



Report No. SRB/6735/B

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for
Tomlinsons Dairies Ltd
Five Crosses Industrial Estate
Minera
Wrexham
Clwyd
LL11 3YR

Dated: 29 August 2014

BS 4142 NOISE ASSESSMENT
OF A
PROPOSED BLOW MOULDING BUILDING
TOMLINSONS DAIRIES LTD
MINERA
WREXHAM

Measurements carried out by: R E George BEng MIOA
Report Author: S R Baxter BEng MIOA

ACOUSTICAL INVESTIGATION & RESEARCH ORGANISATION LTD

Duxons Turn
Maylands Avenue
Hemel Hempstead
Hertfordshire
HP2 4SB

Telephone: 01442 247146
Facsimile: 01442 256749
E-mail: AIRO@bcs.org.uk
URL: <http://www.airo.co.uk/>

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1. INTRODUCTION

AIRO is retained by Tomlinsons Dairies Ltd to conduct an environmental survey and assessment in relation to the noise impact of a proposed new blow moulding facility on nearby noise sensitive dwellings.

This report presents the results of background noise measurements made near to the nearest identified noise sensitive dwellings (The Chase and Kalver) and noise level measurements of specific items of plant at an existing blow moulding facility in Omagh upon which the proposed facility has been based. An environmental noise assessment has been carried out based upon the measurement data.

The primary source of guidance for the measurement survey and subsequent assessment has been British Standard BS 4142 entitled "Method for rating industrial noise affecting mixed residential and industrial areas" (ref 1)

2. DESCRIPTION

Haston Reynolds Chartered Surveyors drawing H0070-08-A1-PL-04 provides a plan showing the position and extent of the proposed blow moulding building. The building is located next to the existing workshop building just to the north of the main dairy building.

The ground floor of the two storey building comprises approximately 780 m² area in which the blow moulding machines would operate with an office, canteen, toilets, work shop and switch room along the southern end. Loading and unloading is indicated at the northern end of the west elevation. The entire first floor is

proposed as a plastic bottle storage area with a service bridge connecting this to the main building.

The nearest noise sensitive properties are The Chase, Ruthin Road and Kalver, Gwernygaseg Road.

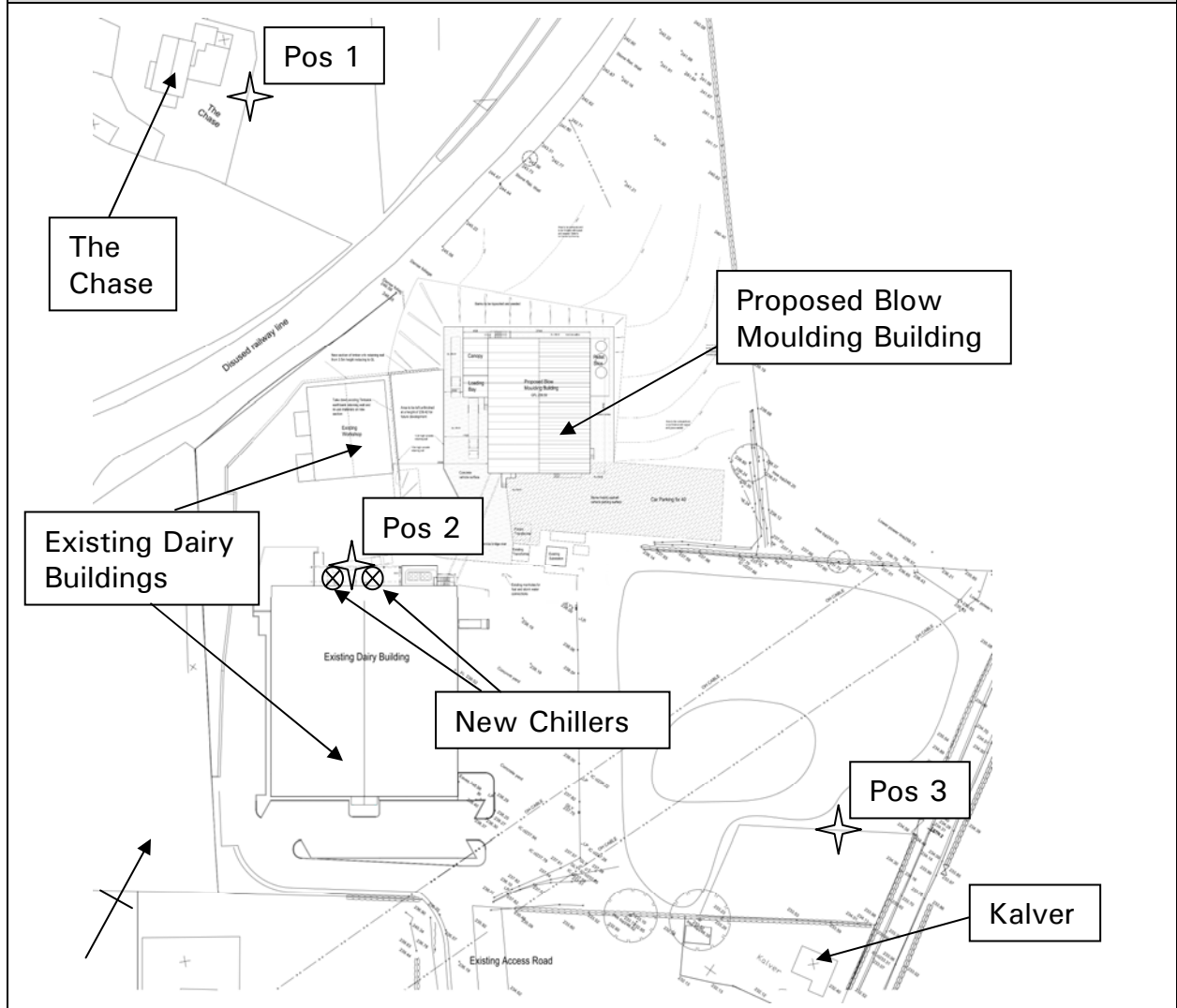
Information provided to AIRO indicates that Milacron R2000-100 blow moulding machines are proposed. Other potential noise producing machinery to be located internally within the building have been identified as the material pipe, C30 hopper loader, internal F48/2 vacuum pump, CL45 cyclone filter, Tri BM 50-30 granulator, SM45A Oil-Free Air Compressor, a bagger, bag lifts and a bag conveyor. The enclosed service bridge connecting the proposed blow moulding building to the existing main building contains a bottle conveyor.

Externally, fixed items of plant and activities giving rise to potential noise have been identified as the filling of the silos, noise from material passing along the pipe between the silos and the building, and a Coolmation TETRIS/SLN-23.4 external chiller.

It is understood that the proposed hours of operation of the blow moulding facility are 24-hours, however, the filling of the silos will take place during normal day time working hours only (between 8 am and 5 pm).

Figure 1 shows the proposed location of the blow moulding building and the nearest potential noise sensitive properties.

Figure 1 – Proposed Blow Moulding Building and Nearest Noise Sensitive Properties



3. NOISE MEASUREMENT UNITS

Noise levels are generally presented in terms of “A-weighted” decibels. The “A-weighting” is an internationally agreed frequency response similar to that of the average human ear, so that “A-weighted” sound levels correspond reasonably well with what is heard.

Typical noise sources do not radiate sound at a continuous steady level but tend to vary in level over a given time period. The Equivalent Continuous Sound Pressure Level, L_{Aeq} , is the most widely used objective averaging technique which expresses

the acoustic energy of a fluctuating noise climate over a given period as the single continuous level having the same energy as the time varying signal.

To measure background environmental noise levels the statistical index L_{A90} is commonly preferred over the L_{Aeq} index. The L_{A90} is the sound pressure level that is exceeded for 90% of the measurement period. The L_{A90} therefore discriminates against short duration peaks of noise and is consequently considered to provide a better representation of typical minimum noise levels compared with the L_{Aeq} .

In some circumstances it is useful to quantify the maximum level of fluctuating noise and commonly used descriptor is L_{Amax} . This represents the maximum reading given by a sound level meter for a given event or period of time and would normally be qualified by either "fast" or "slow" according to the response time setting of the meter.

It is currently correct practice to identify noise levels as "A-weighted" by incorporation of the "A" within the index descriptor such that "A-weighted" L_{eq} , L_{90} or L_{max} are expressed as L_{Aeq} , L_{A90} and L_{Amax} respectively.

4. CONDITIONS AND ASSESSMENT GUIDANCE FOR NOISE

4.1 Conditions Placed Upon the Proposals

It is understood that the following Condition has been placed upon the development:

"6. The rating level of any noise generated by reason of this development shall not exceed pre-existing background noise levels by more than 5 dB(A) at any time. The noise level shall be determined to the nearest noise sensitive premises and measurements and assessment shall be made in accordance with BS 4142:1997 Method or (sic) Rating Industrial Noise Affecting Mixed Residential and Industrial areas".

4.2 BS 4142 – Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas.

A long established method of assessing the significance of industrial noise on residential areas is set out in BS 4142 – "Method for rating industrial noise affecting mixed residential and industrial areas" (ref 1). The BS 4142 assessment method considers the likelihood of noise from specific sources provoking complaints from residents of nearby sensitive properties.

The likelihood of complaints is assessed by comparing the noise levels from the specific noise source under investigation against typical prevailing background noise levels. The audible characteristics of the specific noise source are also taken into account.

Daytime and night-time operating periods are considered separately such that typical periods of 1 hour and 5 minutes respectively are used in the assessment. The relevant noise levels for the assessment are determined at residential buildings where people are likely to be affected.

The margin by which noise levels due to the specific sources under consideration exceed the prevailing background noise level enables the likelihood of complaints of be evaluated. In this case, as stated in Section 4.1 above, the Local Authority have placed the requirement that the noise sources under investigation should not exceed the prevailing background noise level by more than 5 dB(A).

BS 4142 defines various terms for assessment purposes. The three main parameters are the Background noise level, the Specific noise level and the Residual noise level.

Background noise level – the A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval.

Specific noise level – the equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source (the noise source under investigation) over a given reference time interval.

Residual noise level – the equivalent continuous A-weighted sound pressure level of the ambient noise remaining when the specific noise source is suppressed to a degree that it does not contribute to the ambient noise.

5. NOISE LEVEL MEASUREMENTS

5.1 Noise Level Measurements at Tomlinsons Dairies, Minera

Measurements of the prevailing background noise levels were made near to the nearest noise sensitive premises over the period 12:00 on Wednesday 20 August 2014 to 21:00 on Friday 22 August 2014.

Measurements were made using automatic data logging sound level meters which logged the noise level every 2 seconds throughout the period together with hourly values across a range of indices.

At Position 1, the microphone was at a height of approximately 1.8 metres above local ground level in a field adjacent to the eastern boundary of The Chase approximately 18 metres from the “rear” façade of The Chase, Ruthin Road.

At Position 2, the sound level meter was located on the 6 metre (approx) high platform upon which the new dairy chillers are positioned. The microphone was approximately 1 metre from the chillers. The sound level meter was located at Position 2 between 17:00 on 20 August and 20:00 on 22 August.

For short periods either side of the measurements at Position 2, measurements were made at Position 3, with the microphone approximately 1.5 metres above local ground level on the dairy site boundary as close to Kalver as possible. Due to an earth bund between Position 3 and the dairy, the microphone was shielded from the noise from the dairy and therefore was considered to be in a location representative of that to the “rear” of Kalver in terms of noise.

Measurement Positions 1, 2 and 3 are shown in Figure 1 and details of the measurement instrumentation together with recorded weather conditions are presented in Appendix A. Logs of events during both night-time periods can be found in Appendix E.

The full sets of hourly measurement data for measurement Positions 1, 2 and 3 are shown in Appendix B. Table 1 shows the noise levels for day and night-time periods over the measurement period at Positions 1 and 3.

Table 1 – Measured Period Noise Levels				
Position	Date	Period	L_{Aeq} (dB)	L_{A90} (dB)
1	20/8/14 to 21/8/14	Daytime (07:00 – 23:00)	45	39
		Night-time (23:00 – 07:00)	36	30
	21/8/14 to 22/8/14	Daytime (07:00 – 23:00)	46	40
		Night-time (23:00 – 07:00)	39	28
3	20/8/14	12:00 to 16:00	48	40
	22/8/14	20:00 to 21:00	54	51

Measurements were made at Position 2 in order to gain information with regard to the on/off times of the new Chillers and to observe the effect, if any, the operation of the Chillers had on the noise levels at measurement Position 1 adjacent to The Chase. The old Chillers which have been the subject of some noise complaint in the past are no longer operational.

Figures 2 and 3 below show the noise level traces from Positions 1 and 2 over the same night-time period between 23:00 on 20 August and 07:00 on 21 August and between 23:00 on 21 August and 07:00 on 22 August respectively.

The measured data in Figure 2 shows that during the period directly after the chillers were switched on (03:15 to 04:50), the background noise level (L_{A90}) at measurement position 1 does increase by 2dB but the L_{Aeq} decreases by 1 dB and the noise from the new chillers makes very little difference to the overall period noise levels (both L_{Aeq} and L_{A90}). After 04:50 the noise level at the measurement position adjacent to The Chase continues to steadily increase but this cannot be attributed to the chillers at the Dairy as the noise level there remains constant. This general pattern is repeated the following evening as can be seen in Figure 3. It is clear from the measurement data that the operation of the new chillers has very little to no effect on the background noise level at Position 1.

Noise sources noted at Position 1 adjacent to the eastern boundary to The Chase included distant industrial noise from the direction of the industrial area, road traffic, aircraft flyovers, birds and leaves rustling. At the time of setting up and collecting the sound level meter at Position 1 noise from the new chillers at the dairy were indistinguishable from other industrial noise.

Noise measurements at The Chase were not possible as access was not granted. Therefore Position 1 was chosen as a proxy to be representative of noise levels that may be expected at The Chase. Had noise levels been measured at The Chase they may have been different and in fact, previous measurements carried out at first floor level suggest that background noise levels are higher at this position.

(20 August 2014 to 21 August 2014)

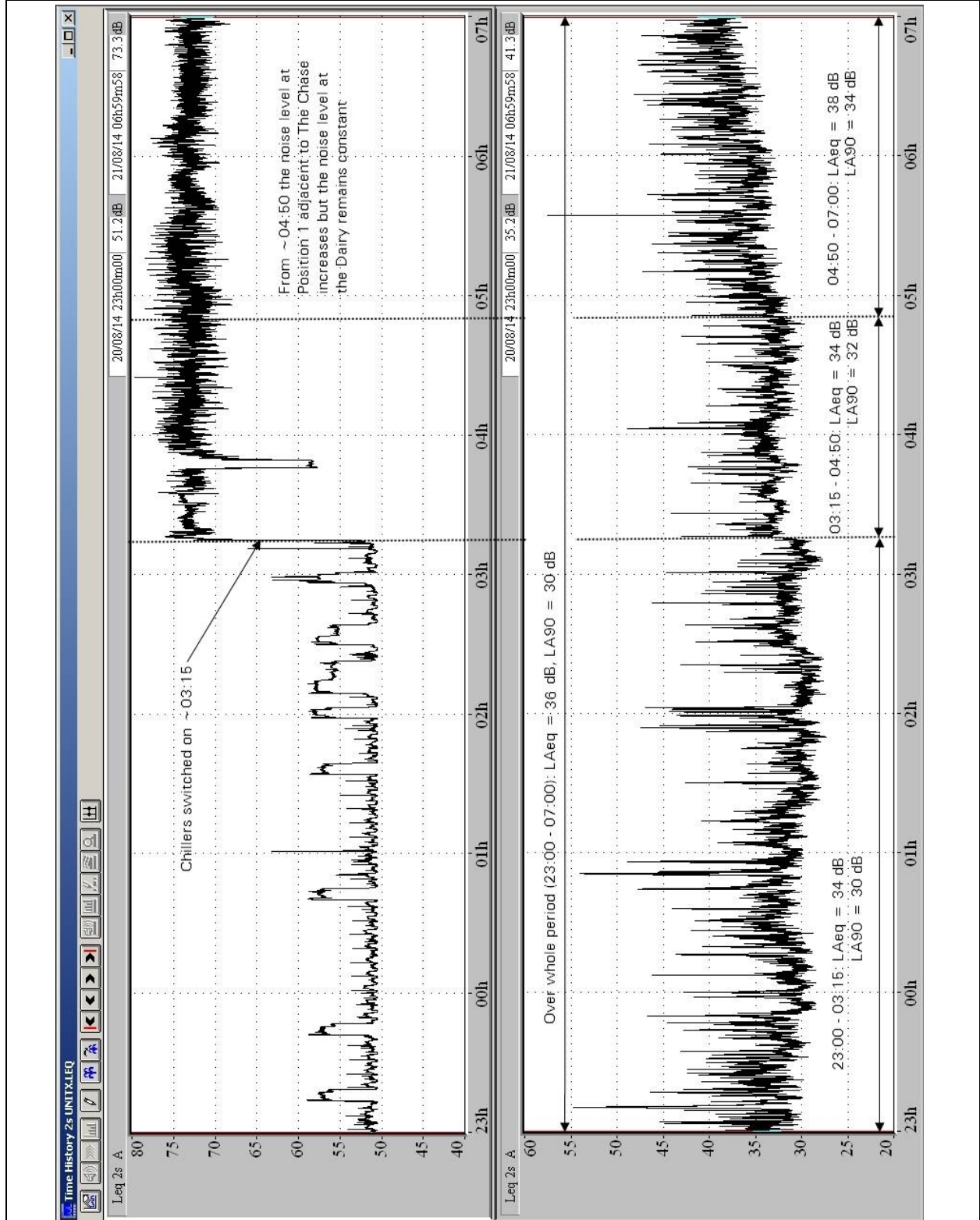
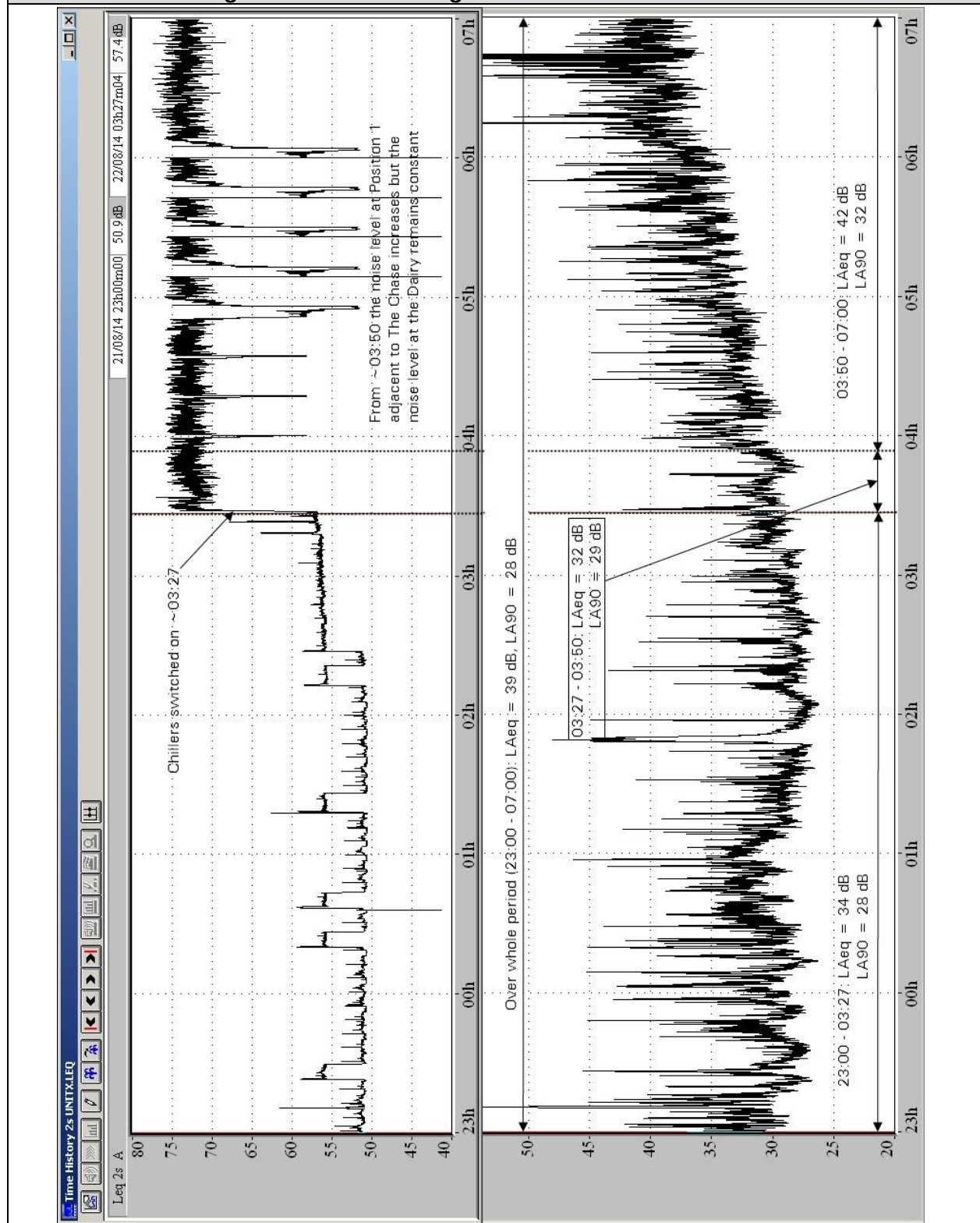


**Figure 3 – Night-time Noise Level Trace for Measurement Positions 1 and 2
(21 August 2014 to 22 August 2014)**



5.2 Noise Level Measurements at Existing Blow Moulding Facility in Omagh

In order to assess the noise levels that the proposed blow moulding facility is likely to produce, measurements of existing noise levels were also made at an existing blow moulding facility in Omagh, Northern Ireland that is understood to be of similar construction and contain machinery that is similar, if not the same as that proposed for the facility in Minera.

Measurements were made inside and outside the facility including average noise levels from all plant and measurements of specific items of plant. Measurements of the silo filling operation were also made.

Measurements were made using a sound level meter mounted on a tripod with the microphone approximately 1.5 metres above local ground level.

The full set of recorded data is shown in Appendix C along with a sketch diagram of the layout of the blow moulding facility in Omagh.

Table 2 below shows a summary of the measured data relevant to the proposed facility in Minera.

The subjective impression was that noise from the internal plant was barely audible when stood just outside the blow moulding building.

Table 2 – Summary of Plant Noise Measurements from Facility in Omagh

Plant	Location Internal/External to building	Approx Frequency	Approx Duration	Approx Noise level (dB)	Distance measured at (m)
Silo Filling - Noise from tanker and granules through fill pipe	External	1-2 deliveries per week	1 hour	94 (lorry tanker pump) 94 (pellets through pipe) *	2 1
Pipe between external silo & building (mainly plastic)	External	6 times in 20 mins	22-35 secs	73	1
Coolmaton TETRIS-SLN- 23.4 External Chiller	N/A as plant in Omagh is different to that proposed for facility in Minera				
Bottle Conveyor	Internal	Continuous		71	1
Material Pipe (metal)	Internal	7 times in 20 mins	29-35 secs	94	1
C30 Hopper Loader	Internal	Makes no noise. Output from Cyclone Filter, The Hopper is just a container			
CL45 Cyclone filter	Internal	7 times in 20 mins	42 secs	83	1
Vacuum pump	N/A as plant in Omagh is different to that proposed for facility in Minera				
Tri BM 50-30 Granulator	Internal	Continuous		82	1
SM54A Two- Stage Oil-free Air Compressor	Internal	Continuous		76	1
R2000-100 Blow Moulding Machine	Internal	Continuous		81	1
Bagger	Internal	Continuous		76	1
Bag Lifts	Internal	Continuous		74	1
Bag Lift Alarms		Every 15 mins	30 secs	84	2
Bag Conveyor	Internal	Continuous		67	1
Average noise level within building from 3 measurement positions		30 mins continuous measurement at each position		80	N/A

* - The 94 dB @ 1 metre quoted for noise from pellets through the pipe includes noise from the tanker and external chiller.

6. NOISE ASSESSMENT – BS 4142:1997

The noise levels arising from the use of the proposed building have been considered in two stages.

Firstly, noise levels arising from fixed external plant to the building have been considered. Calculations have been conducted in accordance with BS 5228 (ref 2) using the computer programme NoiseMap which implements the calculation method of BS 5228 enabling a digital model to be created of the relevant source noise level data and positions together with topographical information affecting the noise propagation path.

Secondly, the transmission of noise from activities inside the building has been considered. The noise level inside the building has been assumed to be no higher than the upper exposure action value of 85 dB(A) stated in the Control of Noise at Work Regulations 2005 which is a daily exposure level that legally should not be exceeded. This has been adjusted based on the acoustical conditions inside the building controlled by the volume of space and the amount of sound absorption.

The noise level measurements made in Omagh support this approach. As can be seen from Table 2, while there may be localised areas within the building where 85 dB(A) is exceeded, there will also be areas where the noise level is below 85 dB(A) the overall noise level in the space is expected to be lower. The measurements in Omagh showed that the average noise level from 3 positions (two of which were very close to items of plant) was 80 dB(A) with one blow moulding machine (and all associated plant) operating. In the proposed facility in Minera where two blow moulding machines and associated plant are proposed, the noise level is expected to be 83 dB(A). Therefore using 85 dB(A) in the assessment is considered a worst case scenario.

The transmission of noise from inside the building to the nearest noise sensitive receptor has been calculated based on the sound reduction indices of the building envelope, the areas of the relevant parts of the building (including the cladding, roller shutter doors and louvres) radiating noise and the distance to the receptor. Any additional screening along the propagation path has also been taken into account. The distance and screening corrections were also made in accordance with BS 5228 using the digital noise model. Data relating to the sound insulation performance of the façade of the proposed building were provided by the supplier and can be found in Appendix D along with all other relevant data including drawings provided to AIRO by Tomlinsons Dairies and Haston Reynolds.

The overall noise level at The Chase and Kalver due to the proposed blow moulding building has then been determined by the decibel addition of the noise levels due to external and internal noise sources.

Table 3 shows a summary of the items of plant to be installed as part of the proposed blow moulding facility and the associated measured, supplied and calculated noise levels. Noise level data for plant different to that in Omagh has been obtained from manufacturers/suppliers technical data which can be found in Appendix D. NoiseMap requires that sound pressure level data be input based on a distance of 10 metres and therefore the noise levels have been corrected for this.

Table 4 below summarises the calculated noise levels at The Chase and at Kalver as a result of noise from the proposed blow moulding building. At each of the two properties, noise levels have been calculated for 1) the worst case hour when the silo is being filled and 2) the most common scenario of the general contribution at times when the silo is not being filled.

The assessment/calculation position for The Chase is 1 metre from the “rear” façade at first floor level. The assessment/calculation position for Kalver is 3.5 metres from the “rear” façade at ground floor level.

Table 3 – Details of all Plant to be Installed

Plant	Location Internal/ External to building	Approx Frequency	Approx Duration	Measured Noise level (dB)	Distance measured at (m)	Distance for Calc (m)	On-Time (%)	Noise Level amended for on time, distance and no. of items	Total for internal plant @10 metres (db)	
Silo Filling - Noise from tanker and granules through fill pipe	External on north east façade	Weekly	1 hour	94	2	10	100 (for operational hour)	84	N/A	
				94	1			74		
Pipe between external silo & building	External on north east façade	Every 60s	30s	73	1	10	50	50		
Coolmation TETRIS-SLN-23.4 External	External on north east façade	Continuous during production		49	10	10	100	49		
Bottle Conveyor	External but enclosed in service bridge	Continuous during production		71	1	10	100	61 (43 outside enclosure)		
Material Pipe (x2l)	Internal	Every 60 secs	30 secs	94	1	10	50	74		76
C30 Hopper Loader (x2)	Internal	Makes no noise. Output is from Cyclone Filter, the Hopper is just a container								
CL45 Cyclone (x2) filter	Internal	Every 60 secs	30 secs	83	1	10	50	63		
Internal F48/2 vacuum pump (x2)	Internal	Every 60 secs	30 secs	74	2	10	50	60		
Tri BM 50-30 Granulator (x2)	Internal	Continuous during production		82	1	10	100	65		
SM54A Two-Stage Oil-free Air Compressor (x2)	Internal	Continuous during production		76	1	10	100	59		
R2000-100 Blow Moulding Machine (x2)	Internal	Continuous during production		81	1	10	100	64		
Bagger (x2)	Internal	Continuous during production		76	1	10	100	59		
Bag Lifts (x2)	Internal	Continuous during production		74	1	10	100	57		
Bag Lift Alarm (x2)	Internal	Every 15 mins	30 secs	84	1	10	10 (in 5 min period)	54		
Bag Conveyor (x 2)	Internal	Continuous during production		67	3	10	100	60		

Table 4 – Calculated Noise Levels at Nearby Noise Sensitive Properties

	Noise Level (dB) at:			
	The Chase		Kalver	
	1	2	3	4
	Worst Case Hour with Silo	Any Hour or Day with No Silo	Worst Case Hour with Silo	Any Hour or Day with No Silo
External Plant	52	26	46	22
Internal Plant	21	21	11	11
Combined External and Internal	52	27	46	22

As shown in Section 5 of this report the overall period background noise levels measured at Position 1 adjacent to the boundary with The Chase were not affected by the operation of the new chillers at the dairy and therefore it is considered that the period noise levels quoted in Table 1 are appropriate to use in the BS 4142 assessment. As period noise levels could not be obtained at Kalver, the background noise levels measured at The Chase have been used for Kalver assessment. Comparing the measurements at The Chase and at Kalver over the same time periods shows that the background noise levels were actually slightly higher at Kalver and therefore the aforementioned approach should give a worst case assessment.

Clause 8 of BS 4142 requires the addition of 5 dB to the Specific noise level if the character of the noise includes one or more features described in the clause. Based on the reported subjective impression of the plant measured at the existing blow moulding facility, it is considered appropriate to apply the penalty in this case.

Table 5 – BS 4142 Assessment Based on a Worst Case Hour with Silo Filling

Description	Analysis		
	Daytime		Night-time
	The Chase	Kalver	
Calculated Noise Level (L_{Aeq})	52 dB	46 dB	--
Residual Noise Level (L_{Aeq})	45 dB	45 dB	--
Specific Noise Level	52 dB	46 dB	--
Acoustic Feature Correction	+ 5 dB	+ 5 dB	--
Rating Level	57 dB	51 dB	--
Background Noise Level (L_{A90})	39 dB	39 dB	--
Excess of Rating over Background	+ 18 dB	+ 12 dB	--

Table 6 – BS 4142 Assessment Based on a Typical Hour with no Silo Filling

Description	Analysis			
	Daytime		Night-time	
	The Chase	Kalver	The Chase	Kalver
Calculated Noise Level (L_{Aeq})	26 dB	22 dB	26 dB	22 dB
Residual Noise Level (L_{Aeq})	45 dB	39 dB	39 dB	39 dB
Specific Noise Level	26 dB	22 dB	26 dB	22 dB
Acoustic Feature Correction	+ 5 dB	+ 5 dB	+ 5 dB	+ 5 dB
Rating Level	31 dB	27 dB	31 dB	27 dB
Background Noise Level (L_{A90})	39 dB	39 dB	28 dB	28 dB
Excess of Rating over Background	-8 dB	-12 dB	+ 3 dB	-1 dB

7. DISCUSSION AND POSSIBLE MITIGATION MEASURES

As can be seen from Tables 5 and 6, for the vast majority of the time the noise generated by the proposed blow moulding plant will not exceed the existing background noise level by more than 5 dB and Condition 6 will be met. On an approximately weekly basis, for one hour (at sometime between 8 am and 5 pm) the noise from the filling of the silos will exceed the existing background noise levels by 18 dB and 12 dB at The Chase and Kalver respectively. It may be noted that this general conclusion is the same as concluded in the previous AIRO report SRB/6735/A dated 27 May 2014.

In order to control the noise impact of the silo filling operation to a level at which it will not breach Condition 6, it must be reduced by at least 13 dB.

The filling of the silos that was measured involved a delivery tanker connecting a flexible pipe to another permanent pipe with opening at the base of the silos and pumping plastic pellets through using a diesel pump attached to the lorry. The two main noise sources are 1) the diesel engine/pump and 2) the plastic travelling through the pipes to the top of the silo.

Through conversation with the delivery driver, he explained that some facilities have their own permanent electric pump on site which pulls the pellets from the delivery tanker and pumps them into the silos. The electric pump is understood to be significantly quieter than the diesel pumps fitted to the delivery trucks. An electric pump, with published noise data, that can be shown to have a sound pressure level of less than 67 dB @10 metres (from the pump itself or from the façade of any building or enclosure in which it is housed) would be required to satisfy the condition.

With regard to reducing the noise level from the pellets travelling through the pipes, given the high frequency content of the noise, significant noise attenuation could be achieved by lagging the pipes. Lagging with technical data showing that it is capable of achieving at least 13 dB of noise attenuation would be required to satisfy the condition.

It is AIRO's understanding that the silo filling pipes will be lagged with Rockwool Techwrap 2 or an equivalent product with equal or better sound insulation. Octave frequency band analysis of the single layer of 25 mm Rockwool Techwrap2 has shown that using it will provide 21dB attenuation to the noise produced from pellets travelling through the filling pipes. The sound reduction data for the Rockwool Techwrap2 lagging can be found in Appendix D.

It is further understood that an electric pump meeting the specification described above will be installed and used for silo filling and the use of diesel pumps fitted to silo delivery vehicles prohibited. The pump will be located either adjacent to the silo's at ground floor level or within the Blow Moulding building itself.

The installation of a permanent electric pump having a sound pressure level output as described above or an electric pump housed internally, combined with the lagging of the filling pipes as described should allow the silo filling operation to comply with Condition 6 at all times.

8. CONCLUSIONS

This report has presented an environmental noise impact assessment of a proposed blow moulding building and associated plant at Tomlinsons Dairies Ltd, Five Crosses Industrial Estate, Minera, Wrexham upon nearby residential properties.

The assessment has been based on the results of noise level measurements made at and in the vicinity of Tomlinsons Dairies Ltd, Minera and at an existing blow moulding facility in Omagh, Northern Ireland over the period 20 to 22 August 2014 as well as technical data provided by specific plant manufacturers/suppliers. The assessment has been guided by British Standard BS 4142:1997 in order to show compliance or otherwise with Condition 6 placed on the development by the Local Authority.

Condition 6 states that the noise from the proposed blow moulding facility shall not exceed the existing background noise level by more than 5 dB. The assessment has shown that for the majority of the time, during both the daytime and night-time periods, the condition will be complied with. Without further noise control, for one hour each week (between the hours of 08:00 and 17:00) the noise level from the silo's associated with the blow moulding facility being filled, will exceed the existing background noise level by more than 5 dB.

However, subject to the implementation of the noise control measures to the silo filling operation, proposed in this report, the assessment is that Condition 6 should be complied with at all times.

Report Approved By:

D L Watts

Eur Ing D L Watts BEng CEng FIOA
Principal Consultant

Report Author:

S R Baxter

Stephen Baxter BEng MIOA
Consulting Engineer

REFERENCES

1. British Standard BS 4142:1997
Method for rating industrial noise affecting mixed residential and industrial areas
British Standards Institution, 1997

2. British Standard BS 5228:2009
Code of practice for noise and vibration control on construction and open sites
British Standards Institution, 2009

APPENDIX A**SCHEDULE OF EQUIPMENT, CALIBRATION STATEMENT AND
WEATHER CONDITIONS**

Table A1 - Schedule of Noise Instrumentation

Use	Type	Serial No.	Details of last verification	Calibrator Reference Level (dB @ 1kHz)	Calibration Level at Test (dB)	
					Before	After
Measuring System	Cirrus CRL 703B	43056	Jan 2014	94.0	94.0	93.9
Microphone	Cirrus MK 226	110792	Jan 2014			
Calibrator	Cirrus CRL 511E	43023	Jan 2014			
Measuring System	Cirrus CRL 703B	43057	Jan 2014	93.9	93.9	94.0
Microphone	Cirrus MK 226	110793	Jan 2014			
Calibrator	Cirrus CR 511E	43024	Jan 2014			
Measuring System	B&K 2260	2341172	Jan 2014	94.0	94.0	94.0
Microphone	B&K 4189	2339504	Jan 2014			
Calibrator	B&K 4231	2342748	Jan 2014			

CALIBRATION

AIRO is accredited by the United Kingdom Accreditation Service as a UKAS testing laboratory No. 0483 and although the measurements carried out for this survey are not listed on our schedule of accreditation, all of AIRO's noise and vibration measurement equipment is routinely calibrated as part of the calibration regime in our Quality Manual and these calibrations are traceable to National Standards.

In addition, the calibration level of the measuring equipment was checked at the start and the end of each survey period using the appropriate calibrator for the relevant meter.

Table A2 - Record of Weather Conditions						
Date	Time	Temp	Humidity	Wind Speed	Wind Direction	Precipitation
20-Aug-14	12:00	12 °C	82%	~ 2-3 m/s	NW	1 mm
	16:00	15 °C	64%	~ 2-3 m/s	NW	1 mm
	20:00	13 °C	69%	~ 1-2 m/s	W	0 mm
21-Aug-14	00:00	10 °C	77%	~ 2-3 m/s	W	0 mm
	04:00	12 °C	75%	~ 3-4 m/s	W	0 mm
	08:00	13 °C	78%	~ 2-3 m/s	SW	0 mm
	12:00	15 °C	62%	~ 3-4 m/s	SW	0 mm
	16:00	15 °C	65%	~ 3-4 m/s	SW	0 mm
	20:00	15 °C	72%	~ 2-3 m/s	SW	0 mm
22-Aug-14	00:00	12 °C	83%	~ 1-2 m/s	W	0 mm
	04:00	12 °C	89%	~ 1-2 m/s	W	0 mm
	08:00	11 °C	89%	~ 1-2 m/s	NW	2 mm
	12:00	14 °C	68%	~ 2-3 m/s	NW	5 mm
	16:00	15 °C	67%	~ 3-4 m/s	NW	0 mm
	20:00	13 °C	66%	~ 2-3 m/s	W	0 mm

APPENDIX B

**SITE MEASUREMENT DATA,
PROPOSED SITE
MINERA**

Table B1 - Hourly Noise Levels Measured at Position 1

Period Commencing	Noise Levels in dB			
	L_{AFMax}	L_{Aeq}	L_{A10}	L_{A90}
Wednesday 20 August				
14:00	84.2	49.8	45.6	37.0
15:00	58.9	43.2	45.3	37.5
16:00	61.1	43.1	45.2	38.2
17:00	68.2	43.4	45.2	37.4
18:00	67.1	42.0	43.8	36.4
19:00	62.5	40.4	43.0	33.9
20:00	81.8	44.9	41.7	33.3
21:00	59.2	39.4	41.4	31.0
22:00	58.3	38.2	40.1	30.4
23:00	56.8	36.6	37.1	29.6
Thursday 21 August				
00:00	58.9	35.7	35.7	29.4
01:00	51.2	32.7	33.7	28.4
02:00	50.3	32.6	33.7	28.4
03:00	48.4	33.4	34.7	29.4
04:00	52.2	34.2	35.3	30.8
05:00	62.4	37.2	38.9	33.1
06:00	55.0	39.6	42.0	34.8
07:00	67.2	42.9	44.8	38.5
08:00	57.8	44.6	46.5	40.3
09:00	60.1	44.8	46.6	40.6
10:00	59.4	45.5	47.1	41.6
11:00	69.3	47.5	49.4	42.5
12:00	64.9	47.4	49.5	42.4
13:00	73.7	49.1	51.1	43.1
14:00	65.3	49.2	51.4	43.8
15:00	62.6	48.5	50.4	44.2
16:00	70.6	48.8	50.7	44.2
17:00	72.1	49.3	51.1	44.4
18:00	73.3	45.0	46.8	39.5
19:00	68.9	44.1	45.6	37.4
20:00	71.6	44.4	47.7	35.6
21:00	72.6	45	48.5	31.6
22:00	51.7	34.7	37.1	28.8
23:00	64.4	36.9	35.1	27.4

Table B1 - Continued

Friday 22 August				
00:00	50.2	33.1	34.5	28.0
01:00	55.8	32.6	32.5	27.1
02:00	47.2	29.5	30.3	26.4
03:00	45.5	31.2	32.4	27.9
04:00	51.4	34.1	35.8	30.6
05:00	56.6	37.6	39.7	32.8
06:00	76.7	46.6	43.3	36.1
07:00	62.6	42.7	44.3	37.1
08:00	73.2	46.2	48.4	38.3
09:00	61.5	43.8	46.1	38.6
10:00	74.4	46.6	50.5	36.7
11:00	63.2	43.1	45.7	36.9
12:00	68.1	43.7	46.1	36.9
13:00	73.7	47.0	46.4	38.1
14:00	68.8	43.4	44.7	37.2
15:00	71.8	43.8	45.8	38.6
16:00	64.4	44.4	46.3	38.9
17:00	59.6	43.9	46.0	38.4
18:00	60.6	42.4	44.5	37.0
19:00	62.0	41.0	43.5	35.2
20:00	89.4	56.5	52.5	33.9

Table B2 - Hourly Noise Levels Measured at Positions 2 and 3

Period Commencing	Noise Levels in dB			
	L_{AFMax}	L_{Aeq}	L_{A10}	L_{A90}
Wednesday 20 August				
Position 2				
12:00	71.8	48.3	50.3	38.4
13:00	68.4	48.6	51.4	38.0
14:00	70.7	47.7	50.1	39.1
15:00	68.7	47.9	49.7	39.7
Position 3				
17:00	83.1	68.8	70.7	58.2
18:00	81.6	57.6	59.0	54.5
19:00	62.0	54.2	54.7	51.9
20:00	65.4	53.8	56.7	51.2

Table B2 - Continued

21:00	66.6	52.8	52.8	50.5
22:00	78.0	53.5	53.8	50.5
23:00	62.0	52.8	56.1	50.5
Thursday 21 August				
00:00	63.2	52.2	52.1	50.5
01:00	65.8	52.3	55.8	50.5
02:00	66.3	55.0	57.5	50.5
03:00	79.4	71.5	73.8	50.6
04:00	80.1	73.5	75.1	69.7
05:00	79.5	73.6	75.0	70.2
06:00	81.1	73.3	74.4	70.5
07:00	83.6	73.0	74.1	69.9
08:00	93.1	73.8	74.8	70.1
09:00	93.5	73.8	75.1	70.4
10:00	94.1	76.9	77.4	70.5
11:00	88.1	73.2	74.4	70.1
12:00	81.9	74.1	75.7	70.2
13:00	90.9	73.3	74.7	69.4
14:00	85.2	68.0	70.4	64.0
15:00	80.7	70.7	72.7	65.9
16:00	81.7	68.8	70.2	66.1
17:00	90.6	71.5	73.3	67.2
18:00	78.4	67.2	68.8	55.1
19:00	79.6	69.3	72.7	52.5
20:00	77.8	59.2	58.7	51.6
21:00	65.7	53.5	55.3	51.0
22:00	60.6	52.6	55.3	50.7
23:00	64.5	52.3	55	50.5
Friday 22 August				
00:00	60.5	52.0	55.0	50.5
01:00	64.0	52.7	55.4	50.5
02:00	65.8	55.9	56.5	51.7
03:00	79.1	71.6	74.1	56.3
04:00	79.0	73.4	74.8	69.9
05:00	80.6	73.8	76.6	69.4
06:00	80.8	73.7	75.2	69.0
07:00	83.4	72.5	74.0	68.9
08:00	80.1	72.5	74.2	68.5
09:00	79.1	72.5	73.8	69.2

Table B2 - Continued					
	10:00	79.0	73.9	75.3	70.1
	11:00	89.9	72.2	73.1	69.3
	12:00	98.9	75.6	77.3	70.7
	13:00	80.4	70.9	73.0	64.5
	14:00	87.4	70.2	71.5	67.0
	15:00	84.7	71.4	72.9	67.6
	16:00	91.7	71.5	73.4	63.1
	17:00	88.1	71.6	75.1	60.4
	18:00	88.6	61.0	61.1	54.2
	19:00	89.7	63.7	62.5	51.5
	Position 2				
	20:00	86.6	54.2	51.9	50.8

APPENDIX C**SITE MEASUREMENT DATA,
EXISTING FACILITY,
OMAGH**

**Table C1 – Sample Measurement Noise Data at Omagh site
(Measured 21 August 2014)**

Measurement Location	Time	Duration, T (mins:secs)	Description of Noise Event	Free-field noise levels ⁱ (dB)	
				L_{Aeq}	L_{A90}
Position A	11:26	30:00	General noise inside bottle factory	81	78
Position B	12:02	30:00	General noise inside bottle factory	81	78
Position C	13:40	30:00	General noise inside bottle factory	76	73
1m from front of Silo B	13:25	00:34	Pellets pumped away from Silo B (into building)	73	51
	13:28	00:34	Pellets pumped away from Silo B	73	51
	13:31	00:35	Pellets pumped away from Silo B	73	50
1m from Cyclone Filler ⁱⁱ	14:32	00:41	Cyclone filler operates	83	70
	14:35	00:42	Cyclone filler operates	82	68
	14:38	00:42	Cyclone filler operates	82	68
	14:41	00:43	Cyclone filler operates	82	67
	14:44	00:43	Cyclone filler operates	83	68
	14:46	00:42	Cyclone filler operates	84	67
	14:49	00:41	Cyclone filler operates	83	67
1m from Granulator (30 secs on each side)	14:58	02:00	Granulator operating as normal (steady noise level)	85	82 ⁱⁱⁱ
1m from rear of Blow Moulding Machine	15:06	01:55	Blow Moulding Machine operating as normal (1 cycle is approx. 6 seconds) – external exhaust	80	79
1m from side of Blow Moulding Machine	15:11	02:01	Blow Moulding Machine operating as normal – external exhaust	82	76
1m from other side of Blow Moulding Machine	15:18	02:01	Blow Moulding Machine operating as normal – external exhaust	81	75
1m from material pipes	15:43	00:35	Pellets pumped through metal pipes inside building	94	82

Table C1 - Continued

2m from pipe between delivery lorry & silo	16:07	06:01	Diesel pump on, pellets pumped from delivery lorry to silo	90	88
2m from side of delivery lorry (near pump)	16:14	11:22	Diesel pump operational	94	93
1m from delivery pipe junction with silo	16:26	10:01	Pellets being delivered through pipe. Diesel pump operating	94	93
1m from diesel pump exhaust (side of lorry)	16:38	05:01	Pump operational	92	91
8m from lorry/pump/delivery pipe	16:46	05:00	Pellets being delivered from lorry to silo	84	84
8m from lorry/pump/delivery pipe	16:51	06:02	Pellets being delivered from lorry to silo	86	86
1m from bottle conveyor motor	17:31	01:07	Noise of conveyor motor with Blow Moulding Machine & Granulator off	72	71
	17:36	00:38	Conveyor motor on	71	70
	17:41	01:01	Conveyor motor on	70	69
1m from bagger	17:57	01:03	Bagger working as normal ^{iv}	79	81
2m from bag lifter	17:58	00:30	Bag Lifter alarm sounds	84	76
Position D	17:59	00:30	General background (without bagger)	78	75
1m from bagger	18:03	01:15	Bagger operating as normal ^{iv}	80	75
Bag conveyor room	18:09	01:00	Background Noise (bag conveyor off)	67	66
	18:13	00:46	Bag Conveyor on (3m away)	67	67
1m from compressor	18:17	03:00	Compressor operating as normal	76	74
	18:21	03:00	Compressor operating as normal	75	73

Table C1 - Continued

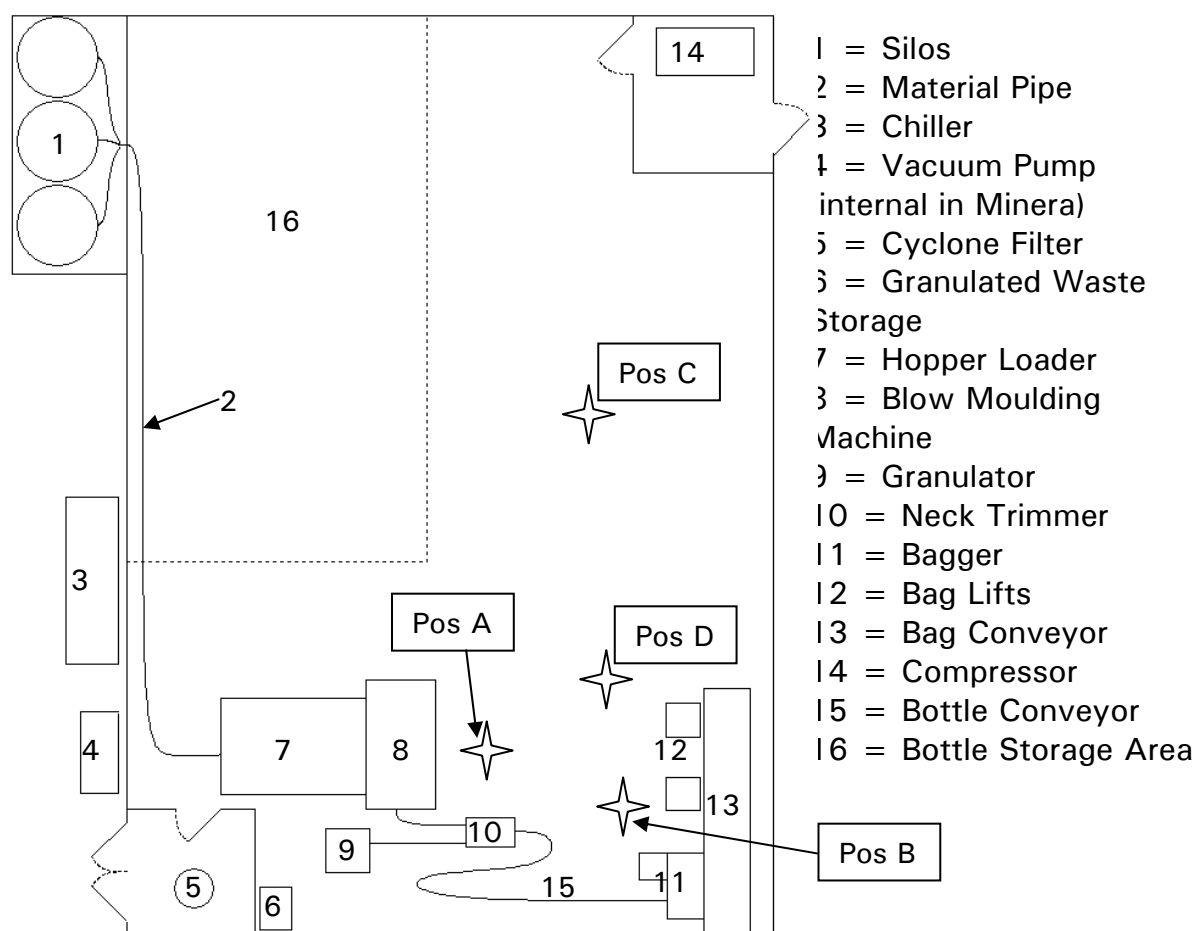
9m from external compressor vent	18:31	01:37	Compressor operating (includes other external sources)	64	64
1m from material pipes	18:36	00:29	Pellets pumped through metal pipes inside building	94	82

ⁱ Where measurement positions are within 3 metres of a reflective surface (other than the ground) the levels shown have been corrected to Free-Field.

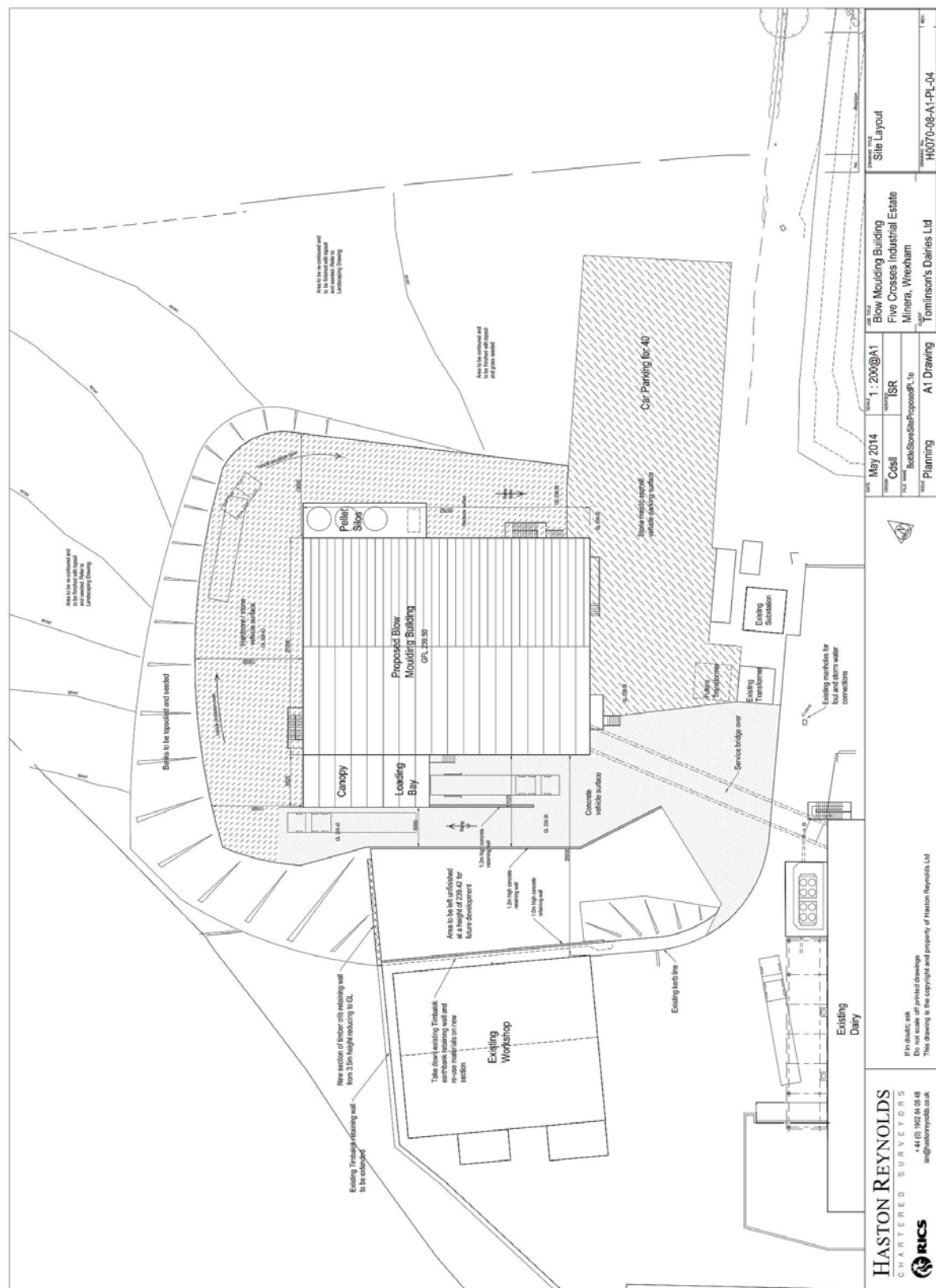
ⁱⁱ Cyclone Filter is located in small plant room

ⁱⁱⁱ Granulator produced very steady noise level but measured level also includes contributions due to other, less steady, sources. Therefore, L_{A90} level used in Table 3.

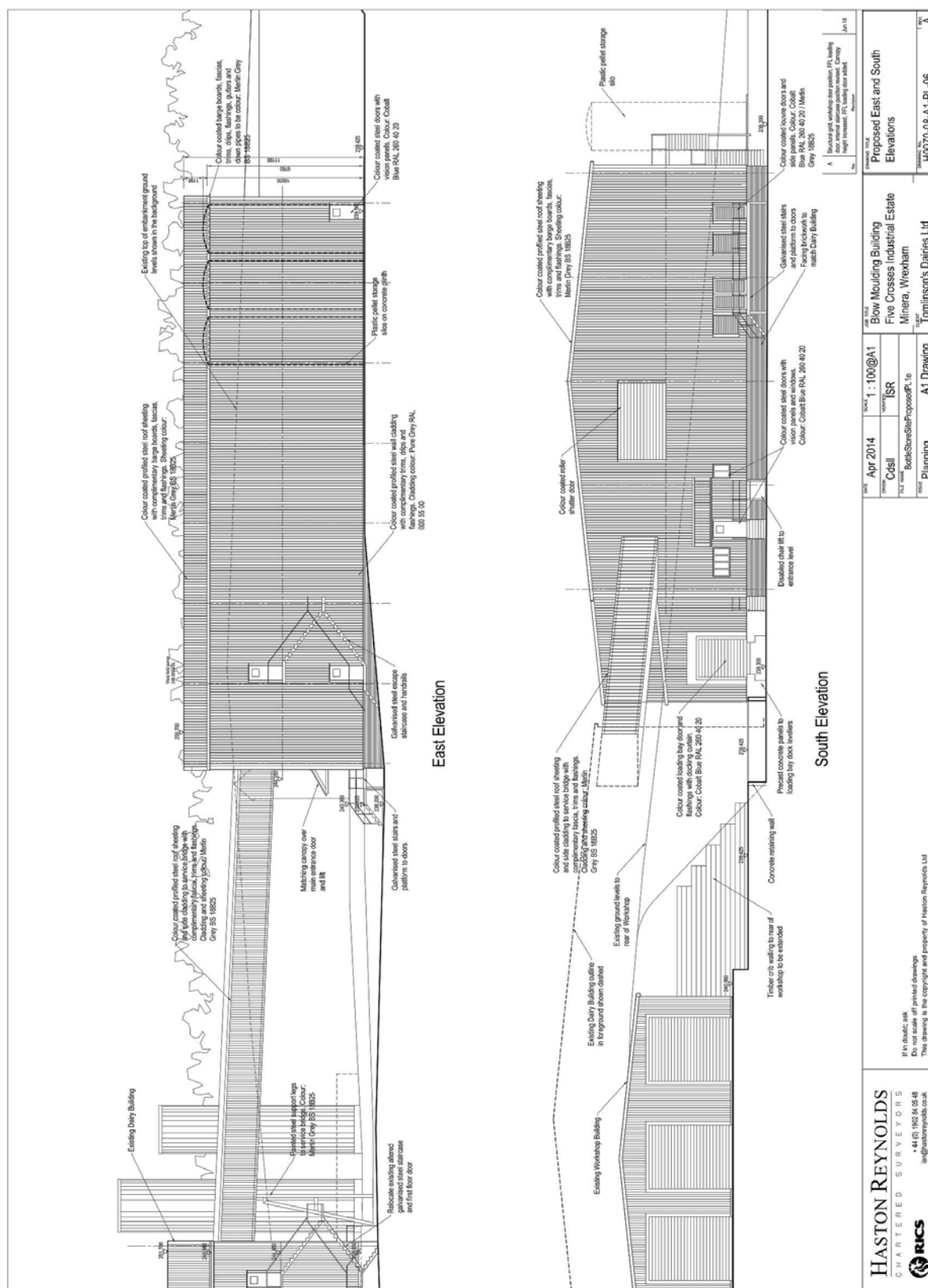
^{iv} Bagger noise level includes all other sources operating. The level in Table 3 has been calculated by comparing the background (i.e. without the bagger) measured at Position D.

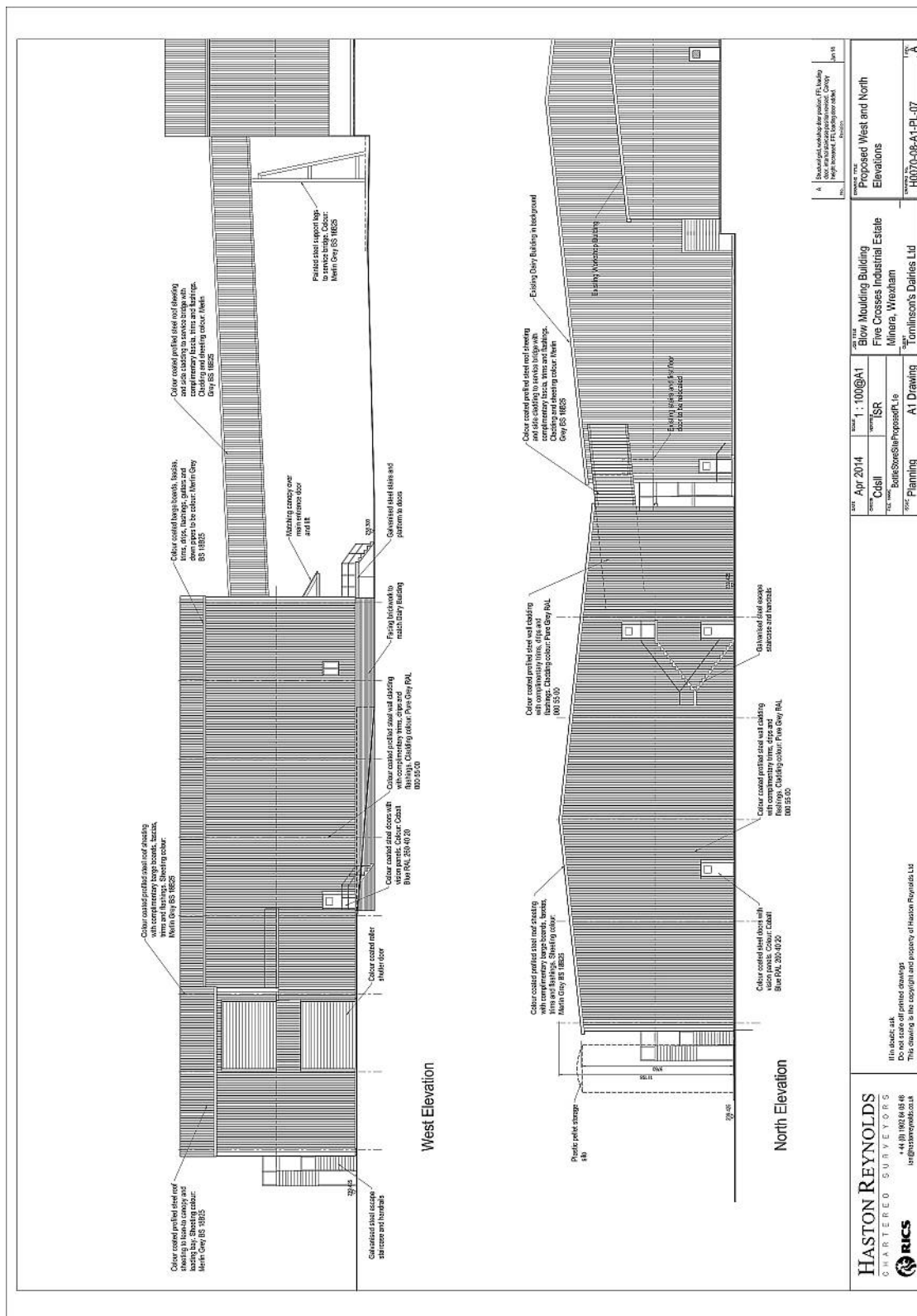
Figure C1 – Sketch Diagram of Facility in Omagh (not to scale)


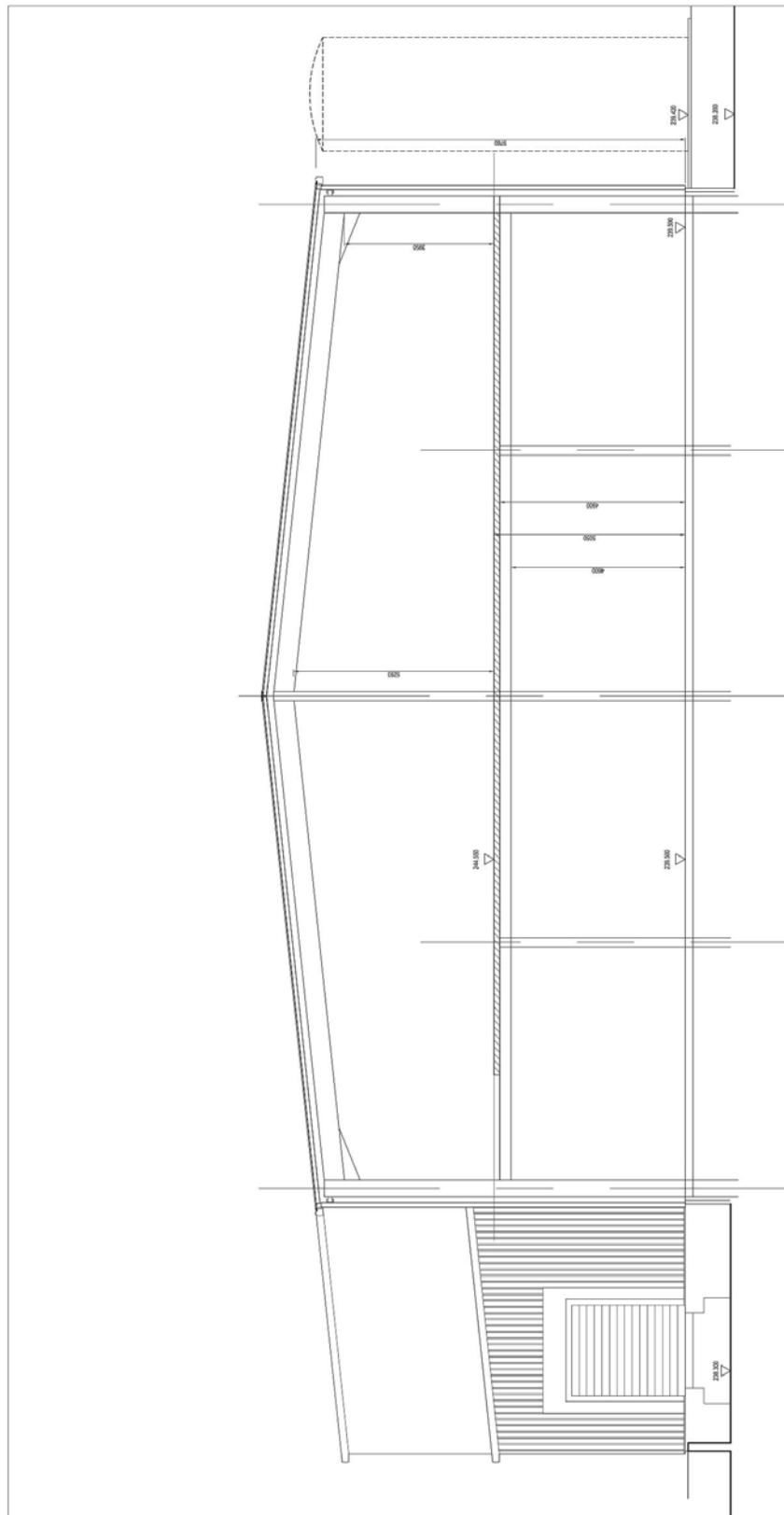
APPENDIX D
SUPPLIED DATA











A Standard gtd. working area position. FTL, loading area internal dimensions only. Carry over dimensions.		DATE: Apr 2014 SCALE: 1:50@A1 PROJECT: Blaw Moulding Building Five Crosses Industrial Estate Minera, Wrexham Client: Tomlinson's Dairies Ltd		PROPOSED SECTION H0070-08-A1-PL-08	
DATE: Apr 2014 SCALE: 1:50@A1 PROJECT: Blaw Moulding Building Five Crosses Industrial Estate Minera, Wrexham Client: Tomlinson's Dairies Ltd		DATE: Apr 2014 SCALE: 1:50@A1 PROJECT: Blaw Moulding Building Five Crosses Industrial Estate Minera, Wrexham Client: Tomlinson's Dairies Ltd		DATE: Apr 2014 SCALE: 1:50@A1 PROJECT: Blaw Moulding Building Five Crosses Industrial Estate Minera, Wrexham Client: Tomlinson's Dairies Ltd	
DATE: Apr 2014 SCALE: 1:50@A1 PROJECT: Blaw Moulding Building Five Crosses Industrial Estate Minera, Wrexham Client: Tomlinson's Dairies Ltd		DATE: Apr 2014 SCALE: 1:50@A1 PROJECT: Blaw Moulding Building Five Crosses Industrial Estate Minera, Wrexham Client: Tomlinson's Dairies Ltd		DATE: Apr 2014 SCALE: 1:50@A1 PROJECT: Blaw Moulding Building Five Crosses Industrial Estate Minera, Wrexham Client: Tomlinson's Dairies Ltd	



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Insulated Steel Roller Shutter Doors
 Energy Saving Steel Doors

MDS range of insulated roller shutter doors are manufactured in strict compliance to industry regulations. The doors offer an energy efficient performance combined with a visually pleasing design.

Our insulated shutters combine functionality with affordability and can help reduce costs of heating whilst providing a high security solution to your business.

The MDS "Insulated Roller Shutter Door" has been designed to offer five main objectives:

- Excellent insulation value of 0.69 W/M.sq.k
- Acoustic insulation value of 18 D.B
- High security twin/wall
- High durability with low maintenance
- Aesthetically pleasing appearance with 100mm deep ribbed face panels

Installation

All door systems are installed by our fully trained fitters who are regularly assessed and meet all current health and safety requirements. All tools and equipment used are inspected monthly and meet all electrical and mechanical requirements. Random site inspections are carried out to ensure a high standard of workmanship is maintained.

All site inspections are documented and audited to ensure no irregular trends are apparent. Upon completion our clients are requested to inspect the installation to ensure all site work is carried out to their satisfaction.

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Sound-insulating doors



The sound-insulating overhead door

The quality of life requires increasingly strict standards; Companies and institutions have strict requirements for sound insulation to protect people and/or the environment. This means that sound insulation and preventing sound pollution are becoming more and more important. Protec's sound-insulating doors meet the latest standards and were recently tested by Peutz. Protec has sound-insulating overhead doors with R_w values of 38 dB, 45 dB and 50 dB; all of these are certified by Peutz in accordance with ISO 140-3: 1995. If you wish to prepare a report for the acoustics and sound insulation of your project with our doors, please contact us for the test results for the various frequencies (Hz) with the associated sound insulation (R_w , C and Ctr).

Certification & legislation

The sound-insulating overhead doors have been tested and certified by Peutz as complete door structures and not only the panels. In collaboration with the Protec engineers and an acoustic consultancy, such as Peutz, the certified sound-insulating overhead doors can be modified to suit any desired sound-level (dB), Sound Transmission Class (STC) and the required octave bands. This makes it possible to develop and produce sound-insulating doors that attenuate extra high or low tones.

Practical application

Examples of buildings where the sound-insulating overhead doors are applied include cultural centres, energy plants, sewage treatment plants, testing rooms, theatres, music venues, casings and industries where sound plays an important role. There is no limitation regarding use or field of application. Even use of a Protec sound-insulating overhead door in an outer wall is no problem at all.

Combination options

It is also possible to use the sound-insulating door in areas and/or outer walls for which also fire-safety requirements are set. The sound-insulating door has also been tested for its fire-resistant properties according to EN 1634-1 and has a classification

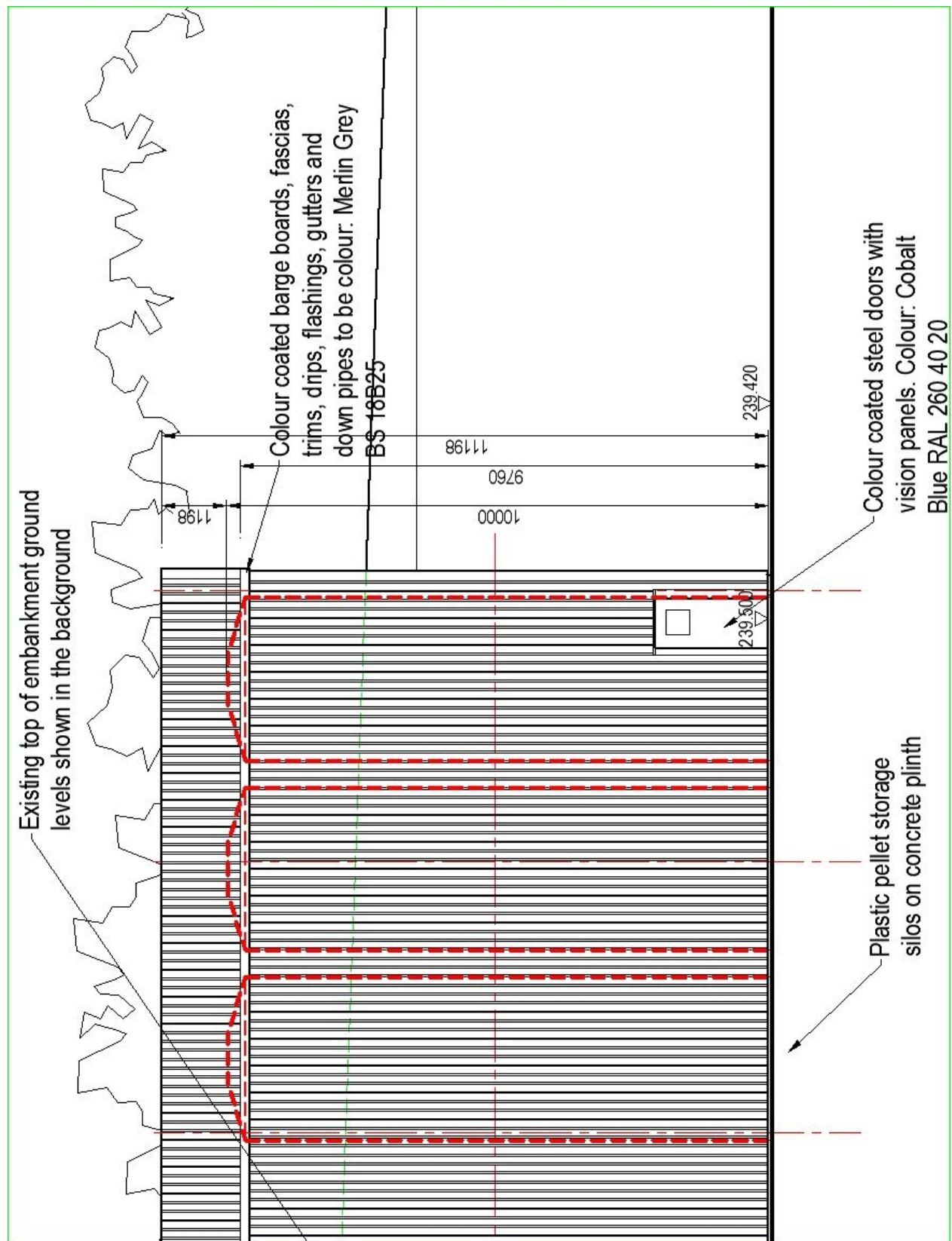
Doors and solutions

- Special doors
- Fire doors
- Sound-insulating doors**
- Security doors
- Explosion safety – ATEX
- Blast resistant doors
- Liquid-retention
- Hangar doors
- Bulletproof doors
- Highly insulating doors (R_c value)
- Hinged doors
- Combined doors

Information request

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Downloads



Trisomet® 333 System

Performance benefits



Thermal performance

The Trisomet® 333 System complies with the minimum requirements of the conservation of fuel and power sections of the Building Regulations for England and Wales (Part L2) and Scotland (Technical Handbook Section 6 Energy). The panel construction offers highly consistent insulation performance, and the site-formed junctions provide a practical and effective method of ensuring good thermal performance.

Thickness (mm)	U-value (W/m²K)*	Typical application
40	0.46	Unheated building
60	0.33	Min Part L requirement for wall
80	0.25	Min Part L requirement for roof
100	0.20	Enhanced
120	0.16	Enhanced

* Figures computer modelled in accordance with EN ISO 10211 as stated in MCRMA Technical Note 14.



Fire safety

The Trisomet® 333 System carries Grade EXT-B and EXT-A approval by the LPCB. Fire resistance performance of 25 mins insulation and 4 hours integrity is also achievable with standard fixing and sealing methods for panels 60mm and above. The panel achieves a Grade AA rating in accordance with BS 476-3, which tests for external surface spread of flame and fire penetration (AA is the best result achievable). The internal surface of the panel complies with Class 'O' in accordance with the Building regulations when tested to BS 476 parts 6 & 7 and also achieves a Class B s2 rating in accordance with EN 13501-1.



Acoustic performance

The acoustic performance of the Trisomet® 333 System has been predicted using software developed by the Department of Applied Acoustics, University of Salford, under a research contract funded by the Metal Cladding and Roofing Manufacturers Association (MCRMA). The results in the table are based on an 80mm core.

Frequency (Hz)	SRI Values (dB)*	Frequency (Hz)	SRI Values (dB)*
100	12.1	800	27.2
125	13.6	1,000	28.9
160	15.3	1,250	30.6
200	16.9	1,600	32.5
250	18.5	2,000	34.3
315	20.2	2,500	36
400	21.9	3,150	35.9
500	23.6	4,000	33.8
630	25.4	5,000	31.2

Weighted SRI RW = 28.5dB

* The predicted sound reduction index values should only be used to provide guidance for preliminary design and/or appraisal of cladding systems.



Water penetration

In accordance with product standard BS EN 14509, the water tightness of a system should be tested to EN 12865. The standard advises that system should achieve water tightness to a pressure of 600 Pa for normal conditions. Laboratory testing shows evidence that the Trisomet® 333 System is watertight up to a pressure of 1050 Pa, which far surpasses this requirement.



Air tightness

The cladding panel and its junction details must be airtight so that the air permeability of the building does not exceed 10m³/h/m² at an applied pressure of 50 Pa, in accordance with the Building Regulations for England and Wales (Part L2) and Scotland (Technical Handbook Section 6 Energy). In laboratory tests in accordance with EN BS 12114, the sealed panel show evidence of air leakage as low as 0.43m³/h/m².

A practical expectation for a finished building, with effective sealing at all junctions would be 3-5m³/h/m². However enhanced detailing practises on large shed buildings can realise air leakage performance figures of less than 3m³/h/m².



Environmental credentials

The Trisomet® 333 System is a sustainable solution with responsible sourcing and traceability of all component materials. All steel elements are produced within the UK Tata Steel's steel production, strip processing, galvanising, coating and profiling facilities. In addition the system's carbon footprint is further minimised by the manufacturing process being situated adjacent to Colorcoat® pre-finished steel production facility.

The PIR insulation within the system has zero ozone depletion potential (ODP) and a very low global warming potential (GWP) of less than 5. Both these factors support the achievement of a high BREEAM rating.

All steel elements are 100% recyclable back into new steel products, without loss of quality. The insulation can be separated using existing scrap shredding technology, after which the materials can be recovered or recycled.



Platinum® System Guarantee

The Trisomet® 333 System is available with the Platinum® System Guarantee. As long as the panels are supplied to an approved specification and fitted by Platinum® System Guarantee approved installers, the system is eligible for a 25 year component guarantee and up to 12 years workmanship guarantee.

Summary of Building Regulation requirements



The Building Regulations for the Conservation of Fuel and Power in England, Wales and Scotland have recently been revised. These regulations present a major step change in how the energy use of buildings is determined as the Government moves towards their aspiration for zero carbon buildings.

Part L covers the building regulations in England and Wales and in Scotland, this is covered by the Technical Handbook, Section 6 – Energy.

The regulations distinguish between new build and existing properties, as well as between dwellings and non-domestic buildings. Part L is divided into four sections: L1A 'New Dwellings', L1B 'Existing Dwellings', L2A 'New Buildings other than dwellings' and L2B 'Existing Buildings other than dwellings'. The main area of interest for Metal Cladding Systems is the non-domestic sector and a brief summary of the changes to these building regulations is provided below.

Part ADL2 – New non-domestic buildings in England & Wales

A fundamental change in Part L 2010 for non-domestic buildings is in the target-setting process. The new process recognises that it is easier and more cost effective to make improvements in some building types than in others. The aim for a 25% reduction in CO₂ emissions from new non-domestic buildings is achieved on aggregate across the new-build stock rather than for each individual building. Some building types will be required to achieve a bigger improvement than 25%, whilst others will need to achieve less.

The Target Emission Rate (TER) will still be generated through the National Calculation Methodology (NCM) using SBEM, but is no longer based on a 2002 notional building; instead the TER is based on a 2010 notional building aligned with the aggregate approach.

The Building Regulations will now require the TER and Design Emission Rates (DER) calculations to be submitted to Building Control at the design stage as well as at completion.

The notional building will either have 40% vertical glazing, 12% roof lights or no glazing at all, with the allocation being driven by the planning-use class. The limiting U-values for non-domestic buildings have not changed; these are shown below along side the figures used within the 2010 notional building.

Element	AD-L2A 2010 back stop value	2010 notional building value
Roofs U-value (integral insulation)	0.25	0.18
Walls U-value	0.35	0.26
Floors U-value	0.25	0.22
Roof lights	Max 20% area	12% area
U-value	2.2	1.80
Building Air Permeability	10.0	5.0

The notional building also uses improved efficiencies for lighting and heating services, which will be essential for compliance. This notional 'blueprint' is a good start for design, however, there is scope for design flexibility, and our technical engineers are on hand to advise on the effects of changes to any element.

A revised procedure is now in place to limit the effects of solar gain, whether or not a building has air conditioning at the time of design. This is a separate calculation to that of the TER but will need to be proven to Building Control as part of the submission.

Scotland – Non-domestic Handbook, Section 6 – Energy

The Scottish approach is basically the same approach as we are currently using; i.e. a 2002 notional building with a percentage improvement (in Part L this is called the flat approach).

However the backstop values have been improved, and the percentage improvement over 2006 levels is a flat 30% (this equates to approximately 50% improvement over the 2002 notional building). This is likely to mean greater emphasis on improvements to all areas, especially on hotels, offices and commercial type buildings.

The following tables include the standard package of construction performance measures for the notional building and backstop values:

Element	AD-L2A 2010 back stop value	2002 notional building value
Roofs U-value (integral insulation)	0.20	0.25
Walls U-value	0.27	0.30
Floors U-value	0.22	0.25
Roof lights U-value	2.0	2.2

No backstop value is set for air permeability. However, it is recommended that buildings be designed to achieve a value of 10m³/h/m² @ 50 Pa or better.

TECHNICAL DATA EN 14511

Unit

Model	TETRIS/SLN-23.4
Refrigerant	R410A

Cooling

Cooling capacity	218.17	kW
Total power input	60.23	kW
EER (2)	3.62	
ESEER	3.97	

Compressors

Type	Scroll	
Quantity	4.00	n°
Refrigerant circuits	2.00	n°
Capacity steps	4.00	%
Total oil charge	26.8	kg
Total refrigerant charge	44.0	kg

Evaporator

Carrier fluid	PROP. GLYCOL 25%	
Inlet water temperature	9	°C
Outlet water temperature	4	°C
Type	Plates evaporator	
Quantity	1.00	n°
Water flow rate	41323	l/h
Hydraulic circuit pressure drop	35	kPa
Water content	21.2	l

Fans

Type	Axial	
Outdoor air temperature	25	°C
Total air flow rate	64000	m³/h
Standard available static pressure		Pa
Quantity	4.00	n°
Fan motor rated power	2.00	kW
Fan motor rated current	4.30	A

Nominal electrical data

Max. absorbed power (1)	110.40	kW
Max. absorbed current - FLA	163.20	A
Max. starting current (4)	351.70	A
Electric power supply	400/3~/50	V/Ph/Hz
Control circuits power supply	230-24/1~/50	V/Ph/Hz

Dimensions

Length	2302	mm
Height	2397	mm
Depth	2302	mm
Weight in operation		kg

Sound spectrum

Frequency	63	125	250	500	1000	2000	4000	8000	Total
[Hz]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB(A)]
Lw	69.0	62.0	72.0	81.0	78.0	67.0	62.0	55.0	81.0
Lp	37.0	30.0	40.0	49.0	46.0	35.0	30.0	23.0	49.0

Lw: sound power levels in free field conditions calculated according to ISO 3744

Lp: sound pressure values measured at 10 meters distance from the unit in free field and at nominal working conditions, in compliance with ISO 3744

(1) Electric power that must be available from the mains for the unit operation.

(2) This value derives from effective absorbed power.

Acoustic Data for equipment outlined in Plevan quotation PUK4000-9302

Silo Filling - Noise from tanker and granules through fill pipe.
 Pipe between external silo & building (This could be inexpensively reduced by lagging this pipe)
 Material pipe
 C30 Hopper loader
 Internal F48/2 vacuum pump
 CL45 Cyclone filter
 Tri 8M 50-30 Granulator
 CA1431 MT External Chiller (noise will be reduced most of the time with an inverter)
 2WPGH010 Pumpset (noise will be reduced most of the time with an inverter)

Location Internal/External to building	Approx Frequency	Approx Duration	Approx Noise level dB
External	Every 2 days	1 hour	100
External	Every 60s	30s	70
Internal	Every 60s	30s	70
Internal	Every 60s	30s	65
Internal	Every 60s	30s	74
Internal	Every 60s	30s	70
Internal	Continuous during production		80
External	Continuous during production		50 - 60
External	Continuous during production		59

AIRO-acoustics

From: "Stephen Landen" <Stephen.Landen@welovemilk.co.uk>
To: <ian@hastoreymolds.co.uk>
Cc: <airo-acoustics@btconnect.com>
Sent: 06 May 2014 16:53
Subject: FW: ASL-13-144 acoustics

Hi steve

Please find comments for the asmech equipment on the list, these are the last four items on the spread sheet,
 Come back to me if it doesn't help
 Cheers
 steve

From: Pete Hudson [mailto:Pete.Hudson@asmechsystems.co.uk]
Sent: 06 May 2014 14:18
To: Stephen Landen
Cc: Shane Gunstone
Subject: RE: ASL-13-144 acoustics

Hi Steve

The figures we have quoted you were based on an installation we carried out for Wisemans in 2008.
 The readings we had taken there were based on being 2 metres from the machines and were all in dBA.

The machines we are quoting for yourselves are bespoke, so we have had to make several assumptions regarding the estimated noise levels from the previous job. We feel we may have gone slightly on the high side, but we would not have anyway of checking this until the machines were built.

Sorry we are not able to be any more specific, but should you require any further information please do not hesitate to contact us

Best regards

Pete

Pete Hudson
Estimator
Direct Line: +44 (0) 1623 412788
Telephone: +44 (0) 1623 424442
Fax: +44 (0) 1623 424433
Website: www.asmechsystems.co.uk



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From: Stephen Landen [mailto:Stephen.Landen@welovemilk.co.uk]
Sent: 06 May 2014 09:42
To: Pete Hudson
Cc: Shane Gunstone
Subject: RE: ASL-13-144 acoustics

Hi guys

Thanks for the information provided, I have been asked to specify the conditions the noise results have been taken, ie db or dba, @1metre or @10metre, and if there is any reference to an iso standard, iso3744 for example, if any further info could be provided it would be much appreciated,

Regards
 steve

From: Pete Hudson [mailto:Pete.Hudson@asmechsystems.co.uk]
Sent: 23 April 2014 16:49
To: Stephen Landen
Cc: Shane Gunstone; Paul Davis
Subject: ASL-13-144 acoustics

Hi Steve

Please find the noise levels as requested –

1. Bottle conveyor 65-67 DBA
2. Bagger 67-69 DBA
3. Bag lifts / stacker 67-69 DBA
4. Bag conveyor 65-67 DBA



CJ/SFB | | (57) | Xm1 | (Pa) |
December 2005 (replaces July 2004 issue)

Application type **Thermal and acoustic**

Construction type **Ducts and pipes**

ROCKWOOL

Techwrap2 and Techtube

High performance acoustic solutions for pipes and equipment

Rockwool Techwrap2 and Techtube form part of a range of high performance Rockwool acoustic insulation products.

Techwrap2 and Techtube are pre-covered with Rockwool Acoustic Membrane and reinforced aluminium foil, engineered to provide the highest standard of noise control to circular and rectangular ductwork, rainwater, soil-vent, service and process pipes.

Because isolation of the mass layer from the underlying surface is critical to acoustic performance, Techwrap2 and Techtube have been designed to maintain their original thickness subsequent to installation.

Advantages

- * Thickness maintained at corners, bends and fixing locations to maintain superior acoustic performance
- * Single application of materials
- * Easy to handle and install
- * Excellent thermal insulation properties

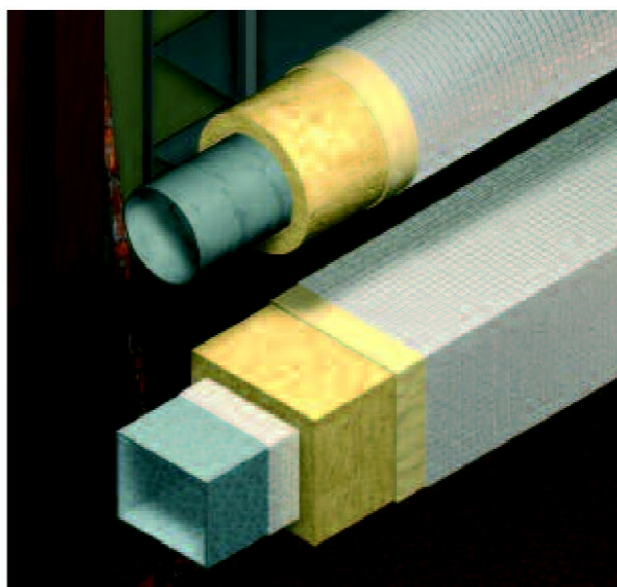
Description

Techwrap2 is constructed from strips (lamellae) of Rockwool bonded on edge to Rockwool Acoustic Membrane to provide high resistance to compression:

- * Reinforced aluminium foil (inner)
- * Rockwool lamella acoustic insulation
- * Rockwool Acoustic Membrane
- * Reinforced aluminium foil (outer)

Techtube is a strong pre-formed Rockwool pipe section pre-covered with Rockwool Acoustic Membrane:

- * Rockwool pipe section
- * Rockwool Acoustic Membrane
- * Reinforced aluminium foil (outer)



High performance Techwrap2 and Techtube constructions

Applications

Techwrap2 is ideally suited for use on ducts, enclosures and larger diameter pipes and Techtube for use on rainwater, soil-vent, service and process pipes.

Service temperatures

Techwrap2 and Techtube can be used to provide thermal and acoustic insulation to pipes and equipment operating at temperatures in the range 0°C to 230°C. The outer facing temperatures should not exceed 80°C. At temperatures below ambient, the foil facing must be continued onto the pipe surface in order to maintain the vapour barrier.

Dimensions

Techwrap2	
length	1000, 2000 mm
width	1000 mm
Rockwool thickness	25, 40, 50 mm
mass Layer	5, 10 kg/m ²

Techtube	
length	1000 mm
to suit pipe OD	17 to 610 mm
Rockwool thickness	20 to 100 mm*
mass layer	5, 10 kg/m ²

*Some combinations of OD and thickness may not be available.

Other forms of insulation, sizes, thicknesses, mass layer types and surface weights may be available to special order.

Installation

General

Rockwool Acoustic Membrane should be positioned outermost from the sound source and overlapped at all joints.

Techwrap2

Techwrap2 should be cut 25 mm oversize and a 25 mm strip of Rockwool removed to create an overlap. All cutting operations can be completed using a sharp knife.

75 mm wide plain aluminium foil self-adhesive tape should be used to seal the joints.

Fixings

Welded or mechanically attached steel pins should be used to fix Techwrap2 to the duct. However, subject to the manufacturer's approval, adhesive applied insulation hangers may be used in place of welded pins. Particular attention should be paid to support of the Techwrap2 at joint locations and where sagging may occur, eg in 'soffit' areas.

The number of pins required will depend upon size and orientation of the duct. However, where pins are employed at Techwrap2 edges, 4 number are recommended at 1000 mm edges and 7 number at 2000 mm edges. Additional 'lines' of pins should be at nominal 300 mm spacings.

Techtube

All joints should be taped with self-adhesive aluminium foil tape. Techtube is generally secured with aluminium bands at approximately 200 mm maximum centres.

Work on site

Techwrap2 and Techtube are easily cut to shape with a sharp knife.

Fire performance

The base materials of Techwrap2 and Techtube are rated non combustible in accordance with ISO 1182.

Thermal conductivity

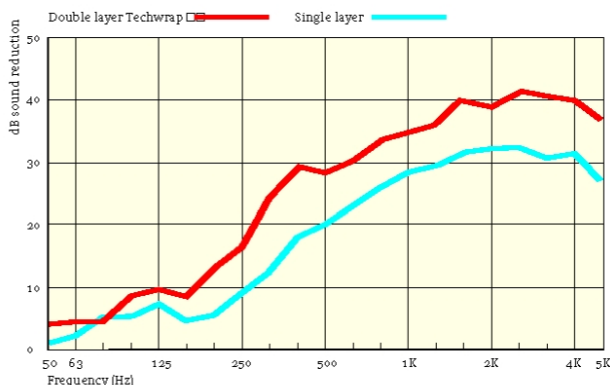
Techwrap2	0.039 W/mK
Techtube	0.033 W/mK
(at 10 °C mean product temperature)	

Technical Information

For further details visit our website at www.rockwool.co.uk or phone the Technical Hotline on 0871 222 1780

Test programme and results

Rockwool Techwrap has been independently tested at the Acoustical Investigation & Research Organisation (AIRO) laboratory.



dB improvements through 0.8 mm steel duct for single and double layers of Techwrap

The test programme conducted at AIRO was designed to indicate as closely as possible the true-to-life acoustic performance of Techwrap when applied to ductwork. Techwrap was installed in-situ on a 6 mm length of 600 mm x 1000 mm duct. As expected, sound leakage was noted at inaccessible duct bearer locations during the test. As with other likely on-site irregularities, this leakage may not have been adequately represented by a more simple flat panel test. To show the actual improvements provided by Techwrap, the noise reduction provided by the original 'untreated' duct is excluded from the above graph.

Environment

Rockwool products rely on trapped air for their thermal properties, which has neither ozone depleting nor global warming potential.

Health and safety

Current HSE 'CHIP' Regulations and EU directive 97/69/EC confirm the safety of Rockwool mineral wool; Rockwool fibres are not classified as a possible human carcinogen.

The maximum exposure limit for mineral wool is 5 mg/m³, 8 hour time-weighted average.

A Material Safety Data Sheet is available from the Rockwool Marketing Services Department to assist in the preparation of risk assessments, as required by the Control of Substances Hazardous to Health Regulations (COSHH).

Rockwool Limited reserves the right to alter or amend the specification of products without notice as our policy is one of constant improvement.

The information contained in this data sheet is believed to be correct at the date of publication. Whilst Rockwool will endeavour to keep its publications up to date, readers will appreciate that between publications there may be pertinent changes in the law, or other developments affecting the accuracy of the information contained in this data sheet.

The above applications do not necessarily represent an exhaustive list of applications for Techwrap2 and Techtube. Rockwool Limited does not accept responsibility for the consequences of using Techwrap2 and Techtube in applications different from those described above. Expert advice should be sought where such different applications are contemplated, or where the extent of any listed application is in doubt.



SoundPro range of acoustic solutions

Techwrap2 and Techtube are a part of the Rockwool SoundPro range of acoustic solutions. Further information on the SoundPro range is available from Rockwool Marketing Services on 01656 862621.



Rockwool Limited
Pencoed, Bridgend, CF35 6NW

E info@rockwool.co.uk
www.rockwool.co.uk

APPENDIX E**LOG OF EVENING EVENTS**

Log of events at Tomlinson Dairies: 20/8/14 - 6pm to 4am

- 6.17 car leaving site
- 6.20 car leaving site
- 6.25 car leaving site
- 6.27 milk tanker arrive on site to collect cream trailer
- 6.28 car leaving site
- 6.30 milk tanker engine idling whilst hooking up trailer
- 6.34 driver opening /closing hatch on top of tanker, very loud
- 6.36 milk tanker leaving site
- 6.45 boiler running
- 6.54 boiler switched off
- 6.58 car leaving site
- 6.59 a lot of water can be heard dropping while new chiller pipework defrosts
- 7.00 air compressor came online
- 7.01 car leaving site
- 7.04 personal exiting staircase by chiller platform
- 7.07 car leaving site
- 7.07 lorry fridge switched off
- 7.13 kids shouting around perimeter of building
- 7.15 main gates locked
- 7.22 two agitators started up in raw milk tanker bay
- 7.24 lorry fridge started
- 7.48 lorry fridge stopped
- 7.54 loud motor bike on main road
- 8.00 very little noise , starting to get quiet, little bit of traffic from local roads
- 8.04 boiler switched off
- 8.06 two agitators started in raw milk tanker bay
- 8.09 one agitator stopped
- 8.10 another agitator started
- 8.13 agitator started
- 8.16 another agitated started
- 8.18 fridge container at village bakery started
- 8.27 lorry fridge started
- 8.31 lorry fridge off
- 8.32 virtually no traffic noise to be heard
- 8.50 lorry fridge started
- 8.54 lorry fridge stopped
- 8.57notice boiler running not sure of start time
- 8.59 boiler switched off

- 9.00 plane heard overhead
- 9.14 clicking noise coming from boiler house could be heard from outside
- 9.17 fridge on lorry switched off, unsure of start time
- 9.19 boiler switched on
- 9.20 traffic heard on main road
- 9.26 dogs heard barking from properties rear of site
- 9.28 plane could be heard overhead
- 9.51 all agitators were off
- 9.52 2 agitators turned on
- 10.00 traffic could be heard on main road
- 10.03 bore hole pump and a agitator started
- 10.05 lorry fridge running unsure of start time
- 10.07 lorry fridge stopped
- 10.10 plane flew over very low
- 10.11 dogs barking at rear properties
- 10.17 boiler started
- 10.20 very loud car on main road
- 10.22 lorry drove round site
- 10.25 lorry reversing onto loading bays
- 10.27 lorry turned engine off
- 10.28 lorry fridge on
- 10.32 lorry fridge off
- 10.33 car leaving site
- 10.34 car horn heard in distance
- 10.42 agitator started
- 10.47 village bakery, very loud bang and forktruck heard loading a wagon
- 10.55 village bakery lorry heard driving around the site
- 10.56 fridge on lorry running unsure of start time
- 10.59 fridge on lorry turned off
- 11.01 loud car on main road
- 11.02 loud car on main road
- 11.09 plane flew over quite low
- 11.16 loud car on main road
- 11.18 boiler switched off unsure of start time
- 11.23 loud car on main road
- 11.25 lorry fridge on
- 11.28 lorry fridge off
- 11.32 very quiet on site
- 11.36 village bakery lorry moving around
- 12.06 loud car on main road

- 12.21 air exhaust from bore hole cabin
- 12.28 lorry fridge on
- 12.31 lorry fridge off
- 12.41 boiler running unsure of start time
- 12.43 plane flew over, not low
- 12.44 boiler turned off
- 12.45 two agitators started
- 12.46 compressor in garage could be heard coming on load
- 12.49 very loud car went past and also a plane flew over
- 12.50 loud car set off again
- 12.54 dogs barking at rear of site
- 01.02 air exhaust in bore hole
- 01.06 village bakery lorry heard running and moving off
- 01.06 lorry fridge started
- 01.07 village bakery lorry drove off
- 01.15 background noise heard from the bakery
- 01.20 car entered site
- 01.26 car moving from loading bay to car park
- 01.28 lorry started engine
- 01.33 lorry left site
- 01.40 background noise from bakery getting louder
- 01.44 car arrived on site
- 01.46 car arrived on site
- 01.47 driver moved car to by lorry
- 01.47 lorry started engine
- 01.55 lorry left site
- 01.58 car entered site
- 02.11 boiler noted to be running, unsure of start time
- 02.20 took off hatch to chiller platform area, and went on to platform
- 02.22 boiler turned off
- 02.26 hatch left open so noise levels on chiller platform could be louder
- 02.30 lorry moving around in bakery and background noise appears to be louder
- 02.37 car arrived on site
- 02.38 agitator started in raw milk
- 02.37 car arrived on site
- 02.54 village bakery lorries and forktrucks heard
- 02.56 lorry arrived on site
- 02.58 lorry arrived on site
- 02.59 both lorries parked up and turned engine off
- 03.11 chiller pumps started

- 03.12 chillers switched on
- 03.13 went onto chiller platform
- 03.14 2 chiller compressors running on chiller 1
- 03.14 2 chiller compressors running on chiller 2
- 03.15 milk delivery pipe pulled through hole on raw tanker intake
- 03.16 chiller 1 25% on 2 compressors, chiller 2 25% On 2 compressors
- 03.17 chiller 1 and 2 all 4 compressors running at 33%
- 03.18 chiller 1 42% On 2 compressors chiller 2 50% on 2 compressors
- 03.19 chiller 1 50% 2 compressors, chiller 2 67% on 2 compressors
- 03.20 chiller 1 58% on 2 comp, chiller 2 75% on 2 comp
- 03.21 chiller 1 67% on 2 comp, chiller 2 84% on 2 comp
- 03.22 chiller 1 75% on 2 comp, chiller 2 92% on 2 comp
- 03.24 chiller 1 84% on 2 comp, chiller 2 100% on 2 comp
- 03.27 chiller 1 100% on 2 comp
- 03.29 both chillers running 100%
- 03.30 sheet of steel knocked over by hatch area
- 03.41 loading ramps and doors being operated, trolleys being pushed onto wagons on loading bays
- 03.45 lorry left site
- 03.50 chiller 1 and 2 both compressors at 0% output
- 03.51 lorry drove round site
- 04.10 chiller 1 16% 2 comp, chiller 2 8% on 2 comp
- 04.12 hatch closed up onto chiller platform
- 04.16 lorry left site
- 04.16 two cars left site
- End of monitored period, general noise from site at this time

Log of events at Tomlinson Dairies: 21/8/14 - 6pm to 4am

- 6.00 little movement around site and general noise levels quite low
- 6.13 two cars leaving site
- 6.24 van left site to check airo noise equipment at chase,
- 6.40 arrived back on site in van
- 6.53 boiler switched on
- 6.58 boiler switched off
- 7.00 car arrived on site
- 7.01 four cars left site together
- 7.18 agitator started in raw silo
- 7.24 agitator started in raw silo
- 7.26 very loud car on main road
- 7.26 boiler and 1 compressor on chiller started up
- 7.28 another chiller compressor started up
- 7.57 chillers turned off
- 8.00 boiler switched on
- 8.11 lorry fridge came on
- 8.14 lorry on fridge turned off
- 8.17 chillers off and large compressor is all that could be heard
- 8.24 car left site
- 8.26 started to rain
- 8.29 van drove round site
- 8.30 boiler running unsure of start time
- 8.35 boiler switched off
- 8.36 rain stopped
- 8.42 agitator started
- 8.45 lorry fridge started
- 8.47 lorry arrived on site
- 8.48 started raining
- 9.15 raining heavy
- 9.17 van movement
- 9.30 boiler running unsure of start time
- 9.36 agitator started
- 9.52 rain stopped
- 9.54 agitator started
- 10.08 background noise from bakery
- 10.15 boiler switched off
- 10.18 site very quiet at this time
- 10.30 car heard on main road and plane flew above

- 11.00 small amount of traffic heard from road
- 11.10 plane flew over quite low
- 11.56 village bakery forktruck in operation
- 12.10 large compressor can be heard running
- 12.35 village bakery fork truck and wagons moving around
- 12.39 village bakery loud bangs and wagons being loaded
- 12.48 agitator started
- 12.49 village bakery , still a lot of noise
- 01.09 light rain
- 01.15 lorry fridge on, unsure of start time
- 01.22 lorry fridge off
- 01.24 lorry fridge on
- 01.28 lorry fridge off
- 01.48 two cars arrive on site
- 02.22 opened hatch on to chiller platform
- 02.26 boiler running, unsure of start time
- 02.30 car arrived on site
- 02.36 lorry moved of loading bay
- 02.45 lorry fridge on
- 02.56 lorry fridge off
- 03.05 chiller pumps started
- 03.09 chillers started
- 03.11 chiller 1 2 comps 0%, chiller 2 2 comps 0%
- 03.13 chiller 1 2 comps 16%, chiller 2 2 comps 16%
- 03.15 chiller 1 2 comps 25%, chiller 2 2 comps 25%
- 03.16 chiller 1 2 comps 42%, chiller 2 2 comps 42%
- 03.18 chiller 1 2 comps 58%, chiller2 2 comps 58%
- 03.20 chiller 1 2 comps 67%, chiller 2 2 comps 67%
- 03.22 chiller 1 2 comps 75%, chiller 2 2 comps 75%
- 03.24 chiller 1 2 comps 84%, chiller 2 2 comps 84%
- 03.26 chiller 1 2 comps 100%, chiller 2 2 comps 100%
- 03.38 lorries loading at this time on they bays
- 03.44 both chillers at 0% load
- 03.46 closed hatch on to chiller platform
- End of sound monitoring, normal site noise from this point