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ENVIRONMENT

FIRETHORN DEVELOPMENTS LTD

LINK LOGISTICS PARK, ELLESMERE PORT

# Noise Impact Assessment

MCP2412

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# Noise Impact Assessment

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## Notice

# EXECUTIVE SUMMARY

BWB Consulting Limited was appointed by Firethorn Developments Ltd to undertake a noise impact assessment for a proposed commercial development on North Road in Ellesmere Port.

The noise impact assessment has been undertaken to inform the Habitats Regulations Assessment for the scheme and considers the potential noise impact of the proposed development at the existing Special Protection Area and Ramsar sites in the vicinity of the site. The noise assessment includes consideration of noise from earthworks, construction, and operational phases of the development.

No human noise sensitive receptors have been identified within the vicinity of the Site. Consultation was undertaken with Cheshire West and Chester Council, and it was agreed that the nearest residents are highly unlikely to be affected. As such, noise impact upon human receptors was not considered within this assessment.

In the absence of construction plant detail, the assessment has made reasonable assumptions on plant type, quantity and utilisation based on experience of previous schemes. For the operational phase noise associated with HGV movements and service yard activity has been considered.

Noise modelling software has been used to predict the noise emission across the site, associated with proposed operations and equipment, to inform the Habitats Regulations Assessment.

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# APPENDICES

# 1. INTRODUCTION

## Appointment & Background

1.1 BWB Consulting Limited was appointed by Firethorn Developments Ltd to undertake a noise impact assessment for a proposed commercial development at Link Logistics Park on North Road in Ellesmere Port to be referred to hereafter as '*the Site*'.

1.2 The noise impact assessment has been undertaken to inform the Habitats Regulations Assessment (HRA) for the scheme and considers the potential noise impact of the proposed development at the existing Special Protection Area (SPA) and Ramsar sites in the vicinity of the site. The noise impact assessment includes consideration of noise from earthworks, construction, and operational phases of the development.

1.3 No human noise sensitive receptors have been identified within the vicinity of the Site. Consultation was undertaken with Cheshire West and Chester Council (CWCC), and it was agreed that the nearest residents are highly unlikely to be affected. As such, noise impact upon human receptors is not considered further within this assessment.

1.4 This report is necessarily technical in nature, so to assist the reader, a glossary of acoustic terminology can be found in **Appendix A**.

## Site Setting

1.5 The Site is located off North Road and is located within the administrative area of CWCC. **Figure 1.1** details the location of the proposed development. The Site currently comprises a vacant hardstanding.

1.6 The Site is adjacent to the Manchester Ship Canal to the north with the Mersey Estuary beyond. To the east and west of the Site lie existing commercial and industrial uses. To the south of the Site lies the M53 motorway with existing commercial uses and residential dwellings beyond.

1.7 The site location is shown in **Figure 1.1** overleaf.

**Figure 1.1: Site Location**


**Figure 1.1: Site Location**

Drawn by: JH
Date: 10/02/2021

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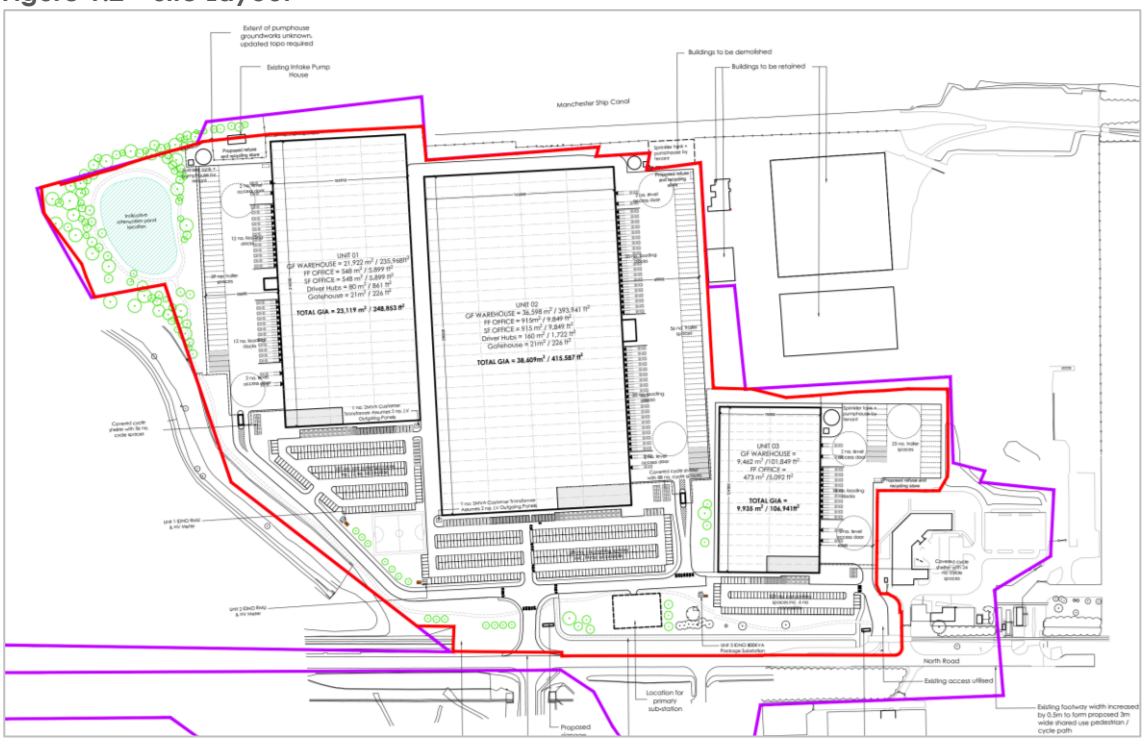
## Proposed Development

1.8 The proposed development will include erection of 3no. storage and distribution units/general industrial with ancillary offices, associated parking, service yards, landscaping and ancillary structures, and new access from North Road. The proposed site layout is shown in **Figure 1.2.**

**Figure 1.2 – Site Layout**




## Existing Sensitive Receptors

1.9 A study was undertaken to identify any statutory designated sites of ecological or nature conservation importance within the vicinity of the Site. This was completed using the Multi-Agency Geographic Information for the Countryside (MAGIC) web-based interactive mapping service which draws information on key environmental schemes and designations.

1.10 The nearest ecological receptor of significance is to the north east, within the Mersey Estuary SPA and Ramsar site, and is detailed below in **Table 1.1**.

**Table 1.1: Existing Noise Sensitive Receptor**

| NSR Number | Description | Bearing from Site |
|---|---|---|
| 1 | Mersey Estuary SPA and Ramsar site | North east |

1.11 An impact may be experienced at other receptors, but this is likely to be equal to or less than those stated above. This is considered on the basis that receptors further from the site would experience lower noise effects from potential noise generating sources due to the increased separation distance.

1.12 No human noise sensitive receptors have been identified within the vicinity of the Site and are not considered within this assessment.

# 2. STANDARDS AND GUIDANCE

2.1 In the absence of specific guidance relating to noise impacts on ecological receptors, the basis of BS5228:2009+A1:2014 and BS4142:2014+A1:2019 have been used to predict noise associated with construction and operational phases.

**BS 5228: Noise and Vibration Control on Construction and Open Sites - Part 1: Noise: 2009+A1:2014**

2.2 This Standard sets out techniques to predict and assess the likely noise effects from construction works, based on detailed information on the type and number of plant being used, their location, and the length of time they are in operation.

2.3 The noise prediction method is used to establish likely levels in terms of the $L_{Aeq,T}$ over the core working day. This Standard also documents a database of information, comprising previously measured sound pressure levels at given distances for a variety of different construction plant undertaking various common activities.

2.4 Example criteria are presented for the assessment of the significance of noise effects. Such criteria are concerned with fixed noise limits and ambient noise level changes. With respect to absolute fixed noise limits, those detailed within Advisory Leaflet 72: 1976: Noise control on building sites are presented. These limits are presented according to the nature of the surrounding environment, for a 12-hour working day. The presented limits are:

- 70dB(A) in rural, suburban and urban areas away from main road traffic and industrial noise; and
- 75dB(A) in urban areas near main roads and heavy industrial areas.

2.5 It should be noted that the criteria above are based on human receptors. The determination of ecological impact is not considered within this assessment, and will be determined through the HRA.

**BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound**

2.6 The BS 4142 Standard describes methods for rating and assessing the following:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- 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, such as that from forklift trucks, or that from train movements on or around an industrial and/or commercial site.

2.7 The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. The Standard advises the purpose of the methodology includes

the assessment of sound from any plant and activities associated with existing industrial and/or commercial uses at proposed residential dwellings.

2.8 If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected, by the application of one or more corrections for acoustic features such as tonal qualities and/or distinct impulses, to give a 'rating' level ($L_{Ar,Tr}$). The Standard effectively compares and rates the difference between the rating level of the specific sound and the typical background sound level ($L_{A90,T}$) in the absence of the specific sound.

2.9 The Standard advises that the time interval ('T') of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) the source in question operates or is proposed to operate in the future.

2.10 Comparing the rating level with the background sound level, BS 4142 states:

> *"Typically, the greater this difference, the greater the magnitude of 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."*

# 3. CONSTRUCTION PHASE NOISE ASSESSMENT

## Noise Model

3.1 In order to predict the noise levels from the proposed development site at the SPA and Ramsar site, a detailed acoustic model of the site has been generated applying the following prediction methodology:

- The model was generated using the PC based CadnaA® noise modelling package;
- The noise model was set to apply the noise prediction methodology set out in ISO 9613-2: Acoustics – *Attenuation of sound during propagation outdoors – Part 2: General method of calculation*;
- Mapping of the Site and the surrounding area was calibrated into the noise model based on known Ordinance Survey grid reference points;
- A 2m DTM terrain model was inputted into the noise model and converted to contours;
- Off-site buildings which would provide screening to the Site have been incorporated as reflective façades;
- To reflect the local ground cover, ground absorption was set to G = 0.5 (50% acoustically absorptive ground);
- The model was set to include second order reflected noise from solid structures.; and,
- The proposed layout as shown in **Figure 1.2** has been incorporated into the noise model in order to account for screening that is provided by the development itself.

## Construction Phase Effects

3.2 It is inevitable with any major development that there will be some disturbance caused to nearby receptors during the clearance and construction phases of the Site. However, disruption due to construction is only temporary, limited to the vicinity of the Site and is of short-term duration.

3.3 It would be expected that noise would be intermittent and would decrease in intensity over the duration of the construction period.

3.4 The predictions have followed the methodology contained within BS 5228-1:2009+A1:2014 and are in terms of the $L_{Aeq,T}$ over the core working day, which is 08:00 to 18:00 hours Monday to Friday and 08:00 to 13:00 on Saturdays. The predictions assume all plant being located at the centre of the Site to represent an average scenario.

3.5 As exact details are not available regarding construction plant, **Table 3.1** sets out the assumed typical plant type, quantities, and utilisation (percentage 'on-time') used in the prediction of noise levels during the key construction activities.

**Table 3.1: Assumed Construction Plant Details**

| Machinery | Measured $L_{Aeq}$ at 10m | BS5228 Reference | % on-time | Number Operating on Site |
|---|---|---|---|---|
| Phase 1 - Earthworks | | | | |
| Dozer | 81.0 | C.2.12 | 80% | 1 |
| Tracked Excavator | 79.0 | C.2.23 | 80% | 1 |
| Tracked Excavator | 79.0 | C.2.23 | 80% | 1 |
| Wheeled Loader | 79.0 | C.2.26 | 50% | |
| Road Roller | 80.0 | C.5.19 | 50% | 1 |
| Vibratory Roller | 80.0 | C.2.21 | 40% | 1 |
| Asphalt Paver (+tipper lorry) | 77.0 | C.2.31 | 80% | 1 |
| Phase 2 - Construction | | | | |
| Cement Mixer Truck Idling | 71.0 | C.4.19 | 60% | 1 |
| Cement Mixer - Discharging | 75.0 | C.4.18 | 40% | 1 |
| Truck mounted concrete pump and boom | 80.0 | C.4.29 | 60% | 1 |
| Mobile Telescopic Crane | 77.0 | C.4.39 | 40% | 1 |
| Telescopic Handler | 79.0 | C.4.54 | 73% | 1 |
| Diesel Generator | 94.0 | D.6.41 | 80% | 1 |
| Poker Vibrator | 94.0 | D.6.42 | 60% | 1 |
| Compressor | 77.0 | D.6.43 | 80% | 1 |
| Circular Saw | 85 | C.4.71 | 40% | |
| Diesel Generator | 61 | C.4.76 | 100% | |
| Tracked Excavator | 88.0 | D.3.14 | 60% | 1 |
| Fork Lift Trucks | 88.0 | D.7.94 | 40% | 1 |

3.6 The calculations are based on a central position of the Site to represent an average scenario. **Table 3.2** sets out the predicted earthworks and construction sound power levels for the construction stages of the works.

**Table 3.2: Predicted Construction Sound Power Levels, dB**

| Phase 1 – Earthworks | Phase 2 - Construction |
|---|---|
| 114dB | 125dB |

3.7 A sound power level of 114dB $L_{WA}$ and 125dB $L_{WA}$ for earthworks and construction phases were calculated using library data contained in BS5228-1. These levels have been modelled as a point source at a height of 2m above ground level from the centre of the Site. The predicted noise levels at a height of 0.5m at the worst-case boundary of the SPA and Ramsar site are shown in **Table 3.3**.

**Table 3.3: Predicted Construction noise Levels at Receptor, dB $L_{Aeq}$**

| Receptor | Phase 1 – Earthworks | Phase 2 - Construction |
|---|---|---|
| 1 | 50 | 61 |

3.8 **Figures C.1** and **C.2** of **Appendix C** also show the predicted noise levels for Phase 1 – Earthworks, and Phase 2 – Construction, the noise contours have been calculated at a height of 0.5m.

# 4. OPERATIONAL PHASE NOISE ASSESSMENT

4.1 The assessment has considered noise from HGV movements, loading and unloading activities and fixed plant at the worst-case boundary of the SPA and Ramsar sites.

4.2 The assumed quantity of deliveries have been derived from the number of available loading bays on site. Deliveries and HGV movements have subsequently been included in the noise model using the following;

- Noise from HGV movements and deliveries were included in the model using noise data from a library of historical measurement data, which has been collected during surveys undertaken at similar developments. The noise levels used within the assessment are presented in **Tables 4.1** to **4.3**.

**Table 4.1: Summary of Historic HGV Pass-by Noise Data used in the Assessment**

| Source | Measurement Distance (m) | Measurement Duration (s) | Measured Sound Pressure Level | |
|---|---|---|---|---|
| | | | dB, $L_{Aeq,T}$ | dB, $L_{Af,max}$ |
| HGV Pass-by | 5 | 6 | 73 | 78 |

4.3 In calculating the level of noise produced by the site access road, vehicle quantities and vehicle speed of 10mph (16kmph) have been accounted for. The following equation has been used:

$$L_{w,1hr}=L_{WA}\text{-}33+10\log_{10}Q\text{-}10\log_{10}V-10\log_{10}(d)$$ (BS5228-1:2009+A1:2014(F.6)).

*Where:*

| | |
|---|---|
| $L_{WA}$ | *sound power level of the plant;* |
| $Q$ | *number of vehicles per hour;* |
| $V$ | *average vehicle speed in km/h; and* |
| $d$ | *distance in m.* |

4.4 **Table 4.2** calculates the level of noise from the site access road as per the calculation detailed in BS5228-1:2009+A1:2014.

**Table 4.2: Calculation of Noise Level from the Access Road**

| Unit | $L_{WA}$ | Number of Vehicles per Hour | Average Vehicle Speed in km/h | Sound Pressure Level of Access Road at 10m $L_{Aeq,1hr}$ |
|---|---|---|---|---|
| 1 | 88 | 28 | 16 | 47 |
| 2 | | 44 | | 50 |
| 3 | | 14 | | 46 |

4.5 In calculating the level of noise produced by the service yard, **Table 4.3** considers vehicles manoeuvring during arrival, departure, and during loading/unloading operations. Sound pressure levels associated with activities have been corrected for "On-time" in a 1-hour period and converted into sound power levels.

**Table 4.3: Summary of Historic Loading and Unloading Noise Data used in the Assessment**

| Source | Sound Pressure Level, $L_{Aeq,T}$ (dB) | Measurement Distance (m) | Assumed, On-time per period (s) | Time corrected, sound power level, $L_{WA,1hr}$ (dBA) | Combined time corrected, sound power level, $L_{WA,1hr}$ (dBA) |
|---|---|---|---|---|---|
| HGV Movement | 71 | 3 | 120 | 74 | 83 |
| Loading/ Unloading | 69 | 2 | 2400 | 82 | |
| HGV Departure | 75 | 3 | 60 | 75 | |

4.6 In accordance with **Table 4.1** to **4.3**, the following noise inputs have been included within the model:

- Calculated specific sound levels from the HGV access route has been calculated using equation F.6 detailed in BS5228-1:2009+A1:2014 based on the assumed number of HGV pass-bys. These have been included in the model as a line source at a height of 1.5m;
- Calculated specific sound levels from HGV arrivals and departures in the service area have been corrected for time based on the assumed number of HGV pass-bys. These have been included in the model as a point source at a height of 1.5m; and
- Calculated specific sound level from deliveries have been included in the model as a point source with a height of 1.5m.

4.7 The time-corrected, specific sound level due to cumulative arrival, unloading/loading, and departure events for the worst-case boundary is presented in **Table 4.4**. The predicted noise levels consider a typical 1-hour period during daytime working hours and has been calculated at a height of 0.5m above ground.

**Table 4.4: Predicted specific sound level at boundary of SPA and Ramsar sites – 0.5m above Ground**

| Event | Daytime, dB $L_{Aeq}$ |
|---|---|
| Predicted Cumulative Specific Noise Level $L_s$ dB | 35 |

4.8 Noise contour maps have also been generated showing the resultant operational noise levels, and are shown in **Figures C.3** of **Appendix C.** The noise contours have been calculated at a height of 0.5m.

# 5. CONCLUSION

5.1 BWB Consulting Limited was appointed by Firethorn Developments Ltd to undertake a noise impact assessment for a proposed commercial development on North Road in Ellesmere Port.

5.2 The noise impact assessment has been undertaken to inform the Habitats Regulations Assessment for the scheme and considers the potential noise impact of the proposed development at the existing SPA and Ramsar sites in the vicinity of the site. The noise assessment includes consideration of noise from earthworks, construction, and operational phases of the development.

5.3 No human noise sensitive receptors have been identified within the vicinity of the Site. Consultation was undertaken with CWCC, and it was agreed that the nearest residents are highly unlikely to be affected. As such, noise impact upon human receptors is not considered further within this assessment.

5.4 In the absence of construction plant detail, the assessment has made reasonable assumptions on plant type, quantity and utilisation based on experience of previous schemes. For the operational phase noise associated with HGV movements and service yard activity have been considered.

5.5 Noise modelling software has been used to predict the noise emission across the site, associated with proposed operations and equipment, to inform the Habitats Regulations Assessment.

***APPENDICES***

# APPENDIX A: Glossary of Terms

## Noise

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or $L_{Aeq}$, $L_{A90}$ etc., according to the parameter being measured.

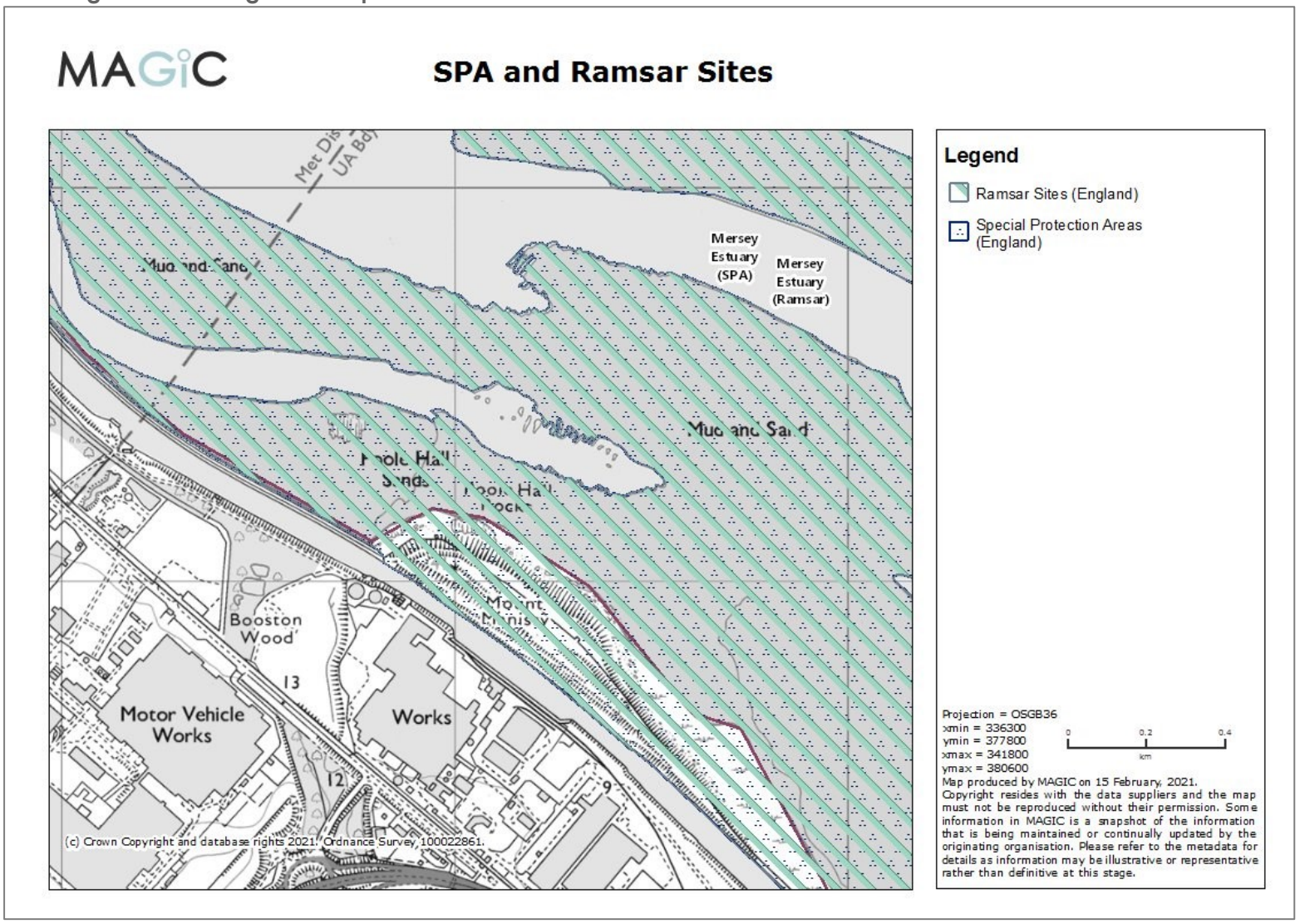
The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

## Acoustic Terminology

| Term | Description |
|---|---|
| dB (decibel) | The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10-5Pa). |
| dB(A) | A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies. |
| $L_{Aeq,T}$ | $L_{Aeq}$ is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period. |
| $L_{Amax}$ | $L_{Amax}$ is the maximum A - weighted sound pressure level recorded over the period stated. $L_{Amax}$ is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall $L_{eq}$ noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response. |
| $L_{10}$ and $L_{90}$ | If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The $L_n$ indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence $L_{10}$ is the level exceeded for 10% of the time, and the $L_{90}$ is the level exceeded for 90% of the time. |
| Free-field Level | A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings. |
| Façade Level | A sound field determined at a distance of 1m in front of a large sound reflecting object such as a building façade. |

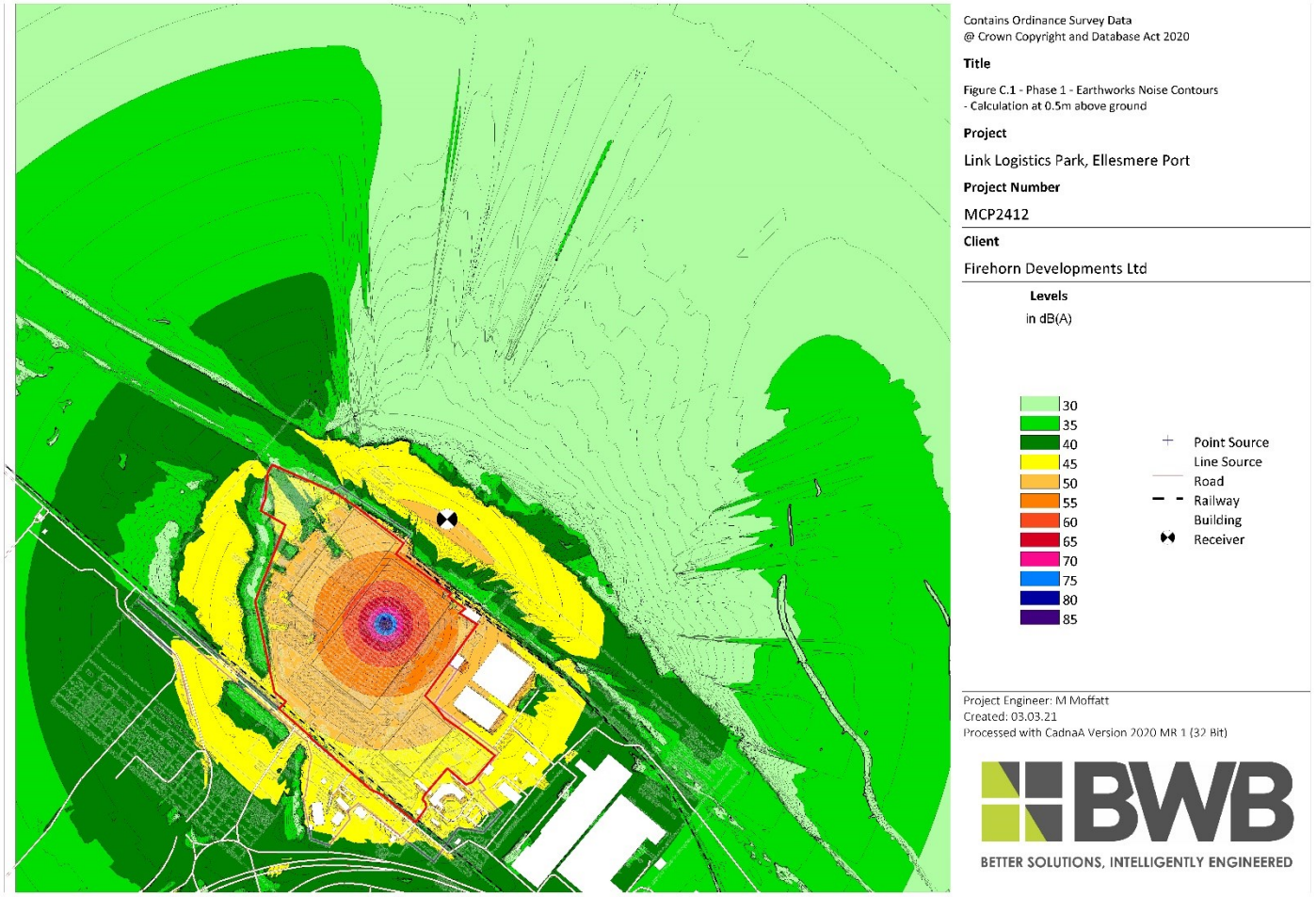
# Appendix B – Sensitive Receptors

**Figure B.1: Ecological Receptors – SPA and Ramsar Sites**

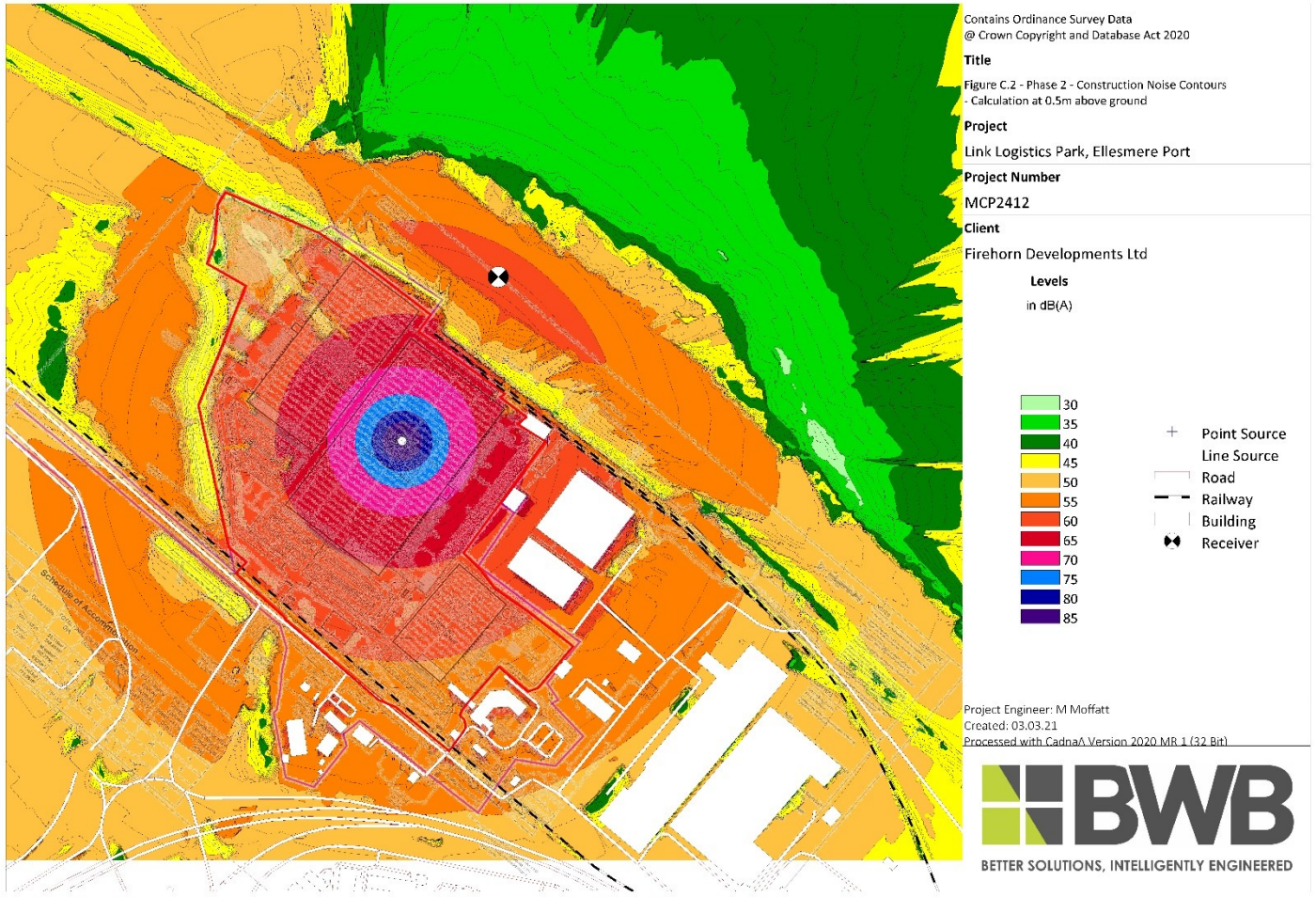


# Appendix C – Noise Contours of Development Generated Noise Levels

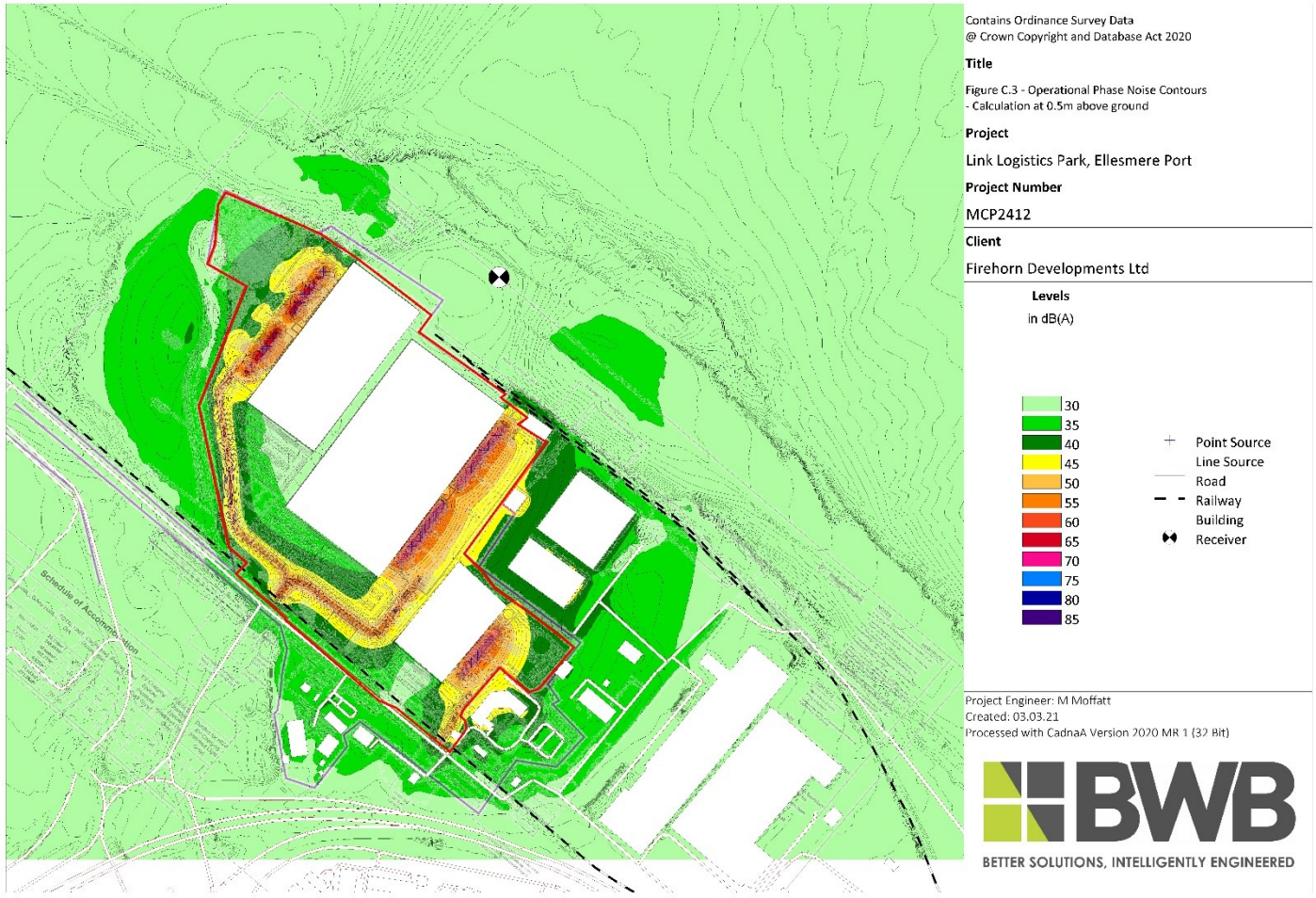
## Figure C.1: Phase 1 – Earthworks Noise Contours – Calculation at 0.5m above Ground, dB $L_{Aeq}$



## Figure C.2: Phase 2 – Construction Noise Contours – Calculation at 0.5m above Ground, dB $L_{Aeq}$



## Figure C.3: Operation Phase Noise Contours – Calculation at 0.5m above Ground, dB $L_{Aeq}$



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