



Report No. DLW/6995/B

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

Dated: 29 July 2016

**ENVIRONMENTAL NOISE ASSESSMENT
OF PHASE 1 AND PHASE 2
COLD STORE EXTENSION
AND BLOW MOULDING BUILDING EXTENSION
TOMLINSONS DAIRIES
MINERA
WREXHAM**

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ENVIRONMENTAL NOISE ASSESSMENT
OF PHASE 1 AND PHASE 2
COLD STORE EXTENSION
AND BLOW MOULDING BUILDING EXTENSION
TOMLINSONS DAIRIES
MINERA
WREXHAM

1. INTRODUCTION

This report presents an environmental noise assessment of proposals for Phases 1 and 2 of the cold store extension and blow moulding building extension at Tomlinsons Dairies, Minera, Wrexham.

Phase 1 has been assessed separately and reported in AIRO Report DLW/6995/A dated 30 June 2016. For convenience, this report can be found at Appendix A.

The cumulative effects of Phase 1, Phase 2 and the blow moulding building extension are considered in this report.

The primary source of guidance for the assessment has been British Standard BS 4142 (ref 1).

2. DESCRIPTION

Haston Reynolds Chartered Surveyors drawing H0019-16-A3-AC-1 provides a plan of the cold store extension after implementation of Phases 1 and 2. For Phase 1 the front half of the existing main building is to be extended to the north east, with 11 loading/unloading bays along the south east elevation. The existing bays (currently used as unloading bays) to the rear of the existing building are to be retained.

Phase 2 extends the cold store to the north west with the original loading/unloading bays that remained after Phase 1, moved and added to, along the new north east elevation. Thereafter, with Phase 2, there are 11 loading/unloading bays along the south eastern elevation of the extension (assessed under Phase 1) and a further 11 loading/unloading bays along the new north east elevation. There is also a ramped access to a basement area.

Associated works include increasing the existing hardstanding to the north east and the provision of a new staff car park with access from Gwernygaseg Road.

Haston Reynolds drawing H0070-17-A1-SK-01 is a plan showing the proposed blow moulding building extension to the rear of the site. It is understood that the proposed two storey extension is to provide additional storage space only and no manufacturing would take place within it. The extension would be partitioned from the main blow moulding building with only limited doorways/openings to convey the blow moulded containers.

The nearest noise sensitive property to the Phase 1 and Phase 2 proposals is Kalver which is approximately 100 metres east from the existing dairy building. The nearest noise sensitive property to the blow moulding building is The Chase, approximately 75 metres from the north west site boundary.

Figure 1 shows the proposals on which the position of Kalver and The Chase are marked.

Figure 1 – Extract Site Plan with Cold Store Extension and Blow Moulding Building Extension



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 a 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. PREVIOUS PLANNING CONDITIONS AND ASSESSMENT GUIDANCE FOR NOISE

4.1 Previous Development

The consent for the most recent development on the site (the blow moulding building) was subject to the following condition.

"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 and 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 are expected to require 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.

4.3 Technical Advice Note (Wales) 11 (TAN 11)

Detailed guidance for Welsh planning authorities in relation to noise is provided in Technical Advice Note (Wales) 11 (TAN 11, ref 2).

Paragraphs 11 to 13 inclusive of TAN 11 are considered particularly relevant and an extract from Paragraph 13 is reproduced below:

“13. There may be circumstances when it is acceptable, or even desirable in order to meet other planning objectives, to allow noise generating activities on land near or adjoining a noise-sensitive development. In such cases, local planning authorities should consider the use of conditions or planning obligations to safeguard local amenity. Care should be taken to keep the noisiest activities away from the boundary or to take measures to reduce the impact of noise.”

Paragraph B17 of TAN 11 relates to noise from industrial and commercial developments as follows:

“B17. The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the “rating level” defined in BS 4142. This “rating level” should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that, ‘A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance’. Since background noise levels vary throughout a 24 hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233: 1987.”

It may be noted that various editions of BS 4142 are referenced. For example, TAN 11 refers to the 1990 version of BS 4142 and the condition applied to the blow moulding building refers to the 1997 version of BS 4142. The latest version of BS 4142 is dated 2014.

The broad approach of comparing a rating level of noise from the source under investigation against a background noise level has remained at the core of the three versions. The terminology has remained similar although the 2014 edition prefers the term “sound” rather than “noise”.

In this report the assessment is essentially following the terms of the anticipated planning condition (referring to the 1997 version of BS 4142). It would be expected that the same specific noise level would be determined under the 2014 edition of BS 4142. In relation to the background noise (sound) level, this report is based on lowest measured hourly values for daytime and night-time.

The latest version of BS 4142 more strongly refers to determining a “typical” or “representative” background noise (sound) level and provides examples where a mean or modal value is used in the assessment. It is considered that using “lowest” hourly values provides a more onerous assessment, that is, an assessment that would indicate a greater noise impact compared with the determination of background noise (sound) level using the 2014 version of BS 4142.

5. NOISE LEVEL MEASUREMENTS

Noise level measurements were conducted in July 2016 in relation to the Phase 1 assessment and may be found at Appendix A. These data are equally applicable for consideration of Phase 2.

The existing blow moulding building was assessed in AIRO Report SRB/6735/B dated 29 August 2014. This report formed part of the planning application at that time. That report presents measurement data supporting that assessment, much of which is not relevant to the blow moulding building extension, since this is for storage only. However, the report does present background noise data for The Chase.

Bringing the information from those two reports together, Table 1 below sets out the representative daytime and night-time background noise levels for Kalver and The Chase, used in the assessments set out in subsequent sections of this report.

Table 1 – Background Noise Levels		
Period	Noise Level L_{A90} in dB	
	The Chase	Kalver
Daytime	39	36
Night-time	28	31

6. NOISE ASSESSMENT

Based on the anticipated planning condition (see Section 4.1) and the background noise levels for The Chase and Kalver (see Table 1), Table 2 below sets out the maximum rating levels that should not be exceeded by the proposals.

Table 2 – Maximum Rating Levels				
Property	Period	Noise Level (dB)		
		Background Noise Level L_{A90}	Criterion	Maximum Rating Level
The Chase	Daytime	39	+ 5	44
	Night-time	28	+ 5	33
Kalver	Daytime	36	+ 5	41
	Night-time	31	+ 5	36

It is not expected that the proposals would have any adverse noise impact in respect of The Chase. The blow moulding building extension does not introduce any new noise generating sources and the existing blow moulding building is already operating for 24 hours each day, as was assessed when permission was granted. The extension would be expected to provide additional screening of The Chase from external plant already located along the north east elevation of the existing building including plant associated with the blow moulding facility and the two blue box chillers units that serve the main dairy building and have recently been relocated.

The cold store extension results in the position of the closest loading bays to The Chase being marginally further away and with the blow moulding building (including the extension) interposed in the direct line between The Chase and the nearest bays. This should increase the screening and reduce noise from loading bay activity.

The 11 bays associated with Phase 1 located along the south east elevation will be comprehensively screened from The Chase by the buildings themselves.

Accordingly, detailed assessment described below concentrates on the potential noise effects of the Phase 2 proposals at Kalver.

The extension of the cold store does not fundamentally alter the nature or characteristics of the noise environment due to the dairy at Kalver. The main sources of noise that can be heard from the existing bank opposite the existing loading bays are from the vehicle movements and refrigeration units on the vehicles. Audible noise breaking out from the dairy was not heard. Effective sound insulation is maintained when the lorries dock with the loading/unloading bays though, on occasion, the rolling of trolleys inside the vehicles can be heard.

In relation to fixed plant, it is understood that the dairy considers that the existing plant would be capable of servicing the extension. If additional fixed external plant is required, this would be carefully selected, and located with environmental noise effects as a key consideration and additional noise control measures incorporated as necessary.

Units to service the cold store should not be confused with the large Coolmation blue box chiller units that provide cooling for the milk processing (i.e for cooling liquids) and have recently been relocated to reduce noise transmission to properties to the north west.

The existing cold store condenser units are part of the system to keep the air temperature in the cold store at an appropriately low temperature.

At this stage, the assessment assumes that if any additional plant is required it will be suitably specified and screened so as to make negligible contribution to the overall noise level from the dairy that is dominated by vehicle manoeuvre noise.

For Phase 1, the assessment indicated that it would be necessary to provide additional screening between the proposals and Kalver to a height of 3 metres along the edge of the service yard, in order to meet the terms of the anticipated planning condition.

Phase 2 introduces loading bays along the new north east elevation that would expose Kalver to additional noise sources. Accordingly, it was evident that the screening between the proposals and Kalver would need to be further increased compared with Phase 1.

In order to determine the screening that would be required, a computer model of the situation was developed. The loading bays were modelled as line noise sources. Based on the measurement data for Phase 1 (see Appendix A), initially a model of the existing 11 bays was developed and calibrated to calculate a noise level of 57 dB L_{Aeq} 45 metres from the centre of the existing loading bays façade, to correlate with the measurement data for Phase 1.

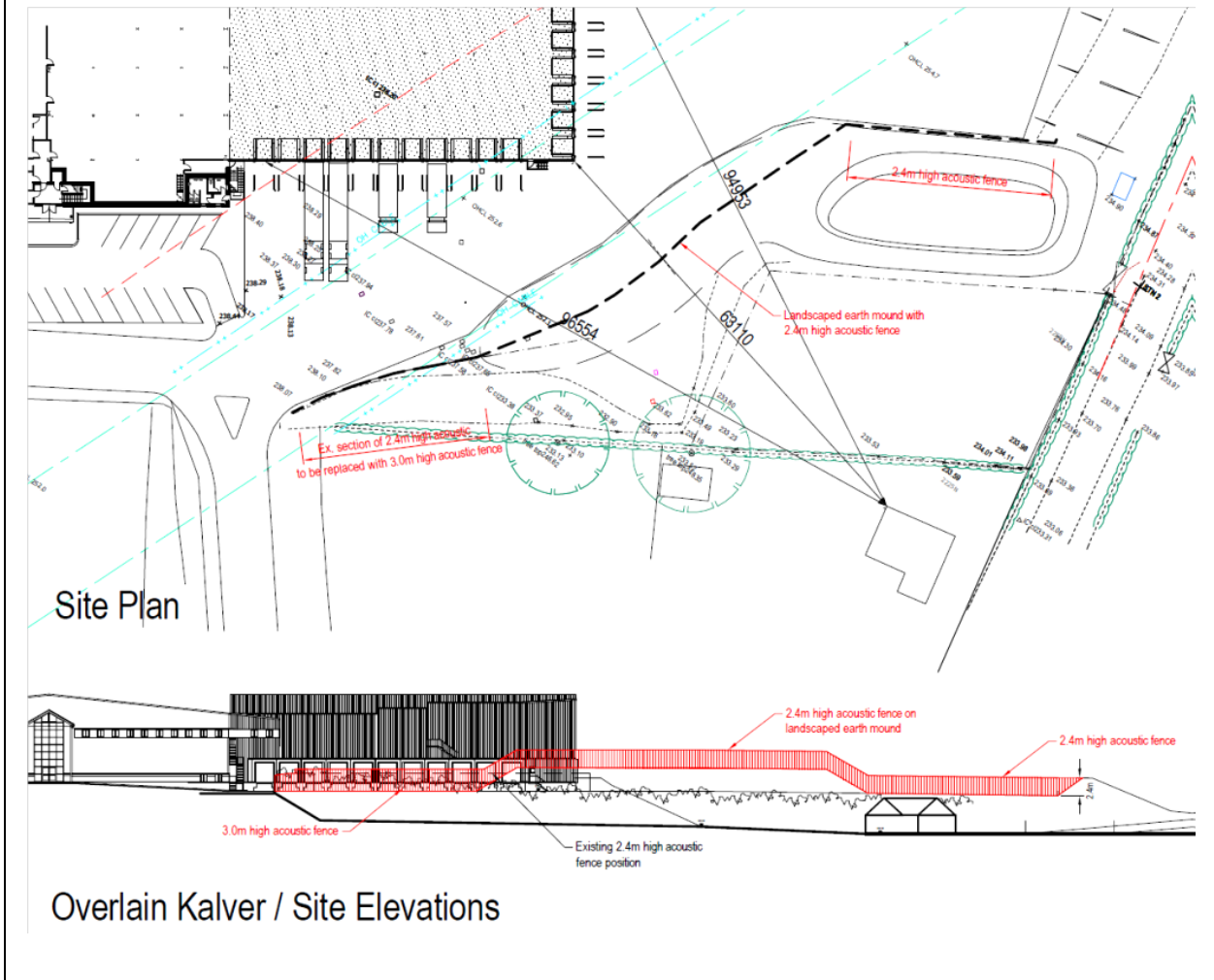
The Phase 1 proposals were then modelled, including the proposed Phase 1 screening. The additional 11 bays along the new north east elevation were added to the model. The calculations showed that the noise level at Kalver would increase by 3 dB with Phase 2, compared with Phase 1, without additional screening. This was consistent with expectations, given that a simplified view of the proposals is that Kalver would be exposed to twice the number of loading bays under Phase 2 compared with Phase 1 and a doubling in the number of noise sources (each being equal) would result in a 3 dB increase in noise level.

Additional screening was then modelled to provide the additional noise attenuation needed to contain the noise level to the anticipated criteria i.e. to provide an additional 3 dB of attenuation.

It became clear that the screening would need to be to a height of at least 6 metres above yard level to deliver the required noise level reductions.

Through a process of discussion with Haston Reynolds, the screening proposals were developed in order to accommodate a 2.4 metre fence on a bund in the critical area, 3 metre fences near the site access and 2.4 metre fences elsewhere.

The proposed screening is shown in Figure 2 below.

Figure 2 – Extract Plan Showing Phase 2 Screening Proposals


With the proposed screening implemented, the calculated daytime noise level at Kalver is 41 dB L_{Aeq} , and the night time noise level is 36 dB L_{Aeq} .

7. CONCLUSIONS

This report has presented an environmental noise assessment of proposals for Phase 1 and 2 of the Cold Store Extension and the Blow Moulding Building Extension at Tomlinsons Dairies, Minera, Wrexham.

In relation to the closest noise sensitive properties to the proposals, The Chase is closest to the blow moulding building extension and Kalver is closest to the cold store extension (Phases 1 and 2).

The proposals are not expected to have any adverse noise impact on The Chase, there being no significant new noise sources associated with the blow moulding building extension, bays are slightly further away and the new buildings provide additional screening.

At Kalver, the latest measurements of background noise levels show lower background noise levels than measured prior to the dairy being constructed in 2007. This indicates that the existing dairy has not adversely affected background noise levels since becoming operational.

It is anticipated that the local authority is likely to seek similar noise criteria as has been applied to previous development on the site as discussed in Section 4.

Accordingly, AIRO has recommended that the extent of boundary treatments providing noise screening is increased by adding appropriate barrier fences and mounding to a height in the critical area of just over 6 metres in the direct line of Kalver to the new bays, to reduce noise from the fully implemented cold store extension.

With the proposed screening implemented, it is assessed that the anticipated planning condition would be met, that is, noise levels arising from the proposals at Kalver would not exceed the background noise level by more than 5 dB.

Overall it may be noted that the predicted dairy noise levels from the proposals are low, and significantly better than general guidance on limits for environmental noise levels for dwellings (for example from the World Health Organization and BS 8233).

Report Approved by:

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Principal Consultant

REFERENCES

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

British Standard BS 4142:2014
Methods for rating and assessing industrial and commercial sound
British Standards Institution, 2014
2. Planning Guidance (Wales)
Technical Advice Note (Wales) 11
Noise
Welsh Government, 1997

APPENDIX A**AIRO Report DLW/6995/A**



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for
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Dated: 30 June 2016

**ENVIRONMENTAL NOISE ASSESSMENT
OF PHASE 1
COLD STORE EXTENSION
TOMLINSONS DAIRIES
MINERA
WREXHAM**

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ENVIRONMENTAL NOISE ASSESSMENT**OF PHASE 1****COLD STORE EXTENSION****TOMLINSONS DAIRIES****MINERA****WREXHAM****1. INTRODUCTION**

This report presents an environmental noise assessment of proposals for Phase 1 of the cold store extension at Tomlinsons Dairies, Minera, Wrexham.

The assessment is based on an environmental noise survey at the dairy, conducted on 21 and 22 June 2016.

The primary source of guidance for the assessment has been British Standard BS 4142 (ref 1).

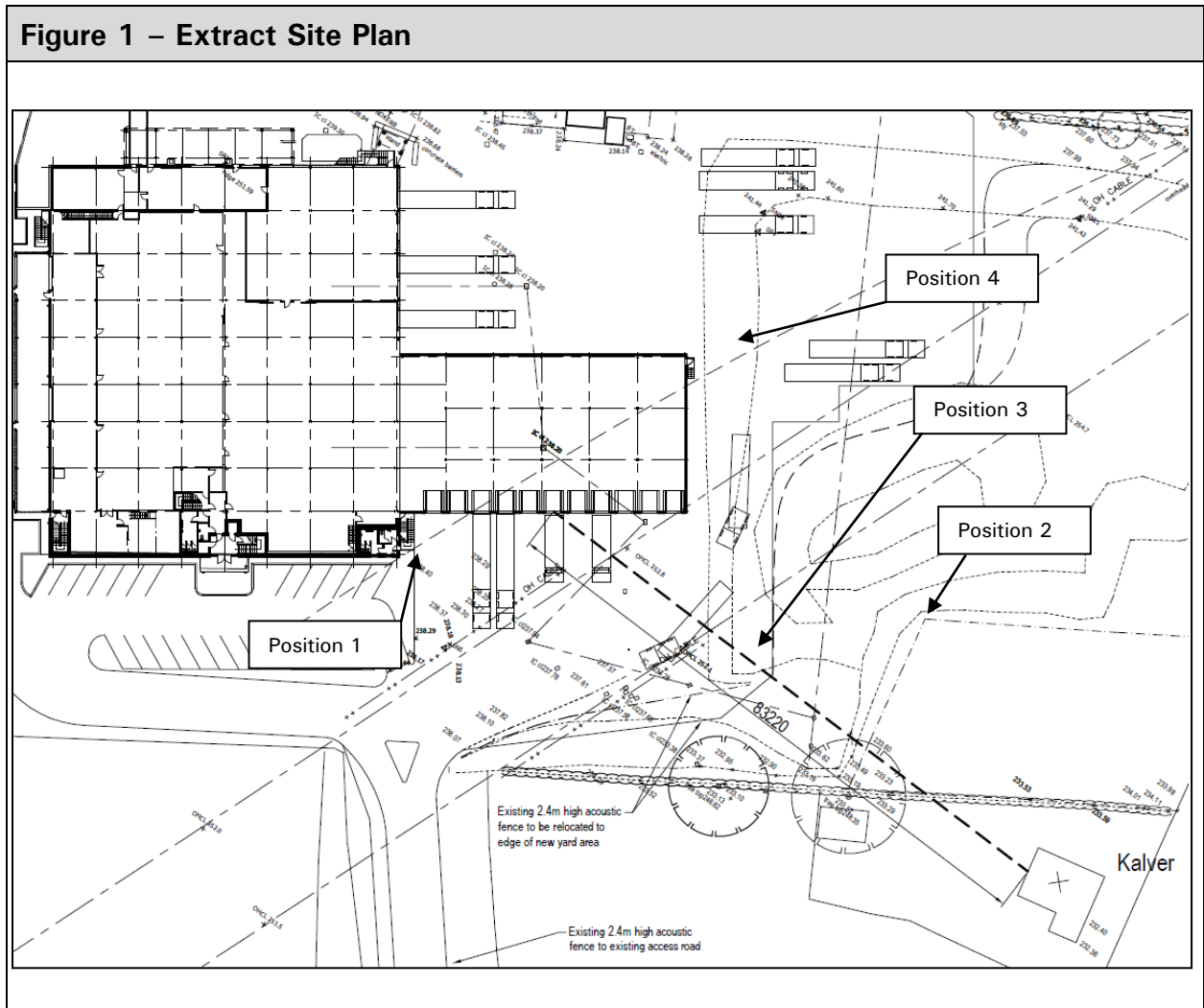
2. DESCRIPTION

Haston Reynolds Chartered Surveyors drawing H0070-16-A3-PL-02 provides a plan of the Phase 1 extension. The front half of the existing main building is to be extended to the north east, with 11 loading/unloading bays along the south east elevation. The existing bays (currently used as unloading bays) to the rear of the existing building are to be retained.

Associated works include increasing the existing hardstanding to the north east and the provision of a temporary car park.

The nearest noise sensitive property to the Phase 1 proposals is Kalver which is approximately 100 metres east from the existing dairy building. The nearest noise sensitive property to the north west of the site is The Chase, approximately 75 metres from the site boundary but significantly further from the proposals than Kalver.

Figure 1 shows the Phase 1 proposals on which the position of Kalver is marked, together with the positions at which the latest noise level measurements have been taken.



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 a 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. PREVIOUS PLANNING CONDITIONS AND ASSESSMENT GUIDANCE FOR NOISE

4.1 Previous Development

The consent for the most recent development on the site (the blow moulding building) was subject to the following condition.

"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

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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.

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

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It may be noted that various editions of BS 4142 are referenced. For example, TAN 11 refers to the 1990 version of BS 4142 and the condition applied to the blow moulding building refers to the 1997 version of BS 4142. The latest version of BS 4142 is dated 2014.

The broad approach of comparing a rating level of noise from the source under investigation against a background noise level has remained at the core of the three versions. The terminology has remained similar although the 2014 edition prefers the term “sound” rather than “noise”.

In this report the assessment is essentially following the terms of the anticipated planning condition (referring to the 1997 version of BS 4142). It would be expected that the same specific noise level would be determined under the 2014

edition of BS 4142. In relation to the background noise (sound) level, this report is based on lowest measured hourly values for daytime and night-time.

The latest version of BS 4142 more strongly refers to determining a “typical” or “representative” background noise (sound) level and provides examples where a mean or modal value is used in the assessment. It is considered that using “lowest” hourly values provides a more onerous assessment, that is, an assessment that would indicate a greater noise impact compared with the determination of background noise (sound) level using the 2014 version of BS 4142.

5. NOISE LEVEL MEASUREMENTS

Measurements of environmental noise levels were made at the dairy over the 24 hour period commencing at approximately 12:00 on Tuesday 21 July 2016.

Automatic data logging sound level meters were set out at 2 positions that measured and logged the noise level every 2 seconds together with hourly values across a range of indices.

Sample noise level measurements were made at two further positions using a tripod mounted sound level meter.

In all cases the microphone was at a height of 1.2 to 1.5 metres above local ground level and well away from any acoustically reflective structures (other than the ground) so as to be in free-field conditions.

The measurement positions are shown on Figure 1, details of the instrumentation are given in Appendix A and weather observations are given in Appendix B.

The main measurement results are given in Tables 1 to 3 below and extract noise level time histories in Figures 2 and 3.

Transcripts of observations made during three sample periods are provided in Appendix C.

**Table 1 – Hourly Noise Levels at Position 1
Tomlinsons Dairies 21 to 22 June 2016**

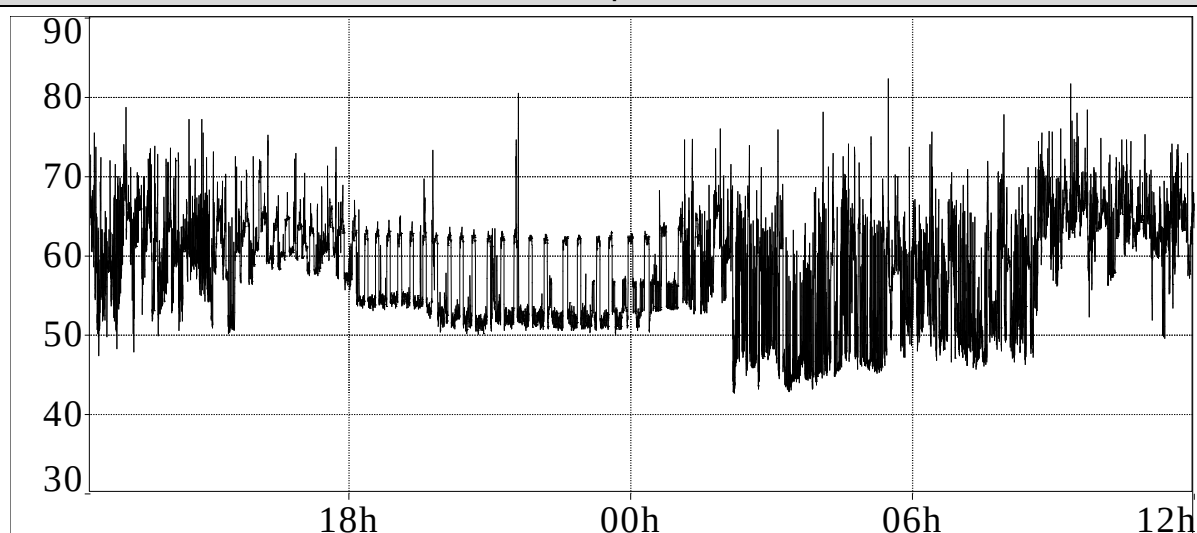
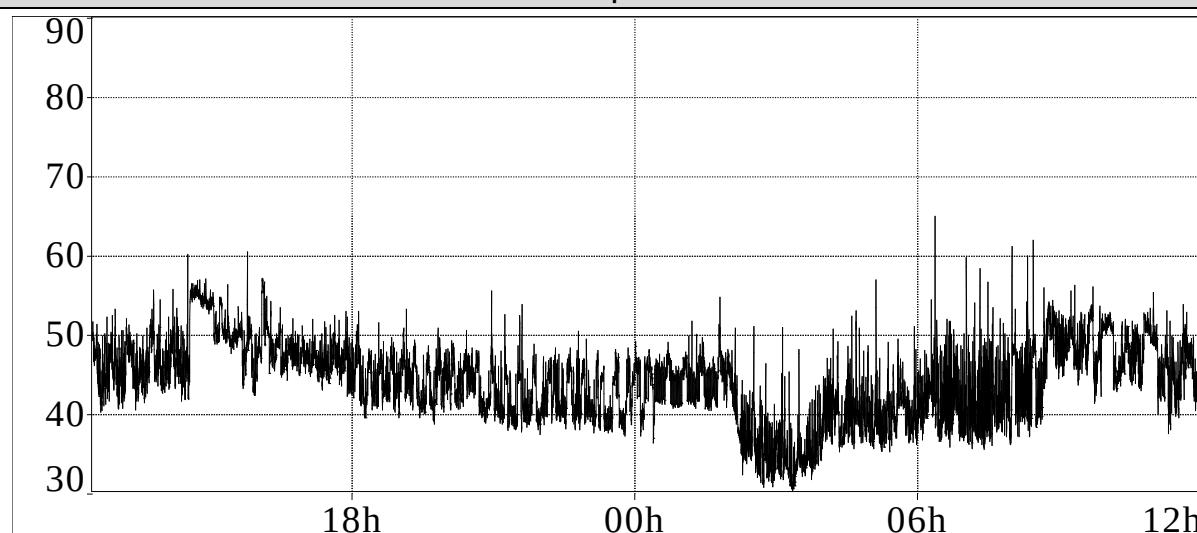
Period Commencing	Noise Level in dB			
	L_{AFmax}	L_{Aeq}	L_{A10}	L_{A90}
Tuesday 21 June				
13:00	89.5	65.2	67.4	52.1
14:00	88.1	63.8	65.5	54.1
15:00	78.9	62.6	64.9	51.1
16:00	86.2	64.1	65.2	58.8
17:00	84.8	62.4	63.9	57.0
18:00	75.7	59.3	62.6	53.1
19:00	84.1	59.6	62.3	52.2
20:00	67.8	57.7	62.0	50.5
21:00	83.7	60.4	62.0	50.7
22:00	63.9	57.3	61.8	50.5
23:00	63.7	57.0	61.7	50.5
Wednesday 22 June				
00:00	71.2	58.8	62.4	51.9
01:00	89.1	62.6	64.9	53.3
02:00	81.9	60.3	63.7	44.9
03:00	89.5	57.2	60.6	43.2
04:00	93.0	61.6	63.8	44.9
05:00	94.1	60.8	61.4	45.5
06:00	87.3	60.4	62.8	47.5
07:00	80.8	60.0	62.3	46.0
08:00	88.2	64.1	67.3	47.5
09:00	94.2	67.1	69.0	58.8
10:00	90.2	65.9	67.6	57.8
11:00	86.7	64.9	67.1	57.2
07:00 to 23:00	--	67	--	--
23:00 to 07:00	--	63	--	--

**Table 2 – Hourly Noise Levels at Position 2
Tomlinsons Dairies 21 to 22 June 2016**

Period Commencing	Noise Level in dB			
	L_{AFmax}	L_{Aeq}	L_{A10}	L_{A90}
Tuesday 21 June				
13:00	66.3	47.1	49.4	41.9
14:00	69.0	52.2	55.0	43.2
15:00	65.5	50.7	53.3	44.5
16:00	63.2	49.5	51.0	45.2
17:00	62.1	47.0	48.4	44.0
18:00	57.8	45.1	47.1	40.6
19:00	63.4	44.8	46.8	40.2
20:00	61.2	44.6	46.2	40.1
21:00	59.4	42.8	44.9	38.1
22:00	58.4	43.2	45.5	38.7
23:00	53.5	42.7	45.5	37.8
Wednesday 22 June				
00:00	54.3	44.5	46.5	39.8
01:00	68.4	45.2	46.9	40.7
02:00	58.8	39.5	42.9	31.7
03:00	61.2	36.3	37.5	31.2
04:00	58.4	41.8	44.0	35.7
05:00	60.6	41.2	43.1	35.7
06:00	78.3	44.4	45.9	36.8
07:00	63.1	44.5	46.8	36.1
08:00	76.0	48.5	51.0	38.8
09:00	69.6	49.5	51.6	44.7
10:00	60.8	49.1	51.3	43.5
11:00	60.7	46.6	49.0	40.6
07:00 to 23:00	--	48	--	--
23:00 to 07:00	--	43	--	--

**Table 3 – Sample Noise Levels
Tomlinsons Dairies 21 and 22 June 2016**

Position	Noise Level in dB				
	Date and Time	Duration (mins)	L_{AFmax}	L_{Aeq}	L_{A90}
3	21/6/16 14:00	15	91.0	60.2	49.2
4	22/6/16 10:15	15	74.4	58.2	56.0

Figure 2 – Noise Level Time History, L_{Aeq} in dB at Position 1

Figure 3 – Noise Level Time History, L_{Aeq} in dB at Position 2


6. NOISE ASSESSMENT

Position 2 was intended to collect data that would be representative of pre-existing background levels at Kalver. This position was the position used for this purpose in relation to the original permission for the dairy on this site. The position is screened from the dairy to a similar extent to Kalver.

It may be seen from Table 2 that the lowest background noise levels (L_{A90}) for any hour were 36 dB during the daytime (07:00 to 23:00) and 31 dB during the night-time (23:00 to 07:00). Further analysis of the night-time period has shown that the lowest background noise level in any 15 minute period was also 31 dB.

It is notable that, with the dairy now fully operational, the latest background noise levels are lower (by 2 to 4 dB) than those measured in 2007 before the dairy was commenced.

Based on the planning condition for the blow moulding building, the rating levels of noise from Phase 1 of the cold store extension should not exceed $36 + 5 = 41$ dB during the daytime and $31 + 5 = 36$ dB during the night-time.

The extension of the cold store does not fundamentally alter the nature or characteristics of the noise environment due to the dairy at Kalver. The main sources of noise that can be heard from the existing bank opposite the loading bays are from the vehicle movements and refrigeration units on the vehicles. Audible noise breaking out from the dairy was not heard. Effective sound insulation is maintained when the lorries dock with the loading/unloading bays though, on occasion, the rolling of trolleys inside the vehicles was heard.

Although the number of docking bays increases under Phase 1, the bays that may be expected to affect Kalver, remain at 11 bays, since the extended building itself will substantially screen Kalver from the remaining existing bays to the rear of the north eastern elevation.

There may also be incidental benefits in respect of the noise environment at Kalver arising from heavy goods vehicles not being able to park along the bank as close to Kalver as currently. The vehicles are shown as parking near the temporary car park further from Kalver, the extended building and access road dictating that there is limited room to park long vehicles close to Kalver as presently occurs.

In relation to fixed plant, it is understood that the dairy considers that the existing plant would be capable of servicing the extension. If additional fixed external plant is required, this would be carefully selected, and located with environmental noise

effects as a key consideration and additional noise control measures incorporated as necessary.

Units to service the cold store should not be confused with the large Coolmation blue box chiller units that provide cooling for the milk processing (i.e for cooling liquids) and have recently been relocated to reduce noise transmission to properties to the north west.

The cold store condenser units are part of the system to keep the air temperature in the cold store at an appropriately low temperature.

At this stage, the assessment assumes that if any additional plant is required it will be suitably specified and screened so as to make negligible contribution to the overall noise level from the dairy that is dominated by vehicle manoeuvre noise.

The 15 minute sample measurement at Position 4 was at a position with a broad unscreened view of the docking bays and service yard. The position was about 45 metres from the dairy façade. The measured noise level was 58 dB L_{Aeq} (see Table 3).

In the same hour, the L_{Aeq} at Position 2 was 49 dB, compared with a daytime period L_{Aeq} of 48 dB.

Accordingly, a representative daytime L_{Aeq} of 57 dB at 45 metres directly in front of the bays may be calculated.

The plan distance between the centre of the new docking bays elevation and Kalver is 83 metres and the topography and boundary fences will provide screening.

Using a distance attenuation rate of 6 dB per doubling of distance suggests the level at Kalver would be 5 dB less than at Position 4.

Assuming the existing boundary fence along the access road is revised/extended to fully screen Kalver from the new bays, at the current height of 2.4 metres it is calculated that noise levels would be reduced by a further 9 dB.

Consequently, the predicted daytime dairy noise level at Kalver with the Phase 1 cold store extension, is assessed to be around $57 - 5 - 9 = 43$ dB L_{Aeq} .

At night, the period L_{Aeq} is 5 dB lower than daytime. Accordingly, the night-time dairy noise level with the proposals is assessed to be around 38 dB L_{Aeq} .

Based on the anticipated local authority criteria the noise level is about 2 dB higher than required.

7. DISCUSSION AND MITIGATION

In order to reduce the dairy noise levels at Kalver by at least a further 2 dB, it would be considered necessary to increase the screening provided by the landscaping and boundary fence.

AIRO has calculated the additional benefit of increasing the height of the boundary fence from 2.4 metres to 3 metres and extending the fence as indicated in Figure 4.

It is assumed that the additional or altered boundary fencing would be constructed to provide acoustic screening as the existing access road fence does. This requires the new fence to be of similar construction, the key points being that it should be imperforate and of sufficient mass per unit area (around 20 kg/m²).

The additional attenuation provided by the extended barrier fence is calculated to be sufficient at 2 dB, i.e. a total reduction due to screening of 11 dB, giving an anticipated noise level at Kalver of 41 dB and 36 dB L_{Aeq} for daytime and night-time respectively.

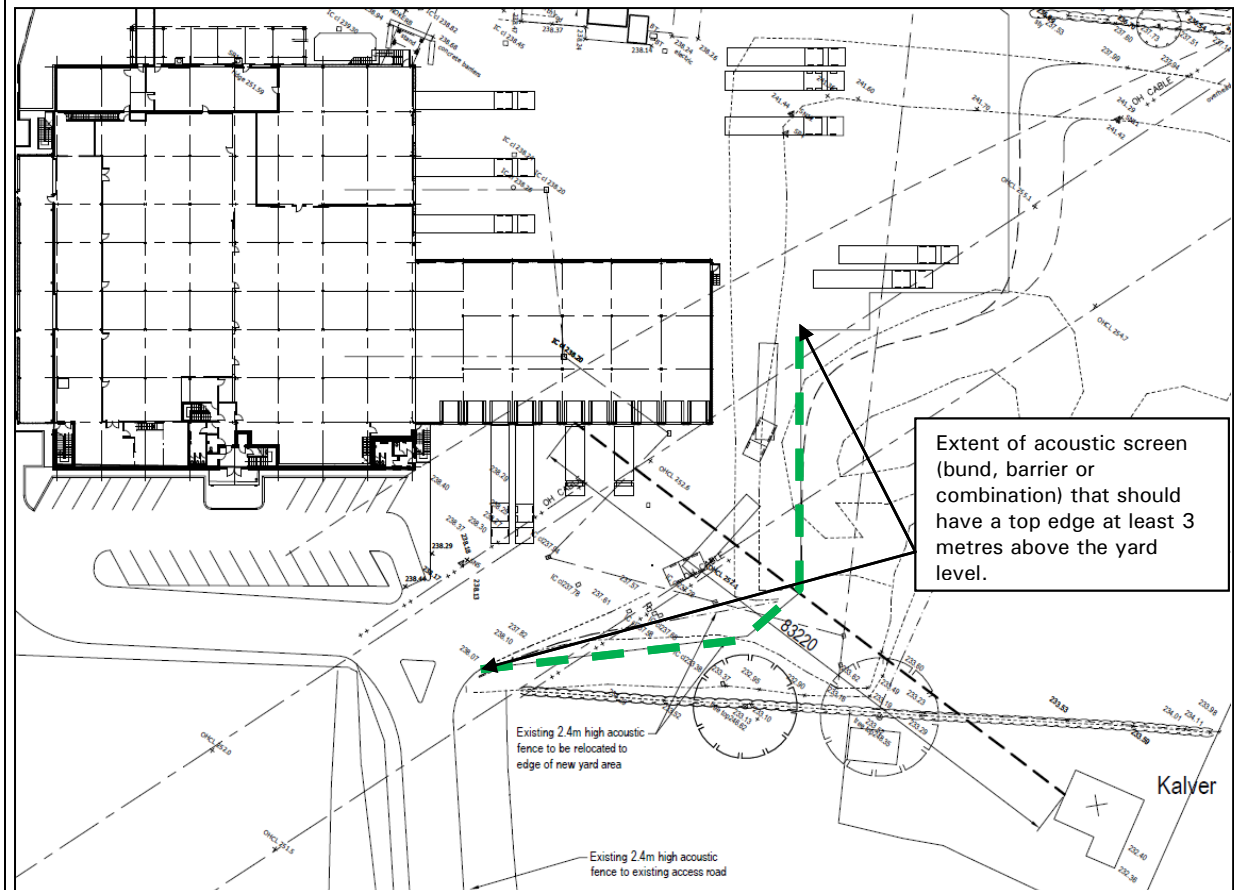
8. CONCLUSIONS

This report has presented an environmental noise assessment of proposals for Phase 1 of the Cold Store Extension at Tomlinsons Dairies, Minera, Wrexham.

At the closest noise sensitive property to the proposals, Kalver, the latest measurements of background noise levels show lower background noise levels than measured prior to the dairy being constructed in 2007. This indicates that the existing dairy has not adversely affected background noise levels since becoming operational.

The Phase 1 proposals do not introduce changes that would alter the broad noise characteristics of the dairy at Kalver. The proposals do place docking bays closer to Kalver but the extended building provides additional screening of the balance of the dairy behind the building (as seen from Kalver). In essence, the proposals

Figure 4 – Extract Plan Showing Screening Proposals



expose Kalver to activity associated with 11 bays that are about 27 metres closer to Kalver than the existing bays.

Anticipating that the local authority is likely to seek similar noise criteria as has been applied to previous development on the site, the assessment of the proposals is that the criteria would be exceeded by about 2 dB as they currently stand.

Accordingly, AIRO has recommended that the extent of boundary treatments providing noise screening is increased by adding appropriate barrier fences to a height of 3 metres in the direct line of Kalver to the new bays.

Overall it may be noted that the predicted dairy noise levels at Kalver are low, and significantly better than general guidance on limits for environmental noise levels for dwellings (for example from the World Health Organization and BS 8233).

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Method for rating industrial noise affecting mixed residential and industrial areas
British Standards Institution, 1997

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Welsh Government, 1997

APPENDIX A – Details of Instrumentation**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 702	012626	Mar 2016	94.2	94.2	94.4
Microphone	Cirrus MK 224	89655	Jan 2016			
Calibrator	Cirrus CR 511D	014086	Jan 2016			
Measuring System	Cirrus CRL 703B	43057	Apr 2016	93.7	93.7	93.4
Microphone	Cirrus MK 224	891199	Jan 2016			
Calibrator	Cirrus CR 511E	43024	Jan 2016			
Measuring System	B&K 2260	2341172	Feb 2016	94.0	94.0	94.2
Microphone	B&K 4189	2339504	Jan 2016			
Calibrator	B&K 4231	2342748	Jan 2016			

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.

APPENDIX B – Weather Observations

Table B2 - Record of Weather Observations					
Date	Time	Temp (°C)	Humidity (% RH)	Wind Speed (m/s)	Wind Direction
21/6/16	12:30	19	58	4-5	SW
22/6/16	10:00	18	73	< 2	SW

APPENDIX C – Transcript of Observations

6995 - Tomlinsons Dairy – 21 June 2016	
Time	Description (near Unit T)
12:32	Small lorry backing up to bay 2, forklift manoeuvring in yard Lorries idling, reverse alarm, voices
12:34	Lorry (small) leaves yard, lorry leaving Bay 1, lorry immediately by T now
12:35	Manoeuvring, reversing up to Bay 1. Articulated lorry leaving site, quieter now
12:36	Tail lift or similar audible, noise from body of Bay 1 lorry (loading presumably) No fixed plant audible
12:38	No idling trucks audible, can hear birdsong
12:40	Whining of lift, clanking continuing
12:41	Relatively quiet
12:43	Bay 1 lorry starts, doors shut, departs Van reverses to Bay 1
12:45	Small lorry leaves, van engine off, reverse beeper then quiet I think beeper is from roof truss yard
12:47	Artic entering site
12:49	Small lorry leaves site
12:50	JCB manoeuvring
12:51	Artic now arrives and stops across from Unit T (presumably awaiting a free bay)
12:52	Refrigeration plant running on artic
12:55	JCB moving (has duck reverse alarm, not beeper)
13:06	Fairly quiet, trolleys in/out lorry at Bay 2
13:09	Artic reverses tight to Bay 3
13:11	By meter Y, can hear JCB, beeped horn, artic starts
13:12	Beeping, vehicle refrigeration unit
13:19	Refrigeration unit on artic parked second in. 7 loading in front, 4 unloading at rear

6995 - Tomlinsons Dairy – 22 June 2016

Time	Description (opposite loading bays 5 and 6 on bank by fenceline)
10:15	Vehicles backed up to 2, 4, 5, 6. 4 and 6 no tractors. 2 is smaller lorry, 5 is a Moran artic. Can hear refrigeration units on lorries, beeper in distance (off site) Whine from re-sited chillers and compressed air $\approx$ 57 dB(A)
10:18	Non articulated lorry manoeuvring, reversing to park by bank (quack), van leaving site. Compressed air release increases level to $\approx$ 62 dB(A) each blast lasts 2-3 seconds, repeating every 28 seconds.
10:22	JCB moving, actually vehicles increase level to $\approx$ 62. Compressed air increases level to about 59 dB(A). Small lorry leaves.
10:23	Voices. Artic waiting on right hand side, now moves across front of bays, now reversing (quack) to park 4 in from left hand side of parking bays (level up to 64 dB(A) for a few seconds), compressed air brake release. Compressed air from release cycle from plant by blow moulding is about 9 seconds duration.
10:26	Non artic leaves Bay 2.
10:27	Artic that parked (compressed air release) then looks like going round building to go to Bay 2.
10:28	Yes, here it comes, preceded by artic reversing to the space it vacated (beeping reverser), quack reverser on M&S lorry reversing to loading bay 7.
10:30	Manoeuvres still going on. Measurement ended.

Time	Description (opposite loading bays 5 and 6 on bank by fenceline)
10:45	JCB moving, picking up pallets (reverse quack) Beeper in distance, compressed air brakes release
+ 1:14	Artic Bay 7 leaves, JCB still moving.
+ 1:41	Artic reversing into space 3 lhs 62 dB(A). JCB level 60 to 62 dB(A)
+ 2:45	Nampac (space 7) leaving
+ 3:10	Small lorry arriving right hand side, Nampac waiting, checking doors, JCB still moving
+ 4:07	JCB
+ 4:14	Airbrakes. LAFmax 79.3 dB.
+ 4:42	Nampac leaves, small lorry reversing into Space 3. Compressed air is most irritating
+ 5:36	Trolley Noise.
+ 6:05	JCB, airbrakes.
+ 7:04	Noises from workshop area, no its forklift $\approx$ 59 dB(A)
+ 7:50	Something dropped.
+ 8:50	Trolleys in yard being moved, rolled and forklift. JCB in Truss yard has been operating audibly for a while.
+ 9:39	Small lorry arrives stops opposite Bay 5/6. There's a continuous choppy noise (like a helicopter) from far corner near workshop.
+ 11:14	Green artic moves from workshop, (the noise came from this vehicle) Vehicles in truss yard (3 no. plainly audible)
+ 13:00	Level now $\approx$ 58 dB(A).
+ 14:08	Small orange lorry leaving.
	ENDED