



# CSP Acoustics

## NOISE IMPACT ASSESSMENT

Balmoral Tanks Ltd,

**Prepared for:**  
Mr. John Findlay  
Ryden

Ref: 1154 002PR V1  
Date: 18<sup>th</sup> April 2017

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## Document Revision History

| Version        | Reason                                                           | Date/Edits Made By: |
|----------------|------------------------------------------------------------------|---------------------|
| 1154 001 PR V1 | 1 <sup>st</sup> Issue                                            | PR/PC               |
| 1154 002 PR V1 | 2 <sup>nd</sup> Issue to address EHO comments/ BS4142 assessment | PR/PC               |
|                |                                                                  |                     |
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|                |                                                                  |                     |

## 1.00 Introduction

- 1.01 This Report has been prepared to support Planning application Ref No. 2017/0013 on behalf of Balmoral Tanks Ltd. The assessment set out within gives details of the potential noise impact of proposed industrial buildings to be developed at Barrowfield Road, Thurnscoe Business Park, Thurnscoe, S63 0BH. Industrial activities carried out at an existing factory located at 321 Haugh Lane, Wombwell will be moved to the new site.
- 1.02 Balmoral Tanks completed noise measurements at the existing factory site and this data will be used as the basis for assessing noise impact from the new factory building. In addition, CSP Acoustics completed ambient noise measurements at the nearest dwellings. Historical noise source data, has been used to assess potential noise impact of HGV vehicle deliveries and forklift movements.
- 1.03 The noise impact from activities associated with the proposed industrial buildings has been assessed at nearby dwellings using the method set out in BS 4142:2014.
- 1.04 Predictions of noise within this report were made using proprietary noise prediction software CadnaA<sup>®</sup> (Computer Aided Noise Abatement) developed by Datakustik.



**1.05** All CSP Acoustics Consultants/Surveyors hold membership of the Institute of Acoustics.

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## 2.00 Summary

- 2.01 CSP Acoustics has completed a noise impact assessment for a new proposed Industrial Building and associated offices to be located at Barrowfield Road, Thurnscoe Business Park, Thurnscoe, S63 0BH.
- 2.02 The activities within the proposed building relate to the design and manufacturing of tank products. It also provides a wide range of associated technical services including the installation, inspection, repair and maintenance of its products. Balmoral Tanks existing premises at Wombwell currently focus on the manufacture and installation of wastewater, processing and anaerobic digestion tanks. These will be moved to the Thurnscoe site.
- 2.03 Assessment of the impact of the proposed Industrial Building and Yard noise on the nearest dwellings has been carried out using the methods set out in BS4142:2014.
- 2.04 Predictions of noise within this report were made using proprietary noise prediction software CadnaA® (computer Aided Noise Abatement) developed by Datakustik.
- 2.05 Noise levels at the nearest dwelling, 21 Lidget Close are below background noise levels during daytime hours. BS4142 notes that where the noise level from the assessed source does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.
- 2.06 During evening and night time hours, noise levels are above the background noise level by 1.1 and 2.8 dB respectively. BS4142: 2014 gives no specific guidance where noise levels are no more than 5 dB above background noise levels. Thus for 21 Lidget Close dwelling it can be inferred that noise from the development does not have an adverse impact.
- 2.07 This indicates that mitigation measures will not be required to reduce the impact of the proposed factory development at the nearest residential dwellings. As this is the worst case assessment location this indicates noise from the proposed development site will meet with limits at other dwellings.

### 3.00 Impact Assessment Criteria

**3.01 Barnsley Metropolitan Borough Council:** Environmental Health Officer Mr. James Gardham of Barnsley Metropolitan Borough Council has advised that the impact of noise from the proposed Balmoral Tanks Ltd development should be assessed using the methods set out in BS4142: 2014. Background noise measurements ( $L_{A90}$ ), should be completed at the nearest residential location. It was agreed that night time measurements will be completed at 03.00 hours and daytime measurements at 09.00 hours. In addition, evening measurements will be completed at 21.00 hours.

**3.02 BS 4142:2014** - provides a rating method to give an indication of the likelihood of complaints when a sound source affects dwellings. The rating level of the sound source is compared against existing levels of background noise level ( $L_{A90}$ ) present at the nearest residential properties, without the influence of the source. Where this is carried out the following guidance is given on the assessment of impact:

- 1) Typically, the greater the rating level exceeds the background noise level then the greater the magnitude of the impact will be.
- 2) Where the rating level exceeds the background noise level by +10 dB or more then this is likely to be an indication of a significant adverse impact, depending on the context.
- 3) Where the rating level exceeds the background noise level +5 dB this is likely to be an indication of an adverse impact, depending on the context.

## 4.00 Survey

- 4.01** Balmoral Tanks completed noise measurement of existing factory levels at 321 Haugh Lane, Wombwell. This will be used as the basis for assessing noise impact from the new factory building. Details of the survey and measured results are summarised below. Appendix B gives an extract of this document provided by Ryden.

**Sound Level Meter Used:** Pulsar PU-30 22543811, Type 1 Sound Level Meter

**Calibration:** The operator calibrated the meter to a reference signal of 94 dBA at 1 kHz prior to completing the factory noise survey

**Survey Date:** 07/10/2016

**Run duration:** 15 minutes

**Location:** Balmoral Yard

**Notes:** Set up equipment next to shutter door on F3 of the factory. Noise equipment approximately 30 m away from the Trumpf machine. Weather conditions during noise assessment was showers. Site movement during noise assessment, forklift and van. 15 min noise assessment carried out. Operative carrying out punch work on the trumpf machine. Shutter doors open whilst Trumpf machine was working.

**Noise Assessment carried out by:** Bob Irwin.

**Data:**

| Table 1: Balmoral Tanks Measured Data |           |       |          |
|---------------------------------------|-----------|-------|----------|
| Leq                                   | 71.2 dBA  | L5.0  | 75.2 dBA |
| Lepd                                  | 56.1 dBA  | L10.0 | 74.0 dBA |
| LAE                                   | 100.7 dBA | L50.0 | 69.4 dBA |
| LAFmax                                | 88.3 dBA  | L90.0 | 61.0 dBA |
| Peak                                  | 102.4 dBA | L95.0 | 60.1 dBA |
| -                                     | -         | L99.0 | 59.6 dBA |

- 4.02** Measurement notes indicate that a Trumpf machine was operating during measurements at the factory. This is understood to be a metal stamp machine, and is likely to generate the highest noise levels within the factory. However, measurements would also include all activities taking place within the factory, albeit at a lower noise level than the Trumpf machine. On this basis noise measurement data is taken to be representative of reverberant noise levels that occur from all sources within the factory. Measurements are assumed to have taken place at 2m from roller shutter doors.
- 4.03** The proposed development site is to be located on a site lying to the south of Thurnscoe Business Park on a land forming part of it set aside for development. The location of the proposed site is shown in the figure below.
- 4.04** CSP Acoustics completed a background noise survey at the nearest residential properties with respect to the proposed Balmoral Tanks development. These are located on Lidget Close to the north of the development site. The dominant noise source in the area during surveys was road traffic and activities associated with Industrial Units in the proximity of this site.
- 4.05** The background noise survey location is shown in figure 1 below, in relation to the development site and the nearest dwellings.

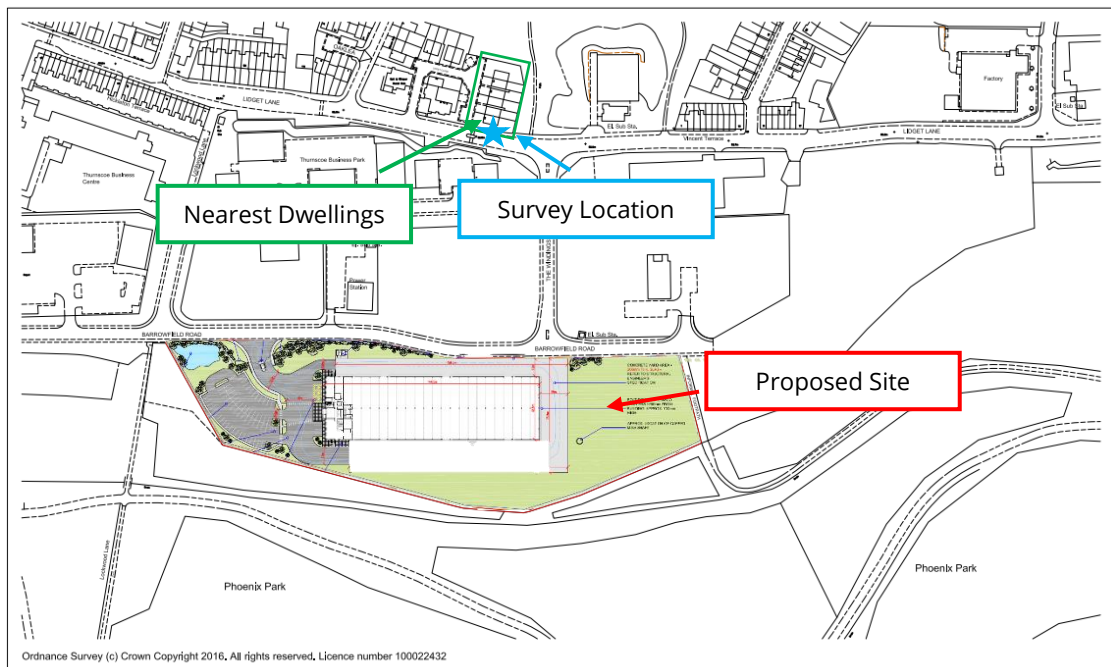


**Figure 1: Survey Location in Relation to Dwellings and Proposed Balmoral Tanks Development**

**4.06** The sound level meter was positioned 1.2 metres above ground level with no vertical reflecting surfaces within 1 metre of the chosen measurement locations. Equipment was operated in accordance with British Standard and ISO procedures. The sound level meter was calibrated prior and post to site measurements using the appropriate calibrator to a reference tone of 114 dB at 1 kHz. Pre and post calibrations indicated a shift of no more than 0.1 dB. Details of sound level meter equipment used is set out below:

- Norsonic Nor140 Serial Number 1404033
- Norsonic Microphone Type 1225 Serial Number 118448
- Norsonic Calibrator Type 1251 Serial Number 32465

**4.07** Weather conditions at the time of the survey were noted as follows: wind speed was below 5.0m/sec, an air temperature varied between 8 and 10 degrees Celsius, during the daytime survey periods. No precipitation was record during surveys.

**4.08** It was determined from local information after arrival at site that Thurnscoe is not a safe area for lone working during night time hours. On this basis, night time measurements were conducted for a period of 15 minutes to reduce potential risk.

**4.09** A summary of measured noise levels are shown in Tables 2 below.

| Table 2: Background Noise Survey Results |                       |                       |
|------------------------------------------|-----------------------|-----------------------|
| Measurement Period                       | L <sub>Aeq</sub> (dB) | L <sub>A90</sub> (dB) |
| <b>Evening Period</b>                    |                       |                       |
| (2017/04/13 21:00:02.00)                 | 64.7                  | 45.2                  |
| (2017/04/13 21:15:02.00)                 | 63.2                  | 43.5                  |
| (2017/04/13 21:30:02.00)                 | 65.2                  | 42.6                  |
| (2017/04/13 21:45:02.00)                 | 65.5                  | 41.9                  |
| <b>Mean/ Average</b>                     | <b>64.7</b>           | <b>43.3</b>           |
| <b>Night Time Period</b>                 |                       |                       |
| (2017/04/14 03:00:02.00)                 | 53.2                  | 37.3                  |
| <b>Mean/ Average</b>                     | <b>53.2</b>           | <b>37.3</b>           |
| <b>Daytime Period</b>                    |                       |                       |
| (2017/04/14 09:00:02.00)                 | 67.5                  | 50.7                  |
| (2017/04/14 09:15:02.00)                 | 65.6                  | 50.0                  |
| (2017/04/14 09:30:02.00)                 | 67.7                  | 51.7                  |
| (2017/04/14 09:45:02.00)                 | 68.8                  | 51.4                  |
| <b>Mean/ Average</b>                     | <b>67.5</b>           | <b>51.0</b>           |

## 5.00 Industrial Noise Assessment

5.01 Information on site operations at the proposed factory were established through discussion with Balmoral Tanks Managing Director Mr. Allan Joyce and Mr. John Findlay of Ryden: More information on the operation of each area of the development is set out below:

- It is understood that the factory will potentially operate seven days a week 24 hours a day. The industrial unit will be used for manufacturing and storage. In addition to this there will be forklift movements and overhead crane movements within the factory building. As noted in section 4.0 Balmoral Tanks completed measurements of factory noise levels at the roller shutter door and this is taken to be representative of noise with the proposed factory building and used as the factory indoor noise source level.
- Deliveries to the yard from Heavy Goods Vehicles and gas powered forklift trucks loading/unloading will be restricted to daytime hours. The yard area in front of the roller shutter doors will be used as a loading bay area to load and unload HGV vehicles; it is understood that a maximum of three deliveries will occur per week, with a maximum of one vehicle per hour within the yard area, this will include forklifts movements. CSPAcoustics historical measurement data for HGVs and gas powered forklifts has been used. Forklift trucks are considered to travel at a maximum speed of 10km/h within the site.

5.02 Table 3 below sets out Loading Bay and Yard area source noise levels used for the assessment.

| Table 3: Loading Bay and Yard Noise Source Levels                                                                                                                                                                                                                                                        |                                                                          |                  |                   |                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------|-------------------|--------------------------------|
| Location                                                                                                                                                                                                                                                                                                 | Noise Sources                                                            | Noise Level dB   |                   | Sound Power Level              |
|                                                                                                                                                                                                                                                                                                          |                                                                          | L <sub>Aeq</sub> | L <sub>Amax</sub> | L <sub>WA</sub> <sup>(2)</sup> |
| Loading Bay                                                                                                                                                                                                                                                                                              | HGV truck manoeuvring arrival / departure at 10 metres <sup>(1)(3)</sup> | 68.0             | 70.0              | 96.0                           |
| Yard area                                                                                                                                                                                                                                                                                                | Forklift movements Loading / Unloading HGV at 10 metres <sup>(1)</sup>   | 64.2             | 80.6              | 92.2                           |
|                                                                                                                                                                                                                                                                                                          | Forklift movements at 10 metres <sup>(1)(3)</sup>                        | 65.0             | 69.4              | 93.0                           |
| <sup>(1)</sup> CSPAcoustics database measurements from other industrial sites;<br><sup>(2)</sup> Sound Power Level of moving Point: $L_{WA-PQ} = L_{Aeq} + 20 \times \log(\text{distance source-receiver}) + 8$<br><sup>(3)</sup> Drive-by maximum sound pressure level, L <sub>pA</sub> (max), at 10 m. |                                                                          |                  |                   |                                |

### 5.03 Calculated Noise Levels at proposed development:

5.04 The impact of the proposed development on nearby dwellings has been assessed using the proprietary noise prediction software CadnaA® and the general methods of calculation set out in ISO 9613. Descriptions are set out below indicating the general procedures to create noise source input data for the model created for the assessment.

5.05 Internal noise levels within the factory buildings have been calculated from the values measured at the existing Balmoral Tanks operations shown in Table 1, based on these being taken at 2 metres from the open factory door. Calculated factory noise levels are as set out in table 4.

| Table 4: Indoor noise levels |                         |
|------------------------------|-------------------------|
| Location                     | Indoor Noise Levels dBA |
| Balmoral Tanks               | 76.7 L <sub>Aeq</sub>   |

5.06 Walls and roof of the workshops were assumed to be made up of profiled metal cladding. This is assumed to provide the following typical sound insulation performances,  $R_w$ , as set out in table below.

| Table 5: Sound Insulation performance of proposed development buildings envelope elements |                                           |
|-------------------------------------------------------------------------------------------|-------------------------------------------|
| Workshop Element                                                                          | Sound Insulation Performance, $R_w$ in dB |
| Roof & Walls                                                                              | 25                                        |
| Rooflights                                                                                | 20                                        |
| Open Doors                                                                                | 0                                         |

5.07 Forklift vehicle movements occurring within the loading bay/yard area are based on a typical yard circuit from the roller shutter door to an HGV. A straight line was used to represent HGV movements from between Barrowfield road and the circuit around the proposed Industrial Building. The movement circuits/routes have been created within the CadnaA® model overlaying them on the existing site layout. Circuits possess a sound power level attribute which was calculated using the CadnaA® concept of a moving point source within Internal Driveways and Areas. The sound power level of a moving source is calculated using the following formulas:

$$\text{Line Source: } L_{WA} = L_{WA-PQ} + 10\lg Q + 10\lg l - 10\lg v - 30\text{dB}$$

Where,

- $L_{WA}$  is the sound power level, dBA
- $L_{WA-PQ}$  is the sound power level of a moving point source, dBA
- $Q$  is the number of pass-bys, per hour
- $l$  is the length of the circuit, metres
- $v$  is the speed of the vehicle, in km/h
- 30dB is a constant of the formula

**5.08** Table 6 below sets out information on the number of vehicle movements likely within a one hour period used to assess their impact.

| Table 6: Assessment Noise Source Parameters                         |                                     |                             |              |
|---------------------------------------------------------------------|-------------------------------------|-----------------------------|--------------|
| Location                                                            | Noise Sources                       | Number of pass-bys per hour | Speed (Km/h) |
| Access road/ HGV circuit <sup>(1)</sup>                             | HGV manoeuvring arrival / departure | 1                           | 10           |
| Yard area <sup>(2)</sup>                                            | Two Forklift Trucks <sup>(1)</sup>  | 100 <sup>(2)</sup>          | 10           |
| <sup>(1)</sup> Defined as a line source                             |                                     |                             |              |
| <sup>(2)</sup> Assumed number of forklift movements within one hour |                                     |                             |              |

**5.09** Noise levels likely to arise at the nearest dwellings due to the influence of the proposed industrial activities have been calculated. Worst case noise levels are likely to occur at the first floor level of 21 Lidget Close located to the north east of the proposed development. The calculated industrial noise levels at this location are shown below in table 7; more detailed noise maps are shown in the Appendix B of this report. It should be understood that noise levels at other dwellings are likely to be lower than those set out in table 7:

| Table 7: Maximum Balmoral Tanks Noise Levels at nearest Dwellings |                                         |                                           |
|-------------------------------------------------------------------|-----------------------------------------|-------------------------------------------|
| Dwelling                                                          | Daytime Levels<br>$L_{Aeq, 16hrs}$ (dB) | Night time Levels<br>$L_{Aeq, 8hrs}$ (dB) |
| 21 Lidget Close                                                   | 41.4                                    | 37.1                                      |

## 5.10 BS4142: 2014 Noise Assessment

5.11 The impact of Workshop and Yard noise levels at the worst case affected dwelling, 21 Lidget Close, has been assessed in accordance with BS4142: 2014; the results are shown in Table below:

| Table 8: BS4142:2014 Noise Assessment                                                                                                                                                                                                                                               |                         |                         |                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|----------------------------|
| Calculation Notes                                                                                                                                                                                                                                                                   | Daytime Operations      | Evening Operations      | Night Time Operations      |
|                                                                                                                                                                                                                                                                                     | 21 Lidget Close         | 21 Lidget Close         | 21 Lidget Close            |
| Balmoral Tanks Operational Noise Level                                                                                                                                                                                                                                              | 41.4 $L_{Aeq,1hr}$ (dB) | 41.4 $L_{Aeq,1hr}$ (dB) | 37.1 $L_{Aeq,15 min}$ (dB) |
| Impulsivity correction (dB)                                                                                                                                                                                                                                                         | +3 <sup>(1)</sup>       | +3 <sup>(1)</sup>       | +3 <sup>(1)</sup>          |
| Rating level (dBA)                                                                                                                                                                                                                                                                  | 44.4                    | 44.4                    | 40.1                       |
| Background Noise $L_{A90}$ (dB)                                                                                                                                                                                                                                                     | 51.0                    | 43.3                    | 37.3                       |
| Level above or below Noise Level (dB)                                                                                                                                                                                                                                               | -6.6                    | +1.1                    | +2.8                       |
| Notes:<br>1) Factory equipment is considered likely to have impulsive characteristics. As dwellings are approximately 170m meters from the site and are subject to frequent impulsive events from road traffic and existing industry a +3 dB impulsive correction has been applied. |                         |                         |                            |

5.12 With reference to Table 8, it can be seen that noise levels at 21 Lidget Close are below background noise levels during daytime hours. BS4142 notes that where the noise level from the assessed source does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

5.13 During evening and night time hours noise levels are above the background noise level. BS4142: 2014 gives no specific guidance where noise levels are no more than 5 dB above background noise levels. Thus for 21 Lidget Close dwelling it can be inferred that noise from the development does not have an adverse impact.

5.14 This indicates that mitigation measures will not be required to reduce the impact of the proposed factory development at the nearest residential dwellings. As this is the worst case assessment location this indicates noise from the proposed development site will meet with limits at other dwellings.

- 5.15 Accordingly this indicates that noise from the proposed development should not be considered an impediment to the grant of planning permission.



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**Checked By:**

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## Appendix A: Acoustic Glossary

| Word                        | description                                                                                                                                                                    |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Acoustic environment        | Sound from all sound sources as modified by the environment                                                                                                                    |
| Ambient Noise               | Totally encompassing sound at a given location, usually composed of sound from many sources near and far                                                                       |
| Background Noise            | The lowest noise level present in the absence of any identifiable noise sources. This is usually represented by the $L_{A90}$ measurement index.                               |
| Break-in                    | Noise transmission into a structure from outside                                                                                                                               |
| Break-out                   | Noise transmission from inside a structure to the outside                                                                                                                      |
| Cross-talk                  | Noise transmission between one room and another room or space                                                                                                                  |
| Ctr                         | Correction term applied against the sound insulation single-number values ( $R_w$ , $D_w$ , and $D_{nT,w}$ ) to provide a weighting against low frequency performance          |
| dB (decibel)                | Defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ( $2 \times 10^{-5} \text{Pa}$ ).             |
| dB(A)                       | Level of sound across the audible spectrum with a frequency filter to compensate for the varying sensitivity of the human ear to sound at different frequencies at a lower SPL |
| Façade Level                | A sound field determined at a distance of 1m in front of a building façade.                                                                                                    |
| Free-field Level            | A sound field measured at a point away from reflective surfaces other than the ground                                                                                          |
| Frequency (Hz)              | Number of cycles of a wave in one second measured in Hertz.                                                                                                                    |
| Impact sound pressure level | Average sound pressure level in a specific frequency band in a room below a floor when it is excited by a standard tapping machine or equivalent                               |

|                                        |                                                                                                                                                                                                                                                                 |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indoor ambient noise                   | Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants                                                                                  |
| $L_{Aeq,T}$                            | $L_{Aeq,T}$ is defined as the equivalent continuous "A"-weighted Sound Pressure Level in dB over a given period of time.                                                                                                                                        |
| $L_{Amax}$                             | Maximum A - weighted sound pressure level recorded over the measurement period. Usually has a time constraint ( $L_{afmax}$ , $L_{asmax}$ )                                                                                                                     |
| Measurement time interval, $T_m$       | Total time over which measurements are taken                                                                                                                                                                                                                    |
| Noise                                  | Unwanted sound.                                                                                                                                                                                                                                                 |
| Noise criteria                         | Numerical indices used to define design goals in a given space                                                                                                                                                                                                  |
| Noise rating NR                        | Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves. This is usually used to control noise that has tonal characteristics that $L_{Aeq,t}$ wouldn't detect.                                                |
| Noise-sensitive premises (NSPs)        | Any occupied premises outside the assessment location used as a dwelling (including gardens), place of worship, educational establishment, hospital or similar institution, or any other property likely to be adversely affected by an increase in noise level |
| Normalized impact sound pressure level | Impact sound pressure level normalized for a standard absorption area in the receiving room                                                                                                                                                                     |
| Octave band                            | Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit                                                                                                                                                              |
| Percentile level $L_{AN,T}$            | A-weighted sound pressure level obtained using time-weighting "F", which is exceeded for N% of a specified time period                                                                                                                                          |
| Rating level, $L_{Ar,Tr}$              | Specific sound level plus any adjustment for the characteristic features of the sound                                                                                                                                                                           |
| Reference time interval, $T_r$         | Specified interval over which the specific sound level can be determined.                                                                                                                                                                                       |
| Residual sound                         | Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound                                                                                               |

|                                                   |                                                                                                                                                                                      |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Residual sound level, $L_r = L_{Aeq,T}$           | Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T                                                 |
| Reverberation time T                              | Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped within a reverberant space                                          |
| Sound level difference D                          | Difference between the sound pressure level in the source room and the sound pressure level in the receiving room                                                                    |
| Sound power level, LWA                            | Ten times the logarithm to the base 10 of the ratio of the sound power radiated by a sound source to the reference sound power, determined by use of frequency-weighting network "A" |
| Sound pressure level                              | Is the Root Mean Squared value of the instantaneous sound level over a period of time expressed in decibels, usually measured with an appropriate frequency weighting                |
| Specific sound level, $L_s = L_{Aeq,Tr}$          | Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, $T_r$                   |
| Specific sound source                             | The sound source which is being assessed                                                                                                                                             |
| Third octave band                                 | Octave bands sub-divided into three parts, equal to 23% of the centre frequency                                                                                                      |
| Weighted level difference $D_w$                   | Single-number quantity that characterizes airborne sound insulation between rooms, but which is not adjusted to reference conditions                                                 |
| Weighted standardized level difference $D_{nT,w}$ | Single-number quantity that characterizes the airborne sound insulation between rooms                                                                                                |

## Appendix B: Noise Maps

- Daytime  $L_{Aeq}$ , 16 hours Noise Map
- Night Time  $L_{Aeq}$ , 8 hours Noise Map
- Night Time  $L_{Amax}$  Noise Map



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**Project**  
Balmoral Tanks, Thurnscoe

Client:  
Balmoral tanks Ltd

Ref:  
1154 002 PR  
Date:  
April 2017

DayTime Period LAeq, 16 hours  
Map height: 4m

Scale: No Scale  
Print: A3

**Legend**

- + Point Source
- Line Source
- ▨ Area Source
- vert. Area Source
- Road
- Railway
- Building
- ⊗ Receiver
- ⊕ Building Evaluation
- Calculation Area

**Noise Levels Contours (dBA)**

- ... < 35.0
- 35.0 ≤ ... < 40.0
- 40.0 ≤ ... < 45.0
- 45.0 ≤ ... < 50.0
- 50.0 ≤ ... < 55.0
- 55.0 ≤ ... < 60.0
- 60.0 ≤ ... < 65.0
- 65.0 ≤ ... < 70.0
- 70.0 ≤ ... < 75.0
- 75.0 ≤ ... < 80.0
- 80.0 ≤ ... < 85.0
- 85.0 ≤ ...





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**Project**

Balmoral Tanks, Thurnscoe

Client:

Balmoral tanks Ltd

Ref:

1154 002 PR

Date:

April 2017

Night Time Period LAeq, 8 hours  
Map height: 4m

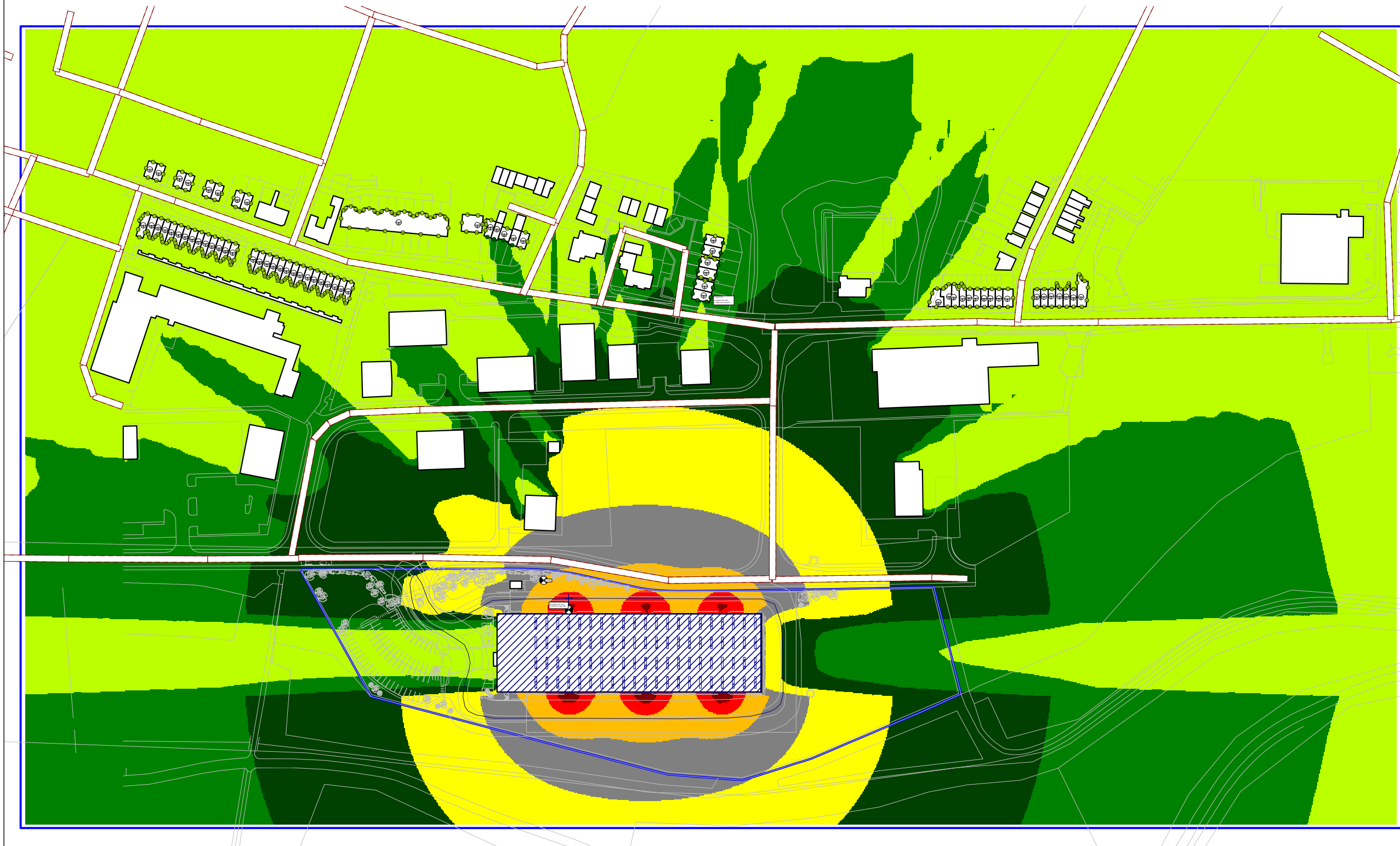
Scale: No Scale  
Print: A3

**Legend**

- + Point Source
- Line Source
- ▨ Area Source
- ▨ vert. Area Source
- Road
- Railway
- Building
- ⊗ Receiver
- ⊕ Building Evaluation
- Calculation Area

**Noise Levels Contours (dBA)**

- ... < 35.0
- 35.0 ≤ ... < 40.0
- 40.0 ≤ ... < 45.0
- 45.0 ≤ ... < 50.0
- 50.0 ≤ ... < 55.0
- 55.0 ≤ ... < 60.0
- 60.0 ≤ ... < 65.0
- 65.0 ≤ ... < 70.0
- 70.0 ≤ ... < 75.0
- 75.0 ≤ ... < 80.0
- 80.0 ≤ ... < 85.0
- 85.0 ≤ ...



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