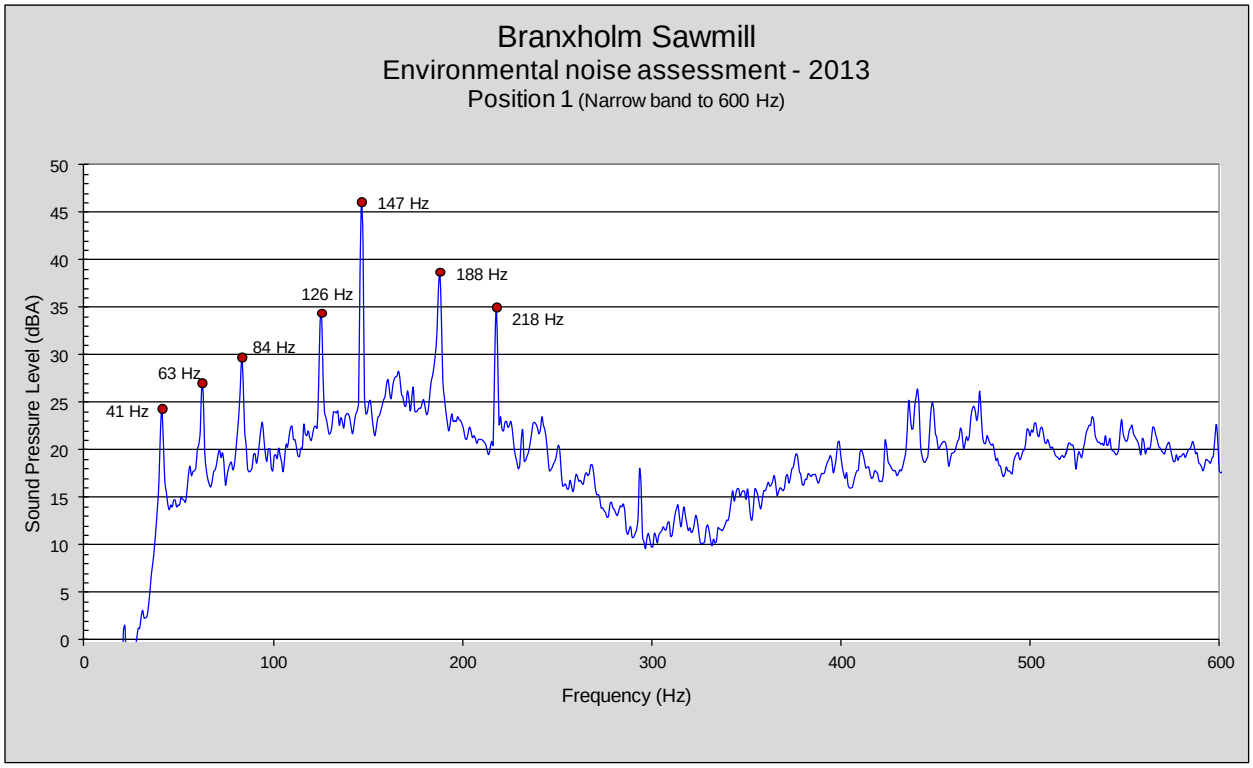

Figure 4 – Position 1 Narrow band spectrum (0 to 600 Hz).

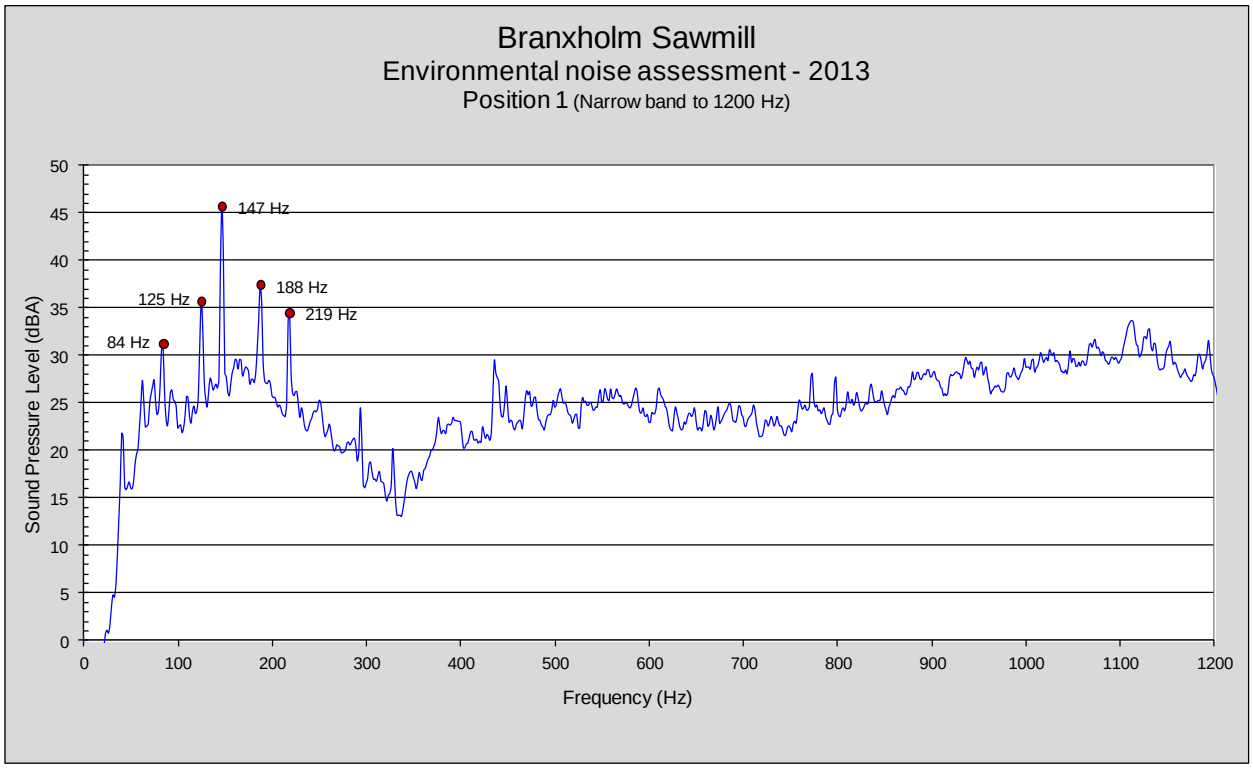

Figure 5 – Position 1 Narrow band spectrum (0 to 1200 Hz).

4.2.2 Position 2

Position 2 is to the south-east of the mill adjacent to houses on Pearce St. This location is on elevated west facing topography with a direct line of sight down to the mill.

Measurements L_{Aeq} levels at this location were elevated by traffic on Pearce St and the Tasman Hwy with the mill clearly audible between intermittent traffic flows. Again, the scragg saw, chipper and sawdust extraction blowers were audible.

Figure 6 – Position 2.

2 – Position 2												
Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Comments
Day	12 Mar	11:00	51.7	69.7	41.0	63.2	52.7	46.6	43.5	42.0	Fine, wind 1m/s NNE, 2/8 cloud	Chipper, scrag saw, saw blade tone, insects, shaker conveyors, backing alarm, fauna, local/ Hwy traffic, music from nearby workshed, voices.

Table 3 – Position 2 - Summary of observed measurements.

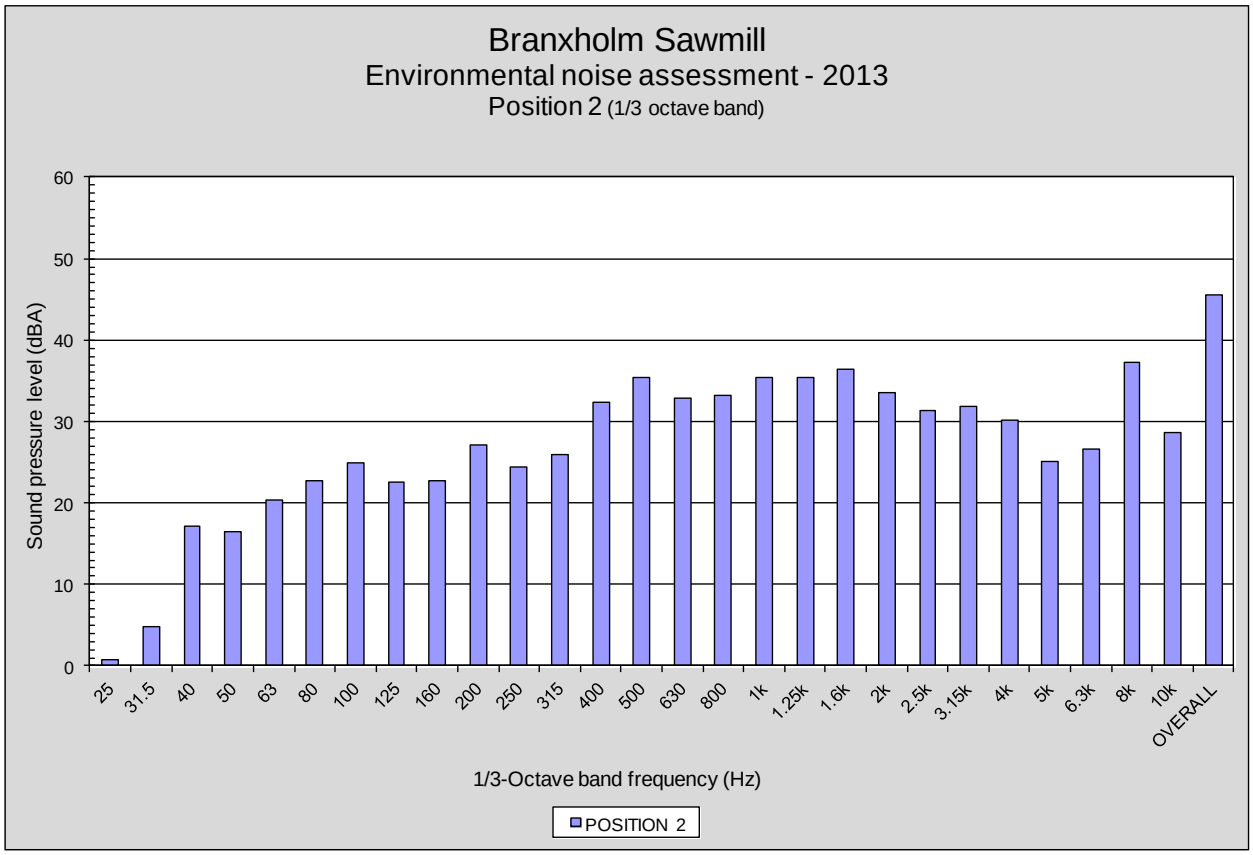

Figure 7 – Position 2 1/3-octave band spectra.

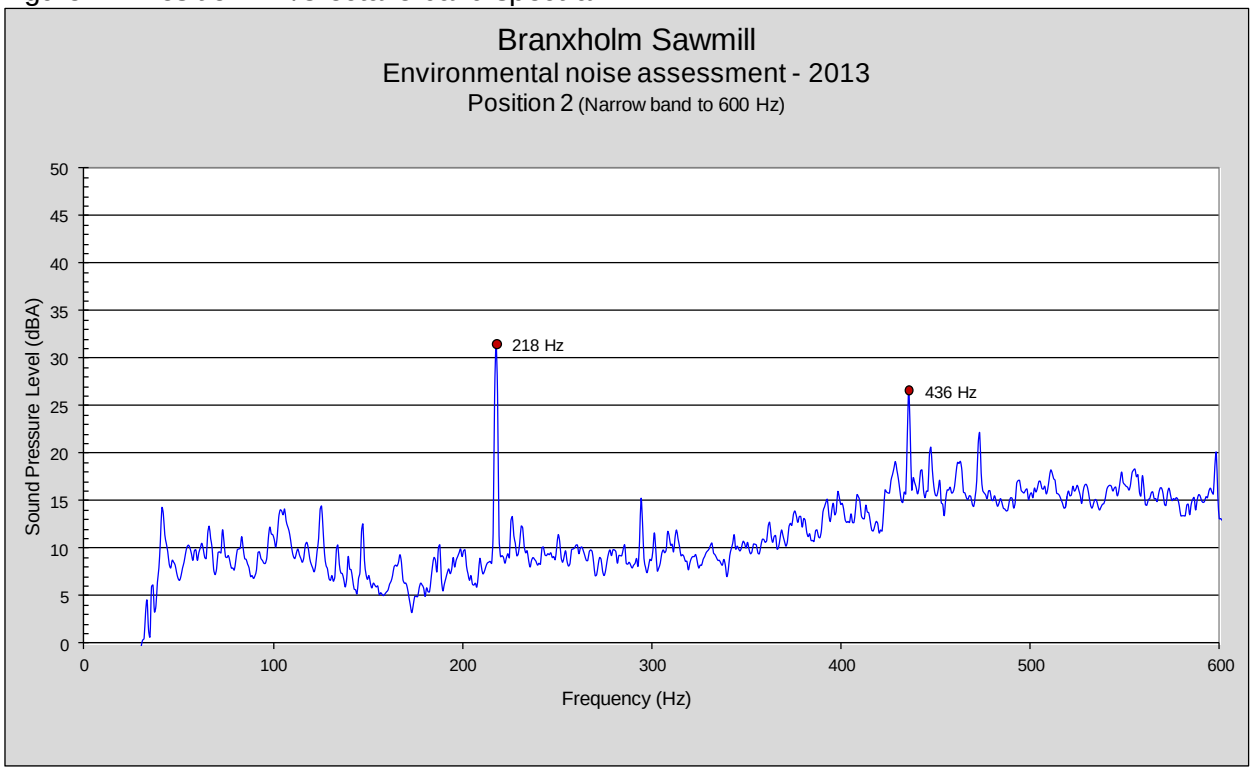

Figure 8 – Position 2 Narrow band spectrum (0 to 600 Hz).

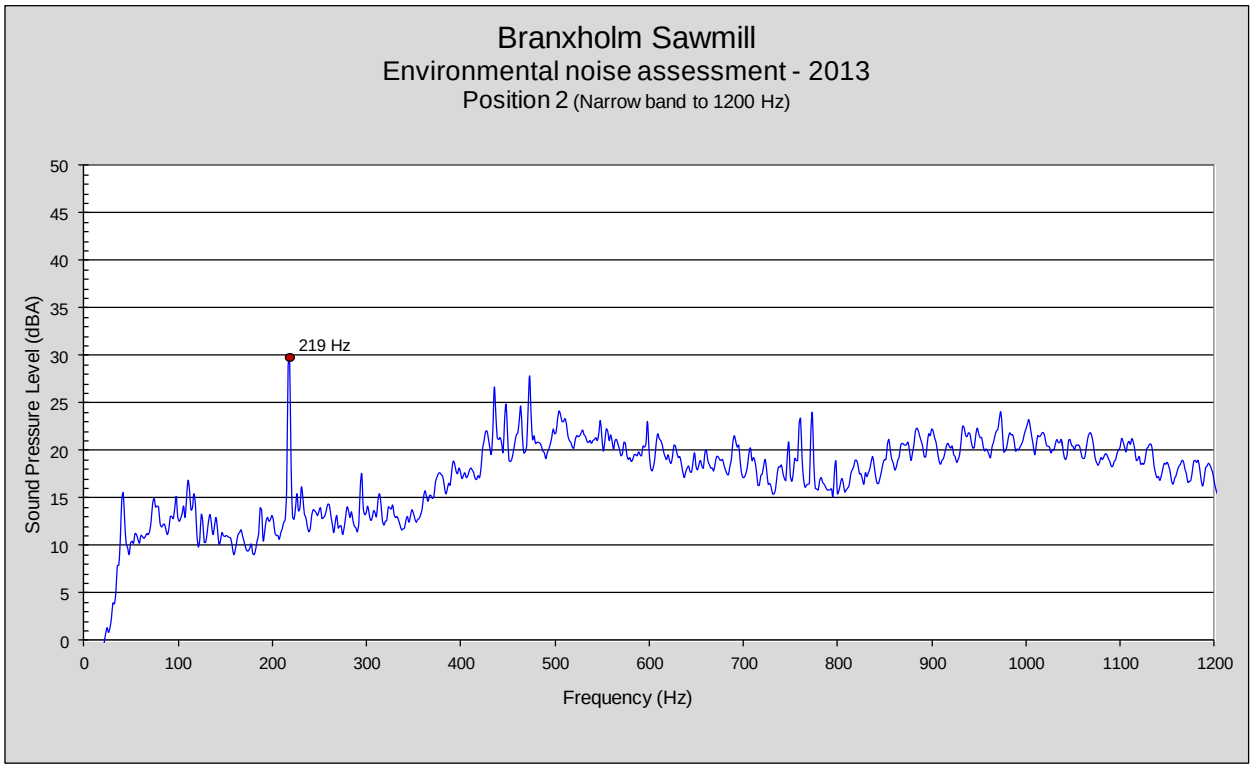

Figure 9 – Position 2 Narrow band spectrum (0 to 1200 Hz).

4.2.3 Position 3

Position three is located to the rear of properties that front onto to Station St, west south-west of the mill.

Measured noise levels at this location where controlled by a combination of tonal acoustic energy from the sawdust extraction blower discharges and insect activity locally.

Figure 10 – Position 3.

Position 3												
Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Comments
Day	12 Mar	12:00	41.1	52.8	36.9	46.7	42.9	40.3	38.5	37.5	Fine, wind 2 m/s NNE, 1/8 cloud	Blower tone, bond saw, local/Hwy traffic, log & timber impacts, insects, fauna, log truck, backing alarm, voices.

Table 4 – Position 3 - Summary of observed measurements.

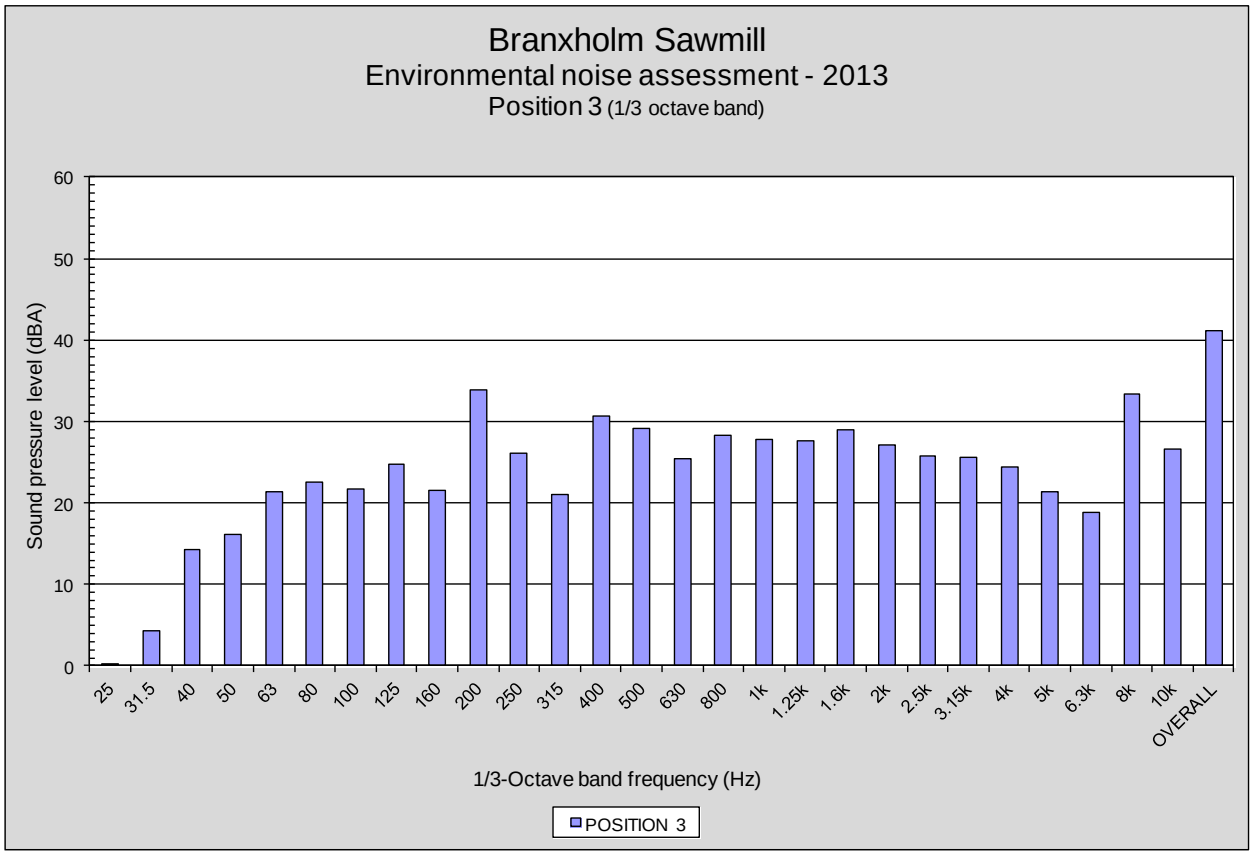

Figure 11 – Position 3 1/3-octave band spectra.

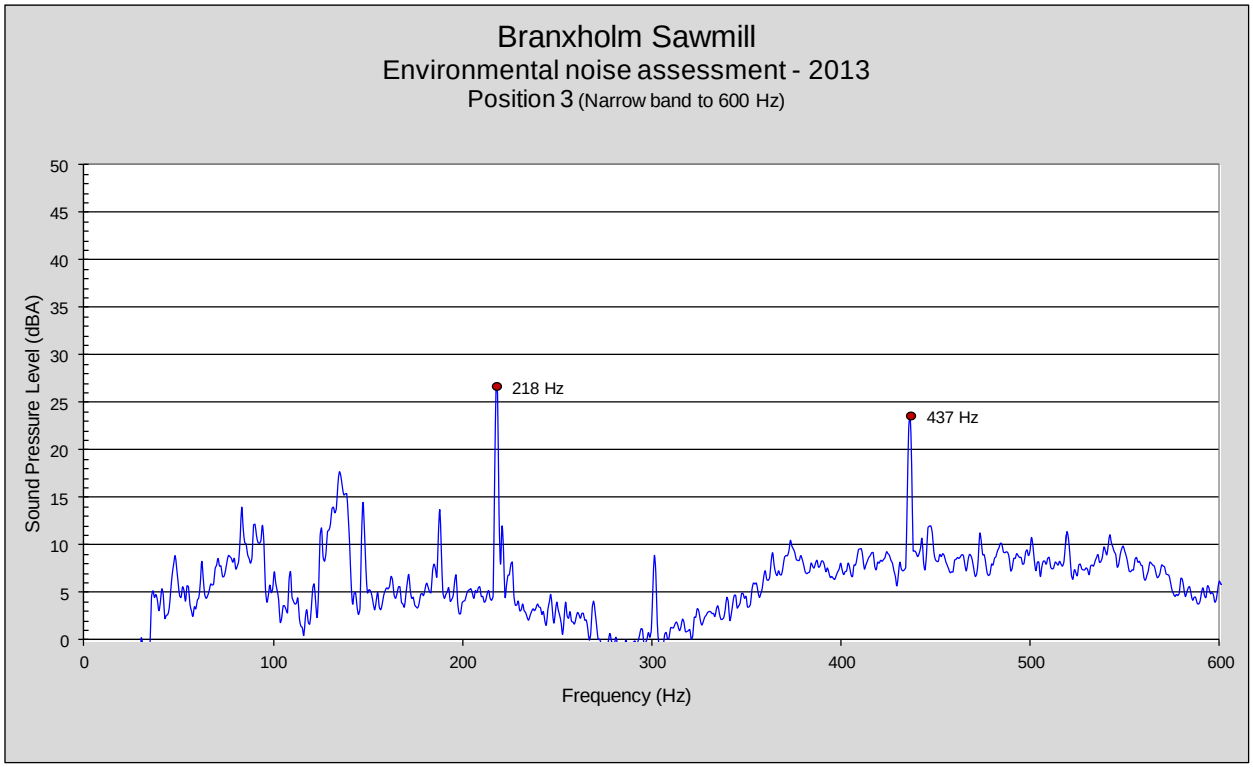

Figure 12 – Position 3 Narrow band spectrum (0 to 600 Hz).

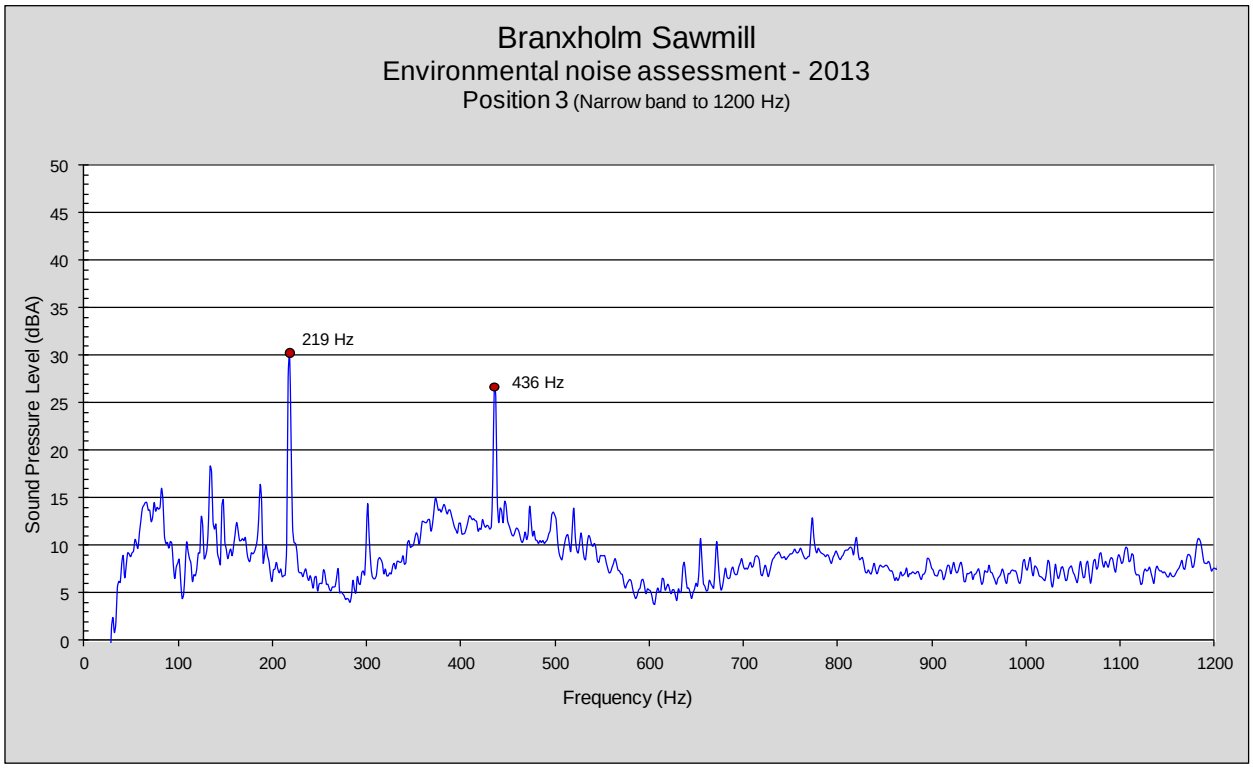

Figure 13 – Position 3 Narrow band spectrum (0 to 1200 Hz).

4.2.4 Position 4

Position 4 is located to the north of the mill adjacent to a residence on Warrentinna Rd.

Noise levels at this location were dominated by local insect activity. Tones from the sawdust extraction blower discharges were the most significant audible noise sources from the mill.

Figure 14 – Position 4.

4 – Position 4												
Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Comments
Day	12 Mar	13:50	44.1	53.4	41.7	47.3	45.1	43.9	42.8	41.9	Fine, wind 2 m/s N, 3/8 cloud	Blower tones, planner, backing alarm, local traffic, nail gun, broad band backing alarm, insects, fauna.

Table 5 – Position 4 - Summary of observed measurements.

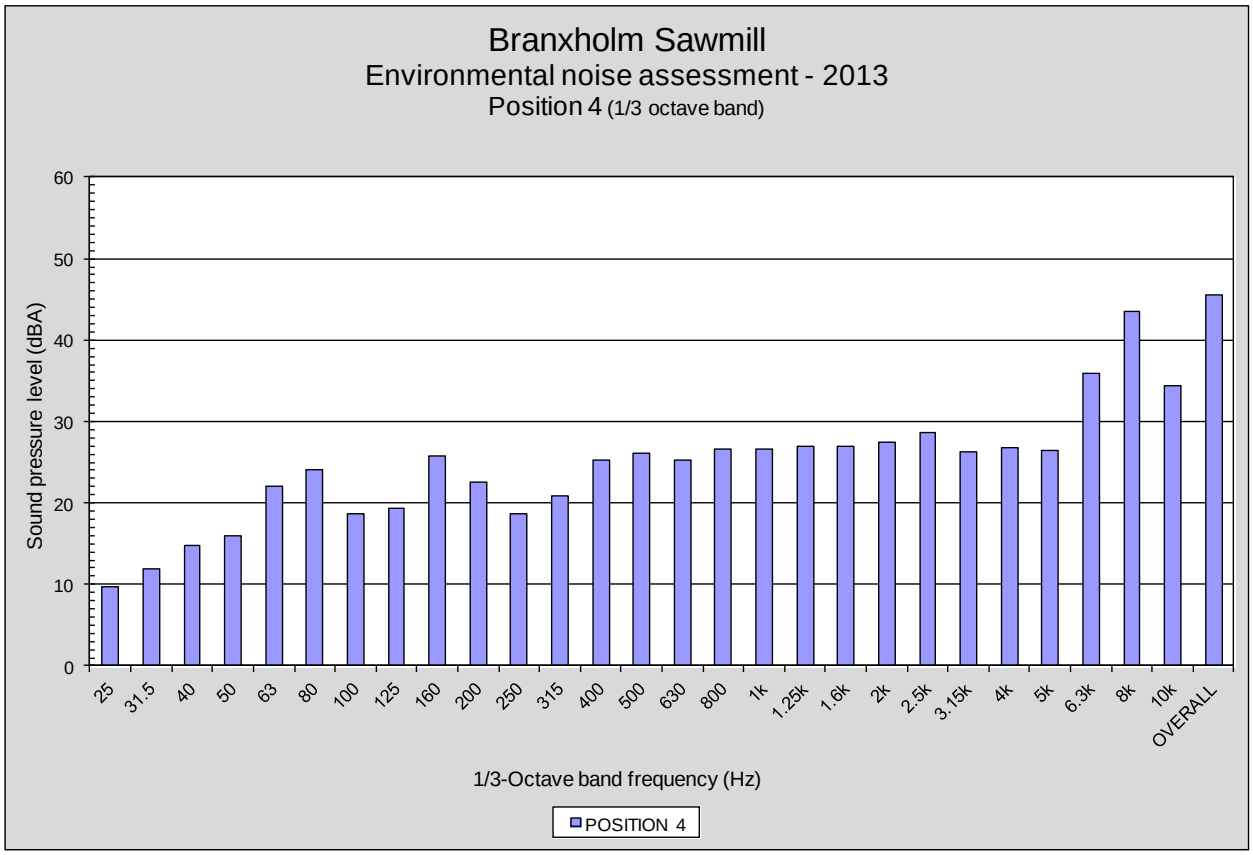

Figure 15 – Position 4 1/3-octave band spectra.

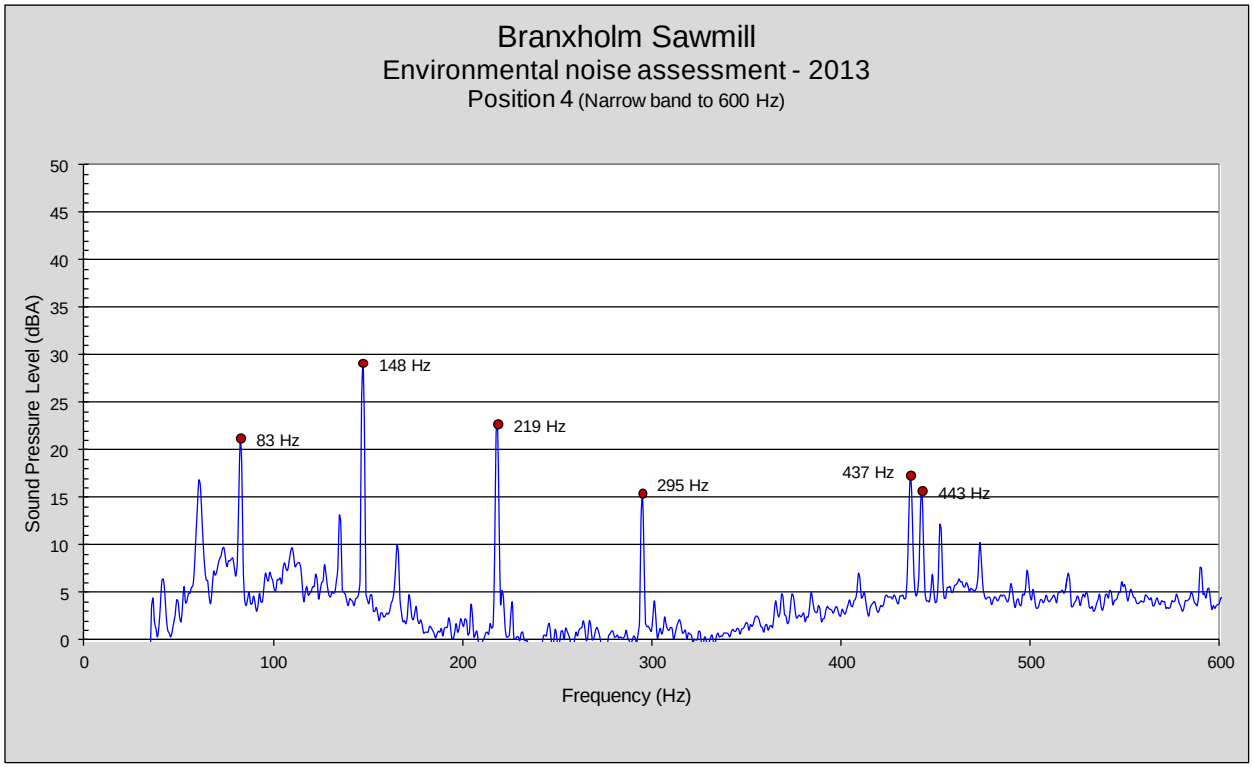

Figure 16 – Position 4 Narrow band spectrum (0 to 600 Hz).

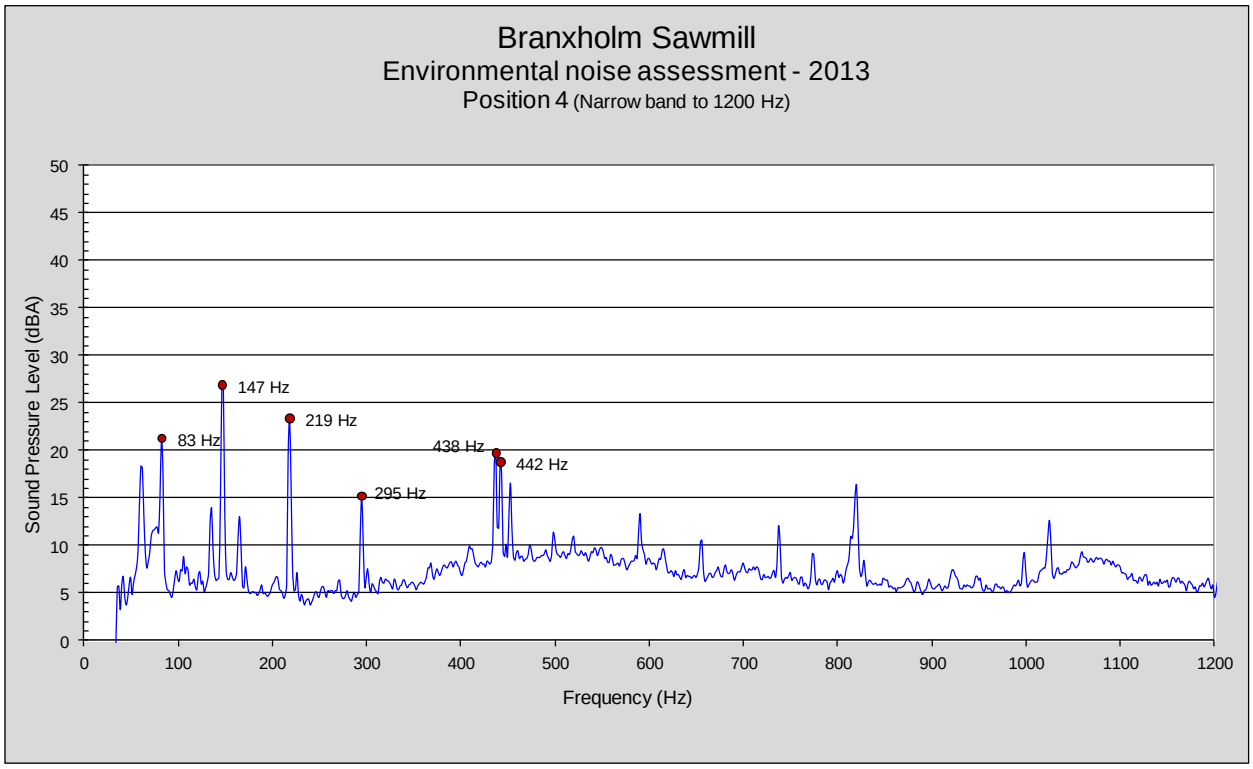

Figure 17 – Position 4 Narrow band spectrum (0 to 1200 Hz).

4.2.5 Position 5

Position 5 is located at the south-east boundary of the mill site on the old railway easement and was selected as a secure location for extended unobserved logging of Ln-statistics.

Spectral measurements at this location, conducted during decommissioning of the logging sound level meter, show a similar spectral shape to that measured at position 1 but at lower amplitude.

The extended data shows clearly that day time noise levels at this location where controlled by mill activity. All three statistics were elevated to between 55 and 65 dBA at the commencement of operations each day and decreased to below 45 dBA at the cessation of activity at the end of the day. During breaks background noise levels appear to drop by approx. 5 to 7 dB with the three statistics showing less separation. This is likely to have been the result of the chipper and scragg saw not operating but the dust extraction blowers continuing to operate and controlling the noise environment.

Background noise levels (L_{A90}) typically dropped to approx. 25 dBA at night with L_{Aeq} and L_{A10} levels elevated intermittently, most likely the result of intermittent traffic flow on the Tasman Hwy and/or harvesting activity at a nearby hop farm.

Figure 18 – Position 5.

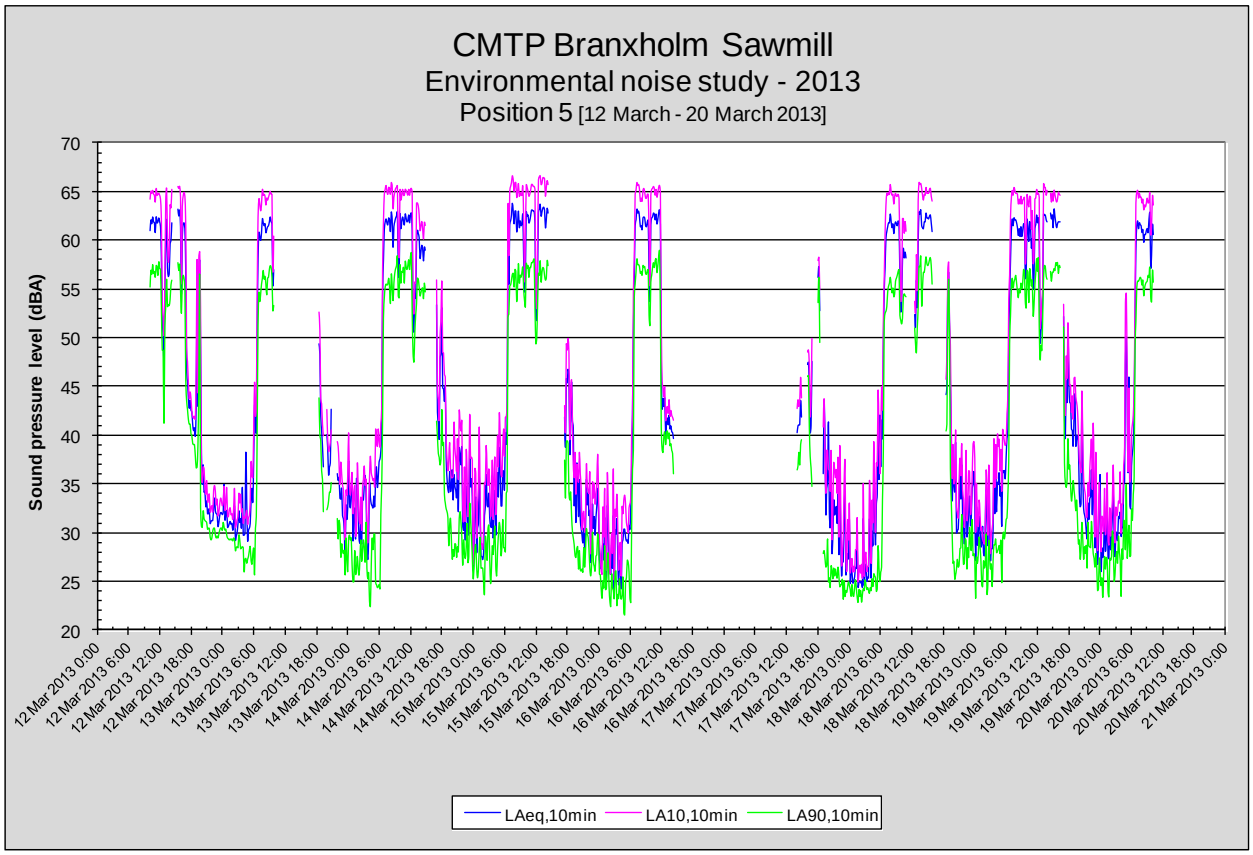

Figure 19 – Position 5 - Extended measurements.

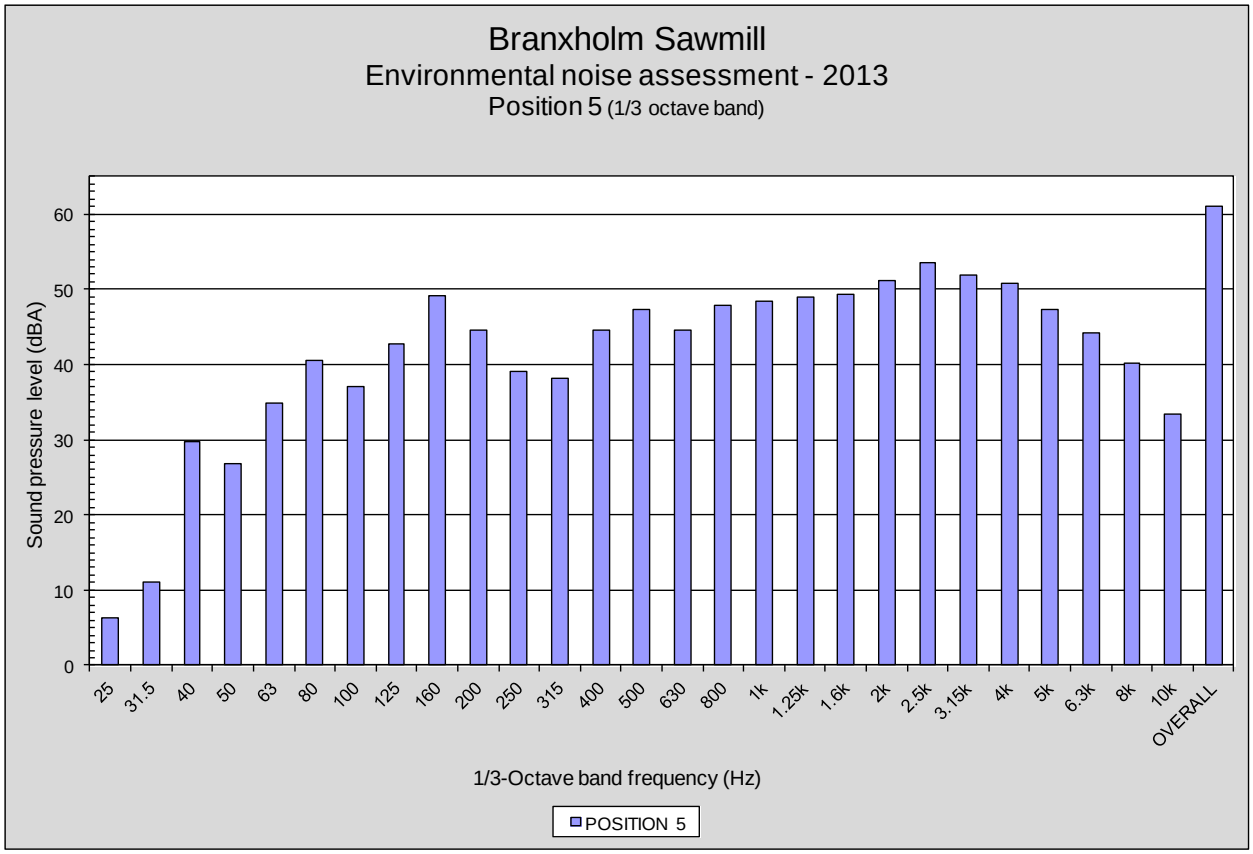

Figure 20 – Position 5 1/3-octave band spectra.

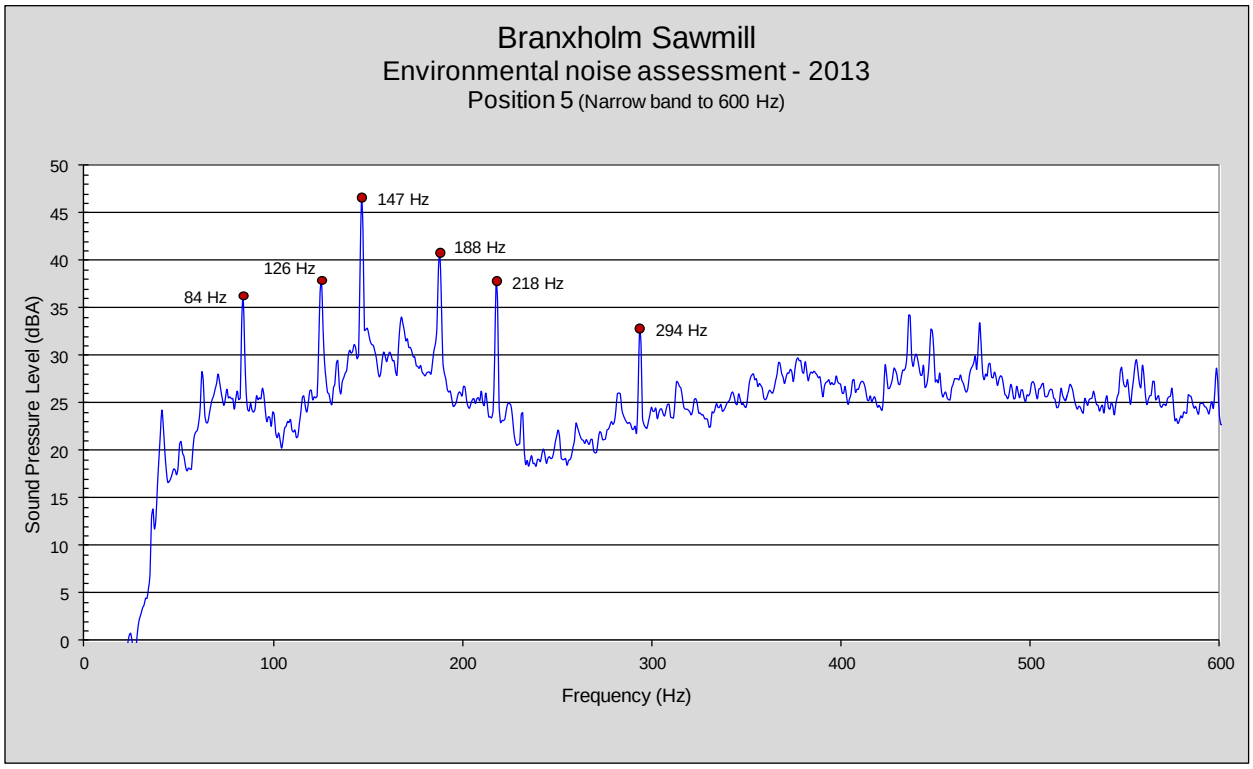

Figure 21 – Position 5 Narrow band spectrum (0 to 600 Hz).

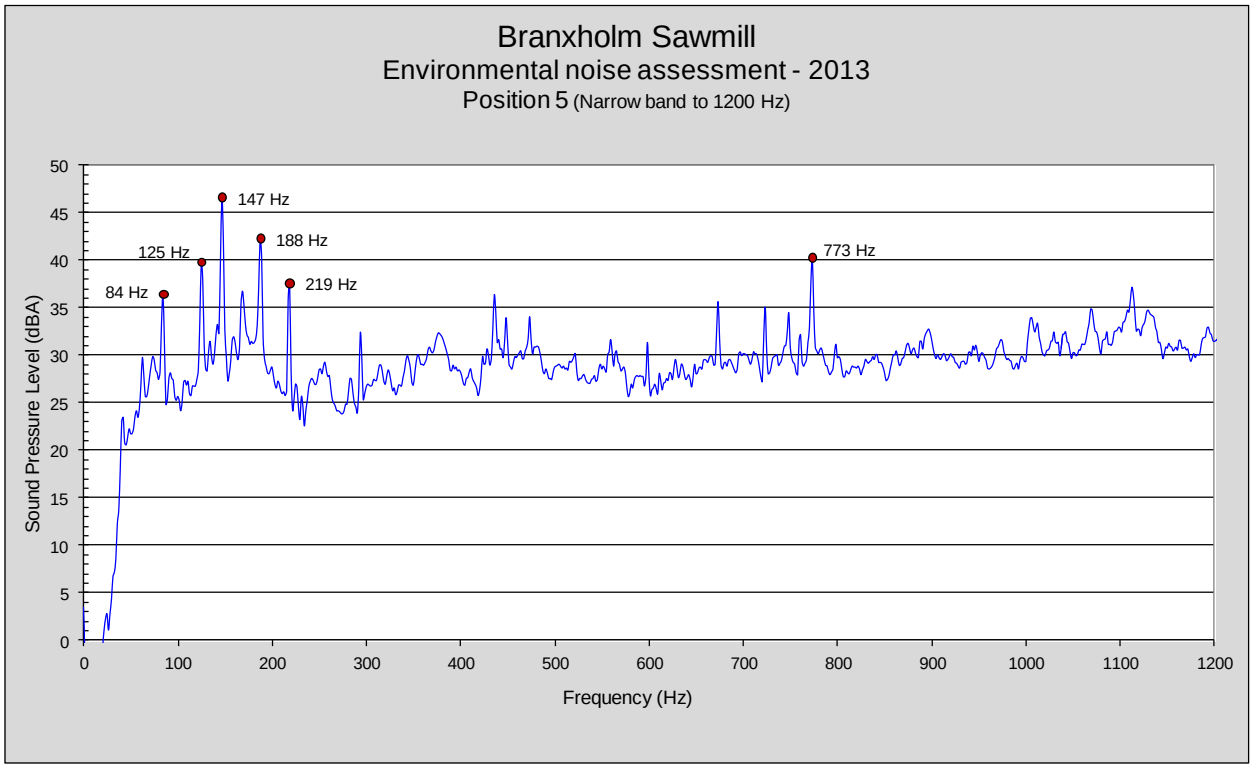

Figure 22 – Position 5 Narrow band spectrum (0 to 1200 Hz).

4.3 Discussion of survey results

Table 6 presents a summary of all measurement positions in relation to the EPN noise emissions limits for the Branxholm Sawmill site. Adjustments for tonality are also presented with adjustment for impulsiveness, modulation and low frequency not relevant. Locations where exceedances and potential breaches occur are indicated.

Summary results

Position	$L_{Aeq,10min}$ (dBA)	$L_{A90,10min}$ (dBA)	EPN Limit (dBA	Tonal Adj (dB)	$L_{Aeq,10min,adj}$ (dBA)	Potential Breach	Comment
1	56.8	51.3	50	0.5	57.3	**Yes**	Noise levels controlled by mill activity. Day limit exceeded and constitutes a potential breach.
2	51.7	43.5	50	0.1	51.8	**No**	L_{Aeq} levels elevated by traffic.
3	41.1	38.5	50	2.2	43.3	**No**	Day noise emission limit not exceeded.
4	44.1	42.8	50	0.3	44.4	**No**	Day noise emission limit not exceeded.

Potential breach of day EPN noise emission limit.

Table 6 – Summary of exceedances and potential breaches of permit conditions.

Discussion in relation to the above is as follows:-

- The exceedance and potential breach of the sites EPN day noise emission limit at position 1 was generated by noise emissions from the scragg saw, chipper and tones from the sawdust extraction blowers (this tonal energy resulted in a penalty of 0.5 dB).
- Tonal energy from the sawdust extraction blowers was also audible and measured at the other three measurement positions.
- Noise controls would be required on the following sources to allow compliance with the site EPN noise emission limit for the day period:-

  Chipper

  Options for chipper noise control would need to include some or all of the following:

  - Attenuation of infeed noise with an acoustic infeed tunnel.
  - Control of casing radiated noise by full enclosure of the chipper. Allowance for maintenance access and inspections, cleaning etc would be required as well as ventilation and lighting provisions.
  - Attenuate outfeed noise with acoustic enclosure of part of discharge conveyor.

  For the enclosure construction options include pre-cast concrete panels, cavity brick or block work, aerated concrete or other double walled timber and steel construction. Single skin, light weight enclosures are unlikely to provide adequate attenuation of chipper noise.

  An acoustic infeed tunnel, 6 to 8 metres long, with the entrance located inside the mill building will probably be required to achieve adequate control of infeed noise while a discharge acoustic tunnel of at least 6 m should be allowed for on the discharge conveyor.

Scragg saw
To control noise from the operation of the scragg saw would require an increased transmission loss to the walls at the south-east corner of the mill building (southern and eastern wall section adjacent to the scragg saw, currently southern wall section is open). Panel construction, such as Bondor, should provide the required transmission loss and would be suitable for incorporation into a sliding door system if access was still required through the southern facade of the mill building.

Sawdust extraction blowers
To control the tonal noise emission from the blowers tuned resonant cavity silencers should be installed on the inlet and discharge of all blowers. VIPAC doesn't recommend the use of absorptive silencers as these are likely to become clogged with material over time, drastically reducing their efficiency. Additionally, absorptive silencers are less effective when noise emissions are tonal.

NB: Please note that the noise control options outlined above are only preliminary and would require further investigation before detailed noise control specifications and design could be developed. VIPAC would be pleased to assist CMTP Branxholm Sawmills with such work should they wish to pursue any of these options.

5 Environmental noise prediction (new gas fired kiln)

5.1 Gas fired kiln

Information relating to the kiln proposed for the Branxholm Sawmill was provided by Mahild Drying Technologies GmBH. From the information provided VIPAC identified the following potential noise sources:-

- **Circulation fans**: located inside the kiln building with noise potentially breaking out though air inlet and exhaust vents in the roof.
- **Combustion air blowers (X2)**: associated with the gas burners for heating the kiln and located externally.

Figure 23 below provides a schematic of the kiln building with the source locations marked.

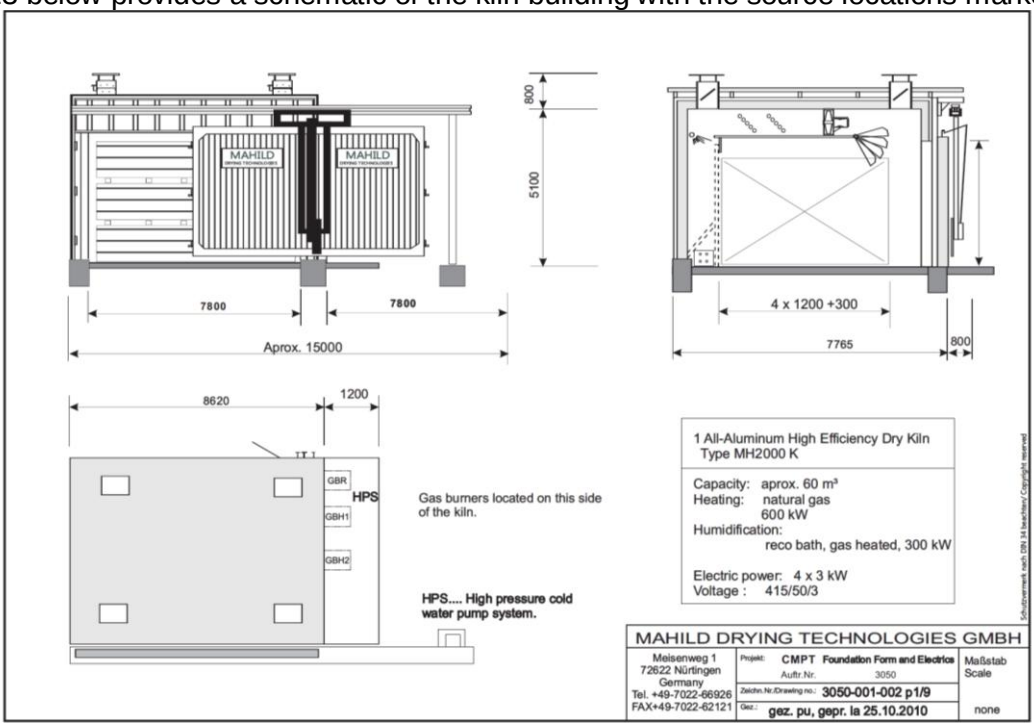

Figure 23 – Kiln schematic.

NB: Breakout of noise through the kiln building envelope was considered unlikely to be significant with the 130 mm double-skin aluminium alloy profile and 100 mm mineral wool infill construction likely to provide a high transmission loss. A third combustion air blower appears to be associated with reconditioning gas burner, however, it was assumed that this would not operate in conjunction with the two burners associated with the heating of the kiln.

5.2 Sound power levels

Sound power data was not available for the kiln installation and consequently VIPAC had to determine reasonable sound power level spectra for the identified sources.

Table 7 provides the calculated sound power level for the sources and information in relation to the determination of the listed level. Table 8 provides the sound power level spectrum for each source.

Overall sound power Levels (dBA)		
Area	SWL	Comment
Combustion blower	82.2	Sound power calculated from Twin City Fan Companies Ltd, TPD08R04B pressure blower sound power spectral data. SWL is per blower, two blowers in total.
Vent	87.4	Sound power calculated from Fantech Pty Ltd, AP1004GP6/10 axial flow fan sound power spectral data.SWL is per vent, four vents in total

Table 7 – Sound power levels.

Sound Power Spectra (dBA)									
Area	SWL spectra (Hz)								
	63	125	250	500	1k	2k	4k	8k	Total
Combustion blower	53.8	62.9	72.4	78.8	77.0	71.2	67.0	59.9	82.2
Vent	53.8	68.9	76.0	82.8	82.6	80.3	74.1	58.5	87.4

Table 8 – Sound power level spectra.

5.3 Receiver locations

Four receiver locations where selected to which noise emission levels from the proposed kiln were predicted. The receiver locations are listed in table 9 below and an aerial view of the mill with the locations marked is provided in figure 24.

NB: Some receiver locations differ from those used during the environmental nose survey, specifically R2 and R4. R4 was not accessible during the survey while R2 is likely to be more strongly influenced by the new kiln and not as strongly influenced by emission from the mill itself when compared to survey position 2.

Receiver locations		
Receiver	Location	Position (Eastings and Northings) (Datum: GDA94, Zone 55)
R1	Southern Boundary	564921E / 5442636N
R2	Pearce St	562313E / 5442764N
R3	Station Rd	561543E / 5442682N
R4	Northern property	561894E / 5443092N

Table 9 – Receiver positions.

Figure 24 – Receiver locations.

5.4 Predicted sound pressure levels

Predicted noise levels at the four receiver locations were calculated with consideration of the following parameters:-

- Distance attenuation
- Ground absorption.
- Atmospheric attenuation/amplification (worst case weather conditions were considered).
- Barrier effect from structures within the mill

Table 10 presented the predicted noise emission levels at each receiver location

Predicted sound pressure levels (dBA)	
Receiver	Predicted SPL
R1	36.1
R2	29.1
R3	30.1
R4	37.4

Potential exceedance of night EPN noise emission limit of 40 dBA.

Table 10 – Predicted noise levels.

5.5 Discussion of prediction results

Predicted noise emission levels from the proposed kiln are below the noise emission limit of 40 dBA for night under the mills current EPN. Given this additional noise controls on the kiln shouldn't be required.

The above is predicated on the noise sources associated with the kiln not exceeding the sound power level spectra developed for this assessment. Additionally, the octave band sound power spectra don't allow for an assessment of potential tonality in the noise emissions. Fans and blowers are notorious for producing tones at blade pass frequencies and given that the background noise levels in the area (based on logged data from the survey) appear to consistently descend below 30 dBA any tones have the potential to be clearly audible and incur penalties under N2(4) of the sites EPN. The supplier of the kiln should be aware of this and ensure that tonal noise emissions are not produced by the kilns operation.

Given that sound power data was not available for the installation VIPAC recommends an environmental noise survey of the kiln is conducted during commissioning to determine the installations compliance with the sites EPN noise emission requirements.

6 Conclusions

- An environmental noise assessment of the CMTP Branxholm Sawmill current operations and potential installation of a new gas fired kiln was conducted by VIPAC.
- An environmental noise survey of current day operations revealed a potential breach of the sites day EPN noise emission limit of 50 dBA.
- The chipper, scragg saw and sawdust extraction blowers were identified as the sources requiring controls to comply with 50 dBA at residential locations and recommendations for control options have been provided in section 4.3.
- Predicted noise emission levels from the proposed kiln installation were below the night EPN noise emission limit of 40 dBA and as such no additional controls should be required. This is provided that the sound power level spectra produced by sources associated with the kiln don't exceed those developed for this assessment; and that noise emissions from the installation are free of tones as defined in the *Tasmanian Noise Measurement Procedures Manual*.

7 Appendix 1

Site	Period	Date	Time	Duration	$L_{Aeq,10min}$	$L_{Amax,10min}$	$L_{Amin,10min}$	$L_{A1,10min}$	$L_{A10,10min}$	$L_{A50,10min}$	$L_{A90,10min}$	$L_{A99,10min}$
1	Day	12-Mar-13	10:20:00	10:00.0	57.3	67.0	49.7	63.3	60.3	56.1	52.3	50.8
1	Day	12-Mar-13	10:30:00	10:00.0	56.9	65.6	48.9	62.7	60.3	55.3	51.1	49.4
1	Day	12-Mar-13	10:40:00	10:00.0	56.1	66.1	47.4	62.4	59.3	54.9	50.6	48.4
				Average	56.8	66.2	48.7	62.8	60.0	55.4	51.3	49.5

Table A1 – Position 1 observed environmental noise measurements.

Site	Period	Date	Time	Duration	$L_{Aeq,10min}$	$L_{Amax,10min}$	$L_{Amin,10min}$	$L_{A1,10min}$	$L_{A10,10min}$	$L_{A50,10min}$	$L_{A90,10min}$	$L_{A99,10min}$
2	Day	12-Mar-13	11:00:00	10:00.0	52.8	72.0	40.3	66.1	52.9	46.4	43.0	41.3
2	Day	12-Mar-13	11:10:00	10:00.0	52.6	72.2	41.0	66.3	52.2	45.9	43.3	42.0
2	Day	12-Mar-13	11:20:00	10:00.0	49.6	64.9	41.7	57.3	52.9	47.5	44.2	42.6
				Average	51.7	69.7	41.0	63.2	52.7	46.6	43.5	42.0

Table A2 – Position 2 observed environmental noise measurements.

Site	Period	Date	Time	Duration	$L_{Aeq,10min}$	$L_{Amax,10min}$	$L_{Amin,10min}$	$L_{A1,10min}$	$L_{A10,10min}$	$L_{A50,10min}$	$L_{A90,10min}$	$L_{A99,10min}$
3	Day	12-Mar-13	12:00:00	10:00.0	41.5	53.2	36.5	48.2	43.6	40.6	38.7	37.4
3	Day	12-Mar-13	12:10:00	10:00.0	41.3	52.4	37.4	46.9	43.0	40.5	38.8	37.9
3	Day	12-Mar-13	12:20:00	10:00.0	40.4	52.7	36.8	45.2	42.3	39.7	38.1	37.1
				Average	41.1	52.8	36.9	46.7	42.9	40.3	38.5	37.5

Table A3 – Position 3 observed environmental noise measurements.

Site	Period	Date	Time	Duration	$L_{Aeq,10min}$	$L_{Amax,10min}$	$L_{Amin,10min}$	$L_{A1,10min}$	$L_{A10,10min}$	$L_{A50,10min}$	$L_{A90,10min}$	$L_{A99,10min}$
4	Day	12-Mar-13	13:50:00	10:00.0	43.4	53.0	41.1	46.8	44.4	43.1	42.2	41.3
4	Day	12-Mar-13	14:00:00	10:00.0	43.6	54.4	41.3	46.7	44.7	43.5	42.4	41.6
4	Day	12-Mar-13	14:10:00	10:00.0	45.2	52.9	42.6	48.5	46.3	45.0	43.7	43.0
				Average	44.1	53.4	41.7	47.3	45.1	43.9	42.8	41.9

Table A4 – Position 4 observed environmental noise measurements.