



## 10. POPULATION AND HUMAN HEALTH

### 10.1 Introduction

The following section of the Planning and Environmental Report examines the potential effects of the proposed development on population and human health.

The potential impacts of the proposed development include noise, visual, air quality, traffic and transportation, and land use. The potential effects of the development on humans and residential amenity with respect to traffic and transport (Section 9), noise and vibration (Section 11), and landscape and visual (Section 13) are detailed in this report and in separate supporting documents. This section includes a description of the existing human environment and the likely impacts on such arising from the proposed development. These include:

- Land use
- Air quality
- Socio-economics i.e., the interaction of social and economic factors
- Local population, residential amenity and tourism.

The connection of the proposed development to the Uisce Éireann water network for water supply has also been considered in this section.

### 10.2 Existing Environment

#### 10.2.1 Land-use and Residential Environment

The proposed development comprises an overall site area of c.5.8Ha. The proposed Long Duration Energy Storage (LDES) Compound with a total surface area of c.2.9Ha containing 248no. battery energy storage units in the form of metal shipping containers. The lands are located within the townland of Ballynahone, near Bunrana, Co. Donegal on agricultural lands and forestry approximately 2.3km east of Bunrana off the Drum Road (L-7231).

As outlined in Section 2 'Description of the Proposed Development', this planning application is for a Long Duration Energy Storage (LDES) facility as well as a transformer compound and an 'under-the-fence' connection to the adjacent Trillick substation.

This area of County Donegal around the site is rural, comprising dispersed one-off housing generally centred along the local road network in a linear pattern. Bunrana is the closest major settlement and the town village includes a national and secondary school, Church, commercial enterprises, medical centre, public parks, sports and recreational facilities and according to the 2022 census, a total population of 6,971.

The site is connected to the local road network to the south and eastern sections of the site.

In terms of socio-economic factors and the local population, the area is considered to have a low-medium population density. The site is contained within the Fahan ED, which comprised a population of 1,634 according to Census 2022 results.



## 10.2.2 Socio-economic and the Local Population

In terms of socioeconomic factors and the local population, the area is considered to have a low-medium population density. As indicated in Section 10.2.1 above, the proposed development site is situated within the Electoral Division of Fahan, the total population of which is 1,634 persons, according to Census 2022 results, providing for a higher population density of c.55 persons per square kilometre, when compared to County Donegal as a whole which has an overall population density of c. 34.4 persons per square kilometre.

There are no significant recreation features or tourist attractions in the immediate area surrounding the proposed development is located within an area of Moderate Scenic Amenity (MSA). The nearest Failte Ireland major Tourist attractions are the IOSAS Celtic Gardens, Wild Ireland Animal Sanctuary located 7.9km, and 9.1km to the south respectively.

There are a total of 44 no. receptors within 1km of the proposed development. The majority of dwellings are located in linear patterns to the north and south of the site on the Drum Road and Grashna Road also on smaller roads off unnamed local roads to the south of the site. It is noted that 3no. of the receptors are listed as vacant.

There are no recorded archaeological monuments on the subject site and there are no sites located within 500m of the site boundary.

## 10.2.3 Existing Air Quality

European air quality legislation requires that each member state be defined in terms of Zones and Agglomerations for air quality, with Ireland divided into four zones. Dublin Conurbation is one zone – Zone A and Cork Conurbation is defined as Zone B. Zone C consists of 24 cities and towns (such as Galway, Limerick and Waterford cities and towns such as Dundalk, Naas, Navan, Newbridge, Celbridge, Leixlip) with a population of greater than 15,000 while Zone D covers the remainder of the country.

The proposed development is located in Zone D in the Rural North-West. The Air Quality in Ireland Report 2022 (EPA 2022) noted that Ireland's overall air quality was good and compares favourably with other member states. The Air Quality Index for Health map on the EPA website shows that the current air quality within the proposed development site is classed as 1 – Good. There is no monitoring site for air quality in the proximity of the proposed development.

Dust emissions arise when particulate matter becomes airborne making it available to be carried downwind from the source. Dust emissions can lead to elevated PM10 and PM2.5 concentrations and may also cause dust soiling. Dust in the area would be expected to be generated by traffic movements and general agricultural practices.

## 10.3 **Potential Construction & Installation Phase Impacts**

### 10.3.1 Impacts on Land-use, Residential Environment and Amenity

No land stripping will occur during the construction of the Long Duration Battery Storage facility and associated site works, except for the construction of approximately 1.270m of new access road and the installation of the facility through the use of material and the surrounding existing land use for continued agricultural and forestry uses in and around the Long Duration Energy Facility.



During the construction phase, there is likely to be a temporary beneficial impact on the local economy due to the small influx of personnel who are likely to source materials and spend locally for the duration of the works. The design, construction and operation of the proposed development will provide for technical consultants, contractors and maintenance staff. The installation phase of the proposed development will result in short-term direct employment.

Furthermore, during the construction phase, it is likely that employment/supplier opportunities will be afforded to local contractors, material suppliers and skilled personnel at the proposed development site. This, in addition to general expenditure in the local area (e.g. accommodation providers, food/drink providers, etc.) is assessed as resulting in a positive short-term effect on the local community.

The construction phase for the proposed Long Duration Energy Storage (LDES) Facility will see an increase in traffic on the roads in the vicinity of the development, and in particular on the local roads associated with the site. This will give rise to a slight temporary negative impact on other road users, appropriate mitigation measures are proposed to address these. Section 9 of this report details the 'haul route' and mitigation measures proposed to handle construction traffic effects. Deliveries to the site will be appropriately managed to minimise the impact on the surrounding community and roads. Noise levels from traffic and associated impacts on the residential environment are considered in Section 11.

In general, construction impacts will be temporary and localised in nature. In most areas, the construction will be well-screened by existing hedgerows and vegetation. There will be a need for limited excavation activities for the foundations of site tracks and underground cabling. Deliveries to the site will be managed to minimise the impact on the surrounding community and roads.

The proposed development will also feature fresh water supply from the Uisce Eireann Mains Network. Works to connect to this network will be carried out by Uisce Eireann and would typically involve works in the public road, and the following:

- Approximately 1.4 km of new 50mm ID connection from the existing 50mm HDPE watermain.
- A new Booster Pump Station.
- On site storage for fireflow.

### 10.3.2 Socioeconomics And the Local Population

During the construction phase, there is likely to be a temporary beneficial impact on the local economy due to the influx of personnel who are likely to source materials and spend locally for the duration of the works. The design, construction and operation of the proposed development will provide for technical consultants, contractors and maintenance staff. The installation phase of the proposed development will result in short-term direct employment.

Furthermore, during the construction phase, it is likely that employment/supplier opportunities will be afforded to local contractors, material suppliers and skilled personnel at the proposed development site. This, in addition to general expenditure in the local area (e.g. accommodation providers, food/drink providers, etc.) is assessed as resulting in a positive short-term effect on the local community.

An average workforce of 12 people is anticipated, increasing to 20 during peak periods.

Impacts to tourism in the area are not foreseen as the Long Duration Battery Storage farm is located at a sufficient distance from any tourist attractions although temporary impacts on traffic and visuals may exist.



In terms of potential effects arising on archaeological and cultural features, there are no archaeological features within 500 metres of the site. Thus, it is found that the proposed LDES will result in no change to the context of these archaeological and notable cultural places.

### 10.3.3 Impacts on Air Quality, Health, and Safety

Dust emissions arise when particulate matter becomes airborne making it available to be carried downwind from the source. Dust emissions can lead to elevated PM10 and PM2.5 concentrations and may also cause dust soiling. The amount of dust generated and emitted from a working site and the potential impact on surrounding areas varies according to:

- The type and quantity of material and working methods;
- Distance between site activities and sensitive receptors;
- Climate/local meteorology;
- Wind direction
- Topography

The principal sources of potential air emissions during the construction of the proposed development include:

- Dust arising from earthworks including trench excavation along internal cable routes and construction of new access tracks;
- Dust arising from the movement of construction vehicles over land as well as the transporting of materials to the site of the proposed development;
- Dust arising from the temporary storage of any excavated materials and wind blowing over unprotected, unconsolidated soils;
- Dust arising from uncovered truckloads, the movement of material around the site and the loading and unloading of aggregates and materials within the site;
- Pollutants arising from temporary diesel generators; and
- Pollutants arising from construction vehicles and machinery exhaust emissions associated with the construction works for the proposed grid connection.

Source		Potential Distance for Significant Effects (Distance from Source in metres)		
Scale	Description	Soiling	PM10	Vegetation Effects
Major	Large construction sites, with high use of haul roads	100 m	25 m	25 m
Moderate	Moderate construction sites, with moderate use of haul roads	50 m	15 m	15 m



Minor	Minor construction sites, with limited use of haul roads	25 m	10 m	10 m
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details the National Roads Authority (NRA, 2011) assessment criteria used for assessing the impact of dust from construction sites of varying scale and with varying haul road usage.

**Table 10-1: NRA Assessment Criteria for the Impact of Dust Emissions from Construction Activities with Standard Mitigation in Place (NRA, 2011)**

Source		Potential Distance for Significant Effects (Distance from Source in metres)		
Scale	Description	Soiling	PM10	Vegetation Effects
Major	Large construction sites, with high use of haul roads	100 m	25 m	25 m
Moderate	Moderate construction sites, with moderate use of haul roads	50 m	15 m	15 m
Minor	Minor construction sites, with limited use of haul roads	25 m	10 m	10 m

Applying the NRA assessment criteria described in

Source		Potential Distance for Significant Effects (Distance from Source in metres)		
Scale	Description	Soiling	PM10	Vegetation Effects
Major	Large construction sites, with high use of haul roads	100 m	25 m	25 m
Moderate	Moderate construction sites, with moderate use of haul roads	50 m	15 m	15 m
Minor	Minor construction sites, with limited use of haul roads	25 m	10 m	10 m



, the construction of the proposed development would be considered a moderate-scale construction site. This means the potential for soiling effects to occur up to 50 m from the source and the potential for PM10 deposition and vegetation effects to occur up to 15 m from the source. There are no properties within 50m of the proposed development, thus screens will not be required to prevent air quality impacts.

Mitigation measures to reduce dust nuisance and to minimise impact on air quality will be employed during the construction and decommissioning phases. These mitigation measures are indicated in the accompanying CEMP and the Mitigation Measures section below.

Construction vehicles and plant emissions associated with the overall project will have the potential to increase concentrations of compounds such as NO<sub>2</sub>, Benzene and PM<sub>10</sub> in the receiving environment. The number and types of vehicles accessing the site of the proposed development during the construction period are provided in Section 9. Traffic and Transportation. It is considered concentrations of compounds will not be significant on the site due to open-air dispersion.

Petrol/diesel generators will be required at various stages of the construction works. These will be relatively small units which will be operated on an intermittent basis.

Although there will be emissions from these units, the impacts due to these emissions will be negligible given the size and scale of the units and the length of time for which they will be operational.

## 10.4 Potential Operational Phase Impacts

### 10.4.1 Impacts on Land-use and Residential Environment and Amenity

The proposed Long Duration Energy Storage will complement the existing land use on the site and once installed, it is expected that there will be a slight, long-term positive impact resulting from the development.

As per the EclA, ecological enhancement measures have been identified within the project design for the Long Duration Battery Storage to create new habitats for native species and to improve the ecological value of the area.

Given that no intensive agricultural activities will occur on-site during the operational phase of the proposed development, the quality of the land in the long term will be rejuvenated, allowing for its ecological enhancement over time.

### 10.4.2 Socio-Economics And The Local Population

During the operational phase of the development, there will be occasional maintenance works associated with the site, however, it is considered that this will have an imperceptible impact on the local population in terms of traffic.

The Long Duration Energy Storage will be largely monitored remotely. Should remote monitoring observe that the LDES is performing sub-optimally, a maintenance technician will be deployed to the site in an LGV.

Maintenance work on the Long Duration Battery Storage is anticipated to be required from time to time, generally occurring at quarterly intervals. Operational traffic is anticipated to be less than one vehicle per week and will use the access road indicated in Section 9. The associated impact on the public road network is considered negligible.



Once operational, the Long Duration Battery Storage will be a significant material asset, providing a valuable source of power and storage to the grid and enhancement to the national transmission network, resulting in a net positive impact on the local and regional population. The operation of the Long Duration Battery Storage will also contribute to the local economy in the form of taxes and local authority rates.

The operation of the proposed development will result in long-term direct employment. It is estimated that 2 jobs are created for the operational / maintenance lifetime of a Long Duration Battery Storage.

Due to the existing and proposed screening, there are no nearby or surrounding recreation facilities that would be affected by the operation of the Long Duration Battery Storage. Further information on this is outlined in Section 12.

In facilitating the proposed development on site, it is envisaged that this form of use will provide the landowner with an alternative use of the site to that of traditional agriculture and forestry, thereby providing the landholder with a secure income source, allowing the landowner to contribute to the local economy.

#### 10.4.3 Impacts on Air Quality

A critical benefit of the project is that due to its very large energy capacity relative to its power capacity it will be able to absorb much more surplus renewable energy when compared to alternative shorter duration storage projects. Donegal suffers from some of the highest levels of Dispatch Down of renewable energy of any region in Ireland due to significant network congestion issues (*A recent energy storage 'Game Changer' report completed by Energy Storage Ireland and Baringa on the benefits of energy storage outlined that County Donegal is facing Dispatch Down levels of 30%<sup>35</sup>, well in excess of the Government's Climate Action Plan 2030 target of 7%.*). This project will be able to absorb this excess clean energy that would otherwise be wasted and then give it back to the system at times of low renewable energy output, thereby displacing high emissions thermal generation, with resultant net improvements in air quality nationally. This is illustrated in more detail in our planning statement (appendix 4 of this report).

A significant positive impact that will arise from the operation of the proposed development is the penetration of renewable energy generation onto the national grid, generation that has the potential to better support the integration of renewables and thus displace less renewable electricity storage generated by less clean forms of electricity generation. Once the proposed project is constructed, no emissions are predicted and as such there will be no significant direct negative emissions to the atmosphere.

#### 10.4.4 Health and Safety

The proposed development has been designed and will be constructed and operated to accord with the highest health and safety standards. The proposed development will only utilise electrical components (LDES modules, power conversions systems etc.) in compliance with the requisite standards and specifications to ensure the avoidance electromagnetic emissions. In addition, and as described above, infrastructure which is likely to give rise to low-level electromagnetic emissions (i.e. LDES modules and power conversions systems) has been located to provide substantial separation distances to nearby dwellings; while all electrical cabling associated with the proposed development will be located below ground thus avoiding any such emissions.

Any electromagnetic emissions will be substantially below recognised limit values as set out in the following guidance:

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<sup>35</sup> <https://www.energystorageireland.com/wp-content/uploads/2022/05/GameChanger-ESI-Report-May2022-Web-1.pdf>



- Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300GHz) (International Commission on Non-Ionizing Radiation Protection; 2018);
- Recommendation on the limitation of exposure of the general public to electromagnetic fields (0Hz to 300 GHz) (EU Council 1999/519/EC);
- Guidelines for limiting exposure to time varying electric and magnetic fields (1Hz–100kHz) (ICNIRP; 2010); and,
- Directive of the European Parliament and of the Council on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) 2013/35/EU.

There is no risk of the thermal runaway mechanism common to lithium-ion batteries. The cells consist of electrodes and iron anodes submerged in a water-based, non-flammable electrolyte. There is no path for uncontrolled chain reactions that could lead to fire risk. The batteries also contain no heavy metals.

The proposed development is not of a type or category of development to which the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations (S.I. No. 209 of 2015). These regulations ('the COMAH Regulations') implement the requirements of the SEVESO III Directive (2012/18/EU) and relate to developments/establishments which present a major accident hazard due to the presence of dangerous substances in quantities that exceed specified thresholds. As the proposed development will not involve the storage of hazardous substances which meet any of the thresholds set out at Annex I of the SEVESO III Directive (2012/18/EU), the requirements of the COMAH Regulations do not apply in this instance. Notwithstanding the above, the proposed development will be operated strictly in accordance with manufacturer specifications and in accordance with the highest health & safety standards.

Overall, therefore, while there is a risk of fire from the proposed development, the likelihood of such an event is low while the effects on population & human health are assessed to be indirect, low negligible and short-term.

## 10.5 Decommissioning Phase

### 10.5.1 Impacts on Land-use

Following decommissioning, it is likely that the land use on site would be reinstated for agricultural and forestry uses with replanting taking place. Furthermore, given that ecological and biodiversity measures have been proposed as part of the Long Duration Energy Storage, it is anticipated that lands would be returned in an enhanced manner.

### 10.5.2 Socio-economics and the local population

During the decommissioning of the proposed development, an increase in traffic movements along local road networks is envisaged, however, the number of vehicles associated with this will be significantly lower than that estimated for the installation phase of development, particularly given the fact that some existing access tracks in agreement with the planning authority are to remain in situ during decommissioning phases.



### 10.5.3 Impacts on Air Quality

If the local authority requires the removal of all infrastructure from the site, there will be the potential for emissions such as dust and vehicle/plant-related emissions resulting from an increase in vehicle movements associated with the works, as well as from the excavation, handling and temporary storage of materials. Therefore, dust emissions arising from the decommissioning of this element of the proposed development may be comparable, though of lower level, to the installation process.

Although there will be truck movements associated with the removal of the Long Duration Battery Storage components during decommissioning, the number of vehicles will be significantly lower than that estimated for the installation phase given that it is anticipated that some access tracks could remain in situ.

Following the decommissioning of the site, all above-ground structures including the modules, compound, tanks, and fencing will be removed. The nature of the construction means that following removal, the site can be returned to its existing condition very quickly and leave little trace that Long Duration Battery Storage ever existed.

### 10.5.4 Health and Safety

It is assessed that any effects associated with the decommissioning phase will be similar to those of the construction phase but of a reduced magnitude.

## 10.6 Mitigation Measures

### 10.6.1 Land Use

No mitigation measures are required concerning land use. When the Long Duration Battery Storage is operational, the land will be used predominantly to store renewable energy. The land will also be used to accommodate ecological enhancement measures which will contribute to the biodiversity of the area.

### 10.6.2 Socio-economics and the local population

The contractor will prepare a site-specific Traffic Management Plan (TMP) prior to the construction works commencing. The contractor will be responsible for the implementation of all agreements between the developer and Donegal County Council with the objective that the transportation needs for the Long Duration Battery Storage facility will have a minimal impact on the road network and on the local community.

The majority of the potential impacts of the proposed LDES facility on socio-economics and the local population are positive and therefore, do not require mitigation

### 10.6.3 Air Quality

Traffic mitigation measures for the proposed haul routes are described in Section 9. The following mitigation measures will be implemented during the construction phase of the LDES development to minimise the impact on air quality:



- The applicant, in association with the contractor for the main civil works, will be required to produce and implement a Dust Control Plan. This plan will address all aspects of the development including excavations, trenching, access roads and temporary stockpiling. The plan will be prepared before any construction activities and will be established and maintained throughout the construction period. It will be submitted to Donegal County Council for approval.
- All new access tracks will be constructed and/or improved before the commencement of other construction activities. These tracks will be finished with graded aggregate.
- The drop height of excavated materials during access track construction will be minimised to a practicable level, to limit fugitive dust generation;
- The access tracks and construction area will be cleaned on a regular basis to prevent soil built-up and from migrating around the site and off-site,
- A mechanised road sweeper will be used at site entrances and along the access tracks if required,
- 'Damping down' of access tracks will be implemented if dust levels are assessed to be resulting in adverse effects,
- Gravel will be used at site exit points to remove caked-on dirt from tyres and tracks before travelling along public roads.
- The site supervisor will undertake daily visual inspections to examine dust generation;
- The working area will be kept as small as possible to minimise potential dust generation
- To suppress the migration of dust from the site, a water bowser will be available to spray work areas and access roads, especially during periods where excavation works coincide with dry periods of weather or existing activities;
- All loads with the potential to cause dust nuisance will be covered using strong, waterproof sheets such as tarpaulin sheets and will not be overloaded. This will minimise the potential for fugitive emissions during transport;
- All other stockpiles will be kept damp and covered to prevent windblown dust emissions;
- Speed restrictions on access tracks will be implemented to reduce the likelihood to dust becoming airborne, and Construction vehicles and plants will be routinely serviced to minimise exhaust emissions during construction. Vehicles will not be left running unnecessarily and low emission fuels will be used where possible.

#### 10.6.4 Health and Safety

The contractor will prepare a site-specific Construction and Environmental Management Plan (CEMP) and Traffic Management Plan (TMP) before the construction works commence. The contractor will be responsible for the implementation of all agreements between the developer and Donegal County Council with the objective that the transportation needs for the Long Duration Battery Storage will have a minimal impact on the road network and the local community. All vehicles hauling materials to and from the site shall only use agreed transport routes.

The design of the proposed development provides for the monitoring of the proposed development for security purposes; however, all security cameras shall be directed solely towards the proposed development and will not monitor any adjoining third party lands. Similarly, all lighting will be located and directed such that no illumination of third-party lands will occur.



With respect to fire safety, the Applicant can confirm that any measures arising from conditions of consent subject to a grant of planning permission and all measures proposed as part of the Fire Safety Risk Assessment (to be agreed with the Donegal Fire Service) will be strictly implemented and adhered to throughout the operational phase of the proposed development.

## 10.7 Cumulative Effects

This Planning & Environmental Report undertakes a full and detailed cumulative assessment of all relevant existing, permitted and proposed developments proximate to the subject proposed development which may be likely to result in in-combination planning and/or environmental impacts. The cumulative assessment has had particular regard to developments identified on the Donegal County Council Online Planning and those in the general proximity of the proposed development:

In line with the cumulative assessment contained in Section 9 above, all known existing and proposed projects within the cumulative study area of 20km that could potentially generate a cumulative impact with the Proposed Development in relation to traffic and transportation during construction, operation and decommissioning were identified and examined as part of this assessment. Table 10-2 provides details of the projects within the study area that were considered for cumulative impacts.

**Table 10-2: Existing and Proposed Projects Assessed for Cumulative Impact**

Development Name	DCC Planning Reference	Distance and Direction from proposed site	Status
Glenard Wind Farm, Co. Donegal	ABP Ref: 312659	~3.6km east of Proposed Eastern Site Boundary	Lodged (04.02.2022)
Sorne Wind Farm Extension	1650335	~4.2km northeast of Proposed Northern Site Boundary	Granted (09.03.2017)
Carrowglen Wind Farm, Quigley's Point, Inishowen, Co. Donegal.	1851230	~9.85km east of Proposed Eastern Site Boundary	Granted (20.04.2021)

The existing energy developments and planning applications listed in Table 9-8 above were obtained from a planning search on the Donegal County Council Planning Website, accessed in August 2024. The search included developments lodged within the last 10 years within 20km of the Site.

The proposed development is not assessed as likely to result in any significant effects on population & human health; either individually or in combination with the water supply connection infrastructure to be developed at a future date. Similarly, it is assessed that those projects listed above are unlikely to result in adverse population & human health effects and, consequently, it is assessed that in-combination effects will not arise.



## 10.8 Residual Impacts

The development will not have a significant, negative impact on surrounding land uses. The areas for installation of the Long Duration Battery Storage and access tracks are not significant when considered at a national or regional level.

Once construction mitigation measures are implemented, issues of health and safety, similar to the normal risks at a typical construction site may arise. Once in operation, there will be no risks associated with the LDES development on human health.

The proposed Long Duration Battery Storage will have an overall significant positive impact on socio-economics due to the creation of employment associated with the construction, operation and decommissioning of the LDES, and also due to the rates payable to the Local Authority.

Concerning the local population, the construction and decommissioning phases of the LDES will temporarily lead to additional traffic on the existing road network, including both HGV and LGV movements (further details included in Section 9 of this Report). The additional traffic will utilise the existing road network to access the site of the proposed development. In terms of impacts to locals as a result of traffic, following the implementation of a Traffic Management Plan (TMP), it is envisaged that the impacts of such would be temporary and slight. There are no likely impacts associated with traffic during the operational phase of the LDES development.

Section 11 of this report provides an assessment of noise levels from traffic and associated impacts on the residential environment during the construction and operational phases. It is expected that with mitigation measures the proposed construction and operational noise criteria will be met and under this criterion.

There will however be a significant residual positive wider impact from the operation of the proposed LDES with the generation and storage of electricity from a clean and renewable resource that has the potential to displace air pollutants generated by less clean forms of electricity generation (burning coal and peat).

Overall, the residual impact of the LDES as an asset will be positive as it will provide for the production of renewable energy storage to the National Grid, as it mitigates dispatch down by storing surplus energy until it is needed, or constraints are removed be it on an intra-day, inter-day, or even seasonal scale. In this way, LDES reduces reliance on fossil fuelled dispatchable generation, which today is required to cover demand in times of low renewable generation. Storage of surplus energy also provides the TSO with increased operational flexibility, which lowers the amount of grid investment required.

## 10.9 References

- EPA, 2022. Air Quality in Ireland Report 2022. Environmental Protection Agency, Ireland.
- NRA, 2011. Treatment of Air Quality During the Planning and Construction of NRA Schemes. National Roads Authority, Ireland.
- British Standard BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise.
- Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (Environmental Protection Agency, 2016)



## 11. NOISE AND VIBRATION

This Section examines the potential noise and vibration impacts of the Proposed Development, as a result of the temporary and permanent works.

### 11.1 Statement of Authority

Please refer to Section 1.2 of this Report for details on the Statement of Authority for the author of this Section.

### 11.2 Existing Environment

The application site is located within the townland of Ballynahone, near the town of Buncrana, Co. Donegal, adjacent to the existing Trillick 110 kV Substation.

The main land use locally is for agriculture and forestry. Existing noise sources in the vicinity of the site include road traffic on the local road network, farm machinery, the existing Trillick 110 kV Substation and quarry activities.

There are 32 residential dwellings (2 of which are vacant), 11 mixed-use buildings (residential and commercial, 1 of which is vacant) and 1 commercial building within 1km of the site. There are residential locations to the north, south east and west of the site.

### 11.3 Baseline Noise Survey

An unattended noise survey was undertaken to establish the local baseline noise climate in the vicinity of the site during daytime, evening and night-time periods. The noise survey was carried out between the 18th of April 2024 and 2nd of May 2024.

#### 11.3.1 Survey Methodology and Equipment

Unattended noise monitoring was carried out using Svantek 307 Type 1 Sound Level Meters (SLMs). The meters were fitted with a 1/2" microphone. The microphone was fitted with a windshield. The sound level meter was mounted on a tripod at a height of 1.5 m. The microphone was placed at least 3.5 m from reflecting surfaces to obtain 'free-field' conditions. The sound level meter was set to log a range of noise parameters every 15 minutes. The sound level meter was set to a frequency weighting of 'A' in accordance with international standard IEC 61672:2013 and various national standards relating to the measurement of sound pressure level representative of human hearing and a fast response time. All equipment was calibrated before and after the survey and the drift in calibration was within an acceptable range.

All measurements were taken in accordance with ISO 1996 Standards Acoustics - Description and Measurement of Environmental Noise, Part 1 (ISO 1996-1:2016) and Part 2 (ISO 1996-2:2017) and the EPA document NG4 2016: Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities. Rainfall was measured on site using a RainVUE10 SDI-12 rain gauge.



#### 11.3.2 Noise Monitoring Locations

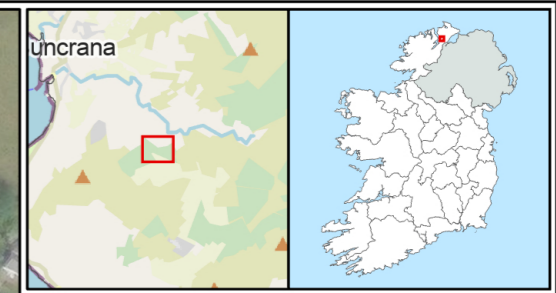
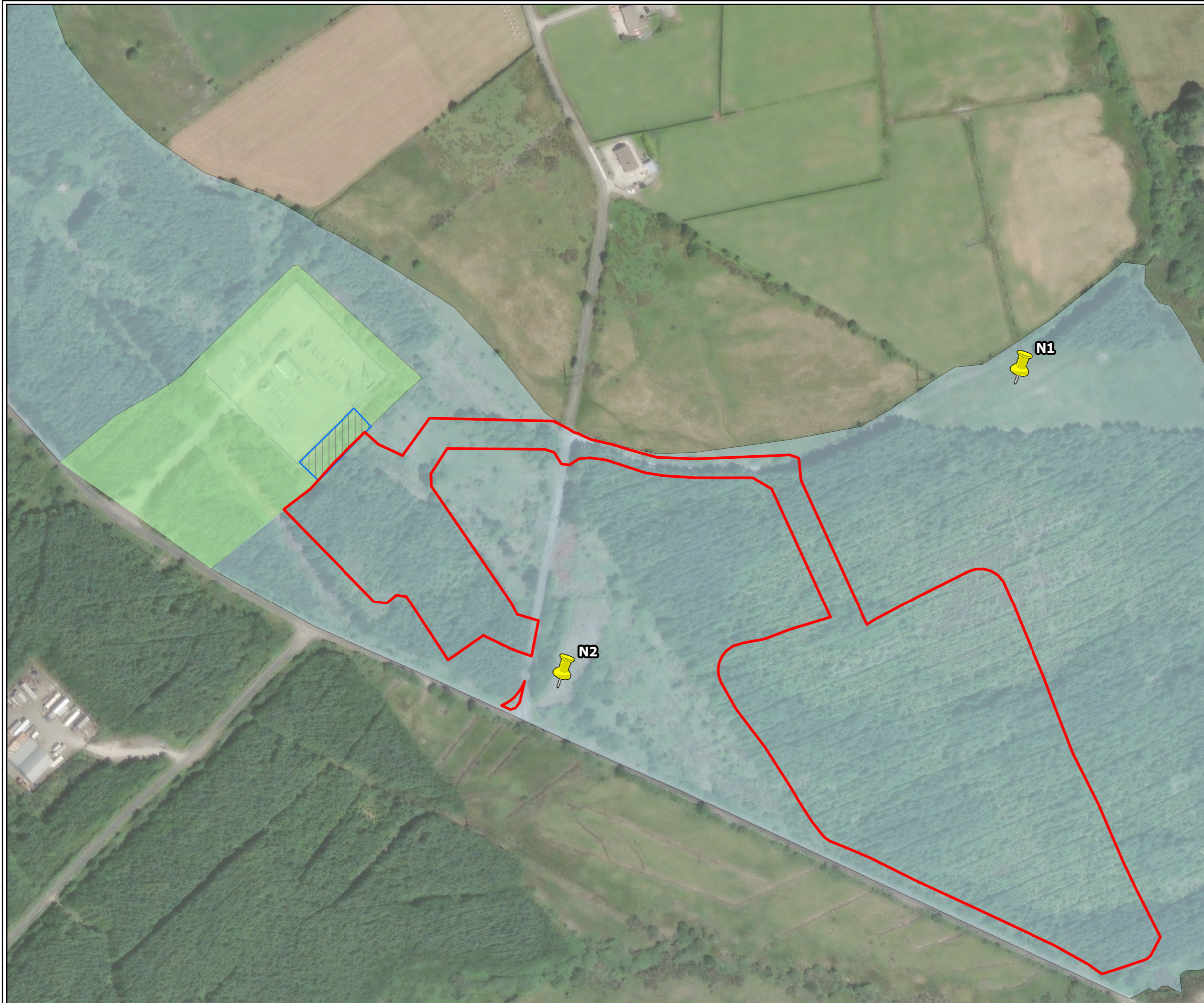
Two noise monitoring locations were identified to obtain a detailed representation of the ambient and background noise levels in the vicinity of the proposed development.



The details of the noise monitoring locations are summarised in Table 11-1 below. A figure showing the monitoring locations is provided in

**Table 11-1: Noise Monitoring Locations**

Monitoring Location	Location Description	Photograph
N1  ITM 637571 929645	Located along field boundary north of forestry. Representing a group of residential dwellings north of site.	 A photograph showing a noise monitoring station in a grassy field. A black microphone on a pole stands next to a black equipment case and a white bucket. The background shows a line of trees and a cloudy sky.
N2  ITM 637268 929443	Located in forestry clearing to the southwest of site, approximately 220m east of Trillick 110kV substation. Representing residential dwellings to the south.	 A photograph showing a noise monitoring station in a clearing within a wooded area. A black microphone on a pole stands next to a black equipment case. The ground is covered with dry grass and small plants.



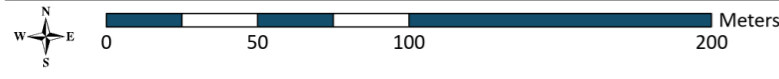
**Legend**

- Proposed Development Boundary
- Landowner Folio Boundary
- Proposed Trillick Substation Compound Expansion
- Substation Property Boundary

**Noise Monitoring Locations**

- 📌 N1
- 📌 N2

<b>TITLE:</b>	Baseline Noise Monitoring Locations		
<b>PROJECT:</b>	Ballynahone Long Duration Battery Storage Planning and Environmental Services		
<b>FIGURE NO.:</b>	11.1		
<b>CLIENT:</b>	FuturEnergy Ireland		
<b>SCALE:</b>	1:2,500	<b>REVISION:</b>	0
<b>DATE:</b>	9/18/2024	<b>PAGE SIZE:</b>	A3





### 11.3.3 Survey Results

#### 11.3.3.1 Meteorological Conditions

In line with best practice acoustic guidance including EPA NG4, an average wind speed of less than 5m/s is the required limit during periods when noise measurements are being taken, with occasional exceedances of up to 7m/s due to gusting wind conditions considered acceptable.

The weather conditions during the noise survey period were mixed, with calm and dry weather experienced as well as rainfall and windy conditions on a number of dates throughout the survey. Rain and wind speed data was obtained from a review of data from the closest Met Éireann weather station (Malin Head) and rainfall measurements taken on-site. Meteorological data for the survey duration is displayed below:

**Table 11-2: Meteorological Conditions**

Date	Rainfall (mm)	Average Wind Speed (m/s)	Max Temp (°C)	Min Temp (°C)
18/04/2024	2.5	8.4	10.1	4.6
19/04/2024	0.9	5.9	11.3	5.5
20/04/2024	0	2.6	11	3.7
21/04/2024	0	2.5	12.6	4.6
22/04/2024	0	6.3	11.6	8.8
23/04/2024	0	7.6	10.3	7.6
24/04/2024	0	5.9	9.9	7.1
25/04/2024	1.5	6.5	9.2	6.2
26/04/2024	0	5.5	9.5	6.2
27/04/2024	0	2.6	10.2	2.7
28/04/2024	1.5	3.3	10.8	4.6
29/04/2024	9.5	6.1	13.7	5
30/04/2024	2.9	8.1	13.4	5.2
01/05/2024	0.1	6.3	11.9	8.3
02/05/2024	0	5.5	14.9	9.1



### 11.3.3.2 Noise Survey Results

Table 11-3 to **Error! Reference source not found.**4 presents the measured  $L_{Aeq}$  (logarithmic average),  $L_{AFmax}$  (maximum) and  $L_{A90}$  (arithmetic average) noise levels for the two monitoring locations. In line with best practice guidance, noise data has been excluded from the results on dates where rainfall was recorded and/or average wind speeds exceeded 5 m/s.

**Table 11-3: Noise Monitoring Results N1**

Monitoring Location N1					
Date	Period	Hours	Measured Noise Level, dB		
			$L_{Aeq}$	$L_{AFmax}$	$L_{A90}$
20/04/2024	Day	07:00 - 19:00	36	68	29
	Evening	19:00 - 23:00	40	66	29
	Night	23:00 - 07:00	40	49	29
21/04/2024	Day	07:00 - 19:00	38	65	30
	Evening	19:00 - 23:00	37	59	29
	Night	23:00 - 07:00	37	46	28
27/04/2024	Day	07:00 - 19:00	39	67	28
	Evening	19:00 - 23:00	41	65	30
	Night	23:00 - 07:00	37	47	24

**Table 11-4: Noise Monitoring Results N2**

Monitoring Location N2					
Date	Period	Hours	Measured Noise Level, dB		
			$L_{Aeq}$	$L_{AFmax}$	$L_{A90}$
20/04/2024	Day	07:00 - 19:00	49	71	32
	Evening	19:00 - 23:00	46	73	28
	Night	23:00 - 07:00	47	56	28
21/04/2024	Day	07:00 - 19:00	47	68	32
	Evening	19:00 - 23:00	44	69	27
	Night	23:00 - 07:00	49	62	26
27/04/2024	Day	07:00 - 19:00	46	70	30
	Evening	19:00 - 23:00	43	67	29
	Night	23:00 - 07:00	45	54	23



### 11.3.3.3 Noise Survey Discussion

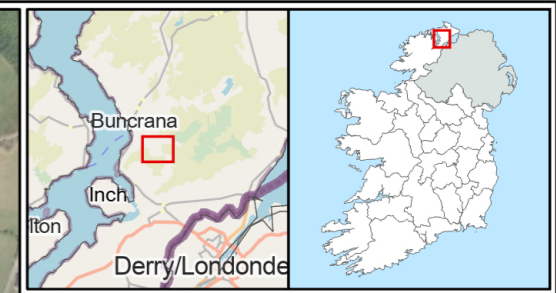
At monitoring location N1, north of site, the average ambient noise levels at the monitoring location ranged between 36 to 39 dB  $L_{Aeq}$  during the daytime, 37 to 41 dB  $L_{Aeq}$  during the evening and 37 to 40 dB  $L_{Aeq}$  at night. Average background noise levels range from 28 dB to 30 dB  $L_{A90}$  during daytime, 29 dB to 30 dB  $L_{A90}$  during evening and 24 dB to 29 dB  $L_{A90}$  at night. The noise sources noted at this location during equipment installation and removal included vegetation rustling in the wind.

At monitoring location N2, to the south-west of site, the average ambient noise levels at the monitoring location ranged between 46 to 49 dB  $L_{Aeq}$  during daytime, 43 to 46 dB  $L_{Aeq}$  during evening and 45 to 49 dB  $L_{Aeq}$  at night. Average background noise levels range from 30 dB to 32 dB  $L_{A90}$  during the daytime, 27 dB to 29 dB  $L_{A90}$  during the evening and 23 dB to 28 dB  $L_{A90}$  at night. The noise sources noted at this location during equipment installation and removal included vegetation rustling in the wind and road traffic movements.

## 11.4 Noise Sensitive Locations

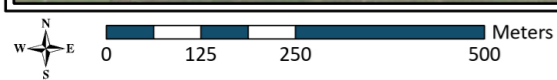
The definition of a noise sensitive receiver in the Environmental Protection Agency's 2016 NG4 noise guidance note is 'any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels'. Noise sensitive receivers are deemed to be locations where the inhabitants can be disturbed by noise or changes in noise levels due to the construction or operation of a development.

The nearest dwellings to the site are shown in Figure 11-2.



- Legend**
- Site Boundary
  - Landowner Folio Boundary
  - Proposed Trillick Substation Compound Expansion
  - Substation Property Boundary
  - Site Boundary - 1km Buffer
- Building Use**
- Mixed Use
  - Commercial
  - Residential

<b>TITLE:</b>	Receptors within 1km of Proposed Development	
<b>PROJECT:</b>	Ballynahone Long Duration Battery Storage Planning and Environmental Services	
<b>FIGURE NO:</b>	11.2	
<b>CLIENT:</b>	FuturEnergy Ireland	
<b>SCALE:</b>	1:10,000	<b>REVISION:</b> 0
<b>DATE:</b>	9/18/2024	<b>PAGE SIZE:</b> A3





## 11.5 Potential Construction Noise Impacts

Noise from the construction phase will arise from deliveries and/or removal of material to and from site, top-soil excavation, preparation of access roads, hardstands and drainage, pouring of foundations where necessary, installation of battery containers, inverters, substation and associated equipment and grid connection works between the proposed site and existing Trillick substation.

### 11.5.1 Construction Noise Criteria

There is no statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. In the absence of specific noise limits, appropriate emission criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise.

The ABC Method from BS 5228-1:2009+A1:2014 is used to derive appropriate noise limits for the Proposed Development. The threshold limits as defined in Table 11-1, of this report, based on existing ambient levels, which if exceeded, signify a potential significant effect. For the appropriate period (e.g., daytime), the ambient noise level is determined and rounded to the nearest 5 dB. Based on the low baseline noise levels in the area measured during the baseline noise survey, the BS 5228 Category A noise limits apply, i.e., a construction noise threshold limit of 65dB during weekdays should be applied. The applicable BS 5228 limits for construction noise during all periods are described in Table 11-6.

**Table 11-5: Construction Noise Limits**

Assessment category and threshold value period	Threshold Value, in decibels ( $L_{Aeq}$ , dB)		
	Category A A)	Category B B)	Category C C)
Night-time (23:00 to 07:00)	45	50	55
Evenings and weekends D)	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values. Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values. Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values. D) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.			

Construction noise has been assessed by comparing predicted construction activities against best practice construction noise criteria at the nearest noise sensitive locations to the site. If the predicted construction noise level meets the relevant BS 5228 noise limits at the nearest locations, compliance at all other more distant noise sensitive locations can be inferred.



### 11.5.2 Construction Noise Modelling and Results

BS 5228-1:2009+A1:2014 sets out several methods for predicting construction noise levels. Methods are presented for stationary and quasi-stationary activities and for mobile plant using a regular well-defined route (e.g., haul roads).

Construction noise predictions have been undertaken using Softnoise Predictor Lim-A software following the prediction methodologies outlined in BS 5228-1:2009+A1:2014. The predictions account for source-receiver distance, reflections and screening, ground attenuation and some methods include a percentage on-time. The ground cover between the site and the receivers can be described as acoustically soft ground ( $G=1$ ). However, a conservative ground cover of  $G=0.75$  was used in the construction noise model. For the purpose of this assessment, it has been assumed that mobile plant will be operating simultaneously and for a percentage on-time of 80%, except for the trucks tipping material where a percentage on-time of 10% is modelled due to short duration of this activity. The reality is that some of the plant will only operate intermittently. The parameters outlined above are a worst case scenario, making the noise modelling assessment a conservative exercise.

#### Site Traffic

Detailed information on construction traffic is presented in Section 9 Traffic and Transportation. To summarise, additional light goods vehicles travelling to and from the site during the construction phase would be expected to peak during the morning (arrival of contractors at the site) and evening (departure of contractors from the site) and are envisaged not be a continuous source of noise emissions from the site during a typical working day.

During the general construction works, an average of 30 HGV trips have been assessed per day. It is estimated that the construction works will last approximately 12 months. Based on this, Fehily Timoney has calculated the predicted noise levels will be below the noise limit of 65 dB  $L_{Aeq,1hr}$  during each of the construction scenarios below.

#### Site preparatory Works

The site preparatory works will involve the removal of overburden, distribution of material and levelling of the site.. The noise emissions from site preparatory works are dealt with in the following sections.

#### Tree Felling

Tree felling of approximately 4.7 ha. of commercial forestry is required to accommodate the construction of development. The felling will be the subject of a Felling Licence Application to the Forest Service prior to construction and is expected to take approximately 12 weeks. Table 11-7 presents the predicted noise levels from this activity. The highest predicted cumulative noise level from this activity is at H2164 (49 dB  $L_{Aeq,1hr}$ ), which is below the noise limit of 65 dB  $L_{Aeq,1hr}$ .

**Table 11-6: Tree Felling**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)	Predicted Noise Level ( $L_{Aeq,1hr}$ ) at Receptors, dB	
				H2164	H2163
Harvester §	C2.5	Harvesting trees	80	46	46
Forwarder μ	C4.53	Moving felled trees	80	46	46
Lorry *	C11.9	Transporting timber and brash off site	Two trips per hour	28	32



Plant	BS 5228 Ref.	Activity	Percentage on-time (%)	Predicted Noise Level ( $L_{Aeq,1hr}$ ) at Receptors, dB	
				H2164	H2163
Cumulative				49	49
* Drive-by maximum sound pressure level § - Excavator BS 5228 Ref C2.5 μ - Lorry with lifting boom – C4.53					

### Preparation of Access Roads, Drainage and Hardstands

Internal access tracks and drainage are proposed as part of the development. The most affected dwellings by this construction activity are H2162 to the south of site and H2163 to the north of the site. H2162 is approximately 350m from this activity and H2163 is approximately 380m from this activity. Noise from more distant noise sensitive locations will be lower. In practice, plant will not operate simultaneously at the same location and the predicted noise levels will be lower than those presented in Table 11-8. Furthermore, the nature of this activity is that items of plant will not be static for long periods and activity will occur at greater distances resulting in lower noise emissions. Therefore, construction noise from the construction activities will be below the construction daytime noise limit of 65dB  $L_{Aeq,1hr}$ .

**Table 11-7: Preparation of Access Roads and Drainage Assumed Plant**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)	Predicted Noise Level ( $L_{Aeq,1hr}$ ) at Receptors, dB	
				H2163	H2164
Tracked excavator (22t)	C2.21	Ground excavation/earthworks	80	39	39
Dump truck (Tipping fill)	C2.32	Tipping fill	10	33	33
Dozer (14t)	C5.12	Spreading chipping/fill	80	45	44
Vibratory roller (3t)	C5.27	Rolling and compaction	80	35	34
Excavator (21t)	C4.65	Trench for drainage	80	39	39
Lorry (Drive-by maximum sound level)	C11.9	Delivery and removal of material	30 two-way trips per day	43	39
Cumulative				49	47

### Installation of battery containers, inverters and associated LDES equipment

All equipment will be on shallow concrete foundation pads which will be either shuttered and poured in-situ or pre-cast. The containers and associated equipment will be lifted, placed and secured on the concrete pads. Table 11-9 presents the predicted noise levels from this activity at the nearest noise sensitive locations (H2176 and H2162 to the south of site). The installation works will occur at approximately 350m from these locations. Assuming all activities occur simultaneously the highest predicted noise level at approximately 350 m distance is 51 dB  $L_{Aeq,1hr}$  which is below the proposed construction daytime noise limit of 65dB  $L_{Aeq,1hr}$ .



**Table 11-8: Installation of Battery Containers, Inverters and Associated LDES/UTF Equipment Assumed Plant**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)	Predicted Noise Level (L <sub>Aeq,1hr</sub> ) at Receptors, dB	
				H2176	H2162
Concrete mixer truck	C4.28	Discharging & pumping concrete	80	41	40
Poker Vibrator	C4.33	Vibrating concrete	80	49	47
Lorry (Drive-by maximum sound level)	C11.9	Delivery and Removal of Material	30 two-way trips per day	37	35
Telescopic handler	C4.54	Lifting plant	80	45	43
Mobile telescopic crane (80t)	C4.39	Lifting electrical skids	80	43	42
Cumulative				51	50
β - Noise data sourced from manufacturers data sheet					

#### Installation of Power Cables/Grid Connection

As described in Section 2 of this report, the proposed development will be connected via an Under the Fence (UTF) grid connection to the Trillick substation. Underground electrical and communications cabling will exit the LDES Compound along the proposed internal access roads associated with the LDES Compound and UTF Transformer Compound before terminating at the UTF Transformer Compound. The likely plant required during the construction works are presented in Table 11-10. Table 11-10 also presents typical noise level for a range of construction activities at the most affected receptors, H2174 to the northwest of site, approximately 310m from the works and H2163 to the north of site, approximately 290m from the works.

**Table 11-9: Typical noise levels during installation of power cables/Grid Connection**

Plant	BS 5228 Ref.	Activity	Percentage on-time (%)	Predicted Noise Level (L <sub>Aeq,1hr</sub> ) at Receptors, dB	
				H2163	H2174
Lorry (Drive-by maximum sound level)	C11.9	Delivery and Removal of Material	30 two-way trips per day	41	36
Dump truck tipping fill	C2.30	Tipping Fill	10	38	38
Excavator (21t)	C4.65	Trenching	80	39	39
Circular Saw petrol	C5.36	Misc	10	46	45
Generator	C4.84	Misc	100	43	42
Vibratory Plate	C2.41	Compacting	10	39	39



Plant	BS 5228 Ref.	Activity	Percentage on-time (%)	Predicted Noise Level (L <sub>Aeq,1hr</sub> ) at Receptors, dB	
				H2163	H2174
Cumulative				50	49

### Cumulative Construction Noise

There are no other significant construction projects proposed in the vicinity of site, therefore, no cumulative construction noise emissions from the Proposed Development with other developments are considered likely.

## 11.6 Potential Operational Phase Impacts

During the operational phase, the main potential noise sources on site are from fans to heat and cool the battery units. Other noise sources associated with the proposed development include four no. inverters located throughout the site and a substation containing one no. 110 kV transformer.

For the purpose of this assessment, a total of 248 battery unit fans (one fan configuration per battery container) have been modelled, along with four no. inverters and one no. 110 kV substation transformer.

The noise impact from these operational components of the Proposed Development have been calculated with findings presented below.

### 11.6.1 Operational Noise Criteria

There is no statutory Irish guidance relating to the maximum permissible noise level that may be generated during the operational phase of the proposed development. In the absence of specific noise limits, appropriate emission criteria relating to permissible noise levels for the Environmental Protection Agency (EPA) Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (Environmental Protection Agency, 2016) have been used.

The Environmental Protection Agency (EPA) Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (Environmental Protection Agency, 2016) provides noise guidance to operator's subject to IPPC or waste licences. While the Proposed Development does not fall under the remit of the EPA, the EPA's NG4 guidelines are considered the most appropriate noise assessment criteria as they follow best practice principles. Hence, the Proposed Development is appraised against the EPA's NG4 guidelines.

### Noise Guidance (NG4) Compliance

Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (Environmental Protection Agency, 2016) requires that sites are screened to determine whether they are in a 'quiet area' in accordance with the EPA publication Environmental Quality Objectives – Noise in Quiet Areas (2003) (Step 1 of NG4 Screening) or areas of low background noise (Step 2 of NG4 screening). This screening is required to determine the most applicable noise limits for sites.

Step 1 of the screening is shown in Table 11.7 below. For the site to be in a 'quiet area', all the criteria listed in Table 11-11 must be satisfied.



**Table 11-10: Quiet Area Screening Step 1**

Criteria	Response
Is the Site >3km away from urban areas with a population >1,000 people?	No. The closest urban area of over 1,000 people is Buncrana which is approximately 2.5km from the Site
Is the Site >10km away from urban areas with a population >5,000 people?	No. The closest urban area of over 5,000 people is Buncrana which is approximately 2.5km from the Site
Is the Site >15km away from urban areas with a population >10,000 people?	Yes, c. 11 km from Derry with a population of 85,279
Is the Site >3km away from any local industry?	No, Site is adjacent to the Trillick substation and approximately 2.5km from Buncrana, quarry approx 1.5km, Meenkeeragh and Sorne Hill Windfarm.
Is the Site >10km away from any major industry center?	Yes
Is the Site >5km away from any national primary route?	Yes
Is the Site >7.5km away from any motorway or dual carriageway?	Yes

Since it is not in a 'quiet area', NG4 requires the site to be screened to determine if the site is within an 'area of low background noise' (NG4 Step 3). Background noise levels are examined to see if they satisfy the following criteria:

- Average Daytime Background Noise Level  $\leq 40\text{dB } L_{AF90}$ , and;
- Average Evening Background Noise Level  $\leq 35\text{dB } L_{AF90}$ , and;
- Average Night-time Background Noise Level  $\leq 30\text{dB } L_{AF90}$ .

In order for a site to be considered an 'area of low background noise', all three criteria above must be satisfied. A baseline noise survey was undertaken to determine if the site of the Proposed Development is considered an 'area of low background noise'.

The baseline noise survey has confirmed that the site is within an 'area of low background noise' and therefore more onerous noise limits have been applied to the development. The applicable noise limits are presented in Table 11-12:

**Table 11-11: Guidance Note NG4 Recommended Noise Emission Limits for Low Background Noise.**

Period	Noise Limit
Daytime (07:00 to 19:00 Hrs)	45 dB(A) $L_{Ar,T}$
Evening-time (19:00 to 23:00 Hrs)	40 dB(A) $L_{Ar,T}$
Night-time (23:00 to 07:00 Hrs)	35 dB(A) $L_{Aeq,T}$



In addition to the numerical limit, the NG4 guidance note states that during the daytime and evening periods, rigorous efforts should be made to avoid clearly audible tones and impulsive noise at all noise sensitive locations. A penalty of 5 dB for tonal and/or impulsive elements is applied to the daytime and evening measured  $L_{Aeq,T}$  values to determine the appropriate rating level  $L_{Ar,T}$ . During night-time no tonal or impulsive noise from the facility should be audible at any noise sensitive location.

### 11.6.2 Noise Prediction Modelling - Overview

Noise levels associated with the battery storage development were predicted according to the International Standard ISO 9613-2: 2024 Acoustics - Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of sound pressure levels outdoors (ISO, 2024) using Softnoise Predictor-Lima software.

The modelling assumes a worst case scenario where all sources will operate simultaneously and for 100% of the time. The reality is that many of the sources will only operate intermittently or at variable levels of output. This makes the noise modelling assessment a conservative/worst case exercise.

The proposed ground cover on site is predominately compacted dense ground and the noise model assumes that the ground cover is  $G=0.3$ , representative of mixed compact dense ground. Atmospheric conditions of 10 °C and 70 % humidity were used, as they represent a reasonably low level of air absorption. Receiver heights of 1.5m and 4.0 m were modelled, representative of ground floor (1.5m) and first floor (4m) level, as applicable.

Noise barriers have been included in the project design. Reflective noise barriers with 4m height have been included in the noise prediction model, to the north and south of site, as indicated on in Figure 2-1 of Section 2 Description of the Proposed Development.

### 11.6.3 Noise Prediction Modelling - Site Noise Sources

Each of the major potential noise sources on the site were identified and reference sound power data assigned. The existing Trillick 110 kV substation to the west of site has also been considered in the assessment.

248 battery unit fans (one fan per battery container), four no. inverters and one no. 110 kV substation transformer are located throughout the site, as shown on the layout plans.

For the purpose of this assessment, FT were provided with manufacturer noise data for the proposed fans and inverters. The proposed fans are Rosenberg N88-50318/GKHM 500-CIB.160.6IF IE fans. FT were provided with one-third octave band manufacturer data for these fans by the Applicant. The fans have an overall sound power level of 95.4 dBA  $L_w$ . The manufacturer noise data confirms that there are no tonal noise emissions associated with the fans. The Applicant has confirmed that these fans will be restricted during operations, by throttling the fans, to provide a maximum sound pressure level of 72dBA  $L_p$  at 1m distance. On review of the manufacturer data, this is equivalent to a total sound power level of 79dBA  $L_w$ , with a 16.4 dBA reduction in sound power level therefore required. For the purpose of this assessment, this reduction for the fan sound power level has been assumed equally across the octave band frequency spectrum, as outlined in Table 11-13.

The inverters modelled as part of this assessment are Sunny Central Storage UP-XT-US battery inverters with an overall sound power level of 93dBA  $L_w$ . It should be noted that at the time of this assessment, the inverter supplier was not in a position to provide octave band noise data for the proposed inverters. Therefore, the total inverter sound power level of 93dBA  $L_w$  has been used in the noise model, along with an assumed octave band frequency spectrum, which has been based on a similar inverter (SMA SC2750), used by FT in the assessment of other similar developments.



Noise modelling considered the cumulative noise emissions from the Proposed Development and existing Trillick substation.

A sound power level of 84 dBA  $L_w$  has been assessed for all periods for the substation transformers associated with the Trillick 110 kV substation and the proposed on-site substation, based on the 2016 Eirgrid Report *EirGrid Evidence Based Environmental Studies Study 8: Noise; Literature review and evidence based field study on the noise effects of high voltage transmission development*. The transformer octave band data was sourced from *An Introduction to Sound Level Data for Mechanical and Electrical Equipment* CED Engineering.

The octave band noise data for the noise sources used in the noise prediction model is presented in Table 11-13 below.

**Table 11-12: Octave Band Sound Power Level Data**

Plant	Sound Power Levels (dBA, $L_w$ ) at Octave Band Centre Frequency (Hz)									
	Overall	31.5	63	125	250	500	1k	2k	4k	8k
Rosenberg Fans (N88-50318/GKHM 500-CIB.160.6IF IE) $\Omega$	79	-	39.3	50.8	69.8	74	74.6	70.2	67.1	59
Sunny Central Storage UP-XT-US battery inverters $\Upsilon$	93	-	64.1	72.8	82.8	86.2	85.2	83.8	88.8	76.3
110kV Substation Transformer *	84	72	78	80	75	75	69	64	59	52

$\Omega$  Restricted to 79 dBA Overall Sound Power Level assuming equal 16.4dBA octave band reduction.  
 $\Upsilon$  From manufacturer datasheet with frequency spectrum based on the SMA SC2750 inverter.  
 \*Based on Eirgrid Report *EirGrid Evidence Based Environmental Studies Study 8: Noise; Literature review and evidence based field study on the noise effects of high voltage transmission development* and validated by measurements taken during FT's baseline noise survey.

It is expected that as technology advances, there will be reductions in the noise emissions from fans and inverters. Noise emission data represent the current information available for the inverters at the time of the assessment.

#### 11.6.4 Operational Noise - Results

43 receptors within 1km of the Proposed Development were modelled. Of these, 32 receptor locations are residential buildings with 11 classed as commercial and residential buildings. For the purpose of this assessment, unless known, dwellings and mixed-use buildings were considered to be two storey receptors and noise levels were predicted for ground floor level (1.5 m) and first floor level (4.0 m).

The predicted noise levels at the most affected NSLs (Noise Sensitive Locations) in Table 11-14 indicate that the daytime, evening and night-time criteria are met at all locations. The predicted cumulative noise levels at the closest residential dwellings to the north and south of the site (H2163 to the North and H2161 to the South) during daytime periods is 34.4 dB  $L_{Aeq}$ . This is below the daytime noise limit of 45 dB  $L_{Aeq}$ , the evening limit of 40 dB  $L_{Aeq}$  and the night-time noise limit of 35 dB  $L_{Aeq}$ .



**Table 11-13: Predicted Operational Noise Levels at Closest NSLs Daytime**

Period	Noise Limit	Predicted Noise Levels, dB (L <sub>Aeq</sub> ) at Receptors					
		Proposed LDES Development		Trillick 110 kV substation		Cumulative Noise	
		H2161	H2163	H2161	H2163	H2161	H2163
Daytime (07:00 to 19:00 Hrs)	45 dB(A) L <sub>Ar,T</sub>	34	33	13	29	34	34
Evening (19:00 to 23:00 Hrs)	40 dB(A) L <sub>Ar,T</sub>	34	33	13	29	34	34
Night-time (23:00 to 07:00 Hrs)	35 dB(A) L <sub>Aeq,T</sub>	34	33	13	29	34	34

The predicted noise levels at other sensitive receptors are lower. Tones may be audible close to the inverters; however, it is expected that tonal noise will not be audible at noise sensitive locations and no penalty for noise character will be applicable.

### 11.7 Decommissioning Phase

The decommissioning activities will use comparable equipment to the construction phase and the predicted noise from decommissioning activities will be equivalent or less than the construction noise levels and will comply with best practice noise limits at the time of decommissioning.

### 11.8 Mitigation Measures

#### 11.8.1 Construction Phase

During the construction phase there is potential for increased ambient noise levels. The predicted maximum noise levels are below the noise limit at the nearest noise sensitive locations.

Good practice noise reduction measures that will be implemented during construction works are outlined below:

- Phasing of works so that noisier items of plant do not operate simultaneously.
- Local screening of noisier items of plant. Note that a screen that just blocks the line of sight between the source and receiver will result in a 5dB reduction. The maximum reduction from a screen would typically be 10 dB.

In addition, the following best practice measures will be implemented:

- Training of site staff in the proper use and maintenance of tools and equipment;



- Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment;
- Machines that could be in intermittent use will be shut down between work periods or will be throttled down to a minimum;
- Plant start-up will be sequential rather than all together;
- Internal access tracks to be well maintained;
- Plant known to emit noise strongly in one direction will, when possible, be orientated so that the noise is directed away from noise-sensitive locations; and
- Drop heights for materials such as gravels will be minimised whenever practicable.

Additional measures to mitigate against the impacts of noise during construction are:

- A pre-construction commitment to managing nuisance noise will be agreed through notification and consultation with affected parties, if deemed necessary;
- Working hours at the site during the construction phase will be limited to 07:00 to 19:00 Monday to Friday and 07:00 to 16:00 on Saturday. Work on Sundays or public holidays will only be conducted in exceptional circumstances and subject to prior notification insofar as possible with the local community;
- Construction contractors will be required to comply with the requirements of the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations, 1988 as amended in 1990 and 1996 (S.I. No. 320 of 1988, S.I. No. 297 of 1990 and S.I. No. 359 of 1996), and the Safety, Health and Welfare at Work (Control of Noise at Work) Regulations, 2006 (S.I. No. 371 of 2006).

The main control measures will be control of noise at source using the following methods in line with Clause 8 'Control of noise' of BS 5228-1:2009+A1:2014:

- Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery (Clause 8.2.1 General);
- Use of appropriate plant and equipment where possible with low noise level generation where possible (Clause 8.2.2 Specification and substitution);
- All construction plant to be used on site should have effective well-maintained silencers (Clause 8.2.3 Modification of existing plant and equipment);
- Noise generating equipment will be located as far as possible away from local noise sensitive areas identified (Clause 8.2.5 Use and siting of equipment); and
- Regular and effective maintenance of site machinery including a full maintenance schedule to ensure that all pieces of equipment are in good working order. With efficient use of well-maintained mobile equipment, considerably lower noise levels than those predicted can be attained (clause 8.2.6 Maintenance).



### 11.8.2 Operational Phase

The predicted noise levels from the Proposed Development at the nearest noise sensitive locations are below the noise limits during all periods.

Noise barriers with a height of 4m are incorporated into the project design to the north and south of site. The following points should be considered when installing the noise barriers:

- The barrier should be 4m in height, 3.35m from the noise source and fully block the line of sight between the source and receiver;
- Barriers should be solid/imperforate with no air gaps and be constructed from a material with a mass per unit of surface area in excess of 10 kg/m<sup>2</sup>;
- Overlapping edges will reduce transmission through air gaps;

The fan manufacturer noise data confirms that there are no tonal noise emissions associated with the proposed fans. A noise survey will be carried out within 1 month of operation to confirm that there are no tonal noise emissions associated with the site and to confirm that the noise limits are not exceeded at nearby NSLs.

## 11.9 Residual Impacts

During the construction phase there is potential for increased ambient noise levels. The noise limits are predicted to be met and the impact from construction works is expected to be slight and temporary in duration. It is expected that operational noise limits will be met at all noise sensitive locations during daytime, evening and night-time periods, and the impacts will be slight and long term.

## 11.10 Cumulative Impacts

The potential for cumulative impacts from the Proposed Development and noise from the nearby Trillick 110 kV substation have been assessed. The predicted cumulative noise levels at the nearest noise sensitive locations are below the noise limits during all periods.

## 11.11 References

- British Standard BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise.
- International Standard ISO 9613-2: 2024 Acoustics -Attenuation of sound during propagation outdoors- Part 2: Engineering method for the prediction of sound pressure levels outdoors.
- Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), Environmental Protection Agency, 2016.
- Environmental Quality Objectives - Noise in Quiet Areas, Environmental Protection Agency, 2003.
- Guidelines on the information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency, 2022.



## 12. CULTURAL HERITAGE

A Cultural Heritage Impact Assessment has been undertaken by John Cronin & Associates, a copy of this is appended to this Report (Appendix 9). We refer the Planning Authority to this for the full details of the archaeological and cultural heritage assessment on the proposed development.

### 12.1 Cultural Heritage Conclusions

The Cultural Heritage Impact Assessment concludes that:

*"There are no recorded archaeological sites within the extent of the proposed development site, while there are three recorded archaeological sites within the 1km. There are no NIAH buildings or protected structures within the subject site or 1km study area. The proposed development comprises the addition of a long duration battery storage site to the area east of the existing Trillick ESB 110kV sub-station, County Donegal.*

*The proposed development will not give rise to any direct or indirect negative impacts or significance of effect on recorded/protected archaeological or architectural heritage sites.*

*The proposed site has had extensive previous ground disturbance works and landscaping for construction of the existing 110kv sub-station, as well as a significant change of use to commercial forestry plantation. There is low potential for encountering sub-surface archaeological remains.*

*As such, **there is a predicted Not Significant significance of effect predicted for the cultural heritage resource.**"*

It is of further note that no mitigation measures relating to cultural heritage are recommended.