XLINKS' MOROCCO-UK POWER PROJECT

Environmental Statement

Volume 2, Appendix 6.3: Operational Noise

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Prepared by:

RPS

Prepared for:

Xlinks 1 Limited

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Glossary

Term	Meaning
A-weighting	A frequency weighting devised to attempt to account for the fact that human response to sound is not equally sensitive to all frequencies. It consists of an electronic filter in a sound level meter which attempts to build this variability into the indicative sound level reading so that it will correlate, approximately, with the human response.
Attenuation	The reduction in magnitude of sound energy.
Background sound level, $L_{A90,T}$	The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, *T*, measured using fast time-weighting, *F*, and quoted to the nearest whole number of decibels.
Converter Site	The Converter Site is proposed to be located to the immediate west of the existing Alverdiscott Substation Site in north Devon. The Converter Site would contain two converter stations (known as Bipole 1 and Bipole 2) and associated infrastructure, buildings and landscaping.
Converter station	Part of an electrical transmission and distribution system. Converter stations convert electricity from Direct Current to Alternating Current, or vice versa.
Decibel	A unit used to measure or compare the intensity of a sound by comparing it with a given reference level on a logarithmic scale.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Ground factor, G	A dimensionless parameter which allows for the consideration of the acoustic properties of the ground surface between a sound source and the receptor.
Hemispherical radiation	The emission of sound throughout a hemisphere in the presence of a single reflective surface (e.g. the ground). Corresponds to a radiation loss of 8 dB.
Noise	An unwanted or unexpected sound.
Onshore HVDC Cable Corridor	The proposed corridor within which the onshore High Voltage Direct Current cables would be located.
Porosity	The ratio of space or holes and the total volume of a material. A means of defining the ability of a material to allow sound to transmit through it.
Propagation	The transmission of acoustic energy through a medium via a sound wave.
Proposed Development	The element of Xlinks' Morocco-UK Power Project within the UK. The Proposed Development covers all works required to construct and operate the offshore cables (from the UK Exclusive Economic Zone to Landfall), Landfall, onshore Direct Current and Alternating Current cables, converter stations, and highways improvements.
Residual sound level, $L_r = L_{Aeq,T}$	The ambient sound level at a receptor in the absence of influence from the sound source under assessment.
Sound	Fluctuations of pressure within a medium (gas, solid or fluid) within the audible range of loudness and frequencies which excite the sensation of hearing.
Specific sound level, L_s, = $L_{Aeq,Tr}$	The equivalent continuous A-weighted sound pressure level produced by the specific noise source at the assessment location over a given reference time internal, T_r.
Spectrum	The presentation of sound in terms of the amount of energy at different frequencies.
Study area	This is an area which is defined for each environmental topic which includes the Order Limits as well as potential spatial and temporal considerations of the impacts

Term	Meaning
	on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected.
Tonality	A method to account for the dominance of a single frequency in a sound's spectrum which may be more perceptible at a receptor.
Xlinks' Morocco UK Power Project	The overall scheme from Morocco to the national grid, including all onshore and offshore elements of the transmission network and the generation site in Morocco (referred to as the 'Project').

Acronyms

Acronym	Meaning
AC	Alternating Current
DC	Direct Current
EIA	Environmental Impact Assessment
ES	Environmental Statement
ISO	International Organisation for Standardisation
MHWS	Mean High Water Springs
OS	Ordnance Survey

Units

Units	Meaning
dB	Decibel
dB(A)	A-Weighted Decibel
Hz	Hertz
kV	Kilovolt
m	Metre

1 OPERATIONAL NOISE

1.1 Introduction

1.1.1 This document forms Volume 2, Appendix 6.3: Operational Noise of the Environmental Statement (ES) prepared for the United Kingdom (UK) elements of the Xlinks' Morocco-UK Power Project (the 'Project'). For ease of reference, the UK elements of the Project are referred to as the 'Proposed Development, which is the focus of the ES. The ES presents the findings of the Environmental Impact Assessment (EIA) process for the Proposed Development.

1.1.2 This document provides the assessment criteria, methodology, and assumptions adopted for the 3D acoustic modelling undertaken to identify and assess operational noise impacts due to the operation of the converter stations for the Project.

1.1.3 The proposed converter stations will convert the electrical current supplied via the Onshore HVDC Cable Corridor from Direct Current (DC) to Alternating Current (AC) which will allow for connection to the national grid. The Converter Site would comprise two converter stations referred to as Bipole 1 and Bipole 2. Full details of the proposed Converter Site are presented in Volume 1, Chapter 3: Project Description, of the ES.

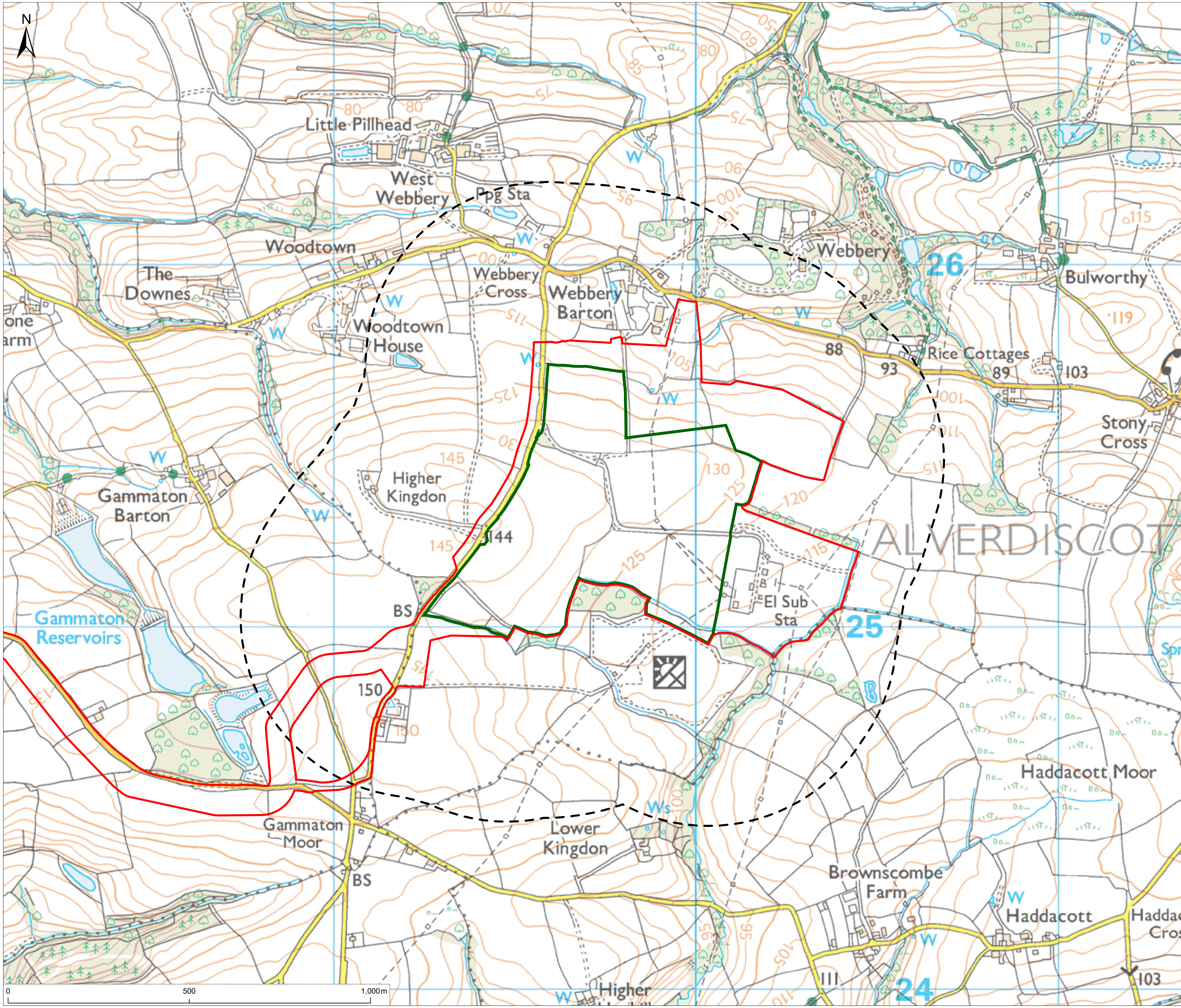
1.2 Study Area

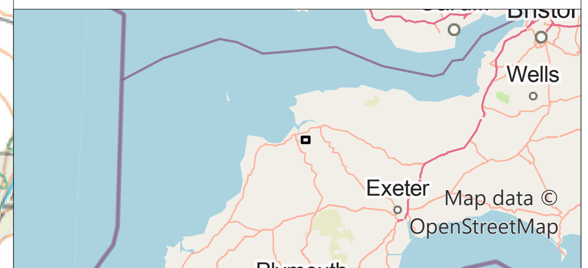
1.2.1 The noise and vibration study area focuses on noise and vibration sensitive receptors landward of Mean High Water Springs (MHWS) where potential impacts are more likely to occur. A brief description of each study area is provided below with graphical representations provided in **Figure 1**.

1.2.2 The twin converter stations located at the Converter Site are the only operational noise sources which may impact the amenity of nearby receptors.

1.2.3 The noise and vibration study are relevant to this technical report is defined as:

- the area of land temporarily or permanently occupied during the construction, operation and maintenance, and decommissioning of the Proposed Development; and
- noise sensitive receptors located within 500 m of the operational noise sources.





Notes
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Legend

- Order Limits
- Converter Site
- 500m Study Area

Rev	Description	By	CB	Date
P01	FINAL	MP	PK	12.11.24

Xlinks

Client: Xlinks 1 Limited

Project: Xlinks' Morocco-UK Power Project

Title: Operational Noise Study Area

Status	Scale @ A3	Date Created
FINAL	1:10,000	Nov 2024

Figure Number: 1

Rev: P01

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1.3 Methodology

1.3.1 A 3D acoustic model has been constructed using the SoundPLAN v8.2 software package. This software implements the outdoor sound propagation method detailed within International Organisation for Standardisation (ISO) 9613-2:1996: 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'. Sound levels have been predicted under light down-wind conditions based on hemispherical radiation with corrections added for atmospheric absorption, ground effects, screening, and source directivity, where each is appropriate. This standard is widely accepted as the industry-standard model.

1.3.2 The maximum design scenario is outlined in Table 6.22 of Volume 2, Chapter 6: Noise and Vibration, of the ES. The list of proposed plant items and maximum quantities is provided in **Table 1.1** below. The maximum design scenario is represented by all plant operating continuously at maximum operational duty 24/7. The location of each plant item has been obtained from indicative layout drawings for the Converter Site.

1.3.3 The input parameters relevant to the Proposed Development include the following.

Local Topographical Features

1.3.4 Variable local topography can affect the 'line of sight' of a receptor to the source and result in greater or fewer obstacles between the source of noise and the receptor such as ground cover, hills, and buildings.

1.3.5 The receptors and other buildings which may provide screening effects have been obtained by importing Ordnance Survey (OS) Local Vector Layer for the Converter Site and surrounding area.

1.3.6 A digital ground model has been calculated using detailed OS Terrain 5 data for Converter Site. The proposed indicative earth-modelling around the Converter Site following the cut and fill exercise, has also been included in the digital ground model to account for the likely future ground conditions.

Ground Effects

1.3.7 Sound propagating outdoors comprises direct waves travelling straight from source to receiver and reflected waves which interact with the ground. Harder surfaces reflect more sound thereby resulting in enhanced noise levels at the receptor. Softer surfaces (such as grass, trees, or vegetation) have a higher porosity and thus can absorb reflected waves, resulting in lower noise levels at the receptor.

1.3.8 The acoustic properties of the ground are accounted for using the ground factor G which is a dimensionless parameter between 0 and 1. ISO 9613-2:1996 specifies a ground factor of 0 for hard surfaces and 1 for porous surfaces.

1.3.9 The area surrounding the Converter Site is predominantly grassland and thus has been assigned a ground factor of G = 0.6.

1.3.10 The converter station platform area is assumed to comprise hard ground with a ground factor of G = 0.3.

Plant Strategy and Layout

1.3.11 The primary model input is the source noise levels of the proposed plant strategy and the operating conditions for the Converter Site.

1.3.12 The proposed plant strategy is outlined in **Table 1.1** below with the typical noise levels associated with each plant item. Frequency spectra have been applied to the levels below which have been obtained from operational noise assessments for similar schemes such as The Celtic Interconnector and East Anglia ONE Offshore Windfarm. The full spectra are presented in **Annex A**.

1.3.13 The heights of each plant item and building have been obtained from a 3D drawing of the proposed Converter Site layout.

1.3.14 The proposed plant has been modelled in two ways:

- Industrial buildings: The industrial building feature in SoundPLAN allows for any larger plant items to be modelled as boxes with all outside surfaces radiating with an assigned sound power level. The sound power level per façade has been calculated by distributing the total sound power level over each individual face of the plant item based upon the area.
- Point sources: Smaller plant items have been modelled as point sources which radiate in such a way that the sound attenuates proportionally with the square of the inverse of the distance from the source.

Table 1.1: Proposed Converter Station plant strategy

Plant Item	Quantity (per Bipole)	Modelled Height (m)	Sound Power Level, L_W, dB(A)	Modelled Source Type
Converter Transformers	6	5	95	Industrial Building
Converter Transformer Fans	60	5	87	Point
Valve Cooling Banks	10	3	89	Point
AC Filter Capacitors	6	7	80	Point
AC Filter Reactors	6	5	80	Point
Air Handling Units	8	3	82	Point

1.3.15 Additional notes on the assumptions adopted for the converter station plant noise emission levels are as follows:

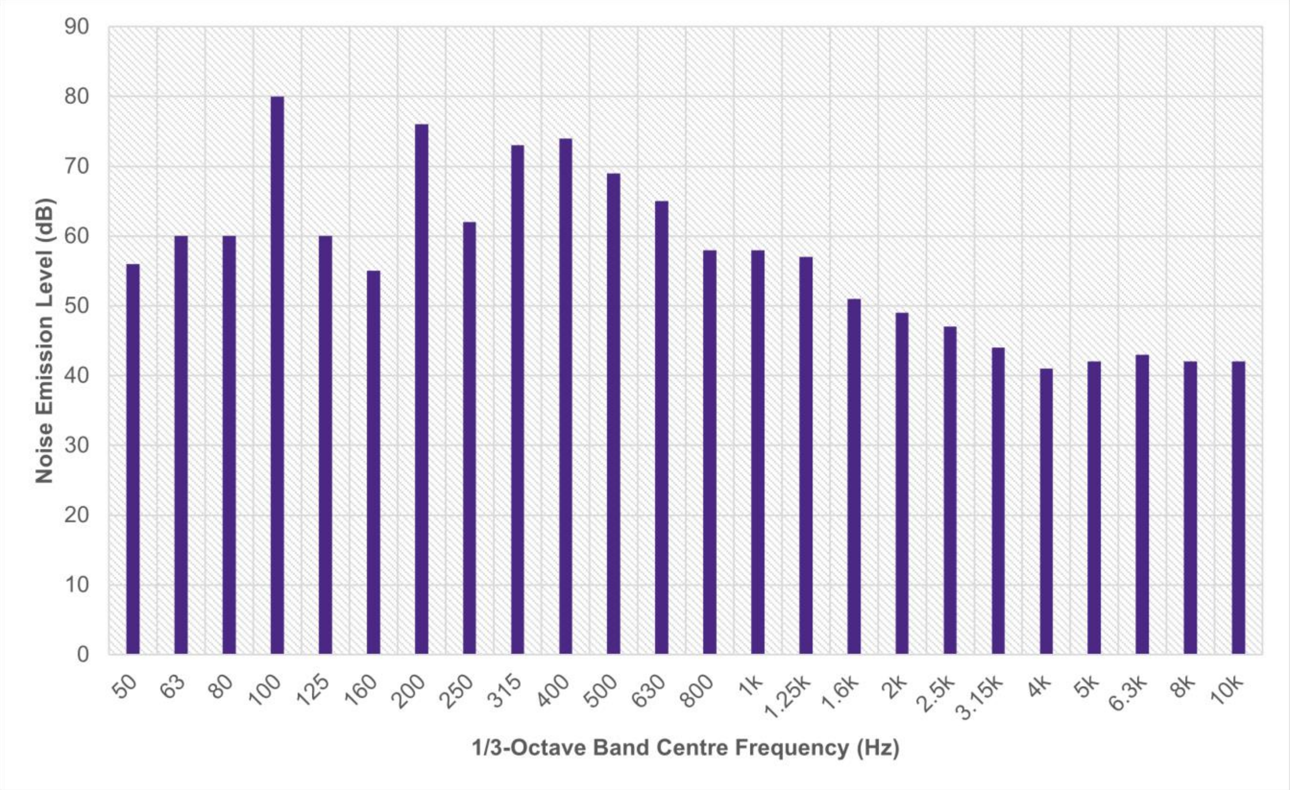
- The number of converter transformer fans is not yet known and 10 fans per transformer has been assumed as a worst case approach. These fans are assumed to be radiators situated on the side of each transformer which transfer heat generated by the converter transformer operation to the surroundings.
- The number of valve cooling banks is assumed at this stage based on information obtained from similar schemes. The individual fans have been modelled as point sources atop a small industrial building to better simulate a top-discharging cooler unit. The sound power level has been split evenly to model a sound power level per fan.
- The exact operation of the air-handling units is not yet known. It has been assumed that the primary source of atmospheric noise emissions will be

associated with the fresh air intake and exhaust termination points which have been modelled as point sources. Since the size of any ductwork or grilles is not yet known, the losses typically associated with the transmission of sound through ducts (duct losses, bend losses, end reflections, and grille directivity) have been omitted from the assessment at this stage as a conservative approach. It has been assumed that the levels from the fan termination points will be much greater than that associated with breakout noise from the casing of the air-handling unit and thus it has not been considered.

- Each of the two bipoles will contain two sets of three AC filter reactors and AC filter capacitors. These have been modelled as six individual point sources for each of the six individual phases.
- There are up to 12 reactors proposed within the valve and reactor hall building. Since these units will be housed internally, noise emissions are likely to be sufficiently controlled by the sound insulation performance of the external building fabric. These details are not yet known and thus this will be considered at a later design stage once more information is available. As such only externally sited plant items have been considered in this assessment.

1.3.16 The frequency content of similar plant which have been applied to the broadband sound power levels in **Table 1.1** highlight that the converter transformers typically contain tonal components to their noise emission spectra at low frequency which could potentially cause disturbance to nearby receptors. The fundamental frequency where the tonal components are generally present is the 100 Hz 1/3-octave frequency band, as shown in **Figure 2** below which shows the shape of a typical transformer spectrum (Gange, 2011). Subsequent harmonics to the fundamental frequency can be seen at higher frequencies. However, low frequency sound energy travels further due to the long wavelengths associated with the 100 Hz frequency band in comparison to the air through which the energy is transferred. As such, it is the low frequency sound rather than the higher frequency harmonics which requires most consideration.

Figure 2: Typical high-voltage transformer noise emission spectrum.



1.3.17 As such, where these plant items are most influential to the overall receptor noise level, a correction of +2 dB, +4 dB, or +6 dB has been applied corresponding to 'just perceptible', 'clearly perceptible', and 'highly perceptible', respectively, in terms of BS 4142:2014+A1:2019.

Mitigation

1.3.18 The plant layout will be designed to reduce noise impacts as much as is reasonably practicable and additional mitigation measures such as acoustic enclosures, attenuators, and acoustic barriers may be implemented as part of the Proposed Development. The exact measures will be determined as the design progresses and consideration has been given to the limiting plant noise emission levels and the type of mitigation measures which may allow for these levels to be achieved.

1.3.19 Acoustic enclosures are available for transformers which attenuate sound at 100 Hz by around 20 dB (National Grid, 2021). An enclosure which can achieve this amount of low frequency attenuation will reduce noise levels at higher frequencies by a greater amount. However, an overall noise reduction of 20 dB has been applied as a conservative assumption in the absence of a full enclosure specification.

1.3.20 Other mitigation measures may include:

- the selection of quieter equipment;
- acoustic enclosures;
- acoustic silencers for fans; and
- acoustic barriers.

1.3.21 An acoustic silencer has been incorporated into the modelling for the converter transformer fan units with a specification equivalent to that of a 900 m attenuator with 40% free area. The insertion loss is presented in **Table 1.2** below.

Table 1.2: Acoustic silencer specification.

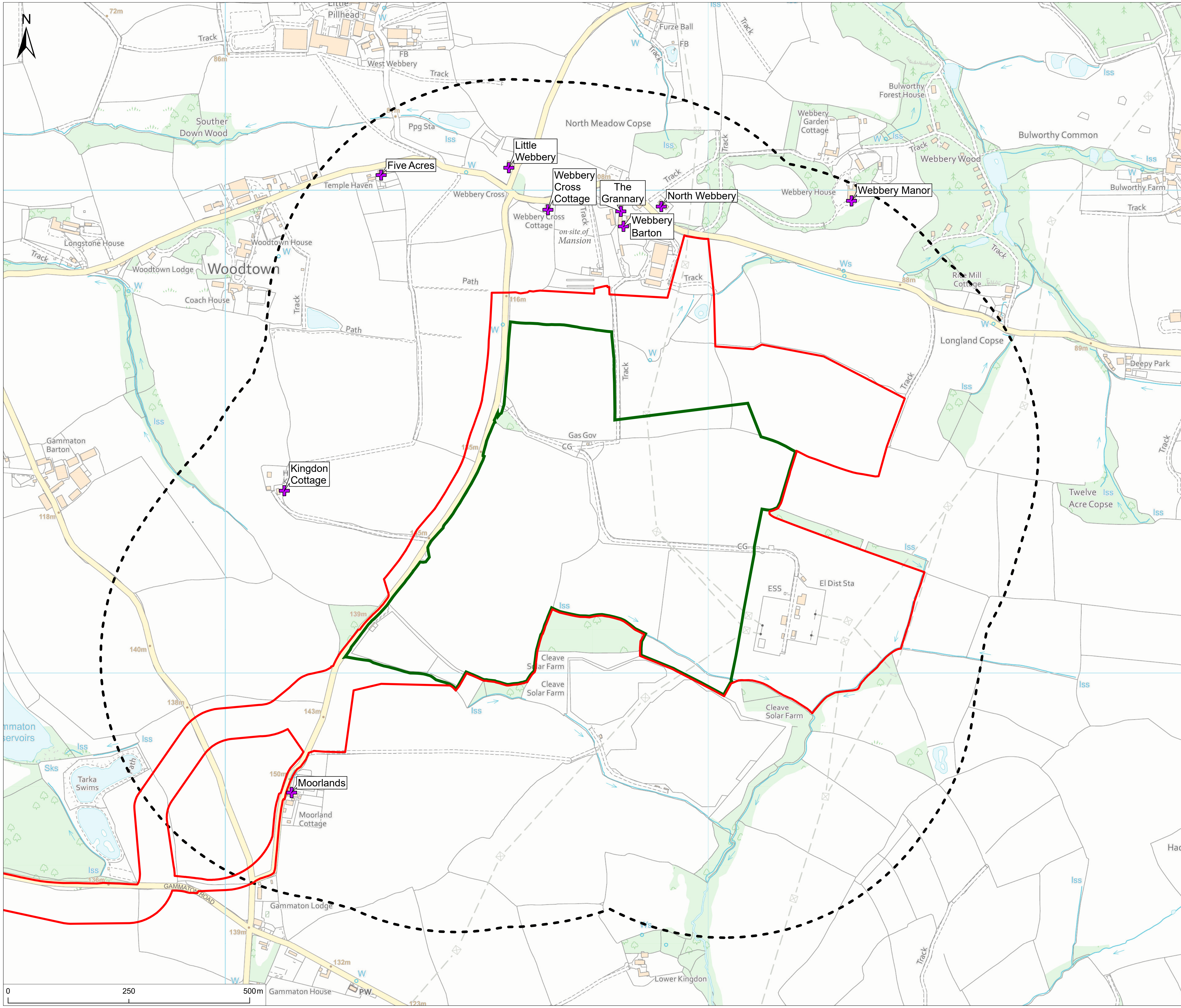
Silencer	Insertion Loss (dB) at 1/1-Octave Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
900 mm length, 40% free area	4	7	13	19	23	23	16	13

1.4 Noise Sensitive Receptors

1.4.1 The nearest noise-sensitive receptors to the Converter Site are presented graphically in **Figure 3** below.

1.4.2 The daytime noise emission levels have been assessed to a receptor situated 1 m from the most exposed façade of the noise-sensitive receptors at a height of 1.5 m above local ground level. This height corresponds roughly to the centre of a ground floor window.

1.4.3 The night-time noise emission levels have been assessed to a receptor situated 1 m from the most exposed façade at a height of 4.5 m above local ground level. This height corresponds roughly to the centre of a first-floor window since it is assumed residents will be in bedrooms situated on the first-floor during the night-time period.



Notes

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Legend

- Order Limits
- Converter Site
- 500m Study Area
- Noise Sensitive Receptor

P01	FINAL	MP	PK	12.11.24
Rev	Description	By	CB	Date

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Client Xlinks 1 Limited

Project Xlinks' Morocco-UK Power Project

Title Operational noise sensitive receptors

Status	Scale @ A3	Date Created
FINAL	1:7,500	Nov 2024

Figure Number 3

Rev P01

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1.5 Assessment Methodology

1.5.1 Noise levels during the operation of the converter stations at the nearest receptors have been predicted from a 3D acoustic model. The predicted noise levels have been assessed with reference to the guidance in British Standard (BS) 4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound'.

1.5.2 The nearest receptors to the are presented graphically in **Figure 3** above.

1.5.3 The computer noise model has been constructed based on an indicative site layout, derived in collaboration with the design team. This has been done to demonstrate operational noise levels at nearby receptors and appropriate methods of mitigation where required. The consent sought through this chapter is for the parameter plan of the site.

BS 4142:2014+A1:2019

1.5.4 British Standard (BS) 4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound' provides a method for rating industrial and commercial sound and method for assessing resulting impacts upon people. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities.

1.5.5 In summary, this standard provides guidance on determining 'rating sound levels' by correcting the 'specific sound level' from the site or operations under consideration for acoustic character corrections such as tonality, impulsivity, and intermittency. The standard provides the following corrections to be applied where each is appropriate:

'Tonality -For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible

Impulsivity - A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible

Intermittency - When the specific sound has identifiable on/off conditions, the specific sound level should be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. … If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied

Other sound characteristics - Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied.'

1.5.6 An initial estimate of the impact of the source is obtained by subtracting the measured background sound level from the rating sound level of the proposed plant. Background sound levels at the receptors were identified from the baseline sound survey data (see Volume 2, Appendix 6.1: Baseline Sound Survey, of the ES).

1.5.7 Acoustic character corrections are applied to the specific sound level at the receptor as presented in **Table 1.4** below.

1.5.8 Typically, the greater the difference between the measured background sound level and the rating sound level, the greater the magnitude of the impact. The operational noise criteria adopted for the Proposed Development are presented in **Table 1.3** below.

Table 1.3: Operational noise impact magnitude criteria

Magnitude of Impact	BS 4142:2014+A1:2019 Semantic Description	Difference Δ between rating sound level $L_{Ar,Tr}$ and background sound level $L_{A90,T}$ (dB)
High	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.	Δ ≥ 10
Medium	A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.	5 ≤ Δ < 10
Low	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.	0 ≤ Δ < 5
Negligible		-10 ≤ Δ ≤ 0

1.6 Operational Noise Assessment

1.6.1 The results of the baseline (unmitigated) scenario and mitigated scenario for the converter stations' operation are presented in **Table 1.4** and **Table 1.5** below, with the noise contours for each scenario presented in **Figure 4** to **Figure 7**.

Baseline Scenario

1.6.2 The construction of the Converter Site will require cut and fill earthworks to allow for a level construction platform upon which the converter stations will sit. The material removed during these works will be used to create earth bunds around the Converter Site which will provide screening of noise emissions for the surrounding receptors. Proposed indicative topography data has been incorporated into the model to account for the potential screening effects of these earth bunds.

Mitigated Scenario

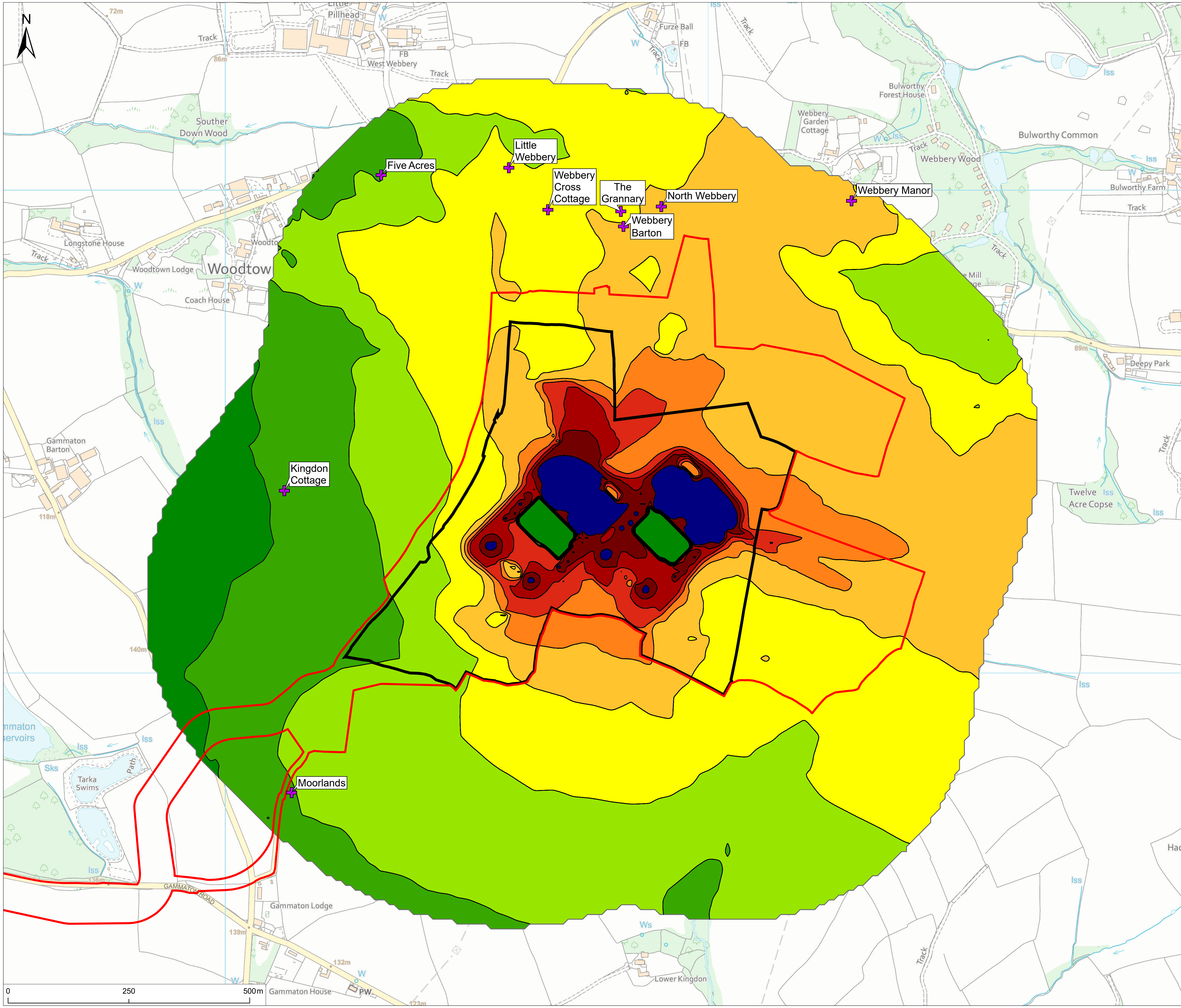
1.6.3 The assessment of the mitigated scenario has been carried out with the indicative earth bunds, considered as part of the baseline, in place. The mitigation considered as part of the noise assessment has been set out in **paragraphs 1.3.18** to **1.3.21** of this appendix.

Table 1.4: Operational noise assessment (unmitigated scenario)

Receptor	Background Sound Level, $L_{A90,T}$ (dB)		Specific Sound Level, $L_{Aeq,T}$ (dB)		Acoustic Character Correction (dB)		Rating Level, $L_{Ar,T}$ (dB)		Difference Between Rating Level and Background Level (dB)		Magnitude of Impact	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Kingdon Cottage	33	31	21	21	0	0	21	21	-12	-10	**Negligible**	**Negligible**
Little Webbery	36	30	32	32	0	0	32	32	-4	+2	**Negligible**	**Low**
Moorlands	33	31	22	22	0	0	22	22	-11	-9	**Negligible**	**Negligible**
North Webbery	36	30	36	36	2	2	38	38	+2	+8	**Low**	**Medium**
Five Acres	36	30	26	26	0	0	26	26	-10	-4	**Negligible**	**Negligible**
The Grannary	36	30	28	28	0	0	28	28	-8	-2	**Negligible**	**Negligible**
Webbery Barton	36	30	35	35	2	2	37	37	+1	+7	**Low**	**Medium**
Webbery Cross Cottage	36	30	34	34	2	2	36	36	0	+6	**Low**	**Medium**

Table 1.5: Operational noise assessment (mitigated scenario)

Receptor	Background Sound Level, $L_{A90,T}$ (dB)		Specific Sound Level, $L_{Aeq,T}$ (dB)		Acoustic Character Correction (dB)		Rating Level, $L_{Ar,T}$ (dB)		Difference Between Rating Level and Background Level (dB)		Magnitude of Impact	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Kingdon Cottage	33	31	18	20	0	0	18	20	-15	-11	**Negligible**	**Negligible**
Little Webbery	36	30	26	27	0	0	26	27	-10	-3	**Negligible**	**Negligible**
Moorlands	33	31	21	26	0	0	21	26	-12	-5	**Negligible**	**Negligible**
North Webbery	36	30	29	30	0	0	29	30	-7	0	**Negligible**	**Low**
Five Acres	36	30	21	24	0	0	21	24	-15	-6	**Negligible**	**Negligible**
The Grannary	36	30	22	24	0	0	22	24	-14	-6	**Negligible**	**Negligible**
Webbery Barton	36	30	29	30	0	0	29	30	-7	0	**Negligible**	**Low**
Webbery Cross Cottage	36	30	28	28	0	0	28	28	-8	-2	**Negligible**	**Negligible**



Notes
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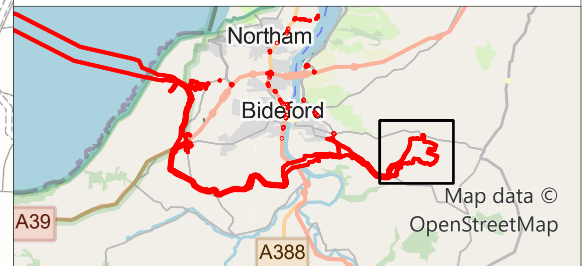
Legend

- Order Limits
- Converter Site
- Noise Sensitive Receptor

Noise Level dB (A)

- < 15
- 15.01 - 20.00
- 20.01 - 25.00
- 25.01 - 30.00
- 30.01 - 35.00
- 35.01 - 40.00
- 40.01 - 45.00
- 45.01 - 50.00
- 50.01 - 55.00
- 55.01 - 60.00
- 60.01 - 65.00



Rev	Description	By	CB	Date
P01	FINAL	MP	PK	12.11.24

Xlinks

Client: Xlinks 1 Limited

Project: Xlinks' Morocco-UK Power Project

Title: Operational Noise Contours: Unmitigated Scenario (Day)

Status: FINAL

Scale @ A3: 1:7,500

Date Created: Nov 2024

Figure Number: 4

Rev: P01

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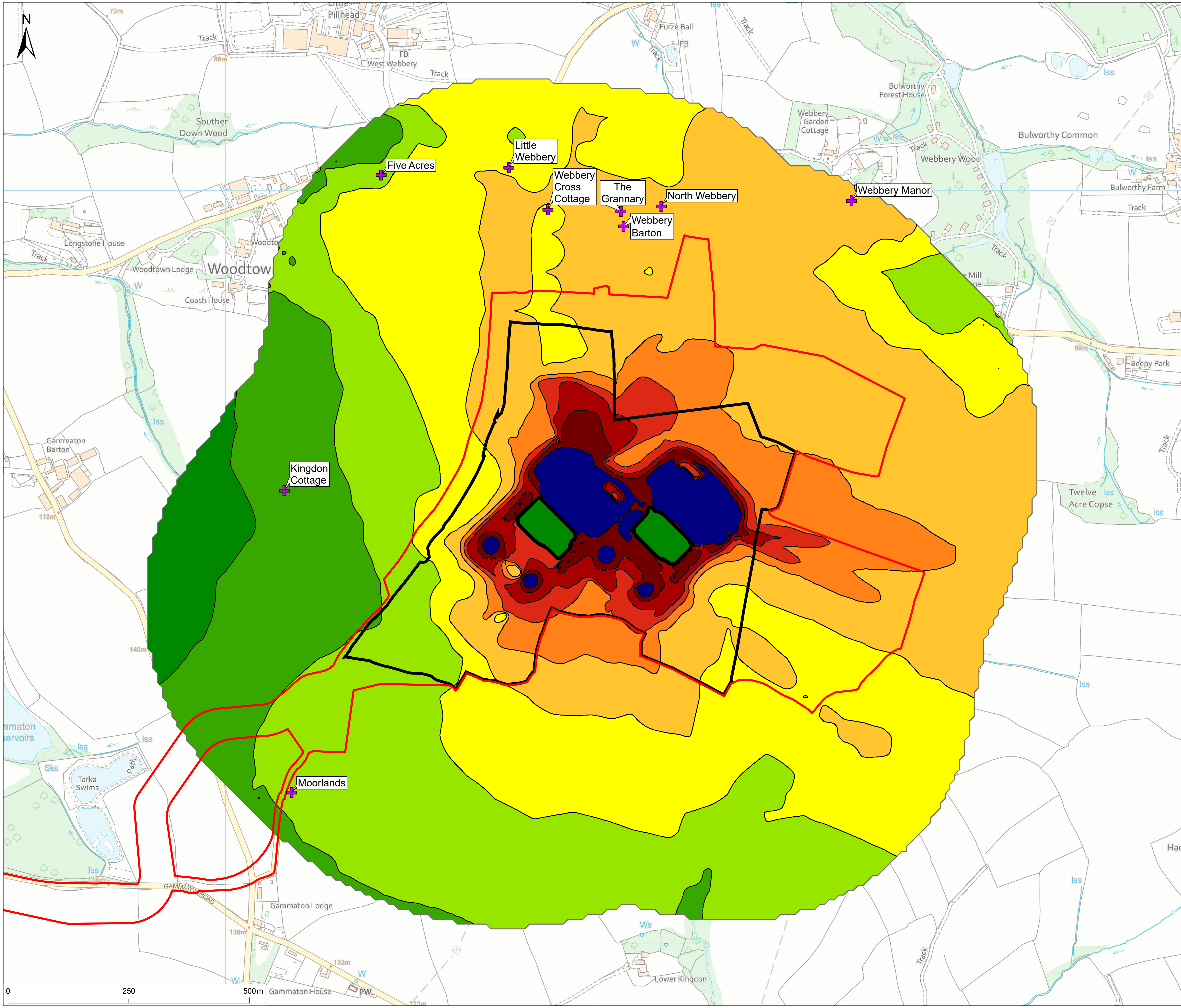

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Legend

- Order Limits
- Converter Site
- Noise Sensitive Receptor

Noise Level dB (A)

- < 15
- 15.01 - 20.00
- 20.01 - 25.00
- 25.01 - 30.00
- 30.01 - 35.00
- 35.01 - 40.00
- 40.01 - 45.00
- 45.01 - 50.00
- 50.01 - 55.00
- 55.01 - 60.00
- 60.01 - 65.00

P01	FINAL	MP	PK	12.11.24
Rev	Description	By	CB	Date

Xlinks

Client: Xlinks 1 Limited

Project: Xlinks' Morocco-UK Power Project

Title: Operational Noise Contours: Unmitigated Scenario (Night)

Status: FINAL
Scale @ A3: 1:7,500
Date Created: Nov 2024

Figure Number: 5
Rev: P01

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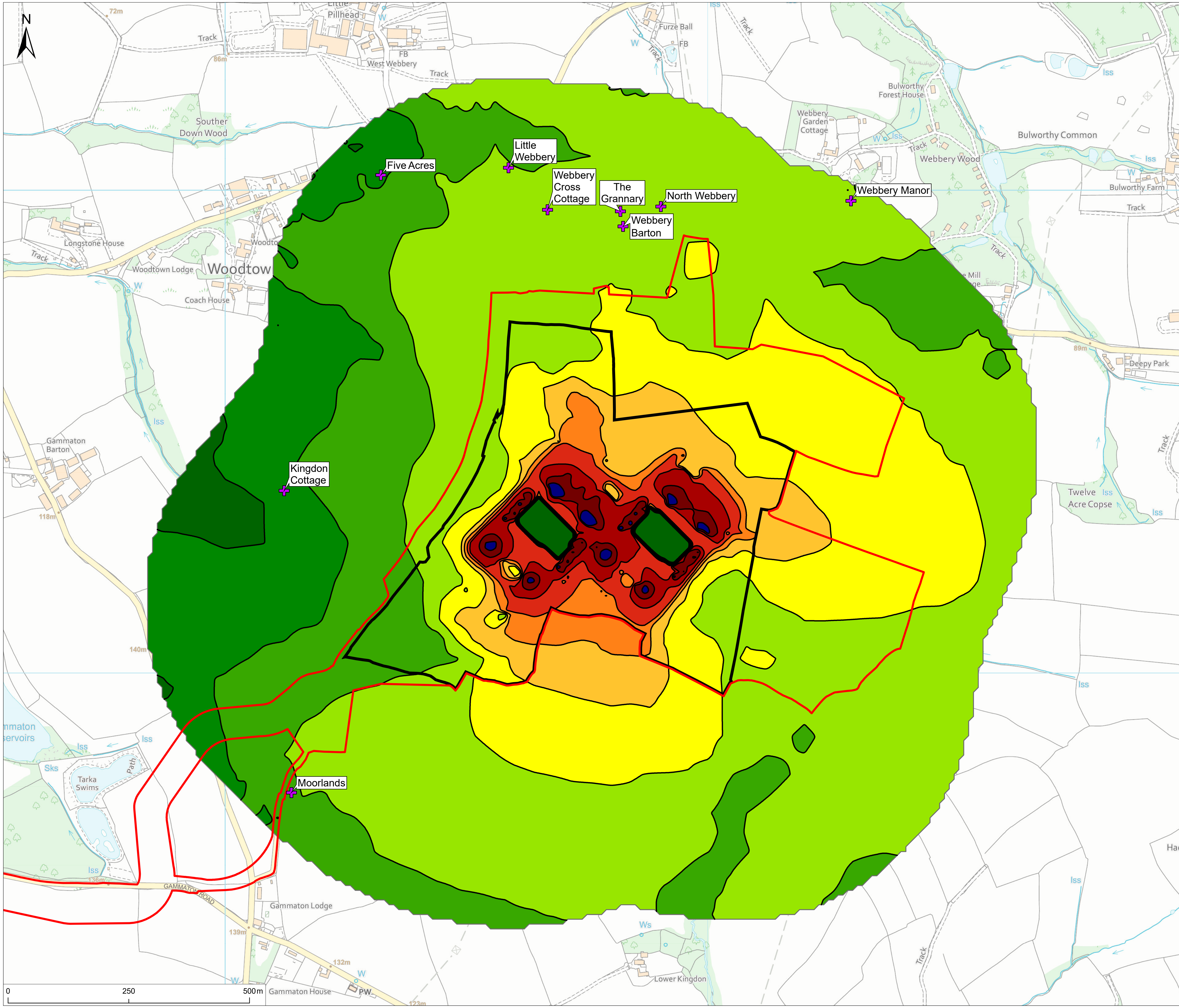

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Legend

- Order Limits
- Converter Site
- Noise Sensitive Receptor

Noise Level dB (A)

- < 15
- 15.01 - 20.00
- 20.01 - 25.00
- 25.01 - 30.00
- 30.01 - 35.00
- 35.01 - 40.00
- 40.01 - 45.00
- 45.01 - 50.00
- 50.01 - 55.00
- 55.01 - 60.00
- 60.01 - 65.00

P01	FINAL	MP	PK	12.11.24
Rev	Description	By	CB	Date

Xlinks

Client: Xlinks 1 Limited

Project: Xlinks' Morocco-UK Power Project

Title: Operational Noise Contours: Mitigated Scenario (Day)

Status	Scale @ A3	Date Created
FINAL	1:7,500	Nov 2024

Figure Number: 6

Rev: P01

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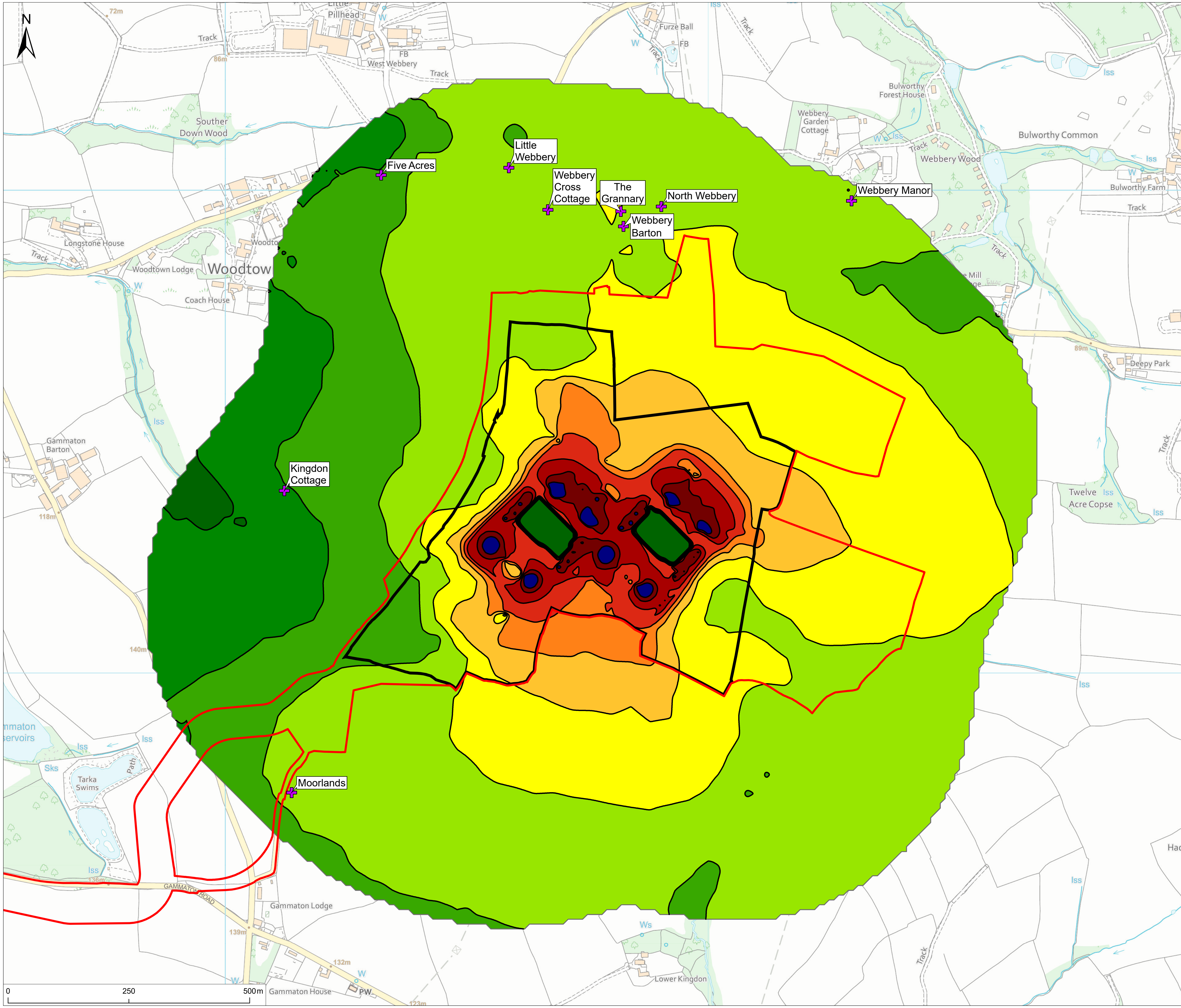

Notes
1. This plan is scaled at paper size A3. If received electronically it is the recipients responsibility to print to the correct scale. Only written dimensions should be used.

Legend

- Order Limits
- Converter Site
- Noise Sensitive Receptor

Noise Level dB (A)

- < 15
- 15.01 - 20.00
- 20.01 - 25.00
- 25.01 - 30.00
- 30.01 - 35.00
- 35.01 - 40.00
- 40.01 - 45.00
- 45.01 - 50.00
- 50.01 - 55.00
- 55.01 - 60.00
- 60.01 - 65.00

Rev	Description	By	CB	Date
P01	FINAL	MP	PK	12.11.24

Client: Xlinks 1 Limited

Project: Xlinks' Morocco-UK Power Project

Title: Operational Noise Contours: Mitigated Scenario (Night)

Status	Scale @ A3	Date Created
FINAL	1:7,500	Nov 2024

Figure Number: 7

Rev: P01

www.xlinks.co

B:_ECOLOGY\11809 Alverdiscott\Tech\Drawings\11809-0265-03.aprx

1.7 References

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Annex A: Noise Emission Spectra

Table A. 1: Converter Station Transformer Spectrum

Frequency (Hz)	Sound Power Level (dB) at 1/3-Octave Band Centre Frequency (Hz)
50	77
63	81
80	81
100	101
125	81
160	76
200	97
250	83
315	94
400	95
500	90
630	86
800	79
1k	79
1.25k	78
1.6k	72
2k	70
2.5k	68
3.15k	65
4k	62
5k	63
6.3k	64
8k	63
10k	63
dB(A)	95

Table A. 2: Operational noise model input spectra (excluding transformer)

Plant Item	Sound Power Level (dB) at 1/1-Octave Centre Frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Converter Transformer Fans	93	89	86	86	81	79	69	59	**87**
Valve Cooling Fan Bank	96	91	88	88	84	81	72	62	**89**
AC Filter Capacitor	68	85	82	81	63	58	62	54	**80**
AC Filter Reactor	68	85	82	81	63	58	62	54	**80**
Air Handling Unit	82	76	83	80	77	74	66	60	**82**