A specialist energy consultancy

Environmental Noise Impact Assessment

Coylton Greener Grid Park

Statkraft (UK) Ltd.

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COMMERCIAL IN CONFIDENCE

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1 Introduction

1.1 Overview

TNEI has been commissioned by Statkraft UK Ltd (Statkraft) to undertake an environmental Noise Impact Assessment (NIA) to support the planning application for the construction and operation of the Coylton Greener Grid Park development (the Proposed Development).

The Proposed Development is located to the southeast of the existing Coylton Substation near to Coalhall, East Ayrshire, and is to the south of the A70, at approximate Ordnance Survey coordinates 246575, 619393.

The Proposed Development site is currently undeveloped agricultural land. The local area around the site is semi-rural in nature, predominantly consisting of agricultural land, but with a small number of residential properties located to the west, north and east, and the existing National Grid substation to the west.

The aims of this NIA are to;

- Identify potential noise sensitive receptors in the vicinity of the Proposed Development;
- Identify the dominant sound sources associated with the operation of the Proposed Development;
- Calculate the likely levels of operational noise at the nearest noise sensitive receptors to determine the noise impacts associated with the development; and,
- Indicate any requirements for mitigation measures, if required, to provide sufficient levels of protection for nearby noise sensitive receptors.

All work undertaken to produce this report has been carried out by members of the TNEI Environment and Engineering Team, all of whom are affiliated with the Institute of Acoustics (IOA). Specifically, the following members of staff have been involved in the project;

- Ewan Watson, AMIOA, BEng (Hons), IOA Postgraduate Diploma in Acoustics and Noise Control: Noise Propagation Modelling, Assessment and Reporting; and,
- Jim Singleton, MIOA, BSc (Hons), IOA Postgraduate Diploma in Acoustics and Noise Control: Quality assurance.

1.2 Nomenclature

Please note the following terms and definitions, which are used throughout this report;

- **Emission** refers to the noise level emitted from a noise source, expressed as either a sound power level or a sound pressure level;
- **Immission** refers to the sound pressure level received at a specific location from a noise source;
- **SWL** indicates the sound power level in decibels (dB);
- **SPL** indicates the sound pressure level in decibels (dB);
- **NML** (Noise Monitoring Location) refers to any location where baseline or specific noise levels have been measured;
- **NSRs** (Noise Sensitive Receptors) are all identified receptors which are sensitive to noise; and;

- **NAL** (Noise Assessment Location) refers to any location where the noise immission levels are calculated and assessed.

In the interests of clarity, a Glossary of Terms is also provided as Appendix A of this report.

All figures referenced within the report can be found in Appendix F.

Unless otherwise stated, all noise levels refer to free field levels i.e. noise levels without influence from any nearby reflective surfaces.

All grid coordinates refer to the Ordnance Survey grid using Eastings and Northings.

2 Project Description

2.1 Development Description

The Proposed Development will consist of up to 50 MW of externally located liquid-cooled battery units (battery cubes) connected to inverter/Medium Voltage (MV) transformer units, and a single High Voltage (HV) Grid Transformer. Other infrastructure includes auxiliary transformers, comms houses, site offices and storage containers. An indicative layout plan and elevation drawings provide an overview of the proposed site and are included in Appendix B.

The Proposed Development site allows space for the installation of more BESS units than are necessary to provide the 50 MW capacity sought by the planning application, however, this NIA assesses the potential operational noise impacts from only 50 MW of BESS plant. Permission to utilise the remaining potential capacity of the site, would be subject to a future Section 36 application to Scottish Ministers should the applicant choose to develop the site further.

The Proposed Development would introduce new sound sources to the local area. Specifically, the dominant sound sources considered within the assessment are:

- Liquid-cooled Battery Cubes (288 of);
- Inverter/Transformer units (24 of); and,
- HV Grid Transformer (1 of).

The sound level output of the auxiliary infrastructure is considered insignificant in comparison to the primary sound sources detailed above. Accordingly, no other items of plant have been considered within the assessment.

2.2 Study Area

Noise Sensitive Receptors (NSRs) are properties that are sensitive to noise and therefore, require protection from nearby noise sources. The study area for the assessment of environmental noise is usually defined through the identification of the closest NSRs to the development.

The assessment of noise attributable to the development considers the nearest NSRs only, on the assumption that if sound levels at the closest receptors are within appropriate noise level limits, then sound levels at NSRs at greater distances should also be within acceptable levels.

The nearest identified NSRs, which have a high level of sensitivity, are existing residential properties located at varying distances in all directions from the site. The curtilage of the closest residential receptors is approximately 340 m to the southwest of the nearest noise emitting plant.

Figure 1 included within Appendix F details the closest NSRs considered within the assessment.

3 Assessment Methodology

3.1 Legislation and Policy Context

3.1.1 PAN 1/2011

At a national level, the relevant policy is PAN 1/2011 (PAN) Planning and Noise (1) and the associated Technical Advice Note (TAN) – 'Assessment of Noise'(2). With regards to the assessment of environmental noise, Appendix 1 of the TAN describes a number of standards and guidelines that may be referred to and details British Standards 4142 and 8233 as appropriate standards to use for the assessment of industrial noise.

3.1.2 East Ayrshire Local Development Plan

The East Ayrshire Local Development Plan (LDP) was adopted in April 2017. The LDP sets out East Ayrshire Council's (EAC) vision for development, indicating where development should and should not occur. The LDP contains the general placemaking and design principles that new development proposals are required to meet.

The LDP does not specifically mention the development of electrical infrastructure, but with regards to Renewable Energy developments, its states:

*"Proposals for the generation and utilisation of renewable energy in the form of new build development, infrastructure or retrofit projects will be supported in standalone locations and as integral parts of new and existing developments where it can be demonstrated that there will be no unacceptable significant adverse impacts on all of the relevant **Renewable Energy Assessment Criteria set out in Schedule 1 of the LDP**, that the scale of the proposal and its relationship with the surrounding area are appropriate and that all relevant policies are met."*

The referred to Renewable Energy Assessment Criteria (Schedule 1), lists *"Impacts on communities and individual dwellings, including visual impact, residential amenity, **noise** and shadow flicker"* as one if it's criteria.

In addition to this, Policy ENV12 of the LDP, *"Water, air and light and noise pollution"*, states:

"All new development must take full account of any Noise Action Plan and Noise Management Areas that are in operation in the area and ensure that significant adverse noise impacts on surrounding properties and uses are avoided. A noise impact assessment may be required in this regard and noise mitigation measures may be required through planning conditions and/or Section 75 Obligations."

3.2 Assessment Methods

A number of standards and guidelines are available for the assessment of environmental noise from proposed new developments or activities. Typically, assessments are based on a comparison of likely noise levels against either 'context' based limits or a set of fixed limits.

Context based limits are set relative to the existing noise environment and may also consider the characteristics of the noise source(s), whilst fixed limits are usually set regardless of the existing noise environment or type of noise source(s).

3.2.1 'Context' Based Limits (BS 4142:2014 +A1:2019)

The TAN endorsed BS 4142:2014 *'Methods for Rating and Assessing Industrial and Commercial Sound'* (3) is commonly used to assess the potential impacts of new sound sources on nearby receptors. In June 2019, the standard was amended and reissued as BS 4142:2014 + A1:2019. This assessment, therefore, is undertaken in accordance with the revised version (hereafter referred to simply as BS 4142). It should be noted that no material changes have been made to the assessment process detailed within the Standard because of the 2019 revision, rather the amendments are simply to provide clarifications to the existing text.

The BS 4142 form of assessment is based on the predicted or measured levels of an assessed sound source compared to the measured background sound levels without the specific sound source present and uses, *"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".*

Specifically, the assessment is made by subtracting the measured background sound level from a calculated or measured 'Rating Level'.

BS 4142 uses the following definitions:

Ambient Sound: Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, both near and far. Described using the metric, $L_{Aeq\,(t)}$.

Specific Sound Level: Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, *Tr*. Described using the metric $L_{Aeq\,(t)}$. Also referred to in this report as the *Immission Level*.

Residual Sound Level: Equivalent continuous A-weighted sound pressure level of the residual sound without the specific sound source(s) present at the assessment location over a given time interval, *T*. Described using the metric $L_{Aeq\,(t)}$.

Background Sound Level: 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 time weighting *F* and quoted to the nearest whole number of decibels. Described using the metric $L_{A90\,(t)}$.

Rating Level: The Specific Sound Level adjusted for the characteristics of the sound. The Rating Level is calculated by adding a penalty or penalties (if required) to the Specific Sound Level when the sound source contains audible characteristics such as tonal, impulsive or intermittent components. Described using the metric, $L_{Aeq\,(t)}$.

3.2.2 Fixed Guideline Levels (BS 8233:2014)

BS 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' (4) presents guideline noise levels for daytime and night-time periods for a number of different building types; for residential properties these are based on guidelines issued by the World Health Organisation (WHO). Specifically, the Standard states; *"In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in Table 4."* BS 8233 Table 4 is reproduced here as Table 3-1.

Table 3-1: Indoor Ambient Noise Levels for Dwellings (*BS8233:2014 Table 4*)

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq\,(16hour)}$	-
Dining	Dining room/area	40 dB $L_{Aeq\,(16hour)}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq\,(16hour)}$	30 dB $L_{Aeq\,(8hour)}$

BS 8233 suggests that an allowance of between 10 to 15 dB for the attenuation of a partially open window is reasonable in order to convert between internal and external sound levels and limits. Therefore, an assessment of external noise levels can assume an external noise level limit of 10-15 dB above those values detailed within Table 3-1 i.e. to achieve an internal night-time level of 30 dB $L_{Aeq\,(8hour)}$ with windows open the external sound level must not exceed a value of between 40 and 45 dB $L_{Aeq\,(8hour)}$[1].

3.2.3 EHO Consultation

In October 2022, TNEI wrote to the EAC Environmental Health Officer to set out TNEI's proposed noise assessment methodology for approval. The letter, which has been included within Appendix C (document reference 15416-002-R0), proposed the use of existing baseline noise data to inform the assessment; this survey was obtained as part of a previous NIA undertaken by Arcus Consulting (Arcus) in 2021, for a previous planning application on the same site. The letter also proposed a Rating Level noise limit of 5 dB above the representative background sound level. In addition, TNEI requested whether any alternative assessment criteria, such as the BS 8233 guideline noise levels shown in Table 3-1, should be considered in addition to BS 4142.

A response from EAC was received at the beginning of 2023 (a copy of which is also included within Appendix C), confirming that TNEI's proposed assessment methodology was deemed acceptable and that no additional assessment criteria beyond the proposed BS 4142 assessment was required. The limit of 5 dB above the representative background noise level was also agreed.

3.2.4 Assessment Criteria

Considering the above, the assessment is made as follows:

- A qualitative assessment is undertaken in accordance with BS 4142:2014; and,
- A quantitative assessment is undertaken against a noise level limit of 5 dB above the representative background noise level.

3.3 Calculation Method

3.3.1 Noise Propagation Model (ISO 9613-2:2996)

In order to predict the noise immission levels attributable to the Proposed Development, a noise propagation model was created using the propriety noise modelling software CadnaA. Within the software, complex models can be produced in order to simulate the propagation of noise according to a range of international calculation standards.

For this assessment, noise propagation was calculated in accordance with ISO9613 '*Acoustics – Attenuation of sound during propagation outdoors* [(5)] using the following input parameters;

- Temperature is assumed to be 10°C and relative humidity as 70%;
- A ground attenuation factor of 1 (soft ground) has been used, with specific areas of developed ground (including the Proposed Development area) modelled with a ground attenuation factor of 0 (hard ground); and
- Receiver heights are set to 4 m.

3.3.2 Uncertainties and Limitations

The noise propagation model is designed to give a good approximation of the specific sound level and the contribution of each individual sound source; however, it is expected that measured levels are

[1] The actual level of attenuation will vary depending on the frequency content of the noise incident upon the window.

unlikely to be matched exactly with modelled values and the following limitations in the model should be considered:

- In accordance with ISO 9613, all assessment locations are modelled as downwind of all sound sources and propagation calculations are based on a moderate ground-based temperature inversion, such as commonly occurs at night. These conditions are favourable to noise propagation;
- Table 5 of ISO 9613 estimates overall accuracy for broadband noise predictions of ± 3 dB, with average source to receiver heights <5 m, at distances of up to 1,000 m;
- The predicted barrier attenuation provided by local topography, embankments, walls, buildings and other structures in the intervening ground between source and receiver can only be approximated and not all barrier attenuation will have been accounted for;
- The model assumes all sound sources are operating continuously, simultaneously and at maximum noise output. In reality not all plant will be operating at the same time or at maximum noise output; and,
- Modelled sound sources represent candidate plant and a proposed site layout. Final plant specification and layout will be determined during the tendering stage.

4 Baseline Sound Level Monitoring

The baseline sound level survey was undertaken by Arcus as part of a previous noise assessment in 2021 in support of a Synchronous Condenser and BESS development on the same development site, which is now consented. However, as a result of National Grid Stability Pathfinder Phase 2, Statkraft was awarded a grid forming battery storage contract for Coylton and there is now no requirement to develop the synchronous condensers. The site is now proposed to be BESS only (the Proposed Development).

The baseline sound level survey was undertaken between the 8th and 10th of June 2021 to ascertain the existing background sound levels in the locality of the Proposed Development. Measurements were undertaken continuously at two monitoring locations for a duration of approximately 2 days, during both daytime and night-time periods. Extracts from the Arcus noise report pertaining to the 2021 baseline sound level survey, including details on the equipment used, meteorological conditions present, photographs of the equipment in-situ, on-site observations and details of any excluded data have been included within Appendix D of this NIA. The Arcus Noise Monitoring Locations (NMLs) are also detailed on Figure 1 within Appendix F.

Table 4-1 details the representative background sound levels detailed within the Arcus report. TNEI are satisfied that the method used by Arcus to derive the representative background sound levels is appropriate for use in the BS 4142 assessment.

Table 4-1: Arcus Representative Background Sound level, dB L_{A90}

Arcus NML	Description	Daytime Representative Background Sound Level, dB L_{A90}	Night-time Representative Background Sound Level, dB L_{A90}
NML01	Located to the north of the Proposed Development, on the roadside adjacent to East Tarelgin.	47	31
NML02	Located to the south of the Proposed Development, approximately 475 m to the east of MacQuittiston Farmhouse.	40	28

5 Operational Noise Impacts

5.1 Modelling of Individual Sound Sources

The noise model considers all of the sound sources detailed within Section 2.1. The following sections describe how each sound source has been incorporated into the noise model. All items of plant have been modelled as area sources and are assumed to be operating continually and with a constant sound level output.

It should be noted that whilst all predictive noise modelling has been undertaken using data for plant that is typical for a development of this size and class, final plant specification will be undertaken at a later stage during the tendering process and may differ from that used within the model.

5.1.1 Liquid-Cooled Battery Cubes

The battery cubes are liquid cooled utilising a chiller unit fixed to the side of each cube. Octave-band sound power level (SWL) data has been provided by the client for a candidate unit, the Wartsila Gridsolv Quantum. The octave-band data equates to an overall sound power level (SWL) of 75 dBA. Table 5-1 details the SWL used in the model.

Table 5-1: Octave Band SWL, dBA used to model the Liquid-Cooled Battery Cubes

Battery Chiller Unit	Frequency (Hz)								
	31.5	63	125	250	500	1000	2000	4000	8000
dBA	40	56	70	70	68	63	60	51	47

5.1.2 Inverter/Transformer Units

The noise model considers an SMA SC4600-UP Inverter as a candidate. TNEI hold data for multiple variants of this unit but for the purpose of this assessment, noise level data has been used for a J-Schneider coil unit working at 100% load and fitted with SMA supplied propriety noise control measures (in the form of attenuated louvres) that can achieve 5 dB of noise attenuation. The noise data has been provided to TNEI from SMA under a Non-Disclosure Agreement and as such the spectral data cannot be provided in this report, however, we can report that the broadband SWL is modelled at 88 dB(A). TNEI would be happy to discuss this data in more detail with EAC, if required.

5.1.3 HV Grid Transformer

The BESS development is to be connected to the grid by a single HV Grid Transformer. The client has provided a data sheet for a candidate transformer that contains a ONAF broadband sound pressure level (SPL) value of 68 dBA at 2 m, which is approximately equivalent 82 dBA SWL. In absence of spectral data, 1/3 Octave Band SWL data for a typical ABB HV Transformer has been input into the CadnaA noise model and then transposed so that the overall broadband SWL equates to 82 dBA. Table 5-2 details the resulting SWL used in the noise model.

Table 5-2: 1/3 Octave Band SWL, dBA used to model the HV Grid Transformer

HV Grid Transformer	Frequency (Hz)								
Hz	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**
dBA	-	-	-	58	42	49	66	62	72
Hz	**200**	**250**	**315**	**400**	**500**	**630**	**800**	**1000**	**1250**
dBA	68	70	74	71	71	73	72	71	68
Hz	**1600**	**2000**	**2500**	**3150**	**4000**	**5000**	**6300**	**8000**	**10000**
dBA	66	64	62	61	61	59	56	54	52

5.2 Additional Mitigation Measures

Acoustic barriers have been included in the design to reduce noise immission levels at the nearest NSRs. The barriers have been modelled at a height of 4.5 m as a single barrier around the perimeter of the site (inclusive of both development Phases) and additional 'L-shaped' barriers are included around the BESS and Inverter units, as shown in Figure 2 of Appendix F.

The perimeter barrier does not need to have any specific noise absorption coefficient value but does need to be of a minimum mass of 10 kg/m^2.

The BESS specific 'L-shaped' barriers have been modelled using CadnaA preset absorption coefficients with an equivalent weighted value of 0.5 to represent an absorbent acoustic barrier. Final specification for the absorptive characteristics will be calculated at the same time as final BESS plant specifications.

All barriers should have no air gaps and be sufficiently robust so as not to develop any air gaps (holes) during the lifetime of the development.

5.3 Calculated Immission Levels

Noise immission levels have been calculated at seven Noise Assessment Locations (NALs), which have been selected to represent the closest NSRs to the Proposed Development site. The NALs are detailed in Table 5-3 and shown on Figure 2 in Appendix F.

Table 5-3: Noise Assessment Locations

Noise Assessment Location				
NAL ID	**NAL Descriptor**	**Eastings**	**Northings**	**Representative NML**
NAL01	East Tarelgin Bungalow	246576	619827	1

Noise Assessment Location				
NAL ID	**NAL Descriptor**	**Eastings**	**Northings**	**Representative NML**
NAL02	East Tarelgin Cottage	246418	619827	1
NAL03	Alwyn Cottage	246121	619716	1
NAL04	MacQuittiston Farmhouse	246053	619266	2
NAL05	Clydenoch Cottage	247273	619274	2
NAL06	Hugh Wallace & Son Farm	247217	619224	2
NAL07	East Tarelgin	246636	619834	1

The immission levels (Specific Sound Level) are calculated assuming all plant is operating continuously and concurrently at maximum operating capacities. No time period is specified as the model assumes, as a worst case, that noise levels do not fluctuate and remain the same for both daytime and night-time periods. A noise contour plot is provided as Figure 2 in Appendix F.

Table 5-4: Predicted Immission Levels, dB $L_{Aeq(t)}$

Noise Assessment Location		Immission Level
NAL ID	**NAL Descriptor**	**Broadband, dB $L_{Aeq(t)}$**
NAL01	East Tarelgin Bungalow	33
NAL02	East Tarelgin Cottage	31
NAL03	Alwyn Cottage	29
NAL04	MacQuittiston Farmhouse	30
NAL05	Clydenoch Cottage	28

Noise Assessment Location		Immission Level
NAL ID	**NAL Descriptor**	**Broadband, dB $L_{Aeq(t)}$**
NAL06	Hugh Wallace & Son Farm	28
NAL07	East Tarelgin	33

6 Noise Impact Assessment

6.1 BS4142:2014 +A1:2019 Assessment

The qualitative assessment, which is undertaken following the guidance presented in BS 4142, considers the predicted immission levels, the character of the sound, the existing sound environment and the context of the development.

In order to assess the immission levels in accordance with BS 4142, the Specific Sound Level must be converted into a Rating Level. The Rating Level allows for character corrections to be added to account for particular characteristics of the sound that may be perceived as more annoying. In particular the Rating Level considers tonality, impulsivity and intermittency of the sound, as well other sound characteristics that are neither tonal, impulsive, or intermittent, but are otherwise readily distinctive against the residual acoustic environment.

6.1.1 Tonality

With regards to tonality, BS4142:2014 states:

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

Electrical plant such as power transformers are inherently tonal at source, typically in the 100 Hz frequency band. BS 4142 corrections, however, are only applied if the noise characteristics are present at the receptor location, not at the source location. Consideration of the predicted one third octave levels at the closest receptors indicate that tonality will not be noticeable from any plant. As such, no tonal character correction has been applied.

6.1.2 Impulsivity

With regards to impulsivity, BS4142:2014 states:

"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."

Impulsivity is not considered to be a relevant sound characteristic of a BESS development when operational. Once operational, the noise is likely to be predictable and consistent.

6.1.3 Intermittency

With regards to intermittency, BS4142:2014 states:

If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

As with impulsivity, intermittency is not considered to be a relevant sound characteristic in this case. Once operational, the proposed development will be operational for extended durations. This is not considered to be a demonstration of intermittency. Once operational, the noise is likely to be predictable and consistent.

6.1.4 Other Sound Characteristics

With regards to other sound characteristics, BS4142:2014(+A1-2019) states:

"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 3 dB can be applied."

No other noise characteristics that would be '*readily distinctive against the residual acoustic environment*' are anticipated, especially when considering the measured ambient sound levels.

6.1.5 Calculation of the Rating Level

With due regard to the above, no character corrections are required. Therefore, the Rating Level is equal to the Specific Sound Level.

6.1.6 Assessment of the Impacts

BS 4142, Section 11, requires that the assessment considers the context in which the sound occurs, and as such there is no definitive pass/fail element to the standard. However, as a starting point the standard states:

"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level, and consider the following…

a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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."

Error! Reference source not found. presents a comparison of the Rating Levels against the daytime and night-time representative background sound levels.

Table 6-1: Margin Above / Below (+/-) Background Sound Level, dB

Noise Assessment Location		Daytime			Night-time		
NAL ID	NAL Descriptor	Representative Background Sound Level, dBA	Rating Level, dBA	Margin, dB	Representative Background Sound Level, dBA	Rating Level, dBA	Margin, dB
NAL01	East Tarelgin Bungalow	47	33	-14	31	33	2
NAL02	East Tarelgin Cottage	47	31	-16	31	31	0

Noise Assessment Location		Daytime			Night-time		
NAL ID	**NAL Descriptor**	**Representative Background Sound Level, dBA**	**Rating Level, dBA**	**Margin, dB**	**Representative Background Sound Level, dBA**	**Rating Level, dBA**	**Margin, dB**
NAL03	Alwyn Cottage	47	29	-18	31	29	-2
NAL04	MacQuittiston Farmhouse	40	30	-10	28	30	+2
NAL05	Clydenoch Cottage	40	28	-12	28	28	0
NAL06	Hugh Wallace & Son Farm	40	28	-12	28	28	0
NAL07	East Tarelgin	47	33	-14	31	33	+2

With the exception of NALs 01, 04 and 07, the Rating Level is below or equal to the background sound level at all NALs during both the daytime and the night-time periods, which is *"an indication of the specific sound source having a low impact, depending on the context."*

At NAL 01, 04 and 07, the Rating Level exceeds the background sound level by 2 dB during the night-time. This is below the level that is considered an *"indication of an adverse impact, depending on the context."*

The context in which the assessment is made is as follows;

- The assessment considers candidate plant and the typical sound level output for this type of plant. As part of the procurement process, plant will be specified in order to minimise noise output.
- The noise model assumes all plant is operating concurrently, however not all cooling units will necessarily be required to operate at the same time and as such, overall noise levels are likely to be lower than predicted.
- Similarly, the noise model assumes all cooling plant is operating at maximum noise level output, however, this will only occur when ambient temperatures are high, or the equipment is under full load. For much of the time cooling equipment will be operating at lower capacities and overall sound output will be reduced.

Consideration of the context does not change the assessment outcome, and the conclusion of the BS 4142 assessment is that that the noise output from the Proposed Development is not expected to have an adverse impact in terms of noise.

With regard to the agreed noise limit of 5 dB above the existing background sound level, the Rating Level will remain below the limits at all times and at all receptors.

7 Discussion and Draft Planning Condition

The assessment considers the likely noise level output of the Proposed Development based on candidate plant and typical noise control options. Source noise levels of individual items of plant, however, will vary as the final plant specifications and required control measures are determined during a commercial tendering process. Accordingly, the predicted noise levels presented in this report, or the noise levels at source, should not be used to specify particular noise level limits.

Rather, it is more appropriate to consider the noise levels received at the nearest NSRs with regards to the existing sound levels in the area (as assessed by BS 4142). This allows appropriate levels of protection to be allocated to the nearest receptors, giving comfort to residents and the Local Planning Authority (LPA), whilst providing the developer with sufficient flexibility in the design and specification of plant during the tendering process.

Accordingly, the following planning condition to control operational noise effects is proposed:

"The noise Rating Level from the operation of the Development shall not exceed 5 dB above the background sound levels, as measured or calculated at the nearest occupied residential Noise Sensitive Receptors (as existing or consented at the time of this consent), as detailed in BS 4142:2014+A1:2019."

8 Summary

In order to predict the noise immission levels of the Proposed Development, TNEI has produced a noise propagation model in accordance with ISO 9613 based on candidate plant typical for this type of development. The model includes mitigation measures including 4.5 m high acoustic barriers and noise control measures fitted to the inverter units (though these may not be required depending on final plant specification). The noise model assumes that all plant will be operating at full capacity, continuously and concurrently, however, this is unlikely to occur for the majority of the time. Accordingly, the noise assessment is inherently conservative.

A qualitative assessment was undertaken in accordance with BS 4142, which concluded that during the daytime and night-time, the Rating Levels from the Proposed Development *"does not exceed 5 dB above the background sound level"* and is *"an indication of the specific sound source(s) having a low impact, depending on the context."*

The quantitative assessment against the agreed noise level limit of background plus 5 dB indicates that the development can operate and remain within the noise level limits for all receptors and all time periods.

Accordingly, the NIA concludes that the Proposed Development will not have an adverse noise impact on the local area.

9 References

1. **The Scottish Government.** *PAN 1/2011 Planning and Noise.* Scotland : The Crown, 2011.

2. —. *Technical Advice Note (TAN) 'Assessment of Noise'.* Scotland : The Crown, 2011.

3. **British Standards Institute.** *Methods for Rating and Assessing Industrial and Commercial Sound.* UK : BSI, 2014. BS4142:2014 + A1:2019.

4. —. *Guidance on Sound Insulation and Noise Reduction for Buildings.* UK : BSI, 2014. BS8233:2014.

5. **(ISO), International Organization for Standardization.** *Acoustics – Attenuation of Sound During Propagation Outdoors: Part 2 – General Method of Calculation.* Geneva : (ISO), International Organization for Standardization, 1996. ISO 9613-2:1996.

Appendix A – Glossary of Terms

Attenuation: the reduction in level of a sound between the source and a receiver due to any combination of effects including: distance, atmospheric absorption, acoustic screening, the presence of a building façade, etc.

Background Sound Level: the sound level rarely fallen below in any given location over any given time period, often classed according to daytime, evening or night-time periods. The LA90 indices (see below) are typically used to represent the background sound level.

Broadband Noise: noise with components over a wide range of frequencies.

Decibel (dB): the ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. A logarithmic scale is used in sound level measurements because of this wide range. The scale used is the decibel (dB) scale which extends from 0 to 140 decibels (dB) corresponding to the intensity of the sound level.

dB(A): the ear has the ability to recognise a particular sound depending on its pitch or frequency. Microphones cannot differentiate sound in the same way as the ear, and to counter this weakness the sound measuring instrument applies a correction to correspond more closely to the frequency response of the human ear. The correction factor is called 'A Weighting' and the resulting measurements are written as dB(A). The dB(A) weighting is internationally accepted and has been found to correspond well with people's subjective reaction to sound levels and noise. Some typical subjective changes in sound levels are:

- a change of 3dB(A) is just perceptible;
- a change of 5dB(A) is clearly perceptible; and
- a change of 10dB(A) is twice (or half) as loud.

Directivity: the property of a sound source that causes more sound to be radiated in one direction than another.

Emission: the sound energy emitted by a sound source (e.g. a wind turbine).

Frequency: the pitch of a sound in Hz or kHz. See Hertz.

Ground Effects: the modification of sound at a receiver location due to the interaction of the sound waves with the ground along its propagation path from source to receiver. Described using the term 'G', and ranges between 0 (hard ground), 0.5 (mixed ground) and 1 (soft ground).

Hertz (Hz): sound frequency refers to how quickly the air vibrates, or how close the sound waves are to each other (in cycles per second, or Hertz (Hz)).

Immission: the sound pressure level detected at a given location (e.g. the nearest dwelling).

Isopleth: a line on a map connecting points of equal value, for example air pressure, noise level etc.

Noise: unwanted sound.

Lw: is the sound power level. It is a measure of the total sound energy radiated by a sound source and is used to calculate sound levels at a distant location. The *LWA* is the A ‑ weighted sound power level.

Leq: is the equivalent continuous sound level, and is the sound level of a steady sound with the same energy as a fluctuating sound over the same period. It is possible to consider this level as the ambient noise encompassing all noise at a given time. The LAeq, T is the A ‑ weighted equivalent continuous sound level over a given time period (T).

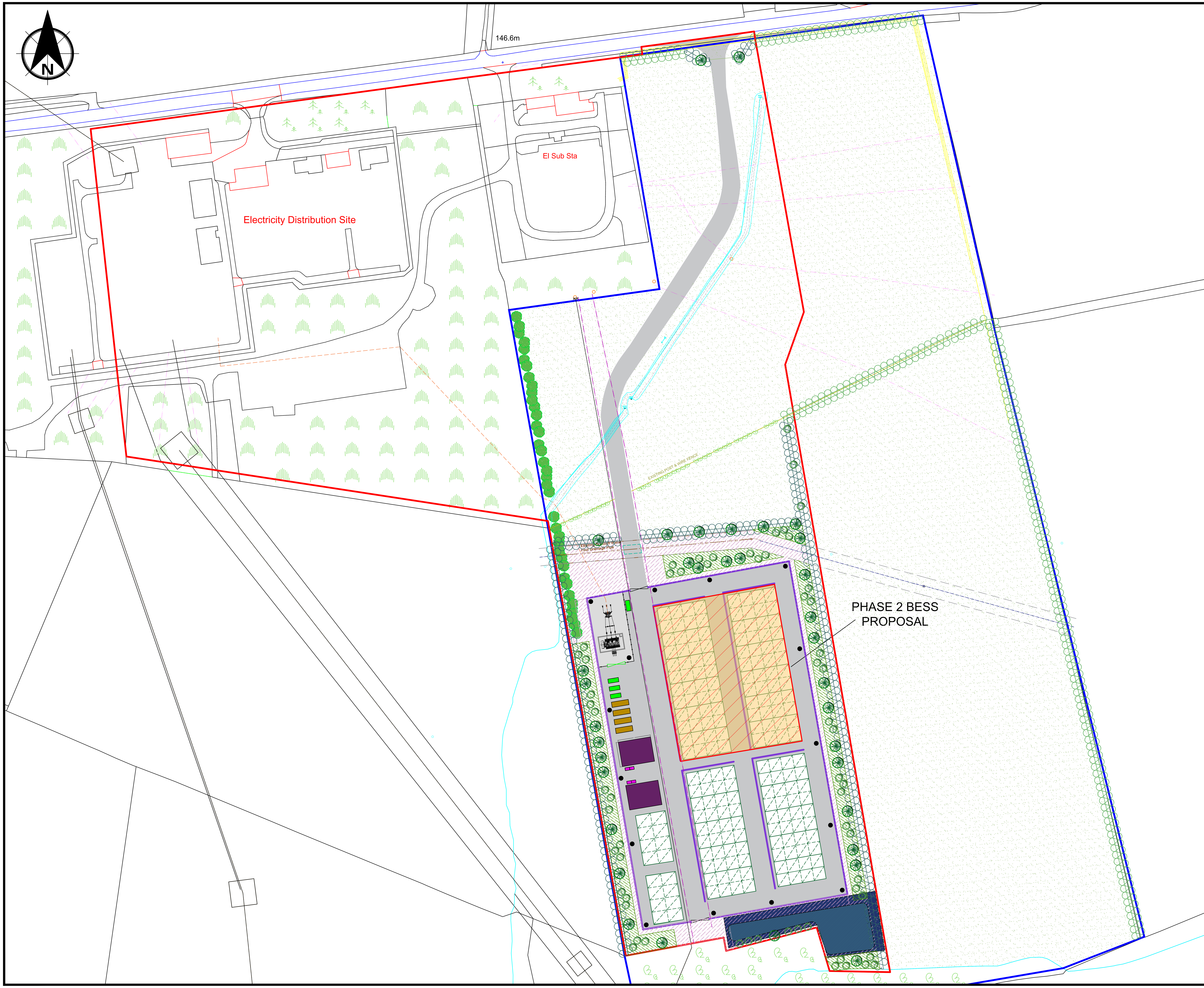
L90: index represents the sound level exceeded for 90 percent of the measurement period and is used to indicate quieter times during the measurement period. It is often used to measure the background sound level. The LA90,10min is the A ‑ weighted background sound level over a ten-minute measurement sample.

Sound Level Meter: an instrument for measuring sound pressure level.

Sound Pressure Level: a measure of the sound pressure at a point, in decibels.

Tonal Noise: noise which covers a very restricted range of frequencies (e.g. a range of ≤20 Hz). This noise is subjectively more annoying than broadband noise.

Appendix B – Proposed Site Layout



LEGEND

- APPLICATION SITE BOUNDARY
- LAND WITHIN THE CONTROL OF THE APPLICANT
- INDICATIVE GRID CABLE ROUTE 0.32 km
- NOISE ATTENUATION / SECURITY FENCING AT 4.5m HIGH
- EXISTING OVERHEAD LINE (33 kV)
- EXISTING OVERHEAD LINE (33 kV) TO BE DIVERTED
- UNDERGROUNDING OF 33 kV CABLE
- EXISTING DITCH
- EXISTING INDICATIVE DITCH ALIGNMENT
- HV YARD INTERNAL SECURITY FENCING AT 3.4m HIGH
- POST & WIRE FENCING
- EXISTING SCOTTISH WATER FOUL DRAINAGE PIPE
- EXISTING SCOTTISH WATER FOUL DRAINAGE PIPE 5m BUFFER
- EXTENDED EXISTING SCOTTISH WATER FOUL DRAINAGE PIPE
- PROPOSED REINFORCEMENT OF SURFACING TO PROTECT PIPE
- COMMS HOUSE 5.63 m (H) x 14.20 m (L) x 18.80 m (W)
- AUX TRANSFORMER 2.50 (H) x2.60 m (L) x 1.60m (W)
- STORES 2.60 m (H) x 6.10 m (L) X 2.40 m (W)
- OFFICES 3.60 m (H) x 9.80 m (L) x 3.1 m (W)
- POROUS CRUSHED AGGREGATE HARD SURFACING
- 4.5 m HIGH GATE (CLOSE BOARDED)
- 3.4 m PALISADE GATE
- CCTV / LIGHTING POLE (6m High)
- PROPOSED SuDS ATTENUATION FEATURE (DETENTION BASIN / SOAKAWAY)
- PROPOSED CULVERT - DETAILS TO BE PROVIDED BY WAY OF A CONDITION
- EXISTING TREES - TO BE RETAINED
- EXISTING SCRUB VEGETATION - TO BE RETAINED
- EXISTING HEDGEROW - RETAINED
- EXISTING AGRICULTURAL LANDUSE - RETAINED / REINSTATED
- PROPOSED NATIVE TREE (SELECT STANDARD)
- PROPOSED NATIVE TREE (FEATHER)
- PROPOSED NATIVE WOODLAND EDGE MIX
- PROPOSED NATIVE MIXED HEDGEROW
- PROPOSED NATIVE WILDFLOWER MEADOW
- PROPOSED WET WILDFLOWER MIX (SuDS AREA)

BATTERY CONTAINER AND HV YARD KEY:

- INDICATIVE BATTERY BLOCK
- HV EQUIPMENT 8 m (H) x 28.1 m (L) x 14.4 m (W)
- HV YARD 40.42 m (L) x 20.78 m (W)

PHASING KEY

- PHASE 2 BESS PROPOSAL

Rev.	Date	Amendment Details	Drw'n	Chk'd	App'd
10	24/10/23	FOR INFORMATION	MR	RL	RL

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Project Title

COYLTON BESS

Drawing Title

PHASE 2 BESS PROPOSAL

Scale	Designed	Drawn	Checked	Approved
1:1000	MR	MR	RL	RL
Original Size	Date	Date	Date	Date
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Drawing Number	Revision
15627 - 034	10

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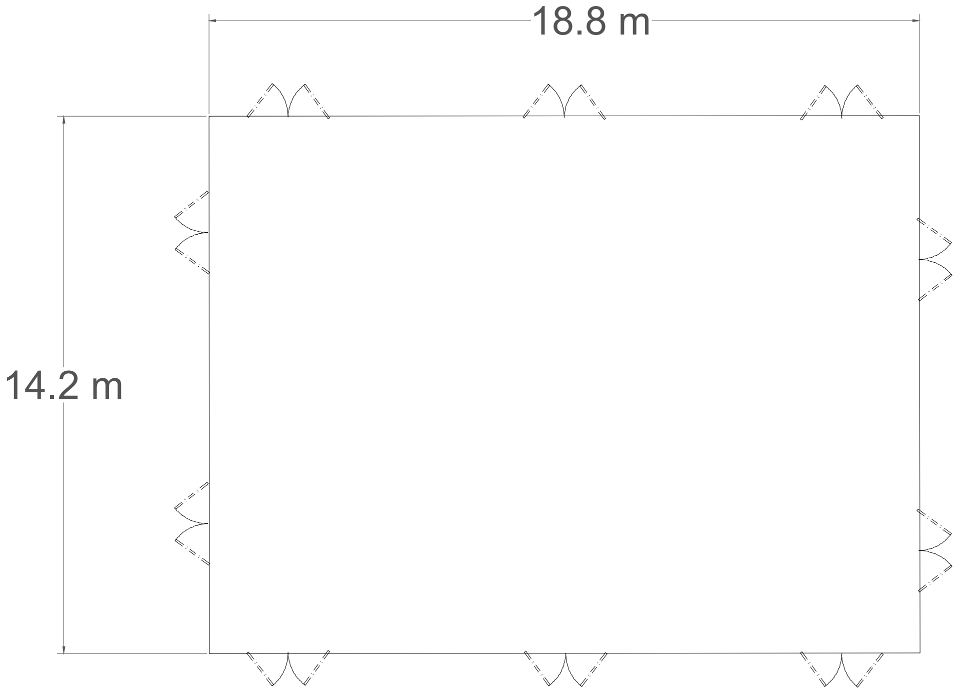

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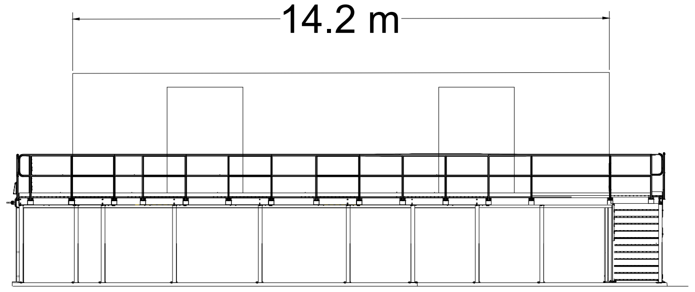

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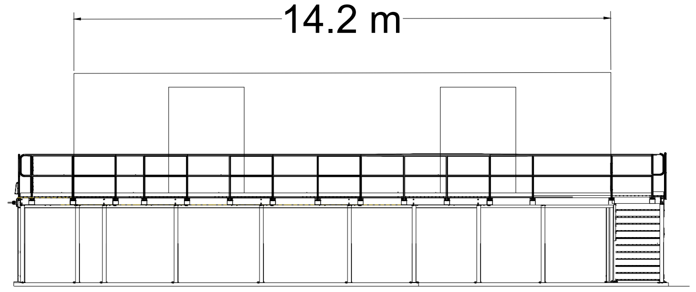

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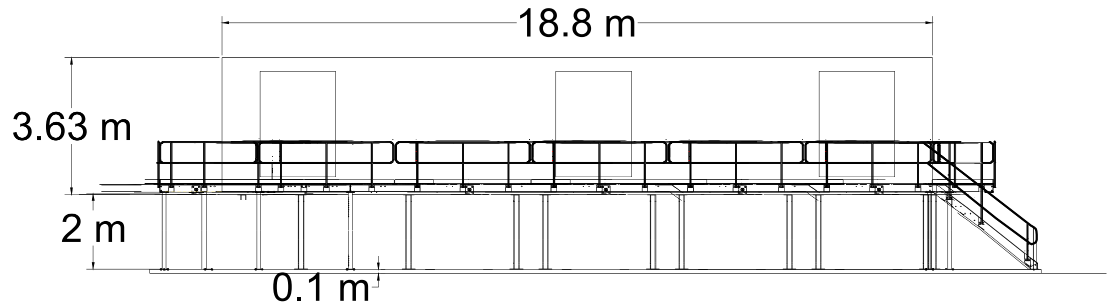

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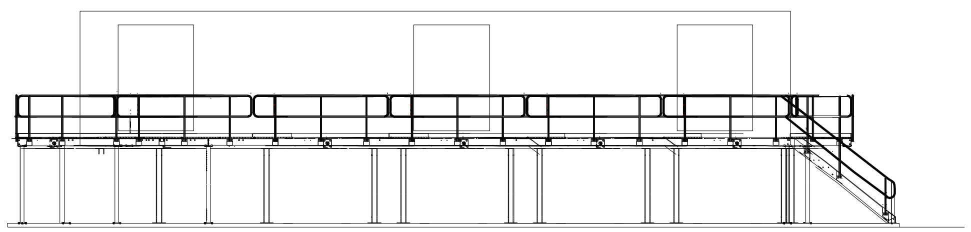

REAR ELEVATION

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00	09/10/23	FOR INFORMATION	SH	RL	RL

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FOR INFORMATION

Project Title

COYLTON BESS

Drawing Title

COMMS HOUSE
PLAN AND ELEVATIONS

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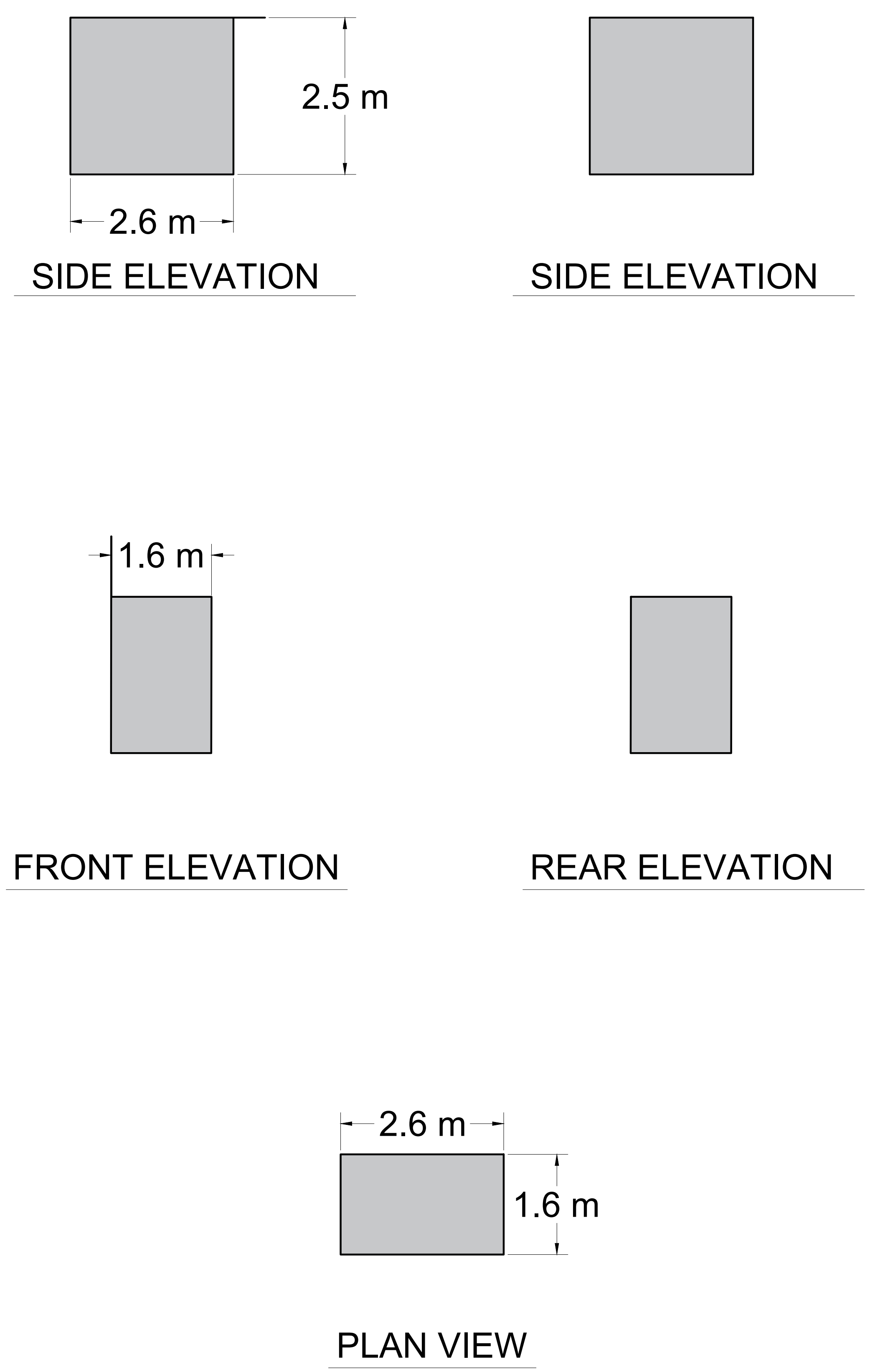
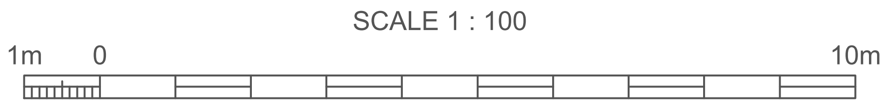
Drawing Number: 15627- 024

Revision: 0





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00	09/10/23	FOR INFORMATION	SH	RL	RL

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Statkraft

Drawing Status
FOR INFORMATION

Project Title
COYLTON BESS

Drawing Title
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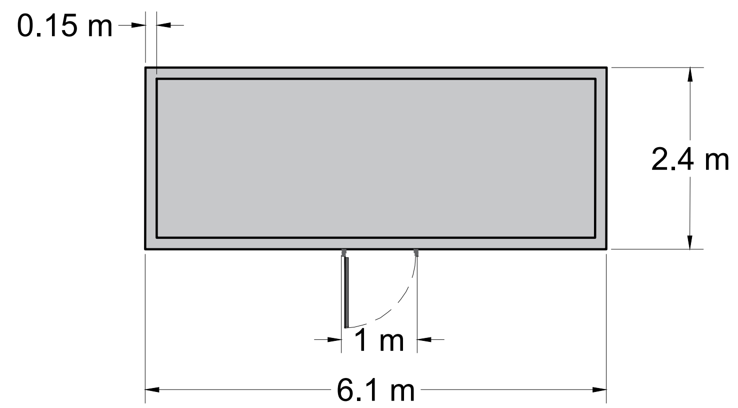
Revision: 0



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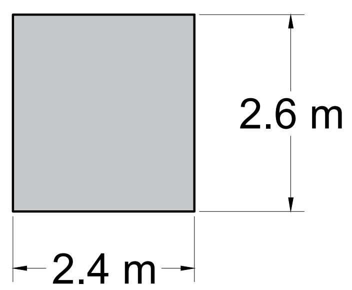

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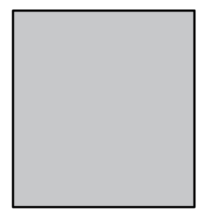

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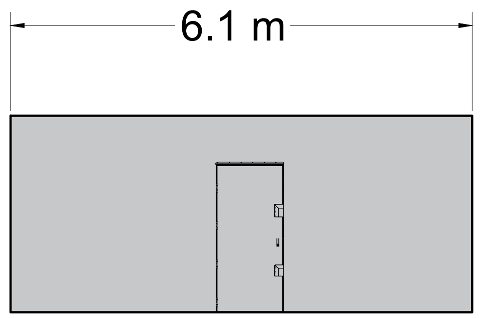

SOUTHERN ELEVATION

NORTHERN ELEVATION

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00	27/09/23	FOR INFORMATION	SH	RL	RL

Client

Drawing Status: FOR INFORMATION

Project Title: COYLTON BESS

Drawing Title: STORES ELEVATION

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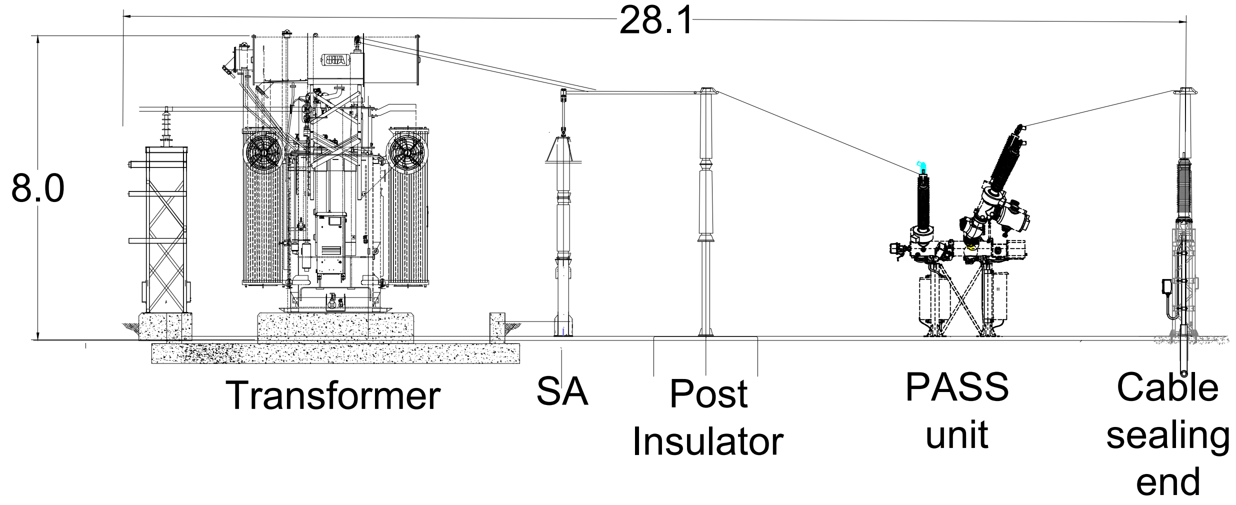
Drawing Number: 15627 - 026

Revision: 1



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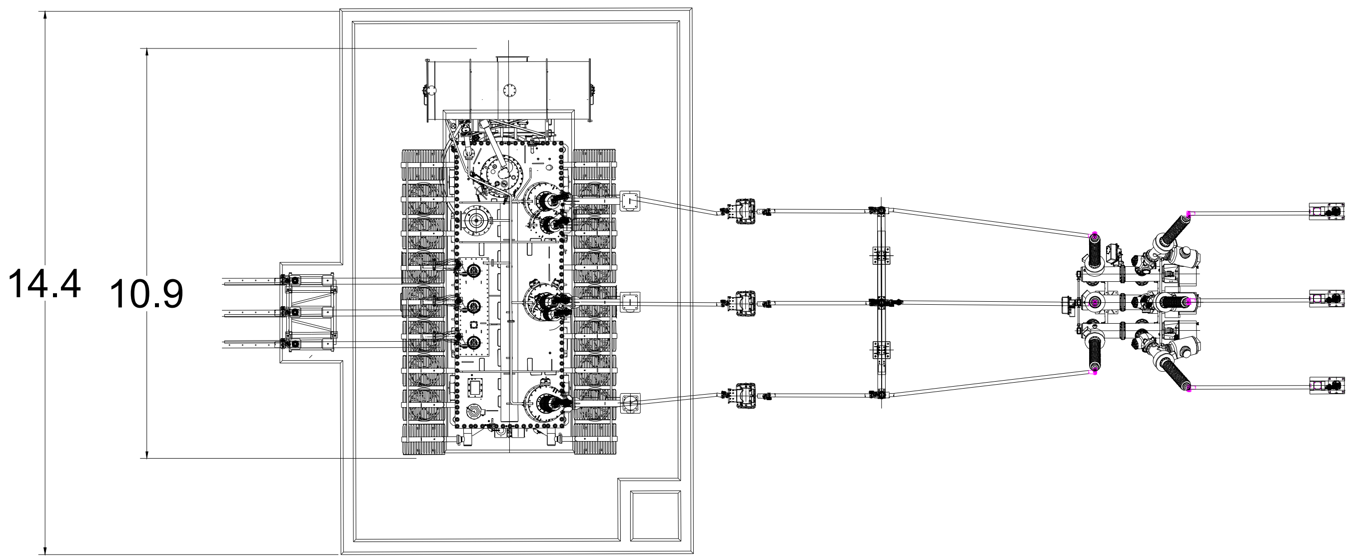

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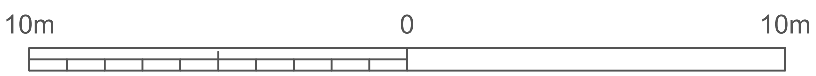

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00	09/10/23	FOR INFORMATION	SH	RL	RL

Client

Drawing Status: FOR INFORMATION

Project Title: COYLTON BESS

Drawing Title: HV YARD PLAN AND ELEVATION

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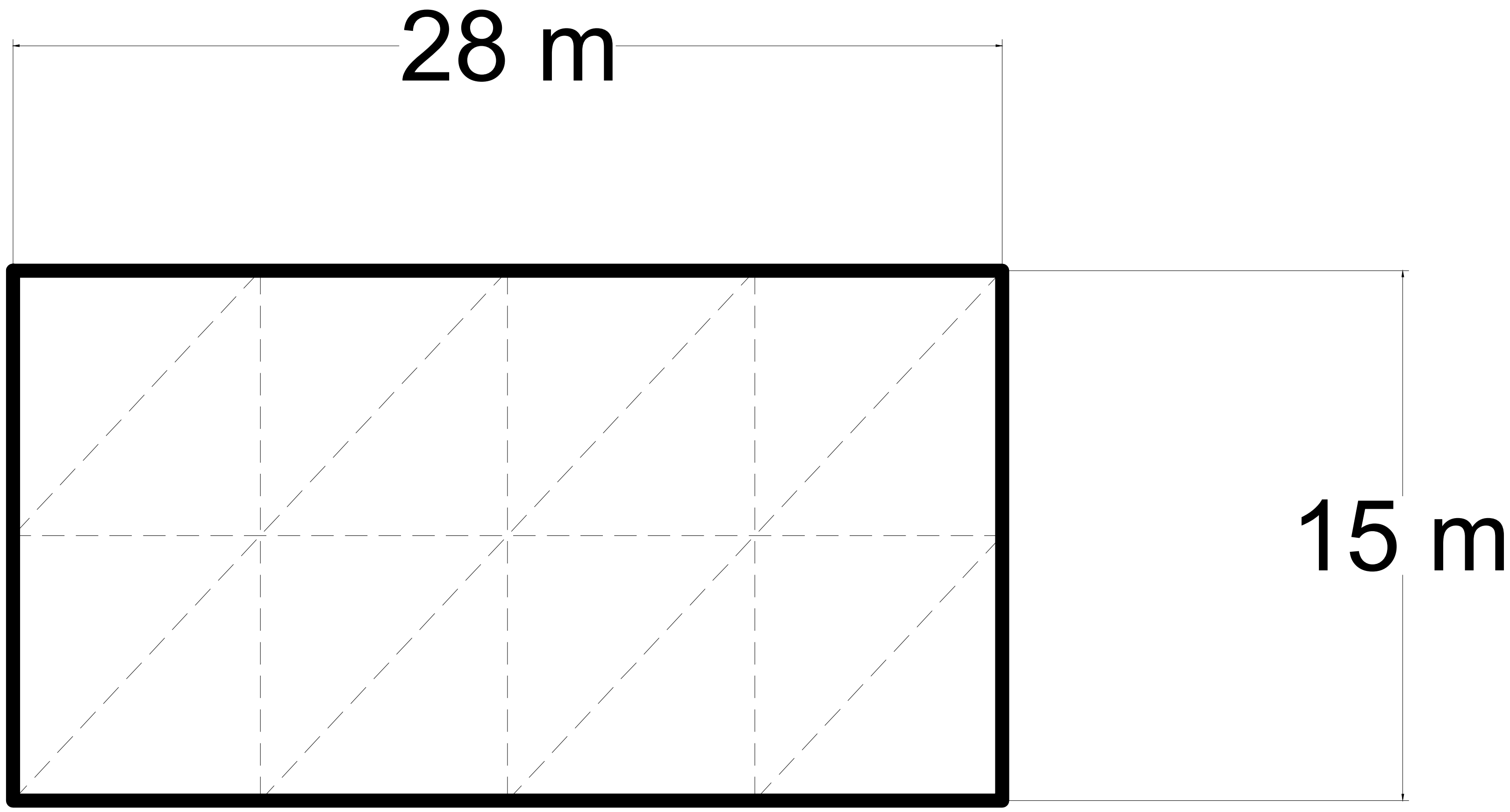

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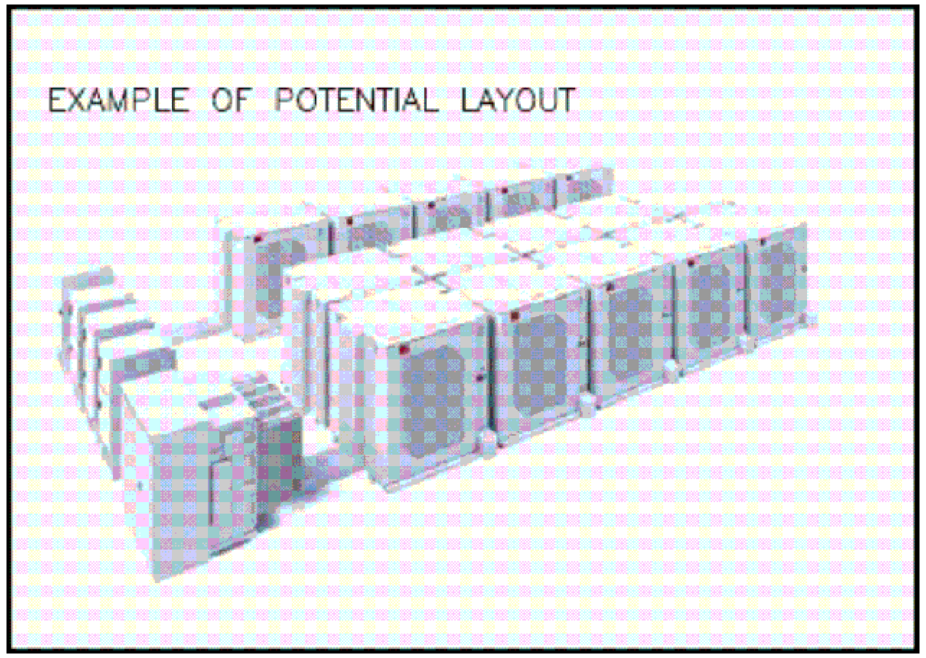

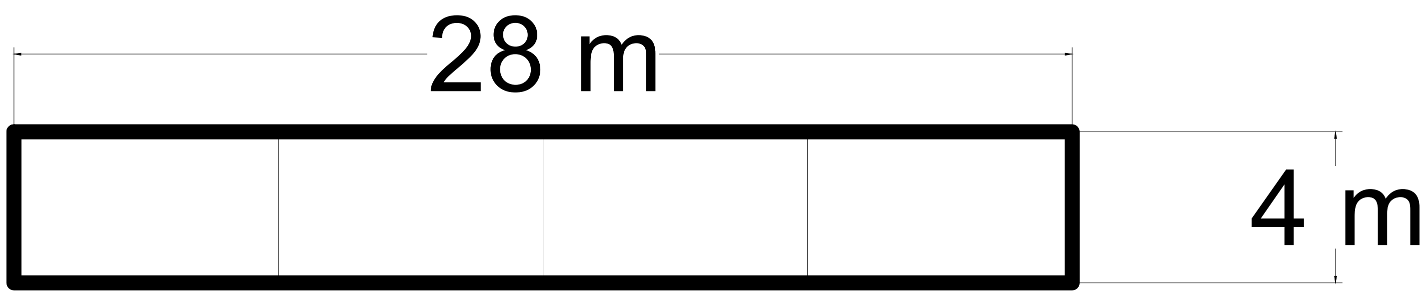

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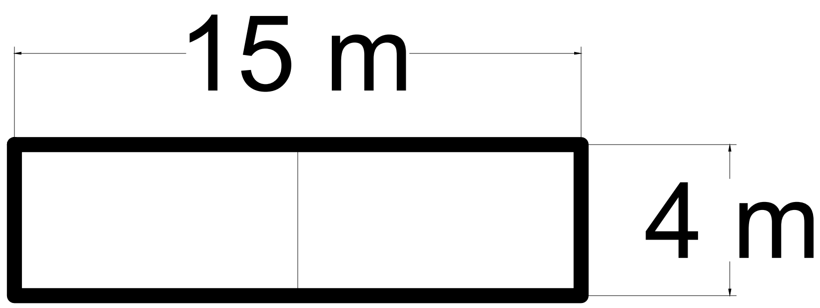

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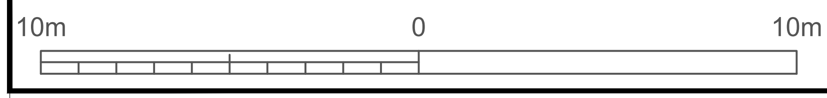

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02	27/09/23	FOR INFORMATION	SH	RL	RL
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00	22/08/23	FOR INFORMATION	SH	JMB	RL

Client

Drawing Status

FOR INFORMATIION

Project Title

COYLTON BESS

Drawing Title

BATTERY BLOCK - MAX EXTENT PARAMETERS PLAN

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Drawing Number	Revision
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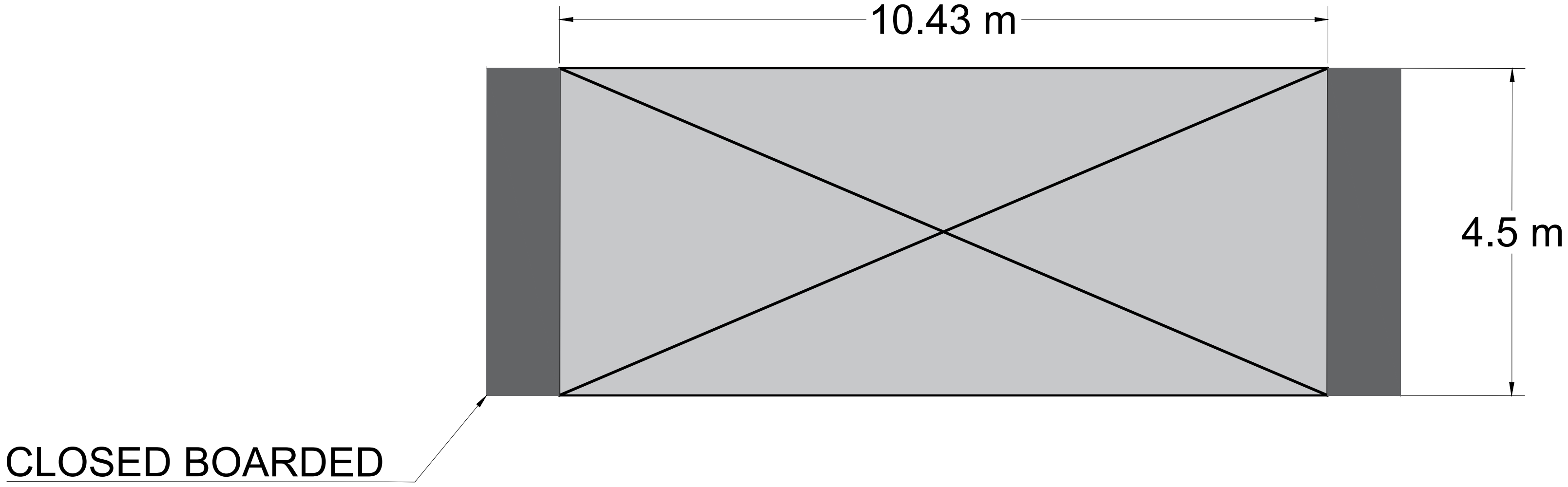

FRONT ELEVATION

SCALE 1 : 100

1m 0 10m

LEGEND

NOTES:

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Rev.	Date	Amendment Details	Drw'n	Chk'd	App'd
00	09/10/23	FOR INFORMATION	SH	RL	RL

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Drawing Status

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Project Title

COYLTON BESS

Drawing Title

GATE ELEVATIONS

Scale	Designed	Drawn	Checked	Approved
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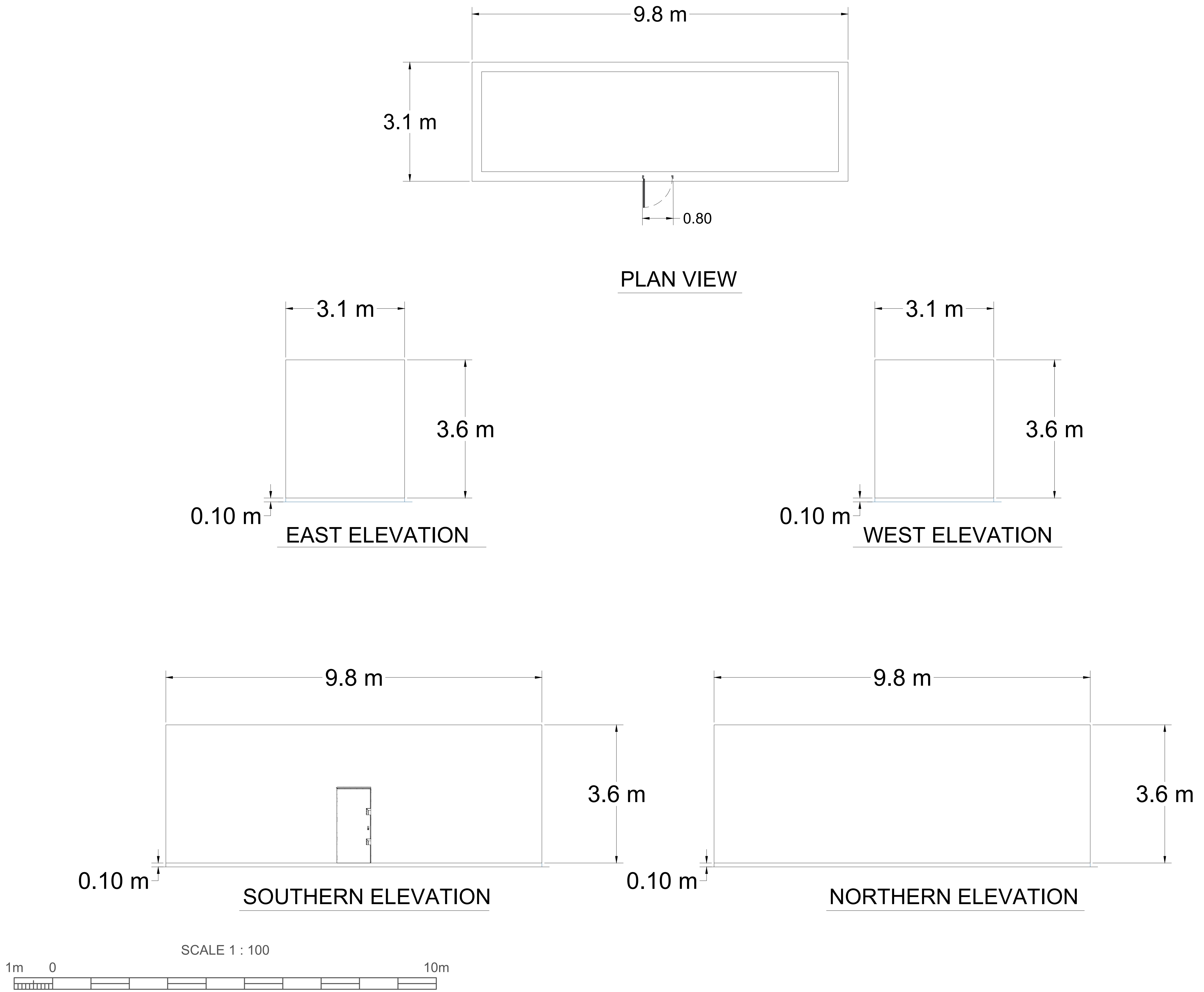
Revision: 1



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01	09/10/23	FOR INFORMATION	SH	RL	RL
00	27/09/23	FOR INFORMATION	SH	RL	RL

Client

Drawing Status
FOR INFORMATION

Project Title
COYLTON BESS

Drawing Title
OFFICES ELEVATION

Scale	Designed	Drawn	Checked	Approved
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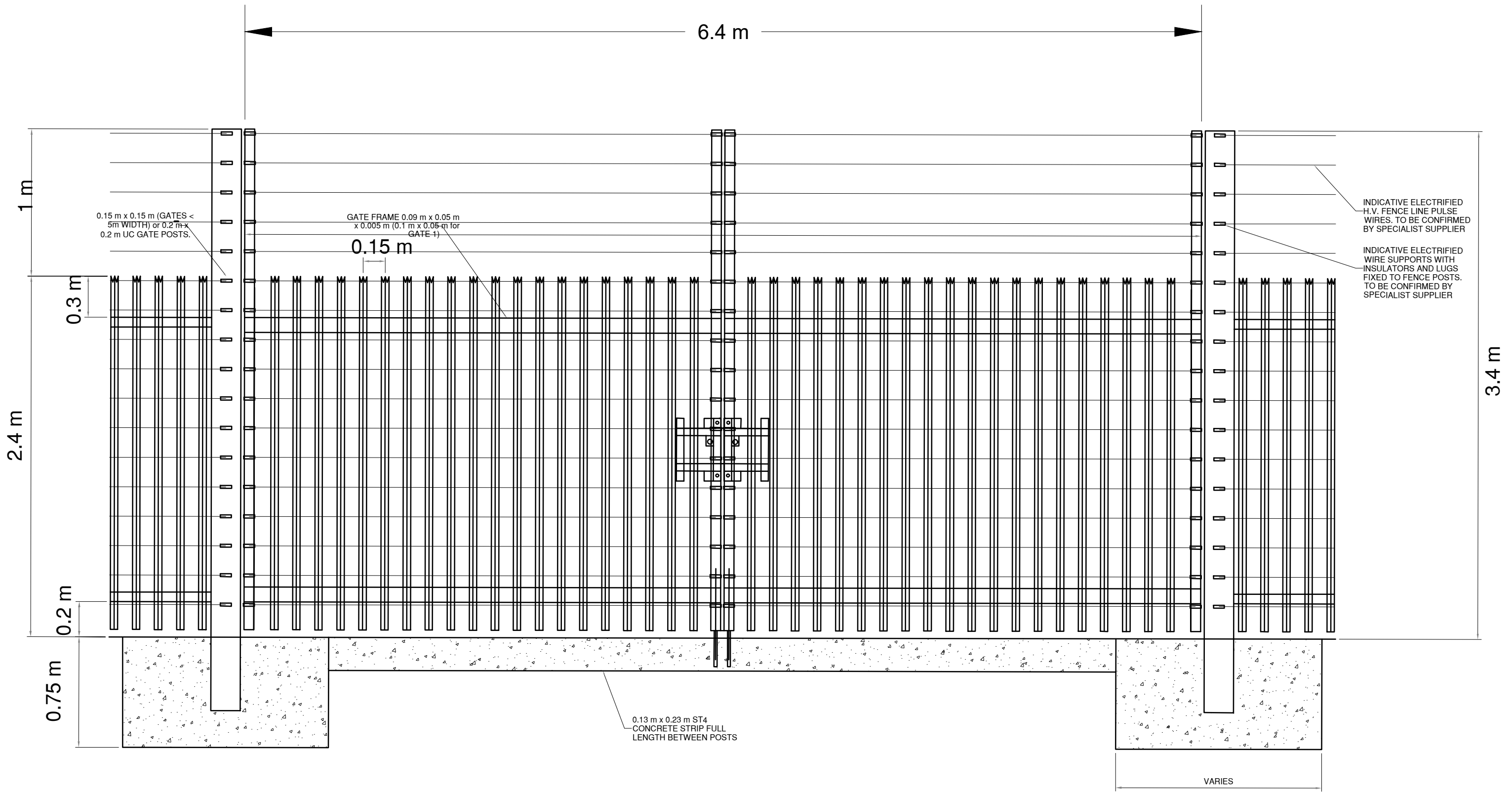
Drawing Number: 15627 - 036
Revision: 1



3.40m HIGH PALISADE GATE

SCALE 1 : 50

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LEGEND

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Rev.	Date	Amendment Details	Drw'n	Chk'd	App'd
01	09/10/23	FOR INFORMATION	SH	RL	RL
00	26/09/23	FOR INFORMATION	SH	RL	RL

Client

Drawing Status

FOR INFORMATION

Project Title

COYLTON BESS

Drawing Title

PALISADE GATE FOR HV YARD

Scale	Designed	Drawn	Checked	Approved
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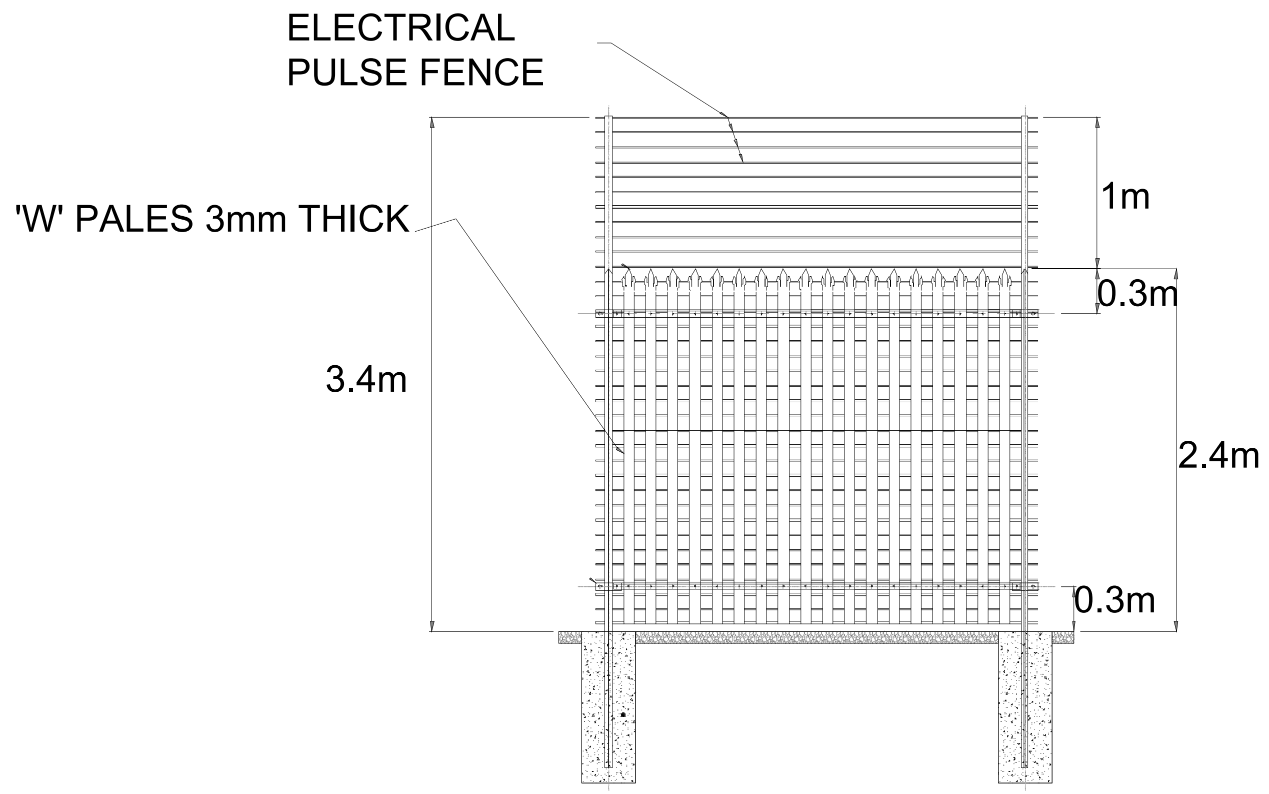
Original Size A3	Date 09/10/23	Date 09/10/23	Date 09/10/23	Date 09/10/23

Drawing Number: 15627 - 037

Revision: 1



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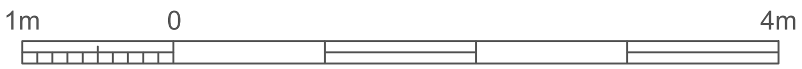

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01	09/10/23	FOR INFORMATION	SH	RL	RL
00	27/09/23	FOR INFORMATION	SH	RL	RL

Client

Drawing Status
FOR INFORMATION

Project Title
COYLTON BESS

Drawing Title
SECURITY FENCING ELEVATION - TO EAST AND SOUTH OF HV YARD

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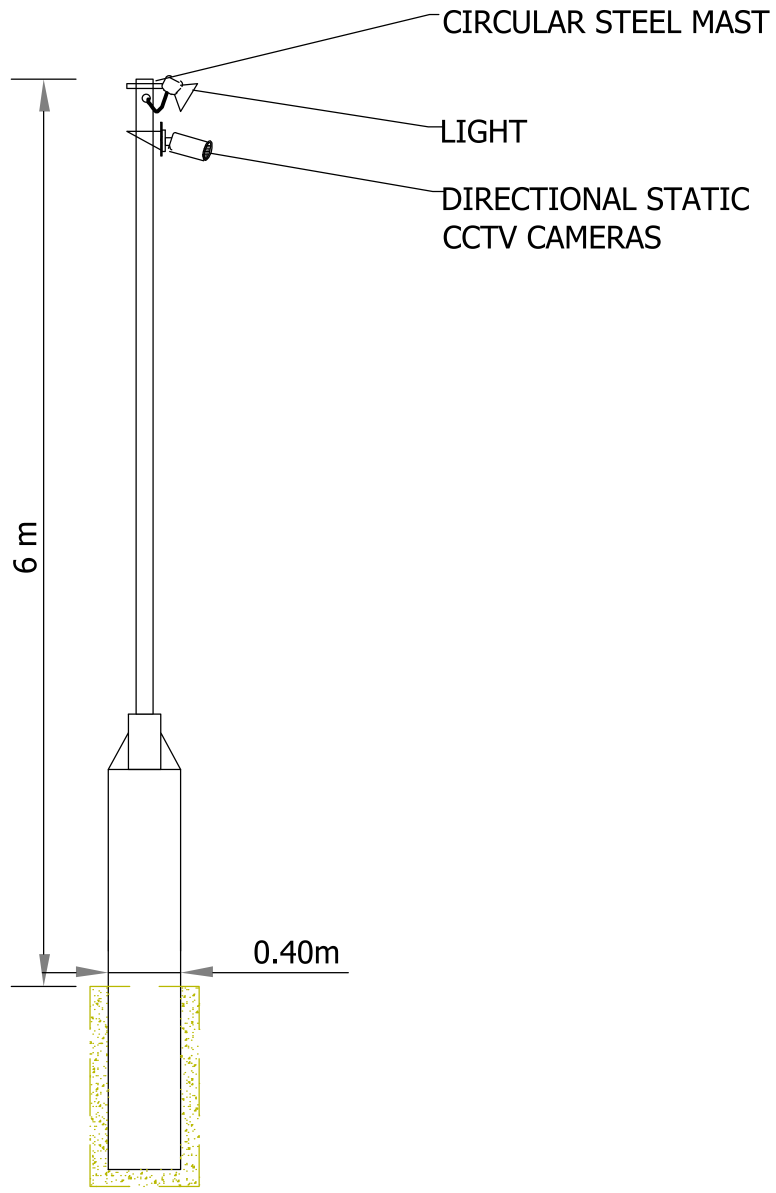

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00	27/09/23	FOR INFORMATION	SH	RL	RL

Client

Drawing Status
FOR INFORMATION

Project Title
COYLTON BESS

Drawing Title
CCTV / LIGHTING
POLE ELEVATION

Scale	Designed	Drawn	Checked	Approved
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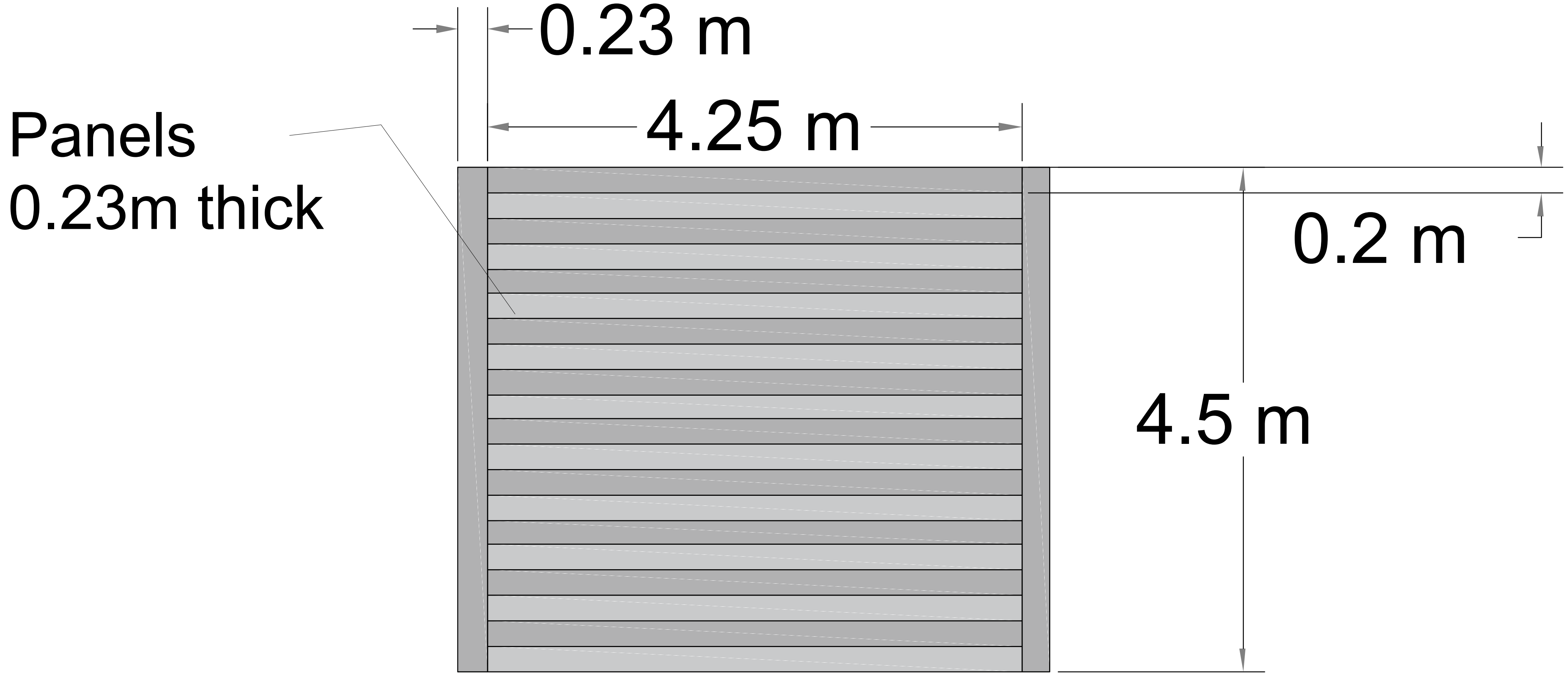
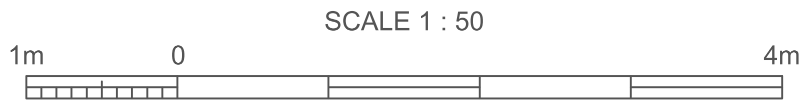
Revision: 1





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1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THIS PROJECT

00	09/10/23	FOR INFORMATION	SH	RL	RL
Rev.	Date	Amendment Details	Drw'n	Chk'd	App'd

Client

Drawing Status
FOR INFORMATION

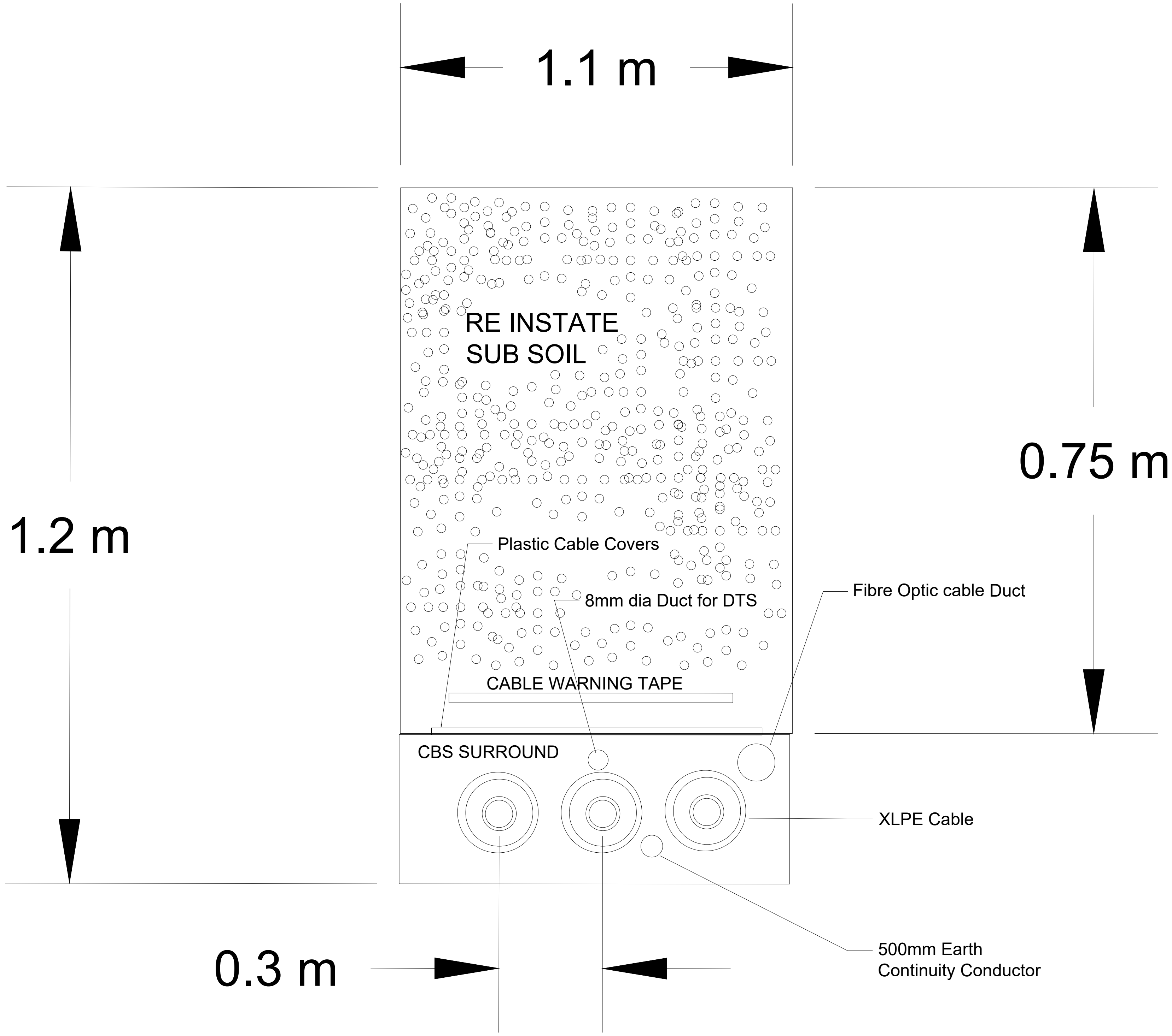
Project Title
COYLTON BESS

Drawing Title
NOISE ATTENUATION
FENCING ELEVATION

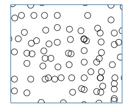
Scale	Designed	Drawn	Checked	Approved
1:50	SH	SH	RL	RL
Original Size	Date	Date	Date	Date
A3	09/10/23	09/10/23	09/10/23	09/10/23

Drawing Number: 15627 - 040

Revision: 0



LEGEND



RE INSTATE SUB SOIL

All 275kV cables shall be installed to the following minimum depths, whether they are laid direct or installed in suitable ducts:

In roads = 750mm
Footways, grass verges or private property = 900mm.
Carriageways (including road crossings) = 900mm.
Normal agricultural land (not subject to deep ploughing) = 1050mm.
Agricultural land subject to deep ploughing = 1200mm.
Across Substation sites = 600mm

NOTE Additional 2mtr should be allowed either side for construction

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THIS PROJECT

00	XX	FOR INFORMATION	SH	RL	RL
Rev.	Date	Amendment Details	Drw'n	Chk'd	App'd

Client

Drawing Status
FOR INFORMATION

Project Title
COYLTON BESS

Drawing Title
CABLE ROUTE
CROSS SECTION

Scale	Designed	Drawn	Checked	Approved
NTS	SH	SH	RL	RL
Original Size: A3	Date: 26/09/23	Date: 26/09/23	Date: 26/09/23	Date: 26/09/23

Drawing Number: 15627 - 041
Revision: 0

Appendix C – EHO Consultation

A specialist energy consultancy

Proposed Noise Impact Assessment: Coylton BESS

To:	[redacted]	Company:	East Ayrshire Council
Date:	26 October, 2022	TNEI Ref.:	15416-002-R0

TNEI Services Ltd (TNEI) have been commissioned by Statkraft Ltd. to undertake a noise impact assessment to support the planning application for a 50 MW Battery Energy Storage System (BESS) located on land near to the Coylton Substation at approximate OS coordinates 246523, 619640. The proposed development will introduce new sound sources into the area in the form of externally located battery banks, electrical inverters and transformers.

TNEI propose to undertake the assessment in line with BS 4142:2014+A1-2019 *Methods for Rating and Assessing Industrial and Commercial Sound* (BS 4142).

Baseline Sound Levels

A baseline sound level survey has already been undertaken by Arcus Consulting as part of a previous noise assessment in support of a mixed Synchronous Condenser (2 of) and BESS development (now consented). However, in light of the National Grid Stability Pathfinder Phase 2, in which Statkraft was awarded a grid forming battery storage contract for Coylton, there is now no requirement to develop the synchronous condensers, and as such the site will become BESS only.

We are therefore in the process of preparing a new noise impact assessment for a full planning application for the BESS only proposal (up to 50MW) i.e. to exclude synchronous condensers, and as a major planning application. The footprint of the new BESS development will be similar in size to the consented scheme, but its exact location and thus the site boundary may differ slightly. A Proposal of Application Notice (PAN) is due to be submitted to East Ayrshire Council imminently.

The baseline survey was undertaken between 8th and 10th June 2021 at two locations representative of the nearest Noise Sensitive Receptors (NSRs) to the development site. Figure 1 (appended) details the location of the proposed development site and the Noise Monitoring Locations (NMLs). We do not expect any significant changes in local noise environment since the surveywas completed, therefore, we propose to use the same survey data for the updated Noise Impact Assessment. Specifically, (with reference to Figure 1) we propose to use the data collected at NML01 to represent the NSRs detailed in yellow and the data collected at NML02 to represent the NSRs detailed in blue.

Assessment Method

With reference to BS 4142:2014+A1:2019, the proposed development will be assessed and designed to not exceed a Rating Level of 5dB above the background sound levels, however, we recognise that there are a number of other methods available for the assessment of environmental noise, such as the fixed guideline levels detailed in World Health Organisation (WHO) documentation and BS8233:2014. Accordingly, if you would like us to consider any alternative approaches, then please advise and we would be happy to incorporate this into our assessment.

Previous Consultation

We note that previous consultation between Arcus and yourself for the same development site confirmed that the same assessment methods were acceptable (see appended email), so I trust that our proposals are also acceptable to you.

Summary

- The proposed development will be designed to ensure an adverse noise impact will not occur at the nearest NSRs, in accordance with BS 4142; and,
- TNEI will undertake the BS 4142 assessment for the proposed development using previous baseline survey data (June 2021).

We would welcome any comments you may have and if you have any further questions then please do not hesitate to contact us on the numbers below.

Regards

Jim Singleton

Principal Technical Consultant, Team Manager (Environment and Engineering)

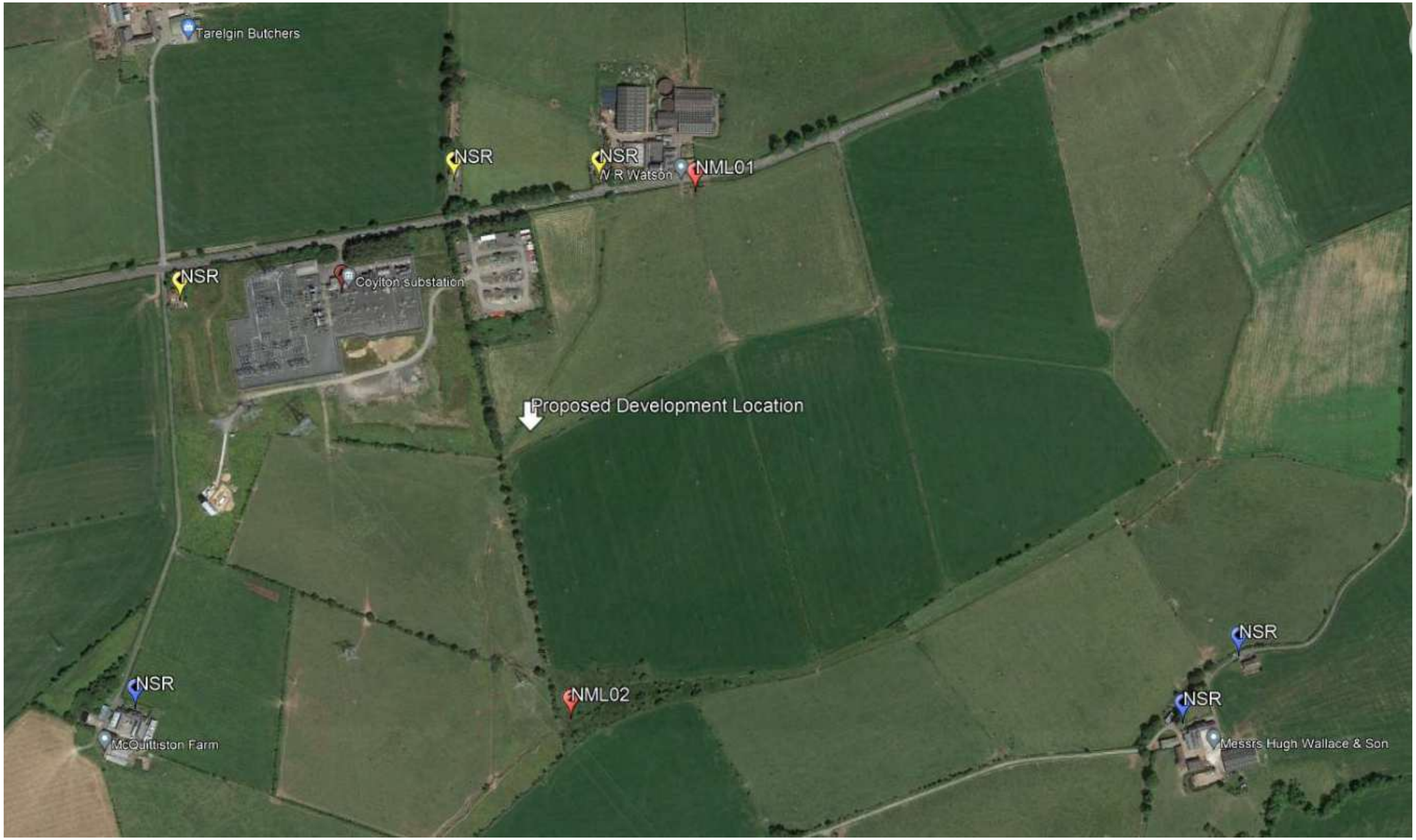
TNEI Services Ltd

Appended

Figure 1

Previous Consultation Emails

Figure 1: Study Area and Noise Monitoring Locations



Note: Red line boundary still to be defined

Jim Singleton

From: [redacted]@east-ayrshire.gov.uk>
Sent: 25 May 2021 11:33
To: [redacted]
Subject: Re: 4188 Coylton Greener Grid EHO Consultation [PUBLIC]

Hi
Thanks for this - your proposed methodology will be acceptable, and we look forward to receiving your report in due course.
Regards

[redacted]
Team Leader
(Pollution Control/Corporate Enforcement Unit)
Regulatory Services (Environmental Health)
East Ayrshire Council
Civic Centre South
16 John Dickie Street
KILMARNOCK KA1 1HW

Tel. [redacted]

From: [redacted]@arcusconsulting.co.uk>
Sent: 25 May 2021 10:01
To: [redacted]
Subject: 4188 Coylton Greener Grid EHO Consultation

Hi [redacted]

I am an Acoustic Consultant with Arcus Consulting Services Ltd, currently undertaking a noise impact assessment for the development of a Battery Storage Facility at land adjacent Coylton Substation at Ayr Road KA6 6NF. We received a pre-application response Ref: 21/0010/PAA (attached) for the Development and so I was hoping to consult with you (or if you could pass this on to the relevant EHO) regarding our approach to the required noise assessment and agree on the methodology for the survey and assessment criteria.

I understand that a noise assessment will be necessary to assess potential impact on the nearest residential properties. The nearest property is the dwelling at Ayr Road directly north of site (East Tarelgin Farm) close to the existing substation, in addition we proposed to monitor at the residential receptor southwest of the Site (MacQuittiston Farm House) to capture background levels not dominated by the substation. Therefore, our methodology is set out as below:

- Background sound survey consisting of 24-hour measurement at two locations; at perimeter of nearest receptors as mentioned above or their representative location;
- Assessment undertaken to BS4142:2014+A1:2019 standard for industrial sound (measuring $L_{Aeq\ 15min,}$ and rating corrections applied where applicable); and
- Assessment criteria of '*rating level no more than 5dB'* above background during day (0700-2300) and night (2300-0700), *where background level is 'low' as defined in BS4142; then alternative criteria for internal noise levels from BS8233 will be assessed.*

The assessment will consist of modelling the proposed Development layout and plant noise in a noise prediction software to determine specific / rated levels at the nearest sensitive receptors, which will be assessed against the respective limits for day and night. It is understood that noise levels would be lower at properties further from the Development and so the properties above represent closest receptors / worse case for impact. I understand given the COVID-19 restrictions in place, the current background levels may not be representative of 'normal' levels. Given the receptors local context (i.e., rural area, substation proximity, small roads etc.) we believe these effects on the local acoustic profile would be minimal.

The screening response stated the following for Noise:

Noise
A noise assessment will require to be submitted as part of any subsequent application with appropriate background noise monitoring undertaken at a range or locations which have the potential to be impacted by noise associated with the construction and operation of the proposed development. A cumulative construction and operational noise assessment will also have to take into account any existing, consented or proposed noise generating developments within the vicinity also likely to be audible at nearby sensitive receptors in combination with the proposed development.

With regards to cumulative assessments; the nearest noise generating development is the Barr Killoch Energy Recovery Park which is nearly 1 km away from the Site. Given the distance we believe the contribution from the energy recovery park to the ambient/background noise levels is negligible. Noise levels in the vicinity of the Development due to the energy recovery park are likely to be below the background noise level. As such, any noise that is audible would not be distinctive, and form part of the general background noise level, rather than being perceived as a cumulative effect along with the Development. We propose to scope out the construction noise assessment as we expect the construction activities to be relatively short-terms, and can be suitably controlled through permitted working times specified in the planning conditions.

Please let me know if the above approach/assessment criteria is agreeable with you, if you have any particular noise concerns in mind please do let me know.

Kind Regards
[redacted]
Acoustic Consultant AMIOA
Arcus Consultancy Services Ltd

[redacted]

Appendix D – Baseline Survey Information

Ewan Watson

From: James Blythe
Sent: 04 January 2023 11:21
To: Jim Singleton
Cc: Ewan Watson; Ryan Llewellyn; Chris Pepper
Subject: FW: Proposed Noise Impact Assessment: Coylton BESS [OFFICIAL]
Attachments: RE: 22/0008/PREAPP - Proposal of Application Response [OFFICIAL]

Follow Up Flag: Follow up
Flag Status: Flagged

Good morning Jim,

Happy New year!

Prior to Christmas, I forwarded the noise assessment methodology letter that you sent to the EHO onto the Planning Officer (as per the attached email), to see if she could chase things internally.

I have this morning received the below response, which outlines that the Council's Environmental Health Team are happy with the approach outlined in the letter.

I hope this is good news but if you have any queries, please let me know.

I will also forward this onto Statkraft separately.

Kind regards,

James

James Blythe
Senior Consultant

tnei

Manchester | Newcastle | Glasgow | Cape Town | Dublin

Tel: +44(0)191 211 1405

From: [redacted]@east-ayrshire.gov.uk>
Sent: 04 January 2023 08:48
To: James Blythe <james.blythe@tneigroup.com>
Subject: FW: Proposed Noise Impact Assessment: Coylton BESS [OFFICIAL]

CLASSIFICATION: OFFICIAL

Good Morning James

I hope you had a nice festive break.

Please see the email below which confirms that EH are content with the approach to be taken.

I trust this is of assistance.

Kind regards

[redacted]

Governance
Opera House
8 John Finnie Street
Kilmarnock
KA1 1DD
[redacted]@east-ayrshire.gov.uk

From: [redacted]@east-ayrshire.gov.uk>
Sent: 21 December 2022 15:57
To: [redacted]@east-ayrshire.gov.uk>
Subject: Re: Proposed Noise Impact Assessment: Coylton BESS [OFFICIAL]

Hi

Apologies you have not had an earlier response. We are happy with the approach to be taken and have no additional comments to offer.

Regards

[redacted]

Team Leader

(Pollution Control/Corporate Enforcement Unit)

Regulatory Services (Environmental Health)

East Ayrshire Council

Civic Centre South

16 John Dickie Street

KILMARNOCK KA1 1HW

[redacted]

From: [redacted]
Sent: 21 December 2022 14:46
To: [redacted]
Subject: Proposed Noise Impact Assessment: Coylton BESS [OFFICIAL]

CLASSIFICATION: **OFFICIAL**

Hi [redacted]

I have asked by the agent if there is any update on whether the attached noise assessment method would be acceptable for a proposed planning application for a battery storage unit south of Coylton. They are anticipating that the application would be submitted in February.

Kind regards

[redacted]
Senior Planner – Development Management (Energy Team)
Governance
Opera House
8 John Finnie Street
Kilmarnock
KA1 1DD
[redacted]

****

Appendix E – Noise Modelling Data

Doc. Name	Noise Data Sheet		
Doc. ID		Revision	g
Doc. Type	Data Sheet	Pages	1 (1)
Author	Agbenyoh, Godwin - Wärtsilä Energy Business	Status	Approved
Reviewed by Approved by			

Noise Data Sheet Gridsolv Quantum

1. Envicool Chiller (2 units per Gridsolv Quantum)

Model number : EMW75HDNC1A

A-weighted sound power level of the chiller, ref. 1pW:

Frequency [Hz]	31.5	63	125	250	500	1000	2000	4000	8000	**Total**
A-weighted sound power level $L_{w,A}$ [dB]	40	56	70	70	68	63	60	51	47	**74**

Sound power level is based on measurement made according to standard ISO 3744:2010 Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane.

Each Gridsolv Quantum has two Envicool chiller units on either side. The noise data is given for the single Envicool chiller unit.

Figure 1 Gridsolv quantum

Figure 2 Single Envicool chiller unit

20.	*Guaranteed noise level acc. to IEC 60076-10*	
	Sound pressure level at 100%Un, 100%In at ONAN	65 dB(A) at 0.3 m
	ONAF	68 dB(A) at 2.0 m
21.	*Dimensions and masses (approx.)*	
	Length	9,000 mm
	Width	5,600 mm
	Height	6,400 mm
	Oil mass	34,100 kg
	Total mass	167,800 kg
	Transport dimensions and mass of heaviest part (approx.)	
	Length	7,500 mm
	Width	2,300 mm
	Height	4,200 mm
	Transport mass	112,300 kg dry air filled
	Estimated packing details per unit : see attached Masses and dimension sheet	

TEST REPORT

Sound Level

Serial No. : 1ZPL001134582

Combination of sound level measurements

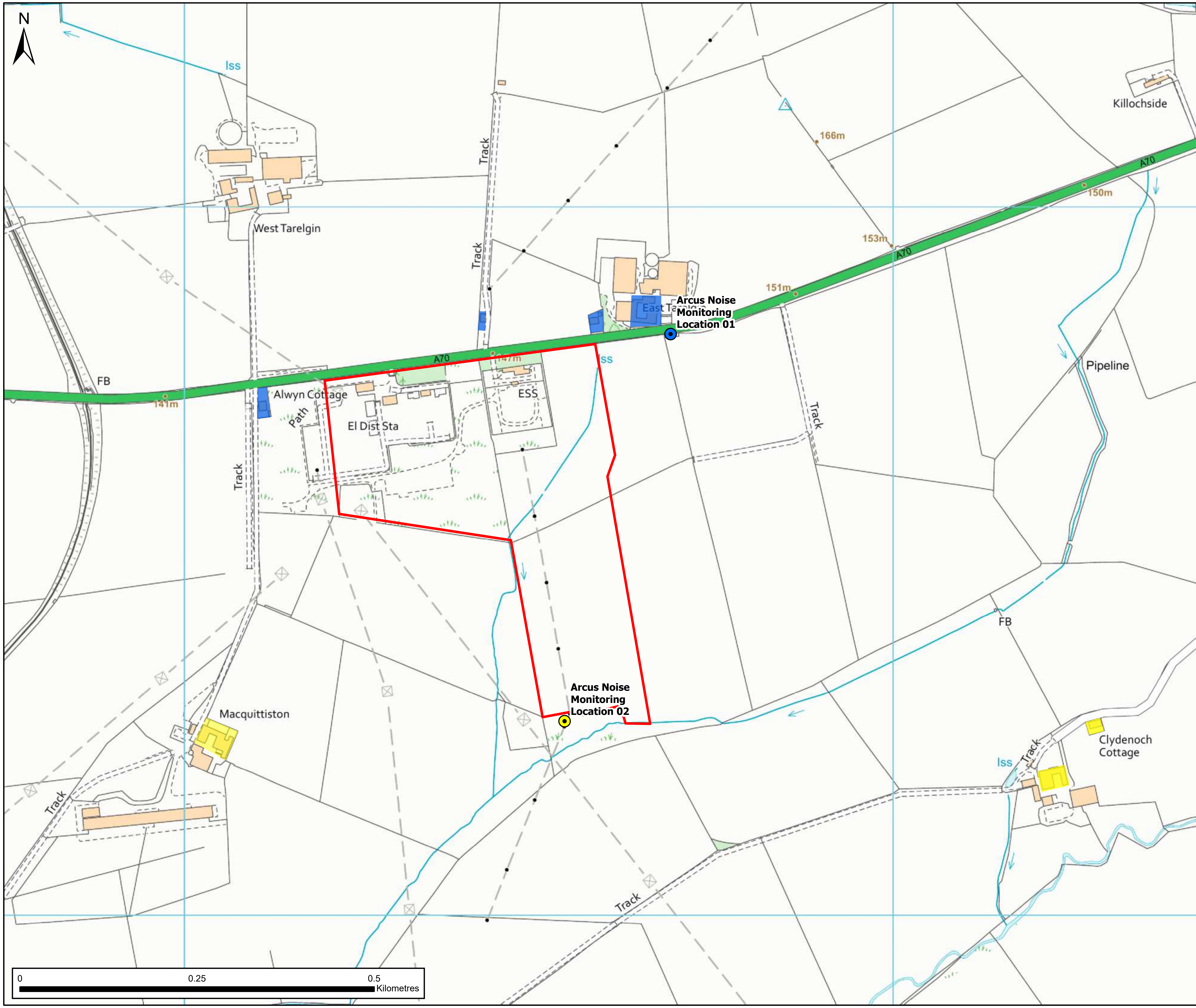
Rated voltage	Applied voltage	Rated current	Applied current	Tap position	Fans in operation	Pumps in operation
[%]	[kV]	[%]	[A]			
100	33	100	262.43		8	

Rated voltage	Applied voltage	Rated current	Applied current	Tap position	Fans in operation	Pumps in operation
[%]	[kV]	[%]	[A]			

	Frequency	Measurement 1 Sound Power Level	Measurement 4 Sound Power Level		Combined Sound Power Level
	[Hz]	[dB(A)]	[dB(A)]		[dB(A)]
Total Sound Level		76.9	87.8		**88.2**
Octave Band	63	39.6	64.4		**64.4**
	125	59.5	79.6		**79.6**
	250	76.1	81.2		**82.3**
	500	67.3	82.6		**82.7**
	1000	56.3	81.7		**81.7**
	2000	51.6	75.4		**75.4**
	4000	54.1	71.3		**71.4**
	8000	57.4	64.2		**65.0**
⅓ Octave Band	50	36.1	63.8		**63.8**
	63	37.0	47.4		**47.8**
	80	0.0	55.1		**55.1**
	100	58.4	71.9		**72.1**
	125	47.5	68.5		**68.6**
	160	51.3	78.4		**78.4**
	200	63.1	73.7		**74.1**
	250	60.9	76.4		**76.5**
	315	75.8	78.0		**80.1**
	400	61.2	77.0		**77.1**
	500	63.7	76.9		**77.1**
	630	62.5	79.2		**79.3**
	800	53.7	78.6		**78.6**
	1000	51.4	76.7		**76.7**
	1250	47.1	74.5		**74.5**
	1600	47.0	72.4		**72.4**
	2000	46.7	70.2		**70.2**
	2500	46.9	68.5		**68.5**
	3150	48.4	67.5		**67.6**
	4000	49.6	66.9		**67.0**
	5000	49.9	64.8		**64.9**
	6300	51.2	61.5		**61.9**
	8000	52.9	58.8		**59.8**
	10000	53.6	56.4		**58.2**

	Frequency				Combined Sound Power Level
	[Hz]				[dB(A)]
Total Sound Level					
Octave Band	63				
	125				
	250				
	500				
	1000				
	2000				
	4000				
	8000				
⅓ Octave Band	50				
	63				
	80				
	100				
	125				
	160				
	200				
	250				
	315				
	400				
	500				
	630				
	800				
	1000				
	1250				
	1600				
	2000				
	2500				
	3150				
	4000				
	5000				
	6300				
	8000				
	10000				

Appendix F – Figures



NOTES

Legend

Red Line Boundary

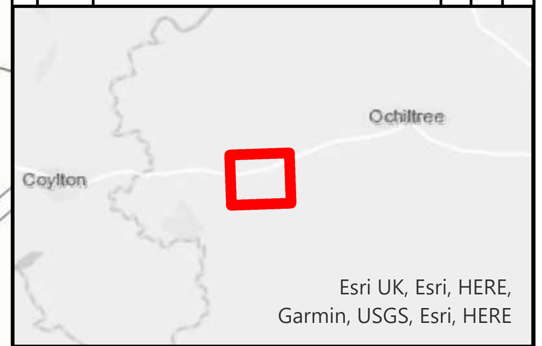
Arcus Noise Monitoring Location 01

Arcus Noise Monitoring Location 02

Noise Sensitive Receptors (NSRs) Represented by Arcus NML01

Noise Sensitive Receptors (NSRs) Represented by Arcus NML02

1	13/10/23	Client Comments	EW	JS	JS
0	02/10/23	For Planning	EW	JS	JS
Rev.	Date	Amendment Details	Drw'n	Chk'd	App'd



tnei

Client

Statkraft

Drawing Status: FOR PLANNING

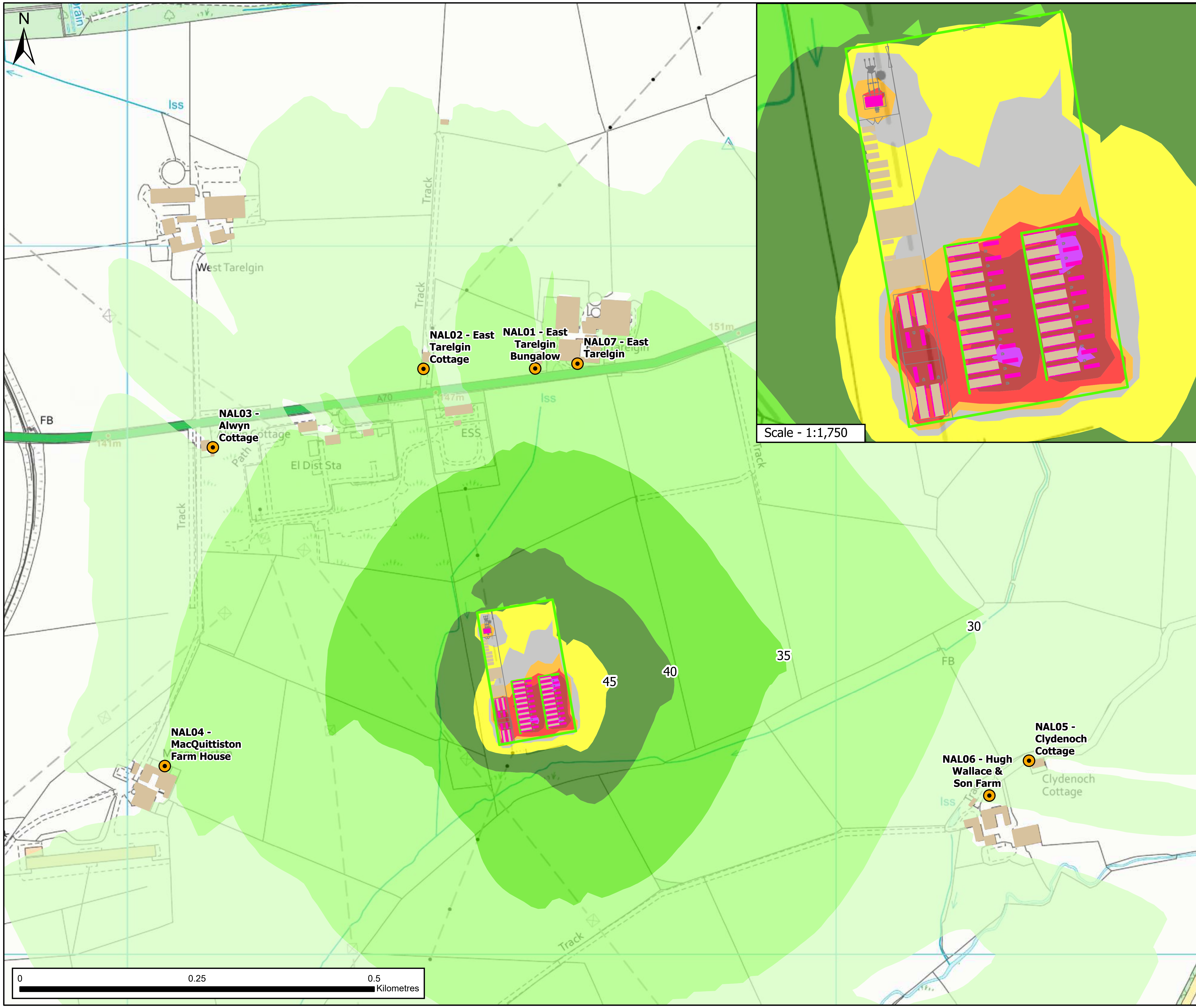
Project Title: Coylton Greener Grid Park - Noise Impact Assessment

Drawing Title: Figure 01 - Noise Study Area

Scale	Designed	Drawn	Checked	Approved
1:5,000	EW	EW	JS	JS
Original Size	Date	Date	Date	Date
A3	13/10/2023	13/10/2023	13/10/2023	13/10/2023

Drawing Number: 15416-004

Revision: 1



NOTES

Legend

- Noise Assessment Locations (NALs)
- Modelled Noise Sources
- Modelled Acoustic Barriers
- Modelled Buildings
- Site Layout

Predicted Noise Levels (dBA)

- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- > 70

Noise contours modelled in accordance with ISO 9613 Part 2:1996 at a height of 4 m and displayed on a 10 m by 10 m grid.

All noise sources assumed to be operating concurrently. All levels shown as dB LAeq(t).

Rev.	Date	Amendment Details	Drw'n	Chk'd	App'd
0	02/10/23	For Planning	EW	JS	JS

Ochiltree
Coylton
Esri UK, Esri, HERE, Garmin, USGS, Esri, HERE

tnei

Client
Statkraft

Drawing Status
FOR PLANNING

Project Title
Coylton Greener Grid Park - Noise Impact Assessment

Drawing Title
Figure 02 - Noise Contour Plot

Scale	Designed	Drawn	Checked	Approved
1:5,000	EW	EW	JS	JS
Original Size	Date	Date	Date	Date
A3	02/10/2023	02/10/2023	04/10/2023	04/10/2023

Drawing Number	Revision
15416-005	0