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Acoustic Consultancy Report

Noise impact assessment for the proposed dwellings on land to the rear of Asda, Goldthorpe

Client: Asda Stores Ltd

Our Ref: 11183

Revision: 0

Report Prepared By S Fowler M.I.O.A.

Date: 4th May 2018



1.0 Introduction

Following a request by the Environmental Health Officer, Acoustic Consultancy Partnership were instructed to undertake a noise impact assessment for the proposed dwellings on the land to the rear of the Asda store in Goldthorpe.

The main concern of the EHO was the potential noise from deliveries and plant connected with the adjacent Asda store affecting the proposed properties.

This report provides details of noise level measurements undertaken for the Asda deliveries and plant, together with recommended noise criteria for the dwellings and the required mitigation treatment.

This report should not be considered as a final design specification for the dwellings. Its purpose is to demonstrate that suitable internal noise levels can be achieved for the nearest and most affected dwelling, if sufficient mitigation is included in the dwelling design.

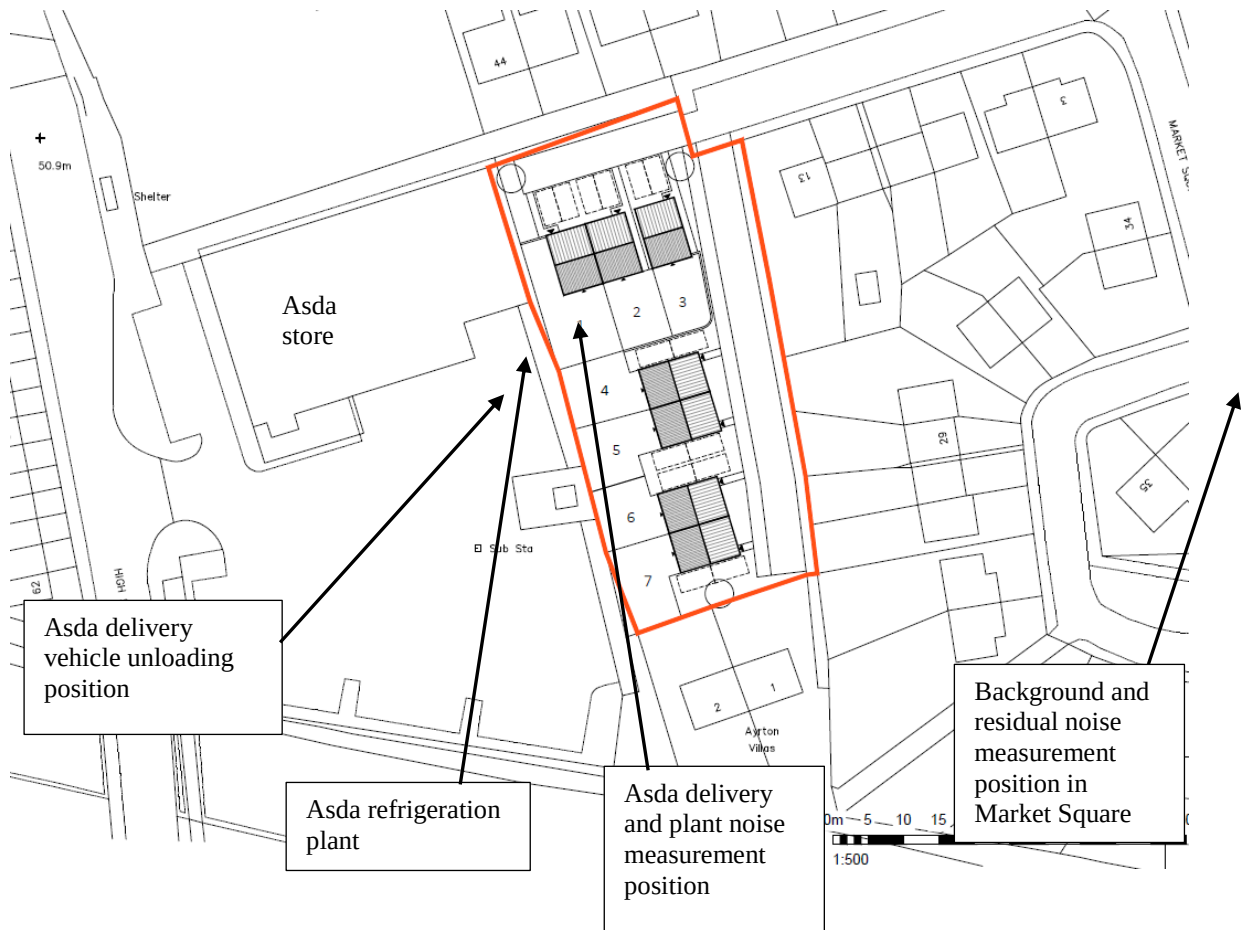
We would recommend that a more comprehensive set of calculations are undertaken in due course, once the final development details are available, allowing the mitigation measures to be tailored to individual room types and dwelling locations. This could be controlled by inclusion of a planning condition, as given in section 8.0.

2.0 Site Layout

The proposed dwellings would be located on land located to the east of the existing Asda Goldthorpe store. The proposed development site is slightly raised in comparison to the Asda site and the nearest dwelling would be approximately 10m from the Asda unloading position. Refrigeration plant on the Asda store is located close to the boundary between the 2 sites.

Existing residential properties are located to the north and east of the development site.

A site plan is provided below.



3.0 Noise Climate and Asda Activity

Following conversations with the Asda store manager, we confirm that the earliest delivery takes place at 06.00 hrs and lasts for approximately 1 hour. This activity occurs 7 days a week and involves a chilled HGV lorry being unloaded by the use of a drop-down tail lift, with goods packed in wheeled cages.

Other deliveries of bread, milk and ambient goods occur, but these are later in the day.

The Asda plant was running constantly during our visit at a relatively steady noise level.

In terms of a noise assessment, the most critical times would therefore be a plant noise assessment at night and a delivery noise assessment for the 0600 start time on a Sunday morning.



4.0 Guideline Noise Criteria for Residential Properties

We give below details of relevant British Standards and guidance documents applicable to this type of noise assessment.

BS 4142:2014 Methods for Rating and Assessing Industrial and Commercial Sound

This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature, together with the procedure for assessing the impact at noise sensitive receptors.

The scope of this standard has been increased from previous versions and now includes “sound from the loading and unloading of goods and materials at industrial and/or commercial premises” and “sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes....”

It confirms it is applicable to assessing outdoor sound at proposed new dwellings or premises used for residential purposes.

BS 4142:2014 provides the following guidance on obtaining an initial estimate of the impact of the specific noise source, based on the excess of the rating level above the background sound level.

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

BS8233:2014 – Guidance on sound insulation and noise reduction in buildings

This British Standard provides guidance on desirable levels of internal noise within dwellings, as given in the table below.

BS8233:2014 guideline internal ambient noise level limits for dwellings			
Activity	Location	07.00 to 23.00	23.00 to 07.00
Resting	Living room	35 dB L _{Aeq,16hr}	-
Dining	Dining room / area	40 dB L _{Aeq,16hr}	-
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq,8hr}	30 dB L _{Aeq,8hr}

BS8233:2014 provides further clarification on the application of the above guideline values, as detailed below.

- The guideline values relate to sources without specific character, previously referred to (in the 1999 version) as anonymous noise. They are intended to reflect the suitability of steady, continuous noise, eg road traffic noise.
- For sources with acoustic features (intermittency, tonal noise, strong low frequency content etc) lower internal noise limits might be appropriate.
- Where development is considered necessary or desirable, despite external WHO guideline values being exceeded, internal guideline values may be relaxed by up to 5 dB and reasonable internal conditions still achieved.
- If relying on closed windows to achieve the internal guideline values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.
- Regular individual noise events can cause sleep disturbance. The document states that a guideline value may be set in terms of SEL or L_{Amax,F} but does not provide specific guidance values.

World Health Organisation (WHO) Guidelines for Community Noise 1999

This document shows close correlation to BS8233:2014, with the information in the WHO document referenced in the British Standard.

The WHO guideline values are the same as those given in tables detailed in the BS8233:2014 section above.

The WHO document also provides a 45 dB L_{AFmax} internal / 60 dB L_{AFmax} external criteria, for sleep disturbance from noise events.



ProPG: Planning and Noise for New Residential Development, May 2017

This guidance document was prepared jointly by the Association of Noise Consultants, Institute of Acoustics, Chartered Institute of Environmental Health, together with practitioners from a planning and local authority background.

The document is based on current legislation, guidance and standards and provides comprehensive guidance for good acoustic design of new dwellings, taking the existing acoustic environment into account.

The document states that suitable guidance on internal noise levels for dwellings can be found in BS8233:2014. The recommended internal noise levels given in ProPG are therefore the same as the BS8233:2014 guidance criteria given earlier in this report, with the addition of a 45 dB L_{AFmax} criteria for bedrooms at night, in line with WHO.

The document also provides considerable additional guidance on the good acoustic design process and clarifies a number of important points, as summarised below.

- The document confirms the recommended internal noise levels relate to steady external noise sources without specific character e.g. sites exposed predominantly to noise from transportation sources.
- For sites where industrial and/or commercial noise is considered to be dominant, ProPG recommends the use of BS4142:2014 methodology.
- The recommended internal noise levels assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used.
- For individual noise events in bedrooms at night, levels should not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night.
- Information is provided on the ventilation strategy for dwellings. It confirms that designers should aim to achieve guideline internal noise levels with windows open, but recognises this is not always possible in noisy locations. Achieving the guideline criteria in noisy locations often requires windows to be closed, with high quality seals, and an acoustically treated ventilation strategy provided to achieve whole dwelling ventilation.



- Openings required for whole dwelling ventilation (a requirement of Approved Document F, e.g. trickle vents), must be allowed for in the assessment of internal levels.

5.0 Adopted Noise Criteria and Methodology

Following discussion with the EHO James Gardham, the following noise criteria and methodology have been adopted

Assessment for Dwellings with Open Windows

Assessment of Asda delivery activity and plant noise affecting dwellings that rely on openable windows for cooling purposes should be undertaken using BS 4142:2014 methodology.

To maintain an acceptable noise impact for properties with open windows, the combined rating level of the Asda plant and delivery activity should not exceed the underlying background L_{A90} noise level for the 06.00 to 07.00 period.

Assessment for Dwellings with Closed Windows (Coupled with Attenuated Ventilation)

Should the BS4142:2014 assessment show an unacceptable noise impact for dwellings with open windows, it would be necessary to provide sufficient sound insulation of the façade to achieve suitable internal noise levels. Any such scheme would need to include attenuated ventilation to ensure the thermal comfort of residents is maintained with windows closed.

Guidance on suitable internal noise criteria can be found in BS8233:2014, as detailed in section 4.0, but the criteria should be lowered to acknowledge the non-anonymous nature of the noise (we would recommend a 5dB reduction to the BS8233:2014 values). We would also recommend the 8hr and 16hr reference time periods are reduced to 1 hour, to acknowledge the intensification of noise levels during the 1 hour delivery period.

By adopting the above approach, the residents would be protected for the worst case delivery period of 06.00 to 07.00 hrs, and would benefit from significantly lower noise levels at other times.

The WHO guidance should also be considered for the 06.00 to 07.00 delivery period, as this would fall within the night time period.



Based on the above, we would recommend the following internal noise criteria, achieved with windows closed and attenuated ventilation.

Recommended internal ambient noise level limits for proposed dwellings		
Location	07.00 to 23.00	23.00 to 07.00
Living areas	30 dB $L_{Aeq,1hr}$	-
Bedroom		25 dB $L_{Aeq,1hr}$ 45 dB L_{AFmax}

6.0 Noise Monitoring

Measurement of the Asda plant and delivery noise was undertaken on the proposed development site, at a location in line with the façade of the nearest proposed dwelling. Readings were completed between 05.40 and 07.05 hours on Sunday 22nd April 2018. A detailed time history was recorded, to allow the plant and delivery worst case noise levels to be identified.

Measurements were also taken at a representative position, in Market Square, away from the influence of the Asda plant and delivery noise. These measurements established the background L_{A90} and residual L_{Aeq} noise levels. Measurements at this position were completed between 02.00 and 03.00 hours and between 05.00 and 06.45 hrs.

The full noise survey details and results are given in Appendix A.

7.0 Noise Impact Assessment

We give below the noise impact assessment for the nearest and most affected dwelling.

Assessment for Nearest and Most Affected Proposed Dwelling with Open Windows

As stated in section 5.0, taking the significance of the Asda delivery and plant noise into account, assessment for dwellings relying on open windows for cooling ventilation should be undertaken against BS4142:2014 methodology.

The results of the BS4142:2014 assessment are given below for the nearest proposed dwelling.

**Asda Plant (night time assessment)**

Measured ambient noise level with Asda plant running	51.5 dB $L_{Aeq}(15min)$
Residual noise level	47.9 dB $L_{Aeq}(15min)$
Specific plant noise level at nearest proposed property	49 dB $L_{Aeq}(15min)$
Acoustic feature correction	+3dB
Plant rating Level	52 dB
Background sound level at night	30 dB $L_{A90}(15min)$
Excess of rating level above background	+22 dB

Asda Combined Plant and Delivery (06.00 to 07.00 Sunday morning assessment)

Measured ambient noise level with Asda plant and delivery	58.5 dB $L_{Aeq}(15min)$
Residual noise level	47.9 dB $L_{Aeq}(15min)$
Specific noise level at nearest proposed property	58 dB $L_{Aeq}(15min)$
Acoustic feature correction	+6dB
Rating Level	64 dB
Background sound level 06.00 to 07.00	37 dB $L_{A90}(15min)$
Excess of rating level above background	+27 dB

The results of the BS4142:2014 assessment exceed the BS4142:2014 criteria given in section 5.0 and therefore confirm that an acceptable noise impact could not be maintained for dwellings with open windows.

Assessment for Nearest and Most Affected Proposed Dwelling with Closed Windows

Assessment of internal noise levels is given below.

We have undertaken detailed façade insulation calculations to determine the minimum façade and attenuated ventilation specification required to meet the internal noise criteria specified in section 5.0.

We have based our calculations on a 4m x 3m x 2.4 high room, with a 1.2m x 1.8m window

The minimum façade element specifications are given below for the nearest most affected proposed dwelling, together with the calculated internal noise levels and comparison to the adopted internal criteria.



Internal Noise Level Within Bedroom at night (06.00 to 07.00)

Window	8.8 Optiphon/16 argon cavity/12.8 Optiphon
Wall	Brick/Block cavity, 400kg/m ²
Ceiling	Tile/slatted roof, with 2x 15mm Soundbloc ceiling on resilient bars
Ventilator	1no Greenwood Airvac MA3051

Calculated internal noise levels, based on façade elements given above			
Calculated internal LAeq(1hour)	Target internal LAeq(1hour)	Calculated internal LAFmax	Target internal LAFmax
17 dB	≤ 25 dB	43 dB	45 dB

Internal Noise Level Within Living Area in the Day

This assessment is based on activity levels recorded between 06.00 to 07.00 and assumes this could be repeated at some point in the day (therefore worst case).

Window	Standard 6/16/6 double glazing
Wall	Brick/Block cavity, 400kg/m ²
Ceiling	Not applicable for ground floor
Ventilator	2no generic acoustic trickle vents

Calculated internal noise levels, based on façade elements given above			
Calculated internal LAeq(1hour)	Target internal LAeq(1hour)	Calculated internal LAFmax	Target internal LAFmax
30 dB	≤ 30 dB	Not applicable	Not applicable

The calculations for the internal noise levels are given in Appendix B.

The results of the internal noise assessment achieve the internal noise criteria given in section 5.0 for the day and night periods.

The above internal noise levels assume closed windows. Ventilation is provided by acoustic vents, but the overall ventilation design must be sufficient to ensure suitable cooling ventilation is maintained with windows closed. This would require a whole house heat recovery ventilation scheme, incorporating the attenuated vents.



8.0 Conclusions

The results of the BS4142:2014 assessment exceed the BS4142:2014 criteria given in section 5.0 and therefore confirm that an acceptable noise impact could not be maintained for dwellings with open windows.

It is therefore necessary to establish the minimum façade insulation requirements in order to achieve acceptable internal noise levels.

Our calculations confirm that the adopted target internal noise levels, given in section 5.0, could be achieved at the nearest and most affected proposed dwelling, if the façade elements specified in section 7.0 are adopted.

We would wish to confirm the following two points

- The façade elements detailed in section 7.0 should not be taken as the finalised requirement for the entire development. The calculations are intended to verify that suitable internal noise levels can be achieved for the nearest, most affected proposed dwelling, based on the information available at this early stage.

There is scope to substitute the selected façade elements with alternative, equivalent elements, together with scope to fine tune the requirements for various façade orientations and dwelling locations.

We would therefore recommend a Planning Condition that requires a further noise assessment to be submitted to and approved by the Local Authority, before commencement of work on site, that demonstrates the adopted design criteria given in section 5.0 of this report would be achieved for all habitable rooms, based on the 06.00 to 07.00 activity noise levels given in Appendix A.

- The sound insulation scheme relies on closed windows and attenuated vents in order to achieve suitable internal noise levels. It is therefore essential that the overall ventilation strategy is sufficient to achieve the cooling ventilation requirements in warm weather, allowing the comfort of occupants to be maintained with windows closed.

We would therefore recommend an additional Planning Condition that requires the ventilation scheme to be submitted to and approved by the Local Authority, before commencement of work on site.

APPENDIX A

Environmental Noise Monitoring

A1.0 Environmental Noise Monitoring Locations

Measurement of the Asda plant and delivery noise was undertaken on the proposed development site, at a location in line with the façade of the nearest proposed dwelling. Readings were completed between 05.40 and 07.05 hours on Sunday 22nd April 2018. A detailed time history was recorded, to allow the plant and delivery worst case noise levels to be identified.

Measurements were also taken at a representative position, in Market Square, away from the influence of the Asda plant and delivery noise. These measurements established the background L_{A90} and residual L_{Aeq} noise levels. Measurements at this position were completed between 02.00 and 03.00 hours and between 05.00 and 06.45 hrs.

The two monitoring positions are confirmed on the site plan below.





A2.0 Monitoring Equipment

The noise monitoring equipment comprised of two Svantek type 1 real time analysers, as detailed below.

MP1 Svantek 971, serial number 34934

MP2 Svantek 957, serial number 21434

The meter calibration was verified before and after the measurement period by a Svantek SV31 acoustic calibrators. The deviations were within acceptable tolerances.

The meters and calibrators have current calibration certificates available upon request.

The weather during the survey periods was suitable for environmental noise monitoring, with dry conditions and light winds.

A3.0 Monitoring Results and Observations

Noise from Asda plant and delivery activity was recorded at MP1, at a position in line with the façade of the nearest proposed dwelling.

Noise level at nearest proposed dwelling with Asda plant running and delivery taking place, measured between 06.00 and 07.00 hrs								
Octave Band Noise Level, dB $L_{eq}(1\text{hour})$								Overall Broadband $L_{Aeq}(1\text{hr})$
63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
61.1	57.7	55.3	54.0	52.5	49.8	45.8	39.2	57.2

During the above measurement, the highest L_{AFmax} noise level recorded was 82.8 dB L_{AFmax}

For the benefit of a BS4142:2014 assessment, the highest fifteen minute L_{Aeq} noise level during the above measurement period was 58.5 dB $L_{Aeq}(15\text{min})$

Noise level at nearest proposed dwelling with Asda plant running in isolation, measured between 05.40 and 05.55 hrs								
Octave Band Noise Level, dB $L_{eq}(1hour)$								Overall Braodband $L_{Aeq}(15min)$
63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
58.8	54.1	47.0	45.4	44.3	45.4	45.1	39.1	51.5

Due to the influence of Asda plant and deliveries, it was necessary to undertake residual and background noise readings at a representative position away from the site. This was completed at MP2 and the results are given below.

Date	Time			Measured Sound Pressure Level, dB			
				LAFmax	LAeq,T	LA10,T	LA90,T
Sunday 22.04.2018	02:00	to	02:15	53.1	34.5	36.5	31.2
	02:15	to	02:30	54.5	35.8	38.1	31.5
	02:30	to	02:45	56.2	34.5	36.6	30.4
	02:45	to	03:00	55.6	36.1	37.9	31.1
	05:00	to	05:15	64.0	49.7	53.9	39.1
	05:15	to	05:30	63.8	50.0	53.8	38.9
	05:30	to	05:45	60.8	47.9	51.9	38.5
	05:45	to	06:00	67.0	49.7	53.6	39.5
	06:00	to	06:15	61.5	47.0	50.6	37.8
	06:15	to	06:30	72.0	46.6	50.1	38.0
	06:30	to	06:45	61.3	46.7	50.6	37.3

APPENDIX B

Calculated Internal Noise Levels

B1.0 Façade Insulation Calculations

Calculated internal noise level for bedroom at night (during delivery between 06.00 to 07.00hrs)

Element 1									
Room Volume		28.8							
Surface area element		2.2							
		63	125	250	500	1k	2k	4k	8k
Glazing 8.8 /(16 argon)/12.8 Optiphon Rw 47(-2-7)	SRI	0	26	36	46	50	52	63	0
Rev Time		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Area of Total Absorption		9	9	9	9	9	9	9	9
Out to in Correction		3	3	3	3	3	3	3	3
External noise with lorry and plant 06.00 to 07.00		-1000	57.7	55.3	54	52.5	49.8	-1000	-1000
Rev Lp Inside dB		-1003	28	16	5	-1	-5	-1066	-1003
Rev Lp Inside dBA		-1029	12	7	2	-1	-4	-1065	-1004
Overall Rev Lp Inside dBA		14.0							
NR									
NR Excess									
Element 2									
Room Volume		28.8							
Surface area element		14.6							
		63	125	250	500	1k	2k	4k	8k
Brick/block cavity 400kg	SRI	0	41	46	52	58	64	64	0
Rev Time		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Area of Total Absorption		9	9	9	9	9	9	9	9
Out to in Correction		3	3	3	3	3	3	3	3
External noise with lorry and plant 06.00 to 07.00		-1000	57.7	55.3	54	52.5	49.8	-1000	-1000
Rev Lp Inside dB		-995	22	14	7	-1	-9	-1059	-995
Rev Lp Inside dBA		-1021	6	6	4	-1	-8	-1058	-996
Overall Rev Lp Inside dBA		10.3							
NR									
NR Excess									
Element 3									
Room Volume		28.8							
Surface area element		12							
		63	125	250	500	1k	2k	4k	8k
Tile slate 2x 15mm soundbloc on resilient bars	SRI	0	49	56	61	64	61	65	0
Rev Time		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Area of Total Absorption		9	9	9	9	9	9	9	9
Out to in Correction		3	3	3	3	3	3	3	3
External noise with lorry and plant 06.00 to 07.00		-1000	57.7	55.3	54	52.5	49.8	-1000	-1000
Rev Lp Inside dB		-996	13	3	-3	-7	-7	-1061	-996
Rev Lp Inside dBA		-1022	-3	-5	-6	-7	-6	-1060	-997
Overall Rev Lp Inside dBA		1.6							
NR									
NR Excess									
Vents									
Room Volume		28.8							
Number of vents		1							
		63	125	250	500	1k	2k	4k	8k
Greenwood MA3051	Dne	0	47	46	49	56	66	69	0
Rev Time		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
External noise with lorry and plant 06.00 to 07.00		-1000	57.7	55.3	54	52.5	49.8	-1000	-1000
Rev Lp Inside dB		-997	14.1	12.7	8.4	-0.1	-12.8	-1066	-997
Rev Lp Inside dBA		-1023	-2	4	5	0	-12	-1065	-998
Overall Rev Lp Inside dBA		8.8							
NR									
NR Excess									
Total									
		5E-101	700.12	40.288	2.9866	0.8417	0.2852	2E-107	5E-101
		3E-100	146.93	26.736	4.9786	0.8853	0.1194	1E-106	3E-100
		3E-100	19.14	2.1975	0.5151	0.1828	0.1959	8E-107	3E-100
		2E-100	25.679	18.603	6.9116	0.9763	0.0524	3E-107	2E-100
Rev Lp Inside dB		-991	29.5	19.4	11.9	4.6	-1.9	-1056	-991
Rev Lp Inside dBA		-1017	13	11	9	5	-1	-1055	-992
Overall Rev Lp Inside dBA		16.5							
NR									
NR Excess									

Calculated internal noise level for living area in daytime

Element 1									
Room Volume		28.8							
Surface area element		2.2							
		63	125	250	500	1k	2k	4k	8k
Glazing 6/(6-16)/6 Rw 32(-1-4)	SRI	0	20	18	28	38	34	38	0
Rev Time		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Area of Total Absorption		9	9	9	9	9	9	9	9
Out to In Correction		3	3	3	3	3	3	3	3
External noise with lorry and plant 06.00 to 07.00		-1000	57.7	55.3	54	52.5	49.8	-1000	-1000
Rev Lp Inside dB		-1003	34	34	23	11	13	-1041	-1003
Rev Lp Inside dBA		-1029	18	25	20	11	14	-1040	-1004
Overall Rev Lp Inside dBA		27.4							
NR									
NR Excess									

Element 2									
Room Volume		28.8							
Surface area element		14.6							
		63	125	250	500	1k	2k	4k	8k
Brick/block cavity 400kg	SRI	0	41	46	52	58	64	64	0
Rev Time		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Area of Total Absorption		9	9	9	9	9	9	9	9
Out to In Correction		3	3	3	3	3	3	3	3
External noise with lorry and plant 06.00 to 07.00		-1000	57.7	55.3	54	52.5	49.8	-1000	-1000
Rev Lp Inside dB		-995	22	14	7	-1	-9	-1059	-995
Rev Lp Inside dBA		-1021	6	6	4	-1	-8	-1058	-996
Overall Rev Lp Inside dBA		10.3							
NR									
NR Excess									

Element 3									
Room Volume		0							
Surface area element		0							
		63	125	250	500	1k	2k	4k	8k
SRI	SRI	0	0	0	0	0	0	0	0
Rev Time		0	0	0	0	0	0	0	0
Area of Total Absorption		9	9	9	9	9	9	9	9
Out to In Correction		3	3	3	3	3	3	3	3
External Noise		0	0	0	0	0	0	0	0
Rev Lp Inside dB		0	0	0	0	0	0	0	0
Rev Lp Inside dBA		0	0	0	0	0	0	0	0
Overall Rev Lp Inside dBA		0.0							
NR									
NR Excess									

Vents									
Room Volume		28.8							
Number of vents		2							
		63	125	250	500	1k	2k	4k	8k
Typical acoustic trickle vent	Dne	0	30	33	38	37	36	0	0
Rev Time		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
External noise with lorry and plant 06.00 to 07.00		-1000	57.7	55.3	54	52.5	49.8	-1000	-1000
Rev Lp Inside dB		-994	34.1	28.7	22.4	21.9	20.2	-994	-994
Rev Lp Inside dBA		-1020	18	20	19	22	21	-993	-995
Overall Rev Lp Inside dBA		27.3							
NR									
NR Excess									

Total									
		5E-101	2787.2	2542	188.44	13.341	17.996	8E-105	5E-101
		3E-100	146.93	26.736	4.9786	0.8853	0.1194	1E-106	3E-100
		1	1	1	1	1	1	1	1
		4E-100	2574	742.35	174.02	155.1	104.86	4E-100	4E-100
Rev Lp Inside dB		0	37.4	35.2	25.7	22.3	20.9	0	0
Rev Lp Inside dBA		-26	21	27	22	22	22	1	-1
Overall Rev Lp Inside dBA		30.4							
NR									
NR Excess									