MERCURY RENEWABLES (CARROWLEAGH) LIMITED

FIRLOUGH WIND FARM, CO. MAYO

AND

HYDROGEN PLANT, CO. SLIGO

VOLUME I

NON-TECHNICAL SUMMARY (NTS)

JUNE 2023

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MERCURY RENEWABLES (CARROWLEAGH) LIMITED
FIRLOUGH WINDFARM AND HYDROGEN PLANT

VOLUME I
NON-TECHNICAL SUMMARY REPORT

CONTENTS

1 NTS.1 INTRODUCTION

This Non-Technical Summary (NTS) summarises the Environmental Impact Assessment Report (EIAR) which accompanies the application for planning permission for Firlough Windfarm and Hydrogen Plant. The Proposed Development associated is primarily located on two distinct sites which are denoted the Wind Farm Site and the Hydrogen Plant Site. Other elements of the Project are located on lands connecting these sites as well as other discrete locations which are required to facilitate the Project.

The Wind Farm Site is situated in the townland of Carrowleagh (Kilbride), Co. Mayo, adjacent to the county boundary with County Sligo. It is located 12 km to the east of Ballina, and 4 km northeast of Bunnyconnellan.

The Hydrogen Plant Site is situated in the townland of Carraun, Co. Sligo, adjacent to the county boundary with Co. Mayo, 6 km west of the Wind Farm Site and 0.6 km from the N59 national road. It is 2.9 km to the south of the village of Corballa (Co. Sligo).

The Wind Farm will produce renewable electricity, however, in the North Mayo and Sligo region, the full renewable energy generation potential of the area cannot be realised due to physical shortcomings and restrictions in the electricity network. The Hydrogen Plant would provide a viable off-take and route to market for renewable energy that otherwise would have been lost due to these constraints.

The location of the Proposed Development is shown in **Figure NTS-1**.

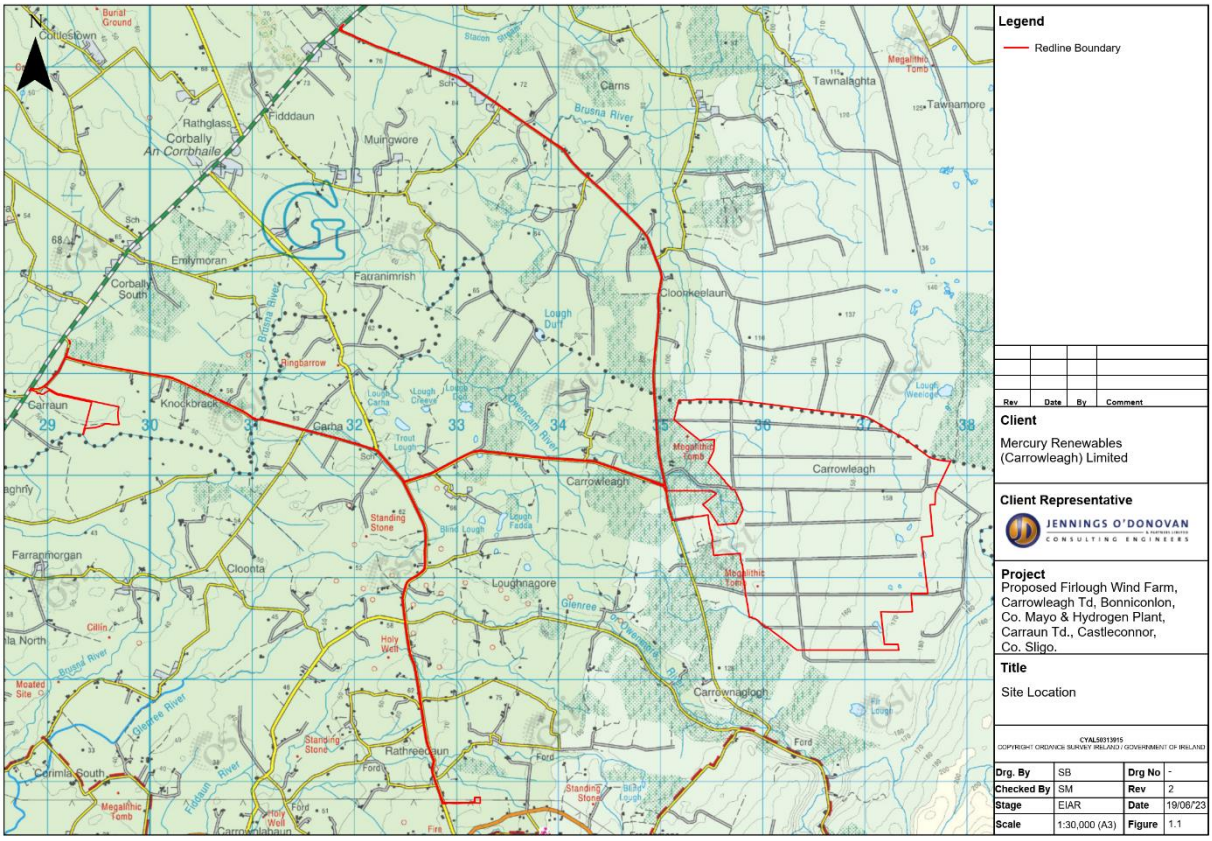

Figure NTS-1: Site Location

Established in 2009, Mercury Renewables (Carrowleagh) Limited (referred to hereafter as 'the Developer') is a wholly owned subsidiary of Mercury Renewables Limited ("Mercury"), is an independent developer of renewable energy projects in Ireland. Focused on the West of Ireland, the Firlough Wind Farm and Hydrogen Plant is Mercury's lead project under development.

Planning permission was granted on the 1st of August 2013 for the construction of 21 wind turbines under An Bord Pleanála Reference PL16.241592. The revised proposal involves the reduction in the number of wind turbines and the addition of the Hydrogen Plant.

Permission is being sought by the applicant for the construction of 13 No. wind turbines (to be known as Firlough Wind Farm), an on-site 110 kV loop-in substation and all ancillary works, the construction of an underground grid connection via a looped connection between the Wind Farm Substation and the existing 110 kV overhead powerline north of Bunnyconnellan village, Co. Mayo. The Proposed Development will also include a Hydrogen Plant comprising 80 MW of modular alkaline electrolyser and all associated infrastructure including; compressors, cooling equipment, refuelling points, water abstraction, storage and processing, and the Hydrogen Plant Substation which will be connected to the Wind Farm via an underground electrical Interconnector.

The EIAR also assesses demolition of an existing dwelling and sheds and construction of a new house and shed.

The Wind Farm Site is located within the county of Mayo and will have an installed capacity range of 65-78 MW. The Site is identified in **Figure NTS-2**.

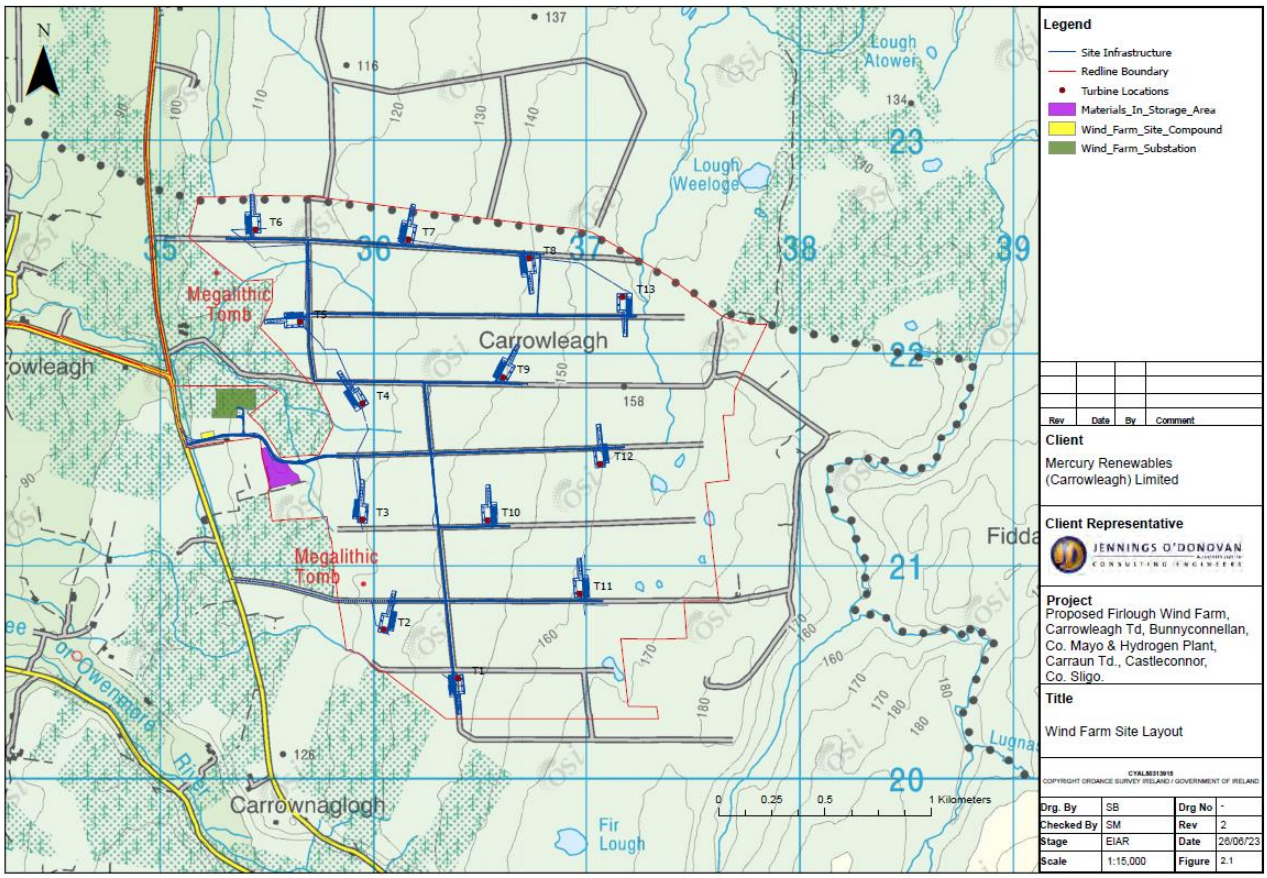

Figure NTS-2: Wind Farm Site Layout

The EIAR presents information on the identification and assessment of the potential significant environmental effects of the Proposed Development and reports the findings of the Environmental Impact Assessment (EIA) which has been undertaken in accordance with the Planning and Proposed Development Act 2000, as amended and the Planning and Proposed Development Regulations 2001, as amended. The EIAR comprises the following documents:

- This Non-Technical Summary (Volume I)
- The Main EIAR Report (Volume II)
- Supporting Figures and Drawings (Volume III)
- Supporting Technical Appendices (Volume IV)

These documents inform readers of the nature of the Project, likely environmental effects and measures proposed to protect the environment during each phase of the Project.
The Proposed Development will comprise the following phases:

- Construction of the Project
- Operation of the Project
- Decommissioning of the Project

2 NTS.2 ENVIRONMENTAL IMPACT ASSESSMENT

Environment Impact Assessment (EIA) is required where there are likely to be significant effects on the environment due to the nature, size or location of a new Proposed Development. Windfarms of the scale of the Proposed Development legally require an EIA to be carried out.

This EIAR has been prepared following a systematic approach to an EIA and project design, with knowledge of the potential effects being used to change the design so as to reduce those effects. The main EIA stages are:

- Scoping consultation (process of asking relevant organisations what they think should be included in the EIA) and how these topics are addressed
- Technical environmental assessments - baseline studies (understanding what the existing environmental conditions are), asking what potential significant environmental effects might occur, informing the design evolution and identification of measures to reduce undesirable effects
- Writing up the findings to include in the EIAR
- Submission of the planning application and EIAR

Scoping and pre-application consultation is important to the development of a comprehensive and balanced EIAR. Requests for Scoping Opinions were submitted to the prescribed bodies and key consultees in November 2020 and in March 2022. The request was accompanied by Scoping Report which included a Description of the Project, a Site Location Map, as well as outlines of the baseline environment and proposed methodology for the various proposed assessments as part of the EIAR. Scoping Opinions received are included as **Appendix 1.1 a and Appendix 1.1 b of Volume IV**. This included agreement on excluding from the EIAR, assessment of effects on certain receptors or features, where it was agreed there was no potential for significant effects.

Significant consultation with local community members and groups has been ongoing throughout the design phase of the Project and has led to changes in the design of the Project and location of ancillary features such as the Hydrogen Plant.

The Project Community Liaison Officer's initial engagement commenced in December 2021. Due to the ongoing Covid-19 pandemic and resultant restrictions on social gatherings, it was decided that the first round of public consultation and information dissemination should take place remotely via a targeted leaflet drop, publishing of notices in local newspapers and the creation of a virtual public exhibition.

The virtual public exhibition website walked members of the public through the then current Project and invited them to provide feedback on their views to take concerns on board in the design of the Project. The website was open from Friday 10th December 2021, it was advertised through leaflet drops to local houses. Once restrictions allowed, two in-person Public Information Days were organised. These were held at the Grove Hall in Bunnyconnellan on Wednesday 14th September 2022 and at the Castleconnor Community Hall on Thursday 15th September 2022, between 12 noon and 8 pm on both days.

Project newsletters were produced in March 2022, May 2022, September 2022 and November 2022, these were delivered to local residents, community groups and council members.

A report on the public consultation process has been prepared and can be found in **Appendix 1.3** in **Volume IV**.

Environmental effects have been assessed in chapters of the EIAR, broadly with one chapter per technical discipline, generally representing a type of receptor of potential effects (e.g., birds). The assessments in each chapter follow a similar, systematic approach, to identify any effects that may be significant in the context of the EIA Regulations. The approach includes establishing the "baseline", this being the current state of the environment, to which the Proposed Development will be added. This identifies the key receptors, including how sensitive they are to the sort of change that might be caused by the Project. The potential size (or magnitude) of change caused by the Proposed Development is then assessed, and the sensitivity and magnitude are considered together to form a conclusion on significance. Effects can be desirable (or "positive", or "beneficial"), or undesirable (or "negative", or "adverse"). Mitigation is proposed where possible to prevent significant undesirable effects. The final proposed effects are those after mitigation has been applied and are the "residual effects".

In accordance with the EIA Regulations, the assessment has considered 'cumulative effects'. These are effects that result from cumulative changes caused by past, present or reasonably foreseeable actions together with the Proposed Development.

3 NTS.3 PROPOSAL FOR THE FIRLOUGH WINDFARM AND HYDROGEN PLANT

Planning permission is being sought by the Developer for the construction of 13 No. Wind Turbines, Substations, Grid Connection and all ancillary works and a Hydrogen Plant comprising an 80 MW modular alkaline electrolyser and all associated infrastructure including the Hydrogen Plant Substation which will be connected to the Wind Farm via an underground electrical interconnector.

The Proposed Development will comprise of the following main components:

- Construction of 13 no. wind turbines with an overall ground to blade tip height of between 177 m and 185 m inclusive. The wind turbines will have a rotor diameter of between 149 m and 155 m inclusive and a hub height of between 102.5 m and 110.5 m inclusive.
- Construction of permanent crane hardstand areas and temporary laydown/storage areas and turbine foundations.
- Construction of new permanent internal Wind Farm Site access roads and the upgrade of existing internal bog tracks to include passing bays and all associated drainage infrastructure.
- Development of a site drainage network for the Wind Farm Site including sediment control systems.
- All associated underground electrical and communications cabling connecting the wind turbines to the Wind Farm Substation.
- Construction of a permanent on-site 110 kV wind farm electrical substation including two no. control buildings with welfare facilities, all associated electrical plant and equipment, security fencing and gates, all associated underground cabling, wastewater holding tank, and all ancillary structures and works.
- All works associated with the permanent connection of the wind farm to the national electricity grid, which will be via a loop-in 110 kV underground cable, in permanent cable ducts from the proposed permanent wind farm substation in the townland of Carrowleagh, and through the townlands of Carha, Carrownaglogh, Rathreedaun, Drumsheen and Bunnyconnellan West County Mayo into the existing 110 kV overhead line in the townland of Rathreedaun County Mayo, with two new 16 m high steel lattice loop-in/out masts at the connection point.

- Construction of a Wind Farm Site Temporary Construction Compound with associated temporary site offices, parking areas, welfare facilities and security fencing.
- Construction of a temporary construction materials storage area for use during construction of the Wind Farm.
- Forestry felling to facilitate construction and operation of the Wind Farm Substation and any onsite forestry replanting.
- Upgrade works on the section of the turbine delivery route which is common to both the Killybegs Turbine Delivery Route and Galway Turbine Delivery Route to include the following to facilitate the delivery of abnormal loads and turbine component deliveries:
    - Improvement of the N59 and L-2604-0 junction in the townland of Ballymoghany, County Sligo to include for the temporary widening of it. The associated accommodation works will include the installation of new drainage pipes, the construction of a 1.2 m high concrete retaining wall and the erection of timber stock proof fencing and 2 no. agricultural gates.
    - Localised widening of the L-2604-0 road in the townland of Cloonkeelaun, County Sligo. The associated accommodation works will include the construction of a 1.2 m high concrete retaining wall and the erection of concrete post and timber rail stock proof fencing and 2 no. agricultural gates.
    - Localised widening of the L-2604-0, L-5137-0 and L-5137-9 local roads in the townlands of Ballymoghany, Muingwore and Cloonkeelaun County Sligo and Carrowleagh County Mayo to achieve a surfaced road width of 4.5 m.
    - Localised widening of the L-5137-9, L-5136-0 and L-6612 roads in the townlands of Carraun and Knockbrack County Sligo, and Carha and Carrowleagh County Mayo to establish passing bays.
- Upgrade works on the Galway Turbine Delivery Route to include the following to facilitate the delivery of abnormal loads and turbine component deliveries;
    - Localised road widening at the N17/N5 roundabout in the townland of Ballyglass East County Mayo.
    - Localised road widening at the road junction with the N5 in the townland of Ballyglass East County Mayo.
    - Alterations to the embankments at the N5 junction with the L-5339 and L-1331 roads in the townland of Cloonmeen West County Mayo.
    - Localised road widening at the junction of the L-5339 and L-1331 in the townland of Lavy More County Mayo.

- Construction of a new Wind Farm Site entrance off the L-5137-9 in the townland of Carrowleagh County Mayo with the creation of a splayed entrance to facilitate the delivery of abnormal loads and turbine component deliveries.
- Construction of a Hydrogen Plant and an access road to it along with, upgrades to the L-6612-1 and the construction of a roundabout. The Hydrogen Plant includes the electrolyser building measuring 130 m by 110 m, and 16 m in height, and equipment, underground water storage tanks, drainage system, constructed wetlands, hydrogen dispensing station, tube trailer parking, water treatment building, fin fan coolers, fire water tanks, compressors, offices and welfare facilities and all ancillary equipment.
- Construction of a permanent on-site 110 kV Hydrogen Plant Substation in a compound of 3,520 m^2 including 2 no. control buildings with welfare facilities, all associated electrical plant and equipment, security fencing and gates, all associated underground cabling, wastewater holding tank, and all ancillary structures and works.
- Abstraction of groundwater from 2 no. boreholes in the townland of Carraun, County Sligo and pumping to the proposed hydrogen plant site and all associated ancillary works.
- Construction of a Hydrogen Plant Site Temporary Construction Compound with associated temporary site offices, parking areas, materials storage and security fencing for use during construction of the Hydrogen Plant Site.
- All works associated with the permanent connection of the Wind Farm to the Hydrogen Plant comprising a 110 kV underground cable in permanent cable ducts from the proposed, permanent, on-site wind farm substation, in the townland of Carrowleagh, Co. Mayo and onto the townlands of Carha, Co. Mayo, Knockbrack, Co. Sligo and terminating in the Hydrogen Plant Substation in the townland of Carraun, Co. Sligo.
- Demolition of agricultural shed C and partial demolition of agricultural shed B in the townland of Carraun to facilitate the construction of the upgraded L-6612-1 and roundabout.

A 10-year planning permission and 40-year operational life from the date of commissioning of the Firlough Wind Farm is being sought.

A permanent planning permission is being sought for the Grid Connection, Hydrogen Plant and Hydrogen Plant Substation as these are to remain in place upon decommissioning of the Wind Farm. The Wind Farm Substation will become an asset of the national grid under the management of EirGrid.

The proposed development includes activities which are subject to an Industrial Emissions License from the Environmental Protection Agency. In addition, the proposed development relates to an establishment which falls within the requirements of the Major Accidents Directive and which will be subject to regulation from the Health and Safety Authority.

While the Project is primarily comprised of the Proposed Development the Project for the purpose of the EIA also includes the following elements for which development consent is not being sought at this time:

- Demolition of an existing dwelling and agricultural sheds D and E and the demolition of the remainder of shed B and construction of a new house and shed in the townland of Carraun, County Sligo.

The Hydrogen Plant production capacity will be scaled up to a maximum 80 MW, to meet demand for green hydrogen in the Irish market. The physical infrastructure of the entire Hydrogen Plant (i.e., buildings, roads, water treatment, cooling and fuelling, etc) will be built during a single construction phase with the modular electrolyser system installed in 5 MW batches. The smallest initial batch of electrolyser capacity will be 10 MW and will produce a maximum of 4,000 kg of green hydrogen per day leaving 55 to 68 MW of installed capacity of the Wind Farm dispatching to the electricity grid. The Hydrogen Plant will be phased up to an 80 MW electrolyser producing a maximum of 31,200 kg of green hydrogen and consuming the whole output of the Wind Farm.

3.1 Wind Turbines

The proposed Wind Turbines will be of typical modern design and will be a three-bladed, rotor up wind of the tower, variable speed, pitched blade regulated machine. Turbine appearance will be a matt non-reflective finish in a white, off-white or grey colour. The foundation-to-tip height will be between 177 m and 185 m.

The Wind Turbines will have a circular based tower, sitting on a reinforced concrete Turbine Foundation. The tower will support the nacelle, rotor hub, and rotor blades. Commercial wind turbine towers are typically made of steel or a hybrid of steel and concrete. The nacelle is mainly metal (steel, copper, aluminium, etc.) with a metal/plastic/glass-reinforced plastic (GRP) body, while the blades can be made of a matrix of glass-fibre reinforced polyester or wood-epoxy or similar composite materials.

Each turbine will have a generator with a maximum capacity of 6 MW giving an overall capacity up to 78 MW. The turbines may be direct drive machines or may contain a gearbox. The final Wind Turbine will be chosen in a competitive tendering process as part of the Project financing process, after all necessary consents have been secured.

The final choice of Wind Turbine model is unknown at this stage. For the purposes of the assessments, the dimensions of the candidate turbine are presented in **Table 3.1**.

Table 3.1: Turbine Parameters

Turbine Parameter	Assessment Envelope
Turbine Blade Tip Height	177 m to 185 m
Rotor Diameter	149 m to 155 m
Hub Height	102.5 m to 110.5 m

3.2 Hydrogen Plant

The Hydrogen Plant will use a process known as electrolysis to produce green hydrogen by using electricity produced at the proposed Wind Farm. The Hydrogen Plant will comprise of an electrolyser building, water supply equipment, water treatment systems, compressors, buffer storage cylinders, and cooling modules. Tube-trailers will be filled with green hydrogen at a dispensing station. The layout is shown in figure **NTS-3**.

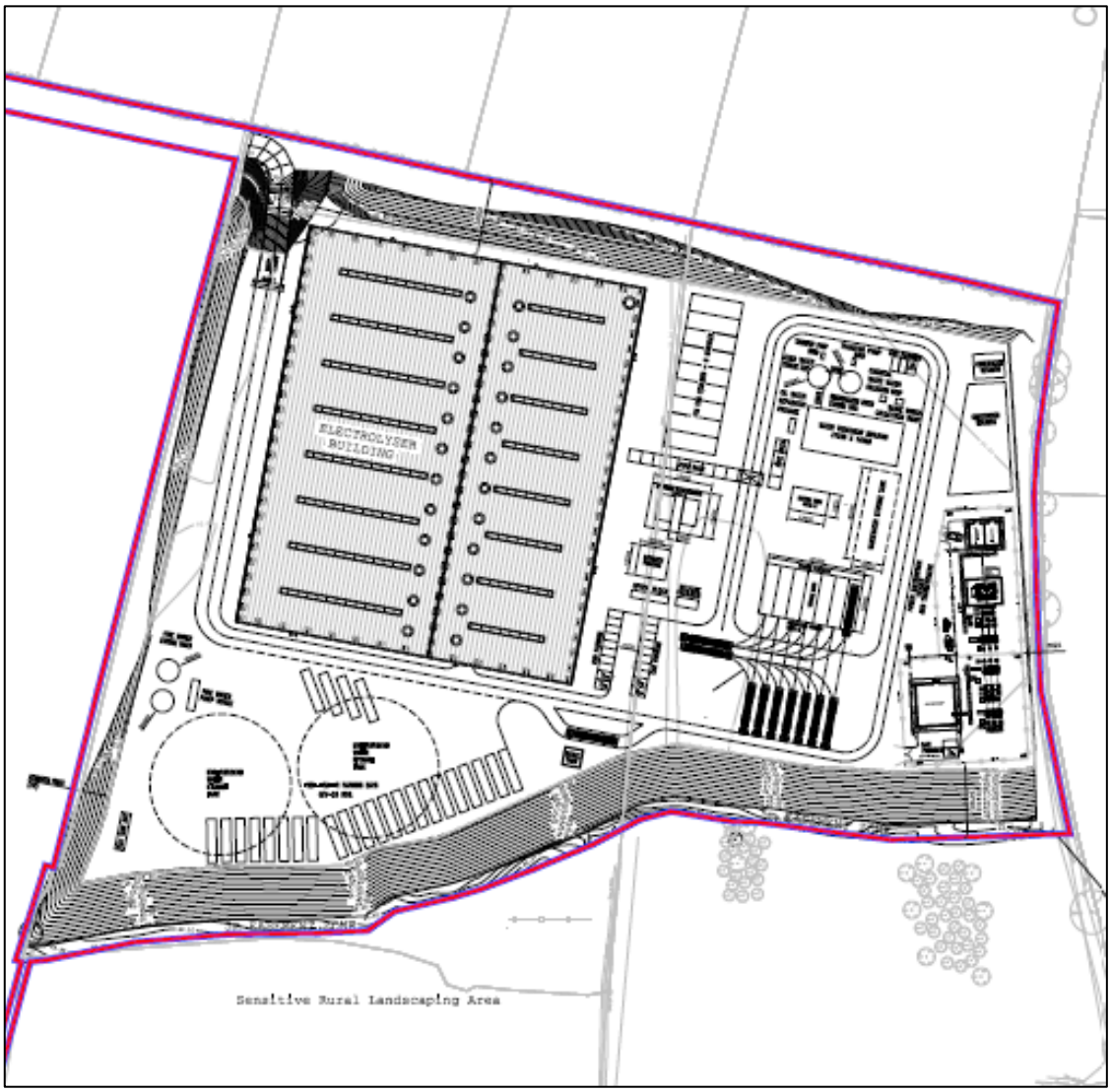

Figure NTS 3: Hydrogen Plant

The green hydrogen is produced by water electrolysis, this is the process of splitting water (H_2O) into its basic components, hydrogen (H_2) and oxygen (O), using an electric current in an electrolyser. Through this process, electrical energy can be stored as chemical energy in the resulting production of hydrogen.

Electrolysis requires pure water which has had the minerals and any impurities removed and so water treatment equipment is needed at the Hydrogen Plant. The water treatment process includes double pass Reverse Osmosis and Continuous Electrodeionization. This process creates wastewater which includes the removed minerals and any impurities. This will be treated through constructed wetlands and regulated discharge rates before being discharged.

Hydrogen has a proven safety track record as a fuel for more than 100 years worldwide and been used for the last 25 years in Ireland. Hydrogen has various properties that make it an ideal energy carrier:

- Hydrogen is non-toxic and non-poisonous, unlike conventional fuels. A hydrogen leak will not contaminate the environment or endanger the health of humans or wildlife. Hydrogen does not create "fumes."
- Hydrogen is 14 times lighter than air, consequently when it is released it dilutes quickly into a non-flammable concentration, significantly reducing the risk of ignition at ground level.
- Hydrogen has a higher oxygen requirement for explosion than conventional gasoline.
- Hydrogen has a lower radiant heat than conventional gasoline, i.e., the air around the hydrogen flame is less hot than around a gasoline flame, reducing the risk of secondary fires.

Green hydrogen can be used as a fuel or converted back to electricity when required. As with all fuels, the production and handling of hydrogen has an inherent degree of risk. Whilst some properties of hydrogen make it safer than other fuels, there is still a requirement to adopt controls and best practice to ensure safety. Hazards and issues involved with handling hydrogen include combustion, the size of the molecule, interactions with materials and pressure hazards.

Health and Safety has been a key consideration in the design of the hydrogen production facility, and the approach has incorporated good practice principles such as inherently safer design, the hierarchy of controls and safety standards. Design standards specific to hydrogen production facilities have been used throughout the design phase and regulations and separation distances required by industry good practice have been incorporated into the design. A Quantitative Risk Assessment (the "TLUP QRA") has been prepared in accordance with the guidelines set out in the Health and Safety Authority's (HSA) Technical Land Use Planning (TLUP) Guidelines. The TLUP QRA (**Appendix 16.3**) has been submitted to the HSA as part of the planning application submission. The purpose of the TLUP QRA is primarily to assess the offsite risks to human health and the environment for the purposes of determining the suitably of the preferred site for the Hydrogen Plant. The assessment finds that the location of the Hydrogen Plant is "broadly suitable" and societal risks from fires and explosions are negligible.

The Seveso III Directive (Directive 2012/18/EU), and the Chemical Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015, which implements

the SEVESO directive, apply to the Hydrogen Plant. The Hydrogen Plant is expected to be designated a lower-tier COMAH site, with no more than 30 tonnes of hydrogen on site at any time.

Consultation with the Health and Safety Authority of Ireland and the Sligo Fire Service was undertaken during the design phase. A Supervisory Control and Data Acquisition ("SCADA") system will monitor the Hydrogen Plant performance. Firefighting systems will include alarms, water spray deluge systems, sprinkler systems, carbon dioxide suppression systems and mobile fire protection equipment and water for firefighting purposes will be contained within two dedicated fire water storage tanks. The Hydrogen Plant is located a significant distance from receptors and the public would have no access to the facility.

On production, the green hydrogen will be compressed and transferred to temporary buffer storage and then filled into tube-trailers at the dispensing station. The tube trailers will be removed from the Hydrogen Plant Site and transported to customers.

3.3 Access to the Proposed Development

The Wind Farm Site access will be from a new entrance on the L5137-9 road which runs along the western side of the Wind Farm Site. A new site entrance will be created which will allow abnormal load turbine delivery vehicles to safely access and exit the Wind Farm Site as well as achieve the required sightlines. This entrance will be used for delivery of both turbine components and building materials such as rock and concrete. The Wind Farm Site entrance is shown on **Figure NTS-4.**

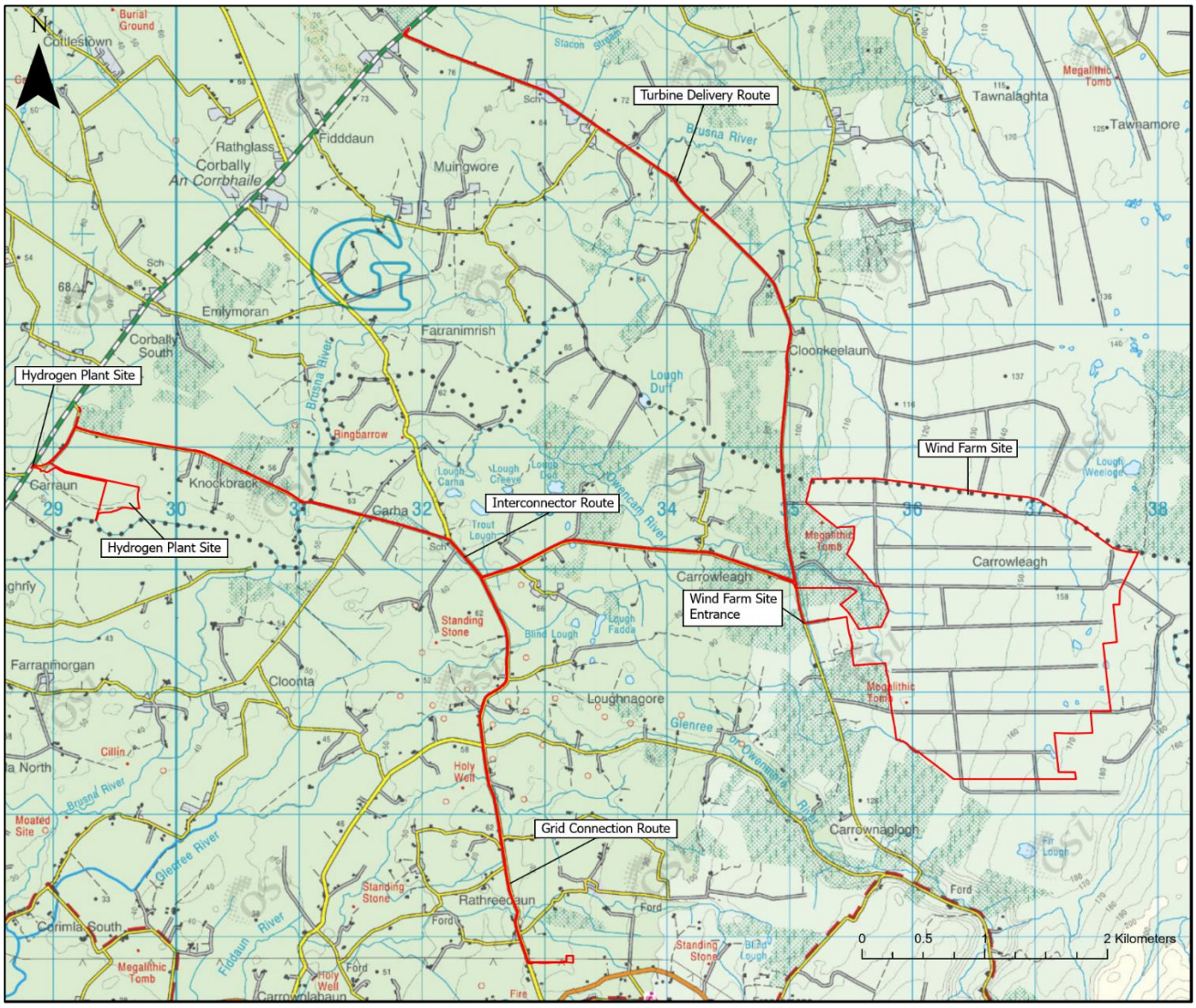

Figure NTS-4: Site Entrances

It is proposed that that the port of entry for the large turbine components will be either Killybegs Port or Galway Port.

From Killybegs Port the turbine nacelles, tower hubs and rotor blades will be transported to the N56 some 4.0 km northeast of the harbour. The route primarily follows the national road network namely the N56, N15, N4 and N59 before turning left onto the L-2604, L-5137-0 and L-5137-9 towards the Wind Farm Site entrance.

From Galway Port the turbine nacelles, tower hubs and rotor blades will be transported to the N83 some 3.0 km north of the harbour. The route primarily follows the national road network namely the N83, N17, N5, N4 and N59 before turning left onto the L-2604, L-5137-0 and L-5137-9 towards the Wind Farm Site entrance.

The delivery of the turbines will require co-ordination with a number of statutory bodies including Mayo County Council, Sligo County Council and An Garda Síochána. An agreed programme of work and will be established in the Traffic Management Plan which will be prepared by the Contractor ahead of any construction work commencing on the Wind Farm Site. The proposed Killybegs Turbine Delivery Route and Galway Turbine Delivery Route is shown on **Figure NTS-5.**

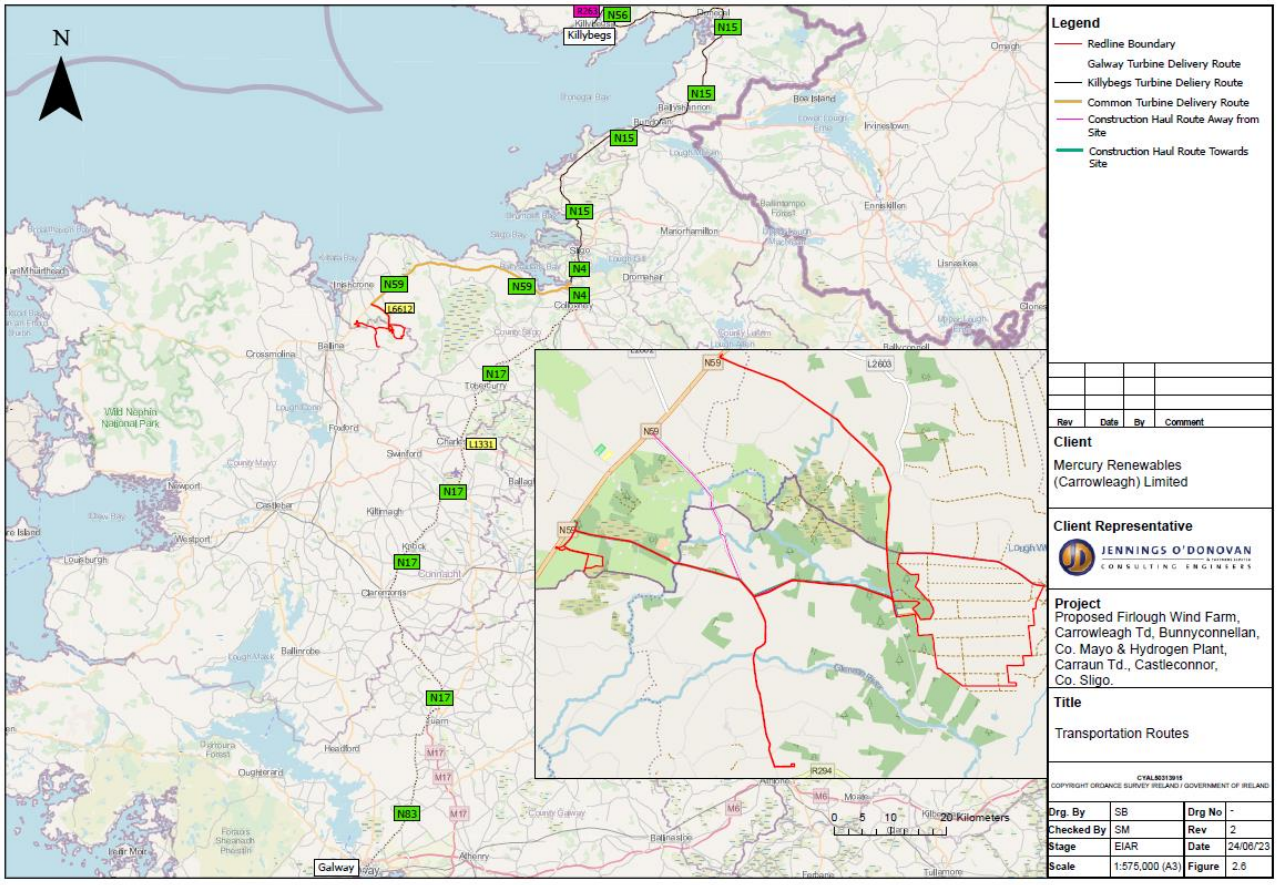

Figure NTS-5: Proposed Turbine Delivery Haul Routes

3.4 Grid Connection and Interconnector

Firlough Wind Farm substation will be connected to the national grid by a 6.65 km, 110 kV underground cable, through the Wind Farm Site, local roads and private lands, to two tower structures that will intersect with the existing Moy - Glenree 110 kV overhead line.

The Wind Farm Substation will be connected to the 110 kV Hydrogen Plant Substation via an 8.2 km 110 kV cable through private lands and local roads. This interconnector will conduct electricity from the Wind Farm to the Hydrogen Plant for electrolysis.

The Grid Connection Route and Interconnector Route can be seen in **Figure NTS-6.**

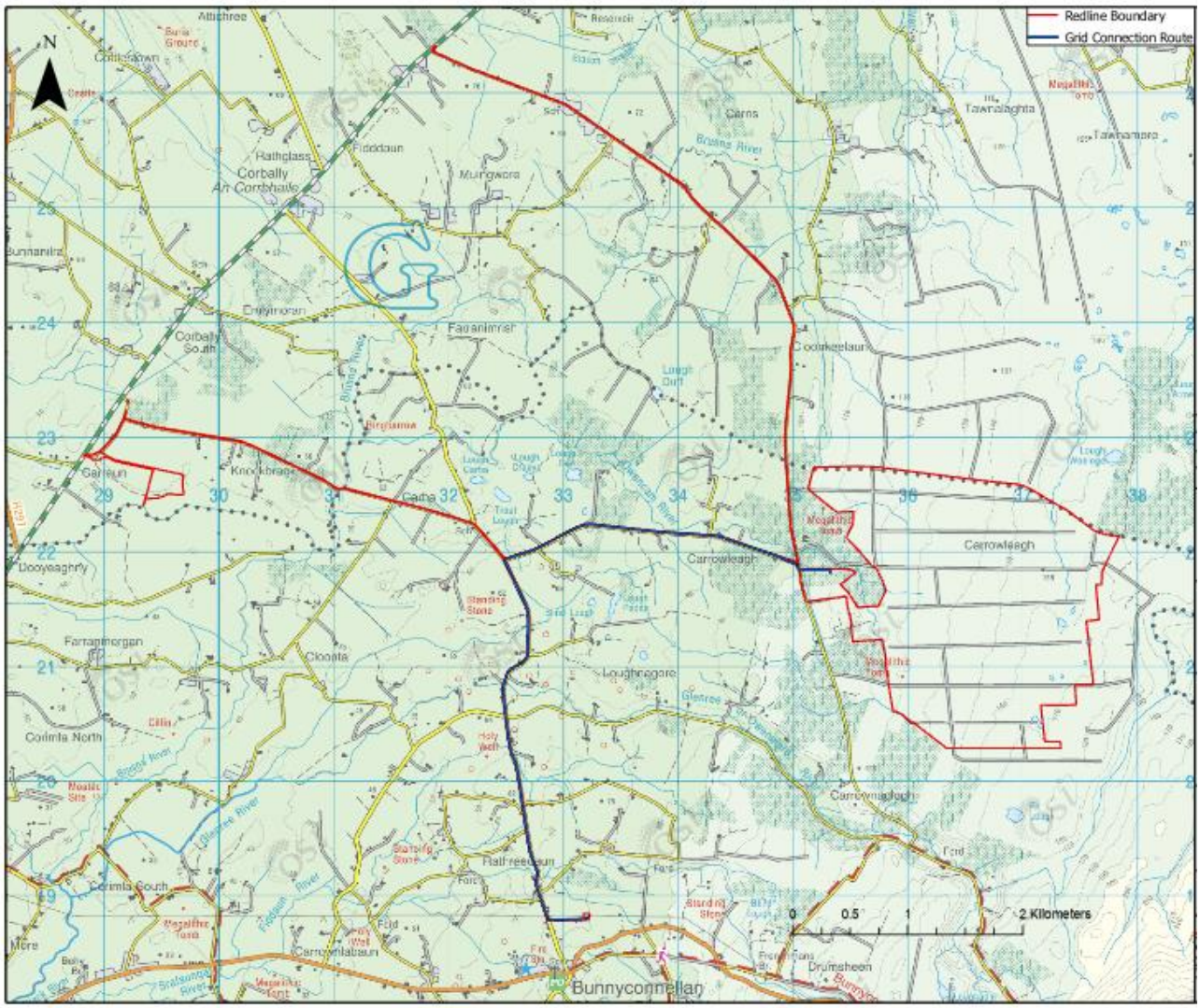

Figure NTS-6: Proposed Grid Connection Route

3.5 Construction Phase

The construction phase of the Project will take approximately 21 months in total. In general, working hours for construction activity will be from 07:00 to 19:00 throughout the week, with reduced working hours at weekends.

The turbines will be located across a wide area of cutover bog, however the land taken by the turbines and other infrastructure is a very small proportion of this, and substantial efforts have been made to re-use existing infrastructure rather than using new land. During the construction phase, the total land-take required for the Wind Farm will be 27.55 ha within the larger site area of 445ha.

The Hydrogen Plant will be located on agricultural land and will be set back from the N59 and houses. The design of the plant has minimised land-take and during the construction

phase. The total land-take required for the Hydrogen Plant 6.5 ha. The Hydrogen Plant production capacity will be scaled up to a maximum 80 MW, to meet demand for green hydrogen in the Irish market. The physical infrastructure of the entire Hydrogen Plant (i.e. buildings, roads, water treatment, cooling and fuelling, etc) will be built during a single construction phase with the modular electrolyser system installed in 5 MW batches.

The Project will appoint a Civil Contractor who will have overall responsibility for management, including environmental management on the construction site. The Civil Contractor will ensure that construction activities are carried out in accordance with the mitigation measures outlined in the EIAR and as required by the planning permission, such as the Construction Environmental Management Plan (CEMP) included in **EIAR Appendix 2.1**. In the event planning is granted for the Proposed Development, the CEMP provides a commitment to mitigation and monitoring, and reduces the risk of pollution whilst improving the sustainable management of resources. The environmental commitments of the Proposed Development will be managed through the CEMP and will be secured in contract documentation and arrangements for construction and later phases, such that there will be a robust mechanism in place for their implementation. The services of specialist advisors will be retained as appropriate, such as an archaeologist and ecologist, to be called on as required to advise on specific environmental issues.

An Ecological Clerk of Works (ECoW) with experience in overseeing renewable energy construction projects will be appointed by the Developer for the duration of the construction phase so that the CEMP is effectively implemented. The contractor will be required to appoint an Environmental Manager.

3.6 Habitat Restoration

A Biodiversity Enhancement and Management Plan (BEMP), included as EIAR **Appendix 5.4**, has been prepared to mitigate for the potential ecological effect of habitat loss as a result of the Project. The Plan is focused on the restoration and rehabilitation of an area of cutover lowland blanket bog habitat which have been subject to upland grazing and turbary pressures. Restoration will be undertaken at the earliest opportunity to minimise storage of turf and other materials.

Figure NTS-2 shows the areas designated for habitat enhancement.

3.7 Operational Phase

The proposed operational lifespan for the Wind Farm is 40-years. During the operation of the Wind Farm, the turbine manufacturer, the wind farm operator, or a service company will carry out regular maintenance of the turbines. During the operational phase of the Proposed Development, turbine and infrastructure maintenance will be ongoing and regular. This is expected to continue to employ approximately 1 or 2 people on a permanent basis for regular operational and maintenance activities. In addition, operation and monitoring activities will be carried out remotely with the aid of computers connected via a telephone broadband link. Routine inspection and preventative maintenance visits will be necessary to provide for the smooth and efficient running of the Wind Farm and Wind Farm Substation.

A permanent planning permission is being sought for the Hydrogen Plant. The plant will be operational 24 hours a day, seven days a week and will be always manned. Approximately 10 full time staff or equivalent will be employed at the facility. During the operation of the Hydrogen Plant, regular maintenance and inspection will be carried out on the electrolyser, dispensing station, compressors, cooling equipment, water treatment equipment, Hydrogen Plant Substation and site infrastructure. In addition, operation and monitoring activities will be carried out remotely with the aid of computers connected via a telephone broadband link.

Site specific management systems and operating procedures will be developed in accordance with industry procedures and policies. While production of green hydrogen is expected to be a 24 hour a day process, the Developer intends to restrict tube trailers from entering and leaving the premises between the hours of 19:00 and 07:00 as part of a wider traffic management plan.

4 NTS.4 SITE SELECTION AND DESIGN

The Proposed Development layout design has evolved through a series of iterations, to avoid or minimise potential effects, including effects on local communities, views, hydrology, peat, ecology and fisheries, ornithology and noise. Technical criteria such as wind speed, prevailing wind direction, existing infrastructure, topography and ground conditions were considered during the Wind Farm design process, in response to guidance documents, survey findings and responses from consultees. The location of the Hydrogen Plant in relation to the national road network, water supply, ground conditions, topography and set back distances to roads and buildings were considered in the design phase of the Hydrogen Plant.

Overall, it is considered that the proposal represents an optimum fit within the technical and environmental parameters of the project.

5 NTS.6 POPULATION AND HUMAN HEALTH

The potential effects of the construction, operational and decommissioning phases of the Project on public interest, settlement patterns, socioeconomics, human health, residential amenity, tourism and recreation were identified and assessed in **Chapter 4** of the EIAR following desk-based collection of data and consultation with local stakeholders.

Four geographical Study Areas were outlined for this assessment:

- Study Area One: The Development and Environs (six Electoral Divisions)
- Study Area Two: Mayo County
- Study Area Three: Sligo County
- Study Area Four: Ireland

The public interest in combating climate change and public concern over the cost of energy is at a high level. The Proposed Development will produce two versatile renewable energy sources locally, helping to mitigate climate change, improve energy security and stabilise and reduce energy costs. The Proposed Development will have a moderate positive long-term impact in relation to public interest.

Effects on settlement patterns during both the construction and operational phases will be minor, with construction workers potentially temporarily relocating to the area and the creation of a small number of long-term jobs.

Effects on the economy during both the construction and operational phases will also be minor, both direct and indirect, and positive, due to the creation of job opportunities and subsequent spending of income in the local area and within Ireland as a whole. The region could also benefit economically from improvements to the renewable energy supply, which could attract business. The production of green hydrogen in the region is a new and developing industry. Cumulatively, together with other proposed wind farm developments in the region, if these are progressed, the effects would be positive and of minor significance.

Overall effects of the Project with regards to tourism are considered to be short-term, slight, negative during both construction and decommissioning phases. During the construction and decommissioning phases, there is the potential for limited impacts on the residential

amenity of the local population. These are likely to be short-term impacts relating primarily to an increase in construction traffic causing noise and dust.

In terms of human health, hydrogen has a proven safety track record as a fuel for more than 100 years worldwide. It is non-toxic and non-poisonous, unlike conventional fuels and a hydrogen leak will not contaminate the environment or endanger the health of humans. Hydrogen does not create "fumes" and is 14 times lighter than air, consequently when it is released it dilutes quickly into a non-flammable concentration, significantly reducing the risk of ignition at ground level. Hydrogen has a higher oxygen requirement for explosion and a lower radiant heat than conventional gasoline. The Proposed Development is adequately distanced from existing properties and associated open space areas and areas.

In terms of human health, the Proposed Development has been considered in terms of water contamination, air pollution, noise, accidents and disasters and electromagnetic fields. With safe design and mitigation, the effect of the Proposed Development on human health has been assessed as imperceptible. The Proposed Development will contribute to the offset of the burning of fossil fuels which has the potential to positively impact human health.

6 NTS.7 SHADOW FLICKER

EIAR Chapter 4: Population and Human Health contains a Shadow Flicker analysis. Shadow flicker is the flickering effect caused when rotating wind turbine blades periodically cast shadows through constrained openings such as the windows of neighbouring properties. Industry standard software was used to model the potential for shadow flicker to occur, based on the proposed turbine locations and dimensions and the locations of residential properties. The defined study area was based on the 2006 Wind Energy Development Guidelines which is for properties within 10 rotor diameters (assumed at 1,550 metres as a worst-case scenario and 2,000 metres for completeness).

The adopted 2006 DoEHLG guidelines are currently under review. The assessment is based on compliance with the current DoEHLG Guidelines limit (30 hours per year or 30 minutes per day). The revised draft of the Wind Energy Development Guidelines 2019 provides for zero shadow flicker. However, it should also be noted that the Project can be brought in line with the requirements of the 2019 draft guidelines, should they be adopted while this application is in the planning system.

A significant minimum separation distance from all occupied dwellings of 740 m, except for one inhabited house has been achieved with the project design. Three houses, H1, H2 and H4 have been classed as derelict and have been removed from the assessment. There is a distance of 725 m from T3 to H3. The owner and occupier of this house is financially involved in the project and has provided written agreement accepting the reduced setback distance and has no objection to the proposed wind energy development, this is inline with the Wind Energy Guidelines 2006.

This assessment has identified the potential for shadow flicker to affect between 29 No. and 32 No. out of 46 No. receptors within the shadow flicker study area. Where significant shadow flicker effects are predicted to affect a sensitive receptor, these can be mitigated by adapting turbine control systems to stop the offending turbine when shadow flicker conditions are present. In this instance, it is proposed that a shadow control system be installed to eliminate the potential for shadow flicker from the Project. The installation of a blade shadow control system on all wind turbines will eliminate shadow flicker impacts from the Development, therefore, removing cumulative shadow flicker impacts.

The assessment has not identified any likely significant effects from the Project on population and human health.

7 NTS.8 BIODIVERSITY

EIAR Chapters 5, 6 and **7** identify and assess the potential impacts of the Project on terrestrial ecology, aquatic ecology and ornithology; respectively. Ornithology is further discussed in Section NTS.9 Ornithology. Surveys were undertaken within and adjacent to areas to the Proposed Development, in order to ascertain the status of ecological features, including habitats, terrestrial mammals, bats, fish and aquatic invertebrates. The nearest designated European site to the Wind Farm Site is the Ox Mountains Bog SAC (002006) which is adjacent to the southern boundary. The nearest designated European Site to the Hydrogen Plant is the River Moy SAC (002298) which is located a terrestrial separation distance of 2.4 km to the south. The nearest national designated site is the Lough Hoe Bog pNHA (000633) which is located a terrestrial separation distance of 2.9 km to the south of the Wind Farm Site.

The main potential impacts of the construction, and operational phases of the Project on ecology are considered to be:

- Direct loss of habitat
- Disturbance and degradation of terrestrial habitats

- Degradation of aquatic habitats and associated fauna supported by watercourses and lake habitats occurring downstream of the Proposed Development; and
- Disturbance to protected species
- Impacts to bats

Habitat surveys included general mapping and quadrat surveys, aimed at identifying important habitat types, including EU Habitats Directive Annex I habitats, either likely to fall under the footprint of the Project or with potential to be affected by it. The results of these surveys highlighted that the Wind Farm Site is ecologically dominated by Cutover blanket bog (PB4 of Fossitt 2000).

The footprint of proposed Wind Farm Site will result in the permanent loss of habitat of 0.48 ha of intact high bog (from a total of 72.46 ha on site) and 15.23 ha of cutover bog habitat (from a total of 368 ha on site). The significance of these losses will be compensated for by the implementation of a Biodiversity and Enhancement Management Plan (BEMP) (**Appendix 5.4**). The primary objective of this plan is to preserve and rehabilitate an area of lowland blanket bog to compensate for the loss of cutover bog as a result of the Proposed Development. Secondary objectives include the provision of enhanced habitat for peatland associated species.

The Hydrogen Plant Site is located within a field of improved agricultural grassland. As improved grassland is an abundant habitat throughout Ireland and of low ecological interest, the permanent loss of this habitat is considered to be not significant.

There are three minor watercourses within the Wind Farm Site, namely:

1. Owencam River (Tributary of Brusna River) which is a tributary of the River Moy.
2. Tributary of Glenree River which is a tributary of the Brusna River.
3. Western headwater tributary of Gowlan River which is a tributary of the Easkey River.

The three watercourses that rise within the Wind Farm Site are all small streams with minor flows. Resultantly they have limited fisheries or aquatic ecological habitat value and are rated of local importance higher value within the Wind Farm Site. However, in their lower reaches they all become of national importance on account of their Salmonid, Lamprey and in the case of the Easkey, its Freshwater Pearl Mussel (*Margaritifera margaritifera*) populations. Electro-fishing surveys were undertaken (under licence from the Department of Communications, Climate Action and Environment) at three locations on watercourses downstream of the Wind Farm Site.

The Dooyeaghny or Cloonloughan River flows to the south of the Hydrogen Plant Site. The stream rises a short distance upstream and has limited fisheries value in the vicinity of the Hydrogen Plant Site, and is rated of local importance higher value. However, in its lower reaches it has some salmonid spawning habitat. It flows into the Killala Bay / Moy Estuary Moy SAC and SPA approx. 4 km downstream of the Hydrogen Plant Site.

The nearest records of Freshwater Pearl Mussel to the Proposed Development is on the Gowlan River approximately 3.5 km downstream of the Wind Farm Site boundary. While this population is not within a SAC, in view of their Annex II Listed status, their unfavourable conservation assessment and being listed as critically endangered in the Republic of Ireland, they are considered of international importance.

The potential for effects on designated sites is fully described in the Natura Impact Statement (NIS) that accompanies this application. The findings presented in the NIS are as follows:

- During the evaluation of potential impacts associated with the Project, it was found that there is no potential to undermine the conservation objectives of the six SPAs and SACs and their relevant special conservation interests occurring within the zone of influence of the Proposed Development.
- A range of mitigation measures have been prescribed that once implemented in full will remove the risk of adverse effects posed by the Proposed Development to these qualifying features of interest.

It can be objectively concluded that the Project, individually or in combination with other plans or projects, has not and will not adversely affect the integrity of any European Site.

The implementation of the CEMP (**Appendix 2.1**) and a Biodiversity Enhancement and Management Plan (**Appendix 5.4**) is considered sufficient to reduce the level of any potential effects to levels that are considered to be not significant, while providing wide ranging benefits to species found on the Sites. There are considered to be no specific cumulative operational effects on individual species or territories as a result of the Proposed Development.

8 NTS.9 ORNITHOLOGY

Chapter 7 of the EIAR identifies and assesses the potential effects of the Project on ornithology. The construction, operational and decommissioning phases of the Project, have the potential to result in the following effects on birds:

- Habitat loss
- Disturbance
- Collision
- Displacement

Bird surveys were carried out between October 2019 and September 2021 at the Wind Farm Site to establish the site baseline, distribution, and abundance of bird populations, including a review of any surrounding designated sites for the wider hinterland up to 6 km. The Wind Farm Site is not located within a Special Protection Area (SPA).

These surveys followed widely recognised best practice guidance on the methods, timings and species that are recorded. This information was used to inform the design of the Wind Farm layout and the identification and assessment of potential effects. This design will limit the potential for direct effects for most bird species from habitat loss and collision.

However, the construction of the Wind Farm will result in the permanent loss of approximately 15.23 ha of cutover bog and a small amount (0.49 ha) of high bog. These peatland habitats are utilised by bird species such as red grouse, snipe, kestrel and meadow pipit (all Red-listed). While any loss of bog habitat is of some significance for associated bird species, the loss accounts for a low proportion (3.5%) of the total bog habitat at the Wind Farm Site and all the existing bird species on site are likely to retain viable populations.

The Hydrogen Plant Site is active agricultural land and does not support any bird species of conservation importance. The loss of part of a treeline at the Hydrogen Plant Site will affect a colony of nesting rooks. Rook is a common bird of the Irish countryside and breeds widely within agricultural landscapes. The loss of trees which support rooks is rated as an Adverse effect of Slight Significance.

From the perspective of birds, the effect by the loss of conifer plantation and wet grassland at the Wind Farm Site and of Improved grassland at the Hydrogen Plant Site is rated as Not Significant.

A requirement for mitigation during the operational phase of the Wind Farm has not been identified. However, should post construction monitoring identify an impact, such as higher collision rates than predicted for a particular species due perhaps to a change in population distribution since the baseline surveys, mitigation will be considered following best practice available at the time.

The implementation of the CEMP (**Appendix 2.1**) is considered sufficient to reduce the level of any potential effects to levels that are considered to be not significant, while providing wide ranging benefits to species found on the sites. No specific cumulative operational effects on individual species or territories as a result of the Project are considered. The ornithological assessment is based upon the observed field data and findings, published information and research and best practice guidance.

With mitigation measures as presented in the report implemented in full, and specifically construction phase mitigation for breeding birds of peatland habitats, as well as measures for target species such as golden plover (as required) during operation phase, it is considered that the significance of the predicted effect on birds as a result of the development will be Slight.

9 NTS.10 HYDROLOGY, GEOLOGY AND THE WATER ENVIRONMENT

Chapters 8 and 9 of the EIAR evaluates the effects of the Project arising from the construction/decommissioning and operational phases on the soils and geology and hydrology, hydrogeology resource within and surrounding the Wind Farm Site and Hydrogen Plant Site. Assessments for the Proposed Development were based on desk studies and Site surveys. The desk study assessment included consultation with the following organisations via online map viewers websites and databases:

- Environmental Protection Agency (EPA)
- Geological Survey of Ireland (GSI)
- Met Éireann (MET)
- National Parks & Wildlife Services (NPWS)
- Office of Public Works (OPW)
- Water Framework Directive (WFD)
- Mayo and Sligo County Councils
- The Local Authority Waters Programme (LAWPRO)
- Inland Fisheries Ireland (IFI)

There are statutory designated sites located near to the study area that are hydrologically connected to the Proposed Development including the Ox Mountains Bogs SAC, River Moy SAC, Killala Bay / Moy Estuary SAC and SPA. The Water Framework Directive (WFD) status of the surface water network associated with both the Wind Farm Site and Hydrogen Plant Site are Good to High.

All receptors associated with the Project i.e. streams, rivers, and groundwater, are considered highly sensitive receptors when considering;

- Water Framework Directive (WFD) status (2016-2021) of 'Good', with some sections ranging to 'High'. The WFD objective to protect waterbodies with at least Good status by the next review period (2027).
- Sensitive protected areas e.g. SAC, SPA associated with the catchment and the sensitive habitats and species associated with same.
- The designation of all waterbodies within the Redline Boundary and downstream surface water bodies and all groundwater bodies as sources of drinking water.

Currently the Wind Farm Site is already extensively degraded and of low environmental importance, with shallow peats, good stability and no steep slopes. The Hydrogen Plant is classified as 'improved' agricultural land. The Proposed Development will apply mitigation measures and monitoring, construction and operational phases of the Project, to avoid significant impacts on the current environment. The Proposed Development will also safely handle excavated material using deposition areas which will be beneficial long term to the environment as habitat enhancement areas.

A stand-alone Site Flood Risk Assessment (SFRA) Stages 1 & 2 for the Firlough Wind Farm and Hydrogen Plant Sites have been prepared as part of this EIAR, the report is presented in **Appendix 9.1** – Site Flood Risk Assessment Firlough Wind Farm and **Appendix 9.2** – Site Flood Risk Assessment Firlough Hydrogen Plant. This FRA assessment details site-specific rainfall and evapotranspiration rates as well as a preliminary water balance assessment for the estimated baseline runoff conditions and the estimated post development conditions at both Sites. There is no residual flood risk on either the Wind Farm Site or the Hydrogen Plant Site. Flood Risk Assessments conclude that the likelihood of exacerbating flood risk or behaviours at the Sites is very low, and the potential to exacerbate effects on local receptors including dwellings is very low.

Consultation with GSI well database (2022) indicates that the Wind Farm Site, Hydrogen Plant Site, Grid Connection Route and Interconnection Route do not intersect with any mapped well buffer zones (250 m). One borehole was identified along the Turbine Delivery Route which is used for agricultural and domestic use. This well is the closest mapped well to the Wind Farm Site at approximately 5 km distance. The closest mapped well to the Hydrogen Plant Site is approximately 1.1 km to the north and also used for agricultural and domestic use.

The Hydrogen Plant will require relatively large volumes of water for the production of hydrogen. Multiple sources of water will be utilised including groundwater and rainwater, and mains water if needed under exceptional circumstances. As presented in the Groundwater Supply Assessment (GSA) Report (**Appendix 9.8**) two boreholes can supply the expected water demand of the Hydrogen Plant Site without depleting the aquifer or impacting the wells nearby. Ongoing groundwater monitoring will be conducted. If monitoring indicates the groundwater is low, e.g., in drought conditions, water stored in two large underground water storage tanks will be used. Alternatively, the connection to the water mains can be used as a further backup.

Peat depths were measured by peat probing at a total of 105 locations at the Wind Farm Site and ranged in depth between 0.00 m and 4.40 m. Peat depth across the Wind Farm Site are generally shallow with the exception of minor isolated pockets of moderately deep and deeper peat delineated by shallow subsoils and/or bedrock at or near the surface. There was no very deep peat observed at the Wind Farm Site.

The Hydrogen Plant is underlain by a mix of 'Grey Brown Podzolics, Brown Earths' and 'Basin Blanket Peats'. Logged data for a series of eight boreholes drilled on or in proximity to the Hydrogen Site indicate depth to bedrock raging from 3 m to 6 m. Directly south of the Hydrogen Plant Site, a peatland area adjacent to the surface water feature, peat depths in this area ranged to maximum 1.9 m depth.

The potential impacts that could arise from the Proposed Development during the construction, operational and decommissioning phases relate to the potential for increased suspended sediment concentrations associated with both Wind Farm Site and the Hydrogen Plant Site preparation activities and excavations, groundwater abstraction and wastewater discharge. The drainage plan, Surface Water Management Plan (SWMP) (**Appendix 2.1**) for the sites will be a key method through which sediment runoff arising from construction activities will be reduced and through which runoff rates will be controlled. Standard, good-practice measures will be implemented to minimise the potential for effects such as pollution, erosion or changes to groundwater and surface water flows at the Proposed Development to occur. These established and effective measures are described in **Chapter 8: Lands, Soils and Geology – Section 8.5 Mitigation Measures and Residual Effects** and **Chapter 9: Hydrology and Hydrogeology – Section 9.5 Mitigation Measures and Residual Effects**.

With mitigation measures in place, the Proposed Development has been assessed as having the potential to result in effects of varying significance, however many are considered avoidable with the exception of the following unavoidable effects:

- There will be a change in ground conditions at the Wind Farm Site and the Hydrogen Plant Site with the replacement of natural materials such as peat, soils, subsoil and bedrock by concrete, subgrade and surfacing materials. This is a localised, negative, moderate adverse significance at a local scale, slight weighted significance at the scale of the Sites, direct permanent change to the materials composition at the sites.
- The potential loading of suspended solids in surface water runoff, particularly in relation to excavation works during the construction phase of the Project. While the loading of suspended solids in runoff is unavoidable, if precautionary and mitigation measures, as described are implemented, concentrations of suspended solids can be reduced to acceptable levels prior to runoff being intercepted by the surface water network.

Other potential effects have the potential to be significantly adverse, for example, a significant fuel spill, however applying the precautionary principal, mitigation measures, and proper planning, the likelihood and significance of such potential effects can be dramatically reduced.

During the construction/ decommissioning and operational phases of the Project, a number of established good practice measures will be put in place to minimise peat disturbance, peat stability, and loss and compaction of soils. With effective and well managed mitigation measures in place, no significant residual effects on geology and peat are predicted as a result of the Proposed Development.

The implementation of mitigation through avoidance principles, choice of best alternatives for location of works, pollution control measures, surface water drainage measures and other preventative measures incorporated into the project design in order to minimise potential significant adverse effects on water quality at the Wind Farm Site, Hydrogen Plant Site and along the Interconnector Route, Grid Connection Route and Turbine Delivery Route.

Overarching objectives of the CEMP are to adopt and implement Nature Based Solutions including the provision of extensive Sustainable Drainage System (SuDS) features. This approach will be adopted to the extent that mitigating against likely effects such as net increase in surface water runoff and potential adverse effects to surface water quality, will overshoot net adverse losses and provide beneficial effects compared to baseline conditions.

The Project as a whole, including the Wind Farm Site, Hydrogen Plant Site, Interconnector Route, Grid Connection Route and Turbine Delivery Route is not likely to significantly impact groundwater quantities, quality or availability. The principal residual risk to groundwater posed by the Proposed Development is the use, storage and transfer of hydrocarbons (fuel) on site for plant equipment. In the unlikely event a spill occurs, the contaminant will be contained, managed and removed immediately.

10 NTS.11 NOISE

Chapter 11 of the EIAR presents an assessment of the noise effects of the Project.

Noise will be emitted temporarily by plant and equipment and vehicles used during the construction phase. The main noise sources will be associated with the construction of the Turbine Foundations, Turbine Hardstands, electrolyser building foundations, Grid Connection, with lesser sources being site access tracks and construction of the Wind Farm Substation and Hydrogen Plant Substation. Decommissioning noise levels are assumed to be in the same order as construction levels and will be of temporary duration. Construction and decommissioning works will typically be more than approximately 740 m from the nearest property (noise receptor), at the Wind Farm Site and 300 m at the Hydrogen Plant Site making the potential for noise and vibration impacts considered to be not significant.

The main sound heard from wind turbines is the 'swish' from the movement of the blades through the air. Modern turbines are designed to minimise noise and planning conditions are used to ensure compliance with specified noise limits. The assessment of operational noise has been undertaken in accordance with best practice and following the latest guidelines. It has been shown that noise due to the Proposed Development, including cumulative effects with operational and consented wind farms will meet all current guidelines at all local properties.

11 NTS.12 LANDSCAPE AND VISUAL

Chapter 12 of the EIAR presents a Landscape and Visual Impact Assessment for the Project. This has been carried out by a qualified and experienced landscape architect to identify significant effects predicted to arise as a result of the Project. It considers separately the effects on landscape and visual receptors, as well as the cumulative effect of the Proposed Development in combination with other windfarm developments.

The Study Area for the Project covers a radius of 20 km for the Wind Farm in accordance with the Wind Energy Proposed Development Guidelines (2006 – Draft Revised 2019).

There is no specific guidelines to determine the extent of the Hydrogen Plant study area. However, the GLVIA-2013 allow for landscape and visual specialists to determine the appropriate study area ion the basis of professional experience and the likelihood of significant effects to occur. In this case a 2 km radius focussed study area has been applied to the Hydrogen Plant. Furthermore, the proposed Hydrogen Plant study area is nested inside the proposed Wind Farm study area allowing a broader consideration of sensitive receptors for the Hydrogen Plant than would otherwise be the case.

The landscape assessment considers potential effects on the receiving and surrounding landscape with reference to a range of landscape character areas (LCAs) and criteria published in various technical documents. The visual assessment considers effects upon visual receptors (as agreed with consultees through the EIA Scoping process) including scenic amenity designations, centres of population, transport routes and local community views using 26 viewpoints from representative / sensitive visual receptor locations. Photomontages have been prepared for the viewpoints and the figures also include a wireline of the Proposed Development on its own and a wireline with all other cumulative proposed developments.

The Proposed Development is located within the transitional landscape between the upland area the Ox Mountains, and the rolling coastal farmland around Killala Bay, with the Firlough Wind Farm located closer to the Ox Mountains, and the Hydrogen Plant within the aforementioned rolling farmland. The Ox Mountains form a dramatic backdrop to the southeast, effectively dividing the Study Area, with more gradual slopes to the northwest than the southeast. To the northwest of the mountains, where the Wind Farm Site is located, the landscape is oriented around the River Moy and Killala Bay, with all waterways and rolling landform oriented towards the coast.

The Wind Farm Site itself is contained within and surrounded by cutaway bog, with a long heritage of domestic use and stewardship by the local community. The landform appears as a level to gently sloping area, covered by exposed and vegetated bog, the expanse of which is halted only by conifer plantations. Overlaid across these, where visible, are the existing wind farm developments of Carrowleagh, Black Lough and further upslope, Bunnyconnellan. The immediate surrounds of the Hydrogen Plant Site are gently rolling topography, with a mix of modified bog (from cutting or planting of conifers) and pasture. To the north, the pasture is interrupted by conifers and residences, while to the south there is a network of small sections of woodland and modified bog. There is a patch of scrubby peatland, which appears to have been at least partially cutaway for domestic purposes

before reverting to vegetation to the south of the Hydrogen Plant Site. This traverses the Mayo and Sligo borders and is identified (on its Sligo side only) as a 'Sensitive Rural Landscape', it is considered that this might be better termed sensitive land cover as it is a fairly typical and unremarkable feature in landscape character term within this part of the country. There are also areas of commercial conifer plantations at various stages of rotation. The busy N59 corridor also influences the landscape character.

The vegetation and land use follows the varied topography of the Wind Farm Site Study Area and can be generally divided into thirds over a cross-section between the peaks of the Ox Mountains and the shore of Killala Bay. The Ox Mountains are defined by rolling peaks covered by moorland vegetation, intact (generally) banket bog, with occasional patches of conifer forestry or scrub in valleys/gentle sloped areas. This transitions to the west into the gentle sloping foothills and plateaux at the base of the Ox Mountains. This is where the Wind Farm Site is located and in defined by broad scale land uses and vegetation types. While dominated by bog, there is a high proportion of conifer forestry, both overlayed by a distributed collection of existing wind turbines. Further west, this plateau develops into rolling agricultural farmland dotted with a higher proportion of rural residences and farmyard buildings, surrounded by pasture and scattered low vegetation, overlaid with walled and hedgerow field boundaries. This is the area within which the Hydrogen Plant is located. The southeastern side of the Ox Mountains follows a similar Upland – Bog/Forestry – Farmed pasture pattern down the slopes of the mountains, however across shorter succession/ transition. There is a small collection of built up, residential and commercial land use areas across the wider Study Area, associated with population centres.

The largest centre of population in the Study Area is Ballina, located 12 km to the west of the Wind Farm Site. To the south, is Foxford, located 18.5 km southwest from the proposed Wind Farm Site. Also to the west is the settlement of Killala (17 km northwest of the Wind Farm Site). Smaller settlements identified on the Mayo settlement hierarchy map are Bunnyconnellan, 4 km southwest of the Wind Farm Site, Attymass and Knockmore, located 11 km and 17.7 km respectively southwest from the array. Within Sligo, Tobercurry (17.5 km southeast of the Wind Farm Site) and Inishcrone (10 km northwest of the Wind Farm Site) are the largest settlements located within the Study Area. Nearest residences to the Wind Farm Site are located along the local roads to the west. Surrounding the proposed Hydrogen Plant Site, the residential pattern features a higher proportion of individual residences on rural lifestyle properties or as holiday accommodation towards the coast.

The Mayo County Development Plan features a Landscape Appraisal rather than a Landscape Assessment, however with regard to identifying the different landscape character areas of the county the two are functionally similar.

The Wind Farm Site is located within Area H: East Mayo Uplands, and described as "*low-lying lakeland drumlins around the shores of Lough Conn and Lough Cullin, to rugged hill country where it forms the foothills at the southwestern end of the Ox Mountains."*

Within the Study Area, there are the following landscape character units:

- Eastern periphery of Unit D: North Coast Plateaux, with the critical landscape factors of elevated coastal vistas, smooth terrain and low vegetation.
- Area G: North Mayo Drumlins, with the critical landscape factors of undulating topography, shelter vegetation, prominent ridgelines, and localised lake vistas
- Northern edge of Area K: East-Central Drumlin Spine, with the critical landscape factors of undulating topography, shelter vegetation, prominent ridgelines, and localised lake vistas.

The County Mayo Renewable Energy Strategy defines the Wind Farm Site as Tier 1 - Preferred (Large Wind Farms) are areas in which the potential for large wind farms is greatest.

While the Wind Farm Site is located within Co. Mayo, the proposed Hydrogen Plant Site is located within Co. Sligo. The Hydrogen Plant Site is located within close proximity to visually vulnerable areas and scenic routes, but generally within the normal rural landscape classification, defined as:
"areas with natural features (e.g. topography, vegetation) which generally have the capacity to absorb a wide range of new development forms – these are largely farming areas and cover most of the County. At the same time, certain areas located within normal rural landscapes may have superior visual qualities, due to their specific topography, vegetation pattern, the presence of traditional farming or residential structures. These areas may have limited capacity for development or may be able to absorb new development only if it is designed to integrate seamlessly with the existing environment".

On the Sligo side of the central Study Area, much of the cutaway peatland area has been assigned 'sensitive rural landscape' status. However, this appears to be a land cover related designation that is applied to all peatland areas of the County on a broad-brush basis and it is not accepted that this is a particularly rare or remarkable setting in landscape character terms.

In terms of landscape effects, there will be physical impacts on the land cover of the site and cable route as result of the Proposed Development during the operational phase, but these will be relatively minor in the context of this productive rural landscape. For most commercial wind energy developments, the greatest potential for landscape impacts to occur is as a result of the change in character of the immediate area due to the introduction of tall structures with moving components. In this instance, wind turbines are a characteristic feature of both the immediate and wider context where they generally form part of a district pattern of development that follows both the terrain and landcover pattern of the area. The effect, therefore, is one of intensification and extension of an established land use in this landscape and not the introduction of a new and unfamiliar feature.

The scale of the Wind Farm will be well assimilated within its landscape context without undue conflicts of scale with underlying landform and land use patterns where wind energy is already a familiar feature. For these reasons the significance of the landscape impact is deemed to be Moderate-slight within the site and its immediate environs.

Beyond the central study area, the significance of landscape impact is deemed to reduce further as the wind farm becomes a proportionately smaller and more integrated component of the overall landscape fabric. Consequently, significant landscape impacts are not considered to occur.

At the Hydrogen Plant, the proposed electrolyser building will present predominantly as a large storage building coloured agricultural green to match the typical tone of farm sheds. It is considerably larger than most farm sheds, however, it is discreetly placed in its landscape setting which provides some natural screening due to the topography and surrounding vegetation. Where it is visible, only a small section of the upper profile of the main budling can be seen and the overall scale will not be apparent. It will therefore not have an overt visual influence. Beyond approximately 1 km it will not have a notable bearing on landscape character.

The visual impact assessments for each of the 26 selected viewpoint locations are contained in **Appendix 12.1** and are summarised within **Chapter 12** based on receptor type.

Ten of the viewpoints are from within approximately 5 km of the Wind Farm Site or Hydrogen Plant Site and represent Local Community Views as well as other receptor types in some instances. The three closest views (VP12, VP13 and VP18) to the Wind Farm Site, have a

very similar context of peatland/ cutaway peatland, commercial forestry plantations and wind energy developments. In all three cases the proposed wind turbines present at a prominent scale and occupy a considerable proportion of the afforded views. However, they do this without great detriment to character of this landscape and the remote / utilitarian nature of the visual context. While the wind turbines certainly add to the scale and intensity of built development within these scenes, they do not unduly compromise the sense of rural remoteness. Consequently, the significance of effects only ranged between 'Moderate' and 'Moderate-slight', which is comparatively low for local views of commercial scale wind energy developments in an Irish context.

Four viewpoints were selected to represent designated scenic routes / views northwest of the N59. The impacts from these vary between slight and imperceptible. Thus, there is a very low degree of impact on scenic designations from the Wind Farm. There were three Wind Farm Site viewpoints selected along the N59 one Hydrogen Plant Site viewpoint. The N59 is a key receptor as it is the principal transport route through the Study Area and also serves to perceptually divide the coastal farmland context to its northwest from the marginal farmland / forestry / wind farm plateau to its southeast. The significance of effects from seeing additional wind turbine blade sets rising within the same wind energy context of the vista was deemed to be 'Slight' in all three instances.

There were six representative viewpoints selected from Ballina and west of the River Moy, Due to the combination of distance, screening and the more localised focus of the selected views to the west of the River Moy, the visual impacts recorded from them are very minor. VP16 is the sole viewpoint used to represent the largest settlement within the Study Area – Ballina. This represents one of few locations where there is potential visibility of the proposed Wind Farm Site from Ballina which otherwise tends to hug the low lying corridor of the River Moy and where built development limits broad visibility. VP16 is from a slightly elevated residential housing estate in the north of the settlement where a green space allows relatively open views towards the distant Wind Farm Site when nearby existing turbines are already visible. The significance of effect was deemed to be 'Slight'.

There are five viewpoints that have been selected within the Ox Mountains context or more specifically from its north facing foothills where broad and elevated visibility across the peatland plateau of the central Study Area is afforded. All of these lie in designated scenic routes from the Mayo or Sligo County Development Plans, except for VP14, which is on a remote section of the Sligo Way long-distance walking route. The significance of impacts of these is deemed to be from slight to moderate.

Four representative viewpoints (VP23, VP24, VP25 and VP26) were selected specifically in relation to the Hydrogen Plant Site which is visually discrete from the Wind Farm Site. None of the Hydrogen Plant Site viewpoints afford clear views of the proposed Wind Farm Site or Wind Farm Site viewpoints that afford clear views of the proposed Hydrogen Plant Site. The selected Hydrogen Plant Site views are contained on the local roads and N59 that circulate the Hydrogen Plant Site.

In terms of the potential for cumulative impacts, there are seven existing, permitted and in-planning wind farms contained within the Study Area. These tend to form part of a district pattern of development that follows the peatland / forestry plateau at the northwestern base of the Ox Mountains. It is an area where wind farms are well accommodated and assimilated in landscape character terms. The proposed wind turbines represent a c. 22% increase to the overall number of turbines that will exist in this area, i.e. from 58 to 71 turbines, it is an extensive area and it is not considered that the proposed wind turbines represent a tipping point where wind turbines will become the predominant or most characteristic landscape feature. Instead, the Project will make wind energy development a more equal contributor to the landscape character of the plateau, which is currently dominated by peatland and forestry.

12 NTS.13 MATERIAL ASSETS AND OTHER ISSUES

Chapter 13 of the EIAR considers a number of other issues associated with the Proposed Development, including potential effects on Land Use – Agriculture and Forestry, Telecommunications and Electromagnetic Interference, Grid Connection and Grid Network, Air Navigation, Utilities (gas, water, waste) and Quarries.

12.1 Land Use; Turbary, Forestry and Agriculture

The Wind Farm Site has an area of approximately 445 hectares and is mainly cutover blanket bog, split in to turbary plots used for domestic purposes with an extensive network of bog tracks. The Wind Farm Site also has an Existing Permission for a 21 No. turbine Wind Farm. There are also a number of residential properties and established wind farms in the region, including the Carrowleagh Wind Farm adjacent to the east and the Carrowleagh Wind Farm Extension which is adjacent to the northeast. All 13 No. wind turbines and the associated site infrastructure are located on cutover areas of former turbary plots. The total land-take of the Wind Farm Site, including the site access roads, Turbine Hardstands and Turbine Foundations is approximately 27.55 hectares. This area will change from cutover, former turbary plots (with permission to build a wind farm) to renewable energy. Access to plots will be carefully managed to enable safe access throughout the construction and decommissioning phases. During the operation phase turbary can continue as normal.

Overall this will have a long-term slight, negative impact on turbary use during the construction, operation and decommissioning phases.

The Wind Farm Substation is to be located within a mature very low yield class commercial forest area of 5.83 ha which will be felled to facilitate construction. Within the wider area there are significant areas of forestry and this will have a permanent slight, negative effect.

The construction of the Hydrogen Plant will result in loss of 6.29 ha of agricultural horse grazing land, a permanent change of land use from agriculture to renewable energy production. The landowner has alternative areas available for horse grazing to continue elsewhere within the landholding. This will have a permanent slight, negative impact on agriculture during the construction and operation phases.

12.2 Telecommunications

Operators of microwave communication links were contacted during the EIA. Mitigation measures were adopted during the layout design to avoid impacting communication links. Disruption to television reception is considered unlikely following the switchover to digital broadcasting, as the signals are less susceptible to interference from turbines.

The implementation of mitigation measures will result in no interference with communication links. Therefore, no effects are predicted on telecommunications or radio reception as a result of the Proposed Development. The potential effects of the Project with regard to telecommunications and electromagnetic interference are therefore considered **not significant**.

12.3 Electricity Networks

The overall length of the Grid Connection between the Wind Farm Substation and the existing Glenree – Moy 110 kV overhead line (OHL) is 6.65 km. The Wind Farm Substation will connect largely with underground cabling, with a minor section of works required in the vicinity of the Tie In towers. During the construction phase the existing overhead line will be de-energised by ESB so work can commence on the construction of the towers. This will not impact the electricity network as EirGrid will configure the network to avoid the section during works. The circuit will be tested in both directions before the line is re-energised. The Proposed Development will contribute directly and in the long term to the electricity network by strengthening it through additional renewable energy generation.

12.4 Air Navigation

Operating wind farms have the potential to cause a variety of effects on aviation. Rotating wind turbine blades may impact on radar operations, although it is not likely at the Proposed Development. The physical height of turbines can cause obstruction to aviation and the overall performance of communications, navigation and surveillance equipment. All structures over 150 m in height are required to have lighting to warn aviation traffic.

The closest international airport is Ireland West knock airport which is 27.3 km to the southeast. Sligo Airport is the closest regional airport and is the helicopter search and rescue base for the northwest, it is 28.7 km to the northeast.

Airfields in the region include: Ballina Airfield is 14.3 km to the southwest, Lough Conn airfield, a grass airfield is 19.3 km southwest and Elphin Airfield; 60 km to the southeast.

Consultation with aviation operators was undertaken and the Irish Aviation Authority responded. They requested an obstacle warning light system for the Proposed Development, the provision of coordinates of each turbine and tip height, and to notify them 30 days prior to any crane operations commencing.

The turbine locations will be added to aviation maps prior to construction, and all requests from the Aviation Authority carried out to see that aviation safety protocols are followed. Therefore, effects on aviation as a result of the Proposed Development will be **negligible**.

12.5 Utilities (gas, water, waste)

It is likely that waste will be generated onsite during the construction and decommissioning phases of the Proposed Development. All rubbish and waste/excess materials will be removed from Site to an appropriate licenced facility from where it will be reused/recycled, where possible, or disposed of accordingly.

A desk study of available information from the EPA did not identify any waste facilities, illegal waste activities, chemical monitoring points or industrial EPA licensed facilities within a 2 km radius of the Site. The nearest waste facility to the Proposed Development is Rathroeen Landfill (W0067-1), 6.2 km northwest of the Hydrogen Plant Site and 12 km west of the Wind Farm Site. There are no gas mains located within the Wind Farm Site or Hydrogen Plant Site.

Mitigation measures will be implemented during each phase of the Proposed Development. Therefore, the residual effects of waste produced as a result of the construction, operational and decommissioning phases of the Proposed Development are considered to be **not significant**.

12.6 Quarries

The construction of the Proposed Development will impact on natural resources such as aggregates which will be sourced from the quarries in proximity to the Development.

The base course materials, including sand and stone for construction of the Development will come from licenced quarries in the locality such as:

- Killala Rock
- Frank Harrington
- Maloney Quarries
- Molloy Concrete ltd.

These quarries will also be the source of crushed stone and concrete for widening works to the Turbine Delivery Route, Construction Haul Routes, Turbine Foundations, the Hydrogen Plant foundations, and for Grid Connection and Interconnector works. Concrete for the Turbine Foundations will also be sourced from one of the local providers listed above. No significant negative impacts on local quarries are anticipated.

13 NTS.14 ACCESS, TRAFFIC AND TRANSPORT

Chapter 15 of the EIAR identifies and assesses the effects of traffic on the road network, and the consequent effects on receptors as a result of the Project.

Potential effects associated with the Project are presented in three key forms: those from the transport of wind turbine components, those as a result of the import of construction material, equipment and personnel and the operational transport of hydrogen.

A computer model of the turbine delivery vehicles is used to identify locations along the turbine component delivery route where road improvements will be required to facilitate delivery for abnormal loads between either Killybegs Port or Galway Port and the wind farm site (refer to EIAR Appendix 15.1 and 15.2).

It is proposed that the turbine and electrical components will be delivered via Killybegs Port, Co. Donegal or via Galway Port, Co. Galway. These components would be transported with an escort vehicle as standard practice, to help ensure safe passage.

The Killybegs Turbine Delivery Route is proposed as:

- Exit Killybegs Port taking the 2nd exit at the roundabout to the Shore Road
- Continue on Shore Road and turn right onto the R263
- Continue on R263 until the road joins to the N56
- At the 1st roundabout near Donegal town, continue on the N56
- At the 2nd roundabout near Donegal town, take the 2nd exit onto the N15
- At the roundabout outside Laghey, continue on the N15
- At the roundabout outside Ballyshannon, continue on the N15
- At the 1st roundabout outside Bundoran, continue on the N15
- At the 2nd roundabout outside Bundoran, continue on the N15
- Continue on N15, then join onto the N4
- At the roundabout near Sligo town, take 2nd exit continuing on the N4
- Take slip road off N4 and turn right to join the N59
- At the 1st roundabout in Ballysadare, take the 3rd exit and continue on the N59
- At the 2nd roundabout in Ballysadare, take the 2nd exit and continue on the N59
- Continue on N59, then turn left at Stokane onto the L-2604-0.
- Continue on L-2604-0, L-5137-0 and L-5137-9 until left turn to Wind Farm Site entrance.

The Galway Turbine Delivery Route is proposed as:

- Exit the Port of Galway onto Lough Atalia Road
- At the junction with R339, Turn right onto College Rd
- At Connolly Avenue junction, turn left towards Taum Road.
- At the junction with R336, turn right onto Tuam Road.
- At the junction with the N83, continue straight onto the N83.
- At the roundabout prior to Tuam, take the 1st exit onto the N17
- At the roundabout north of Tuam, take the 1st exit onto the N17
- At the roundabout south of Charlestown, take the 2nd exit onto the road towards N5
- Continue on N5 for 1.4km to the junction towards the L1331
- At the junction, turn left onto the L1331 towards Charlestown
- At the junction in Charlestown, turn right onto the N17
- At the junction in Tobercurry, continue straight on the R294

- At the junction, rejoint the N17
- At the roundabout south of Collooney, take the 1st exit and go contraflow onto the N4
- At the second roundabout, take the 2nd exit to continue to go contraflow on the N4
- At the contraflow slipway at the N4/N59, take the slipway and joint the N59
- At the 1st roundabout in Ballysadare, take the 3rd exit and continue on the N59
- At the 2nd roundabout in Ballysadare, take the 2nd exit and continue on the N59
- Continue on N59, then turn left at Stokane onto the L-2604-0
- Continue on L-2604-0, L-5137-0 and L-5137-9 until left turn to Wind Farm Site entrance.

There are separate construction haulage routes proposed to and from the Wind Farm Site to mitigate impacts to the local residents. The haul route to the Wind Farm Site leaves the N59 at north of Carraun taking local road L-6612-1, then Knockbrack road (L-6612) for 3.4 km and turning right on to the L2606 for 400 m. It then turns left on to Emlymoran road (L-5136-0) for 2.6 km before turning right on Stockane road (L5137-9) for 200 m to the Wind Farm Site entrance.

The route away from the Wind Farm Site travels back along the Stockane road and Emlymoran road, then turns right on to the L2606 and follows this for 3.4 km to the N59.

The delivery routes proposed primarily use the national road network from Co. Donegal to Co. Mayo bypassing densely populated areas such as Donegal town, Ballyshannon and Bundoran and the national road network from Co. Galway to Co. Mayo bypassing densely populated areas such as Galway and Charlestown.

The Hydrogen Plant Site has one site entrance, located 600 metres off the N59. The haul route includes 10 metres of local road L-6612-1 and an entrance to the N59 in the townland of Carraun which will be subject to improvement works, including a new round about and a junction that has been designed in consultation with the County Council Roads Department to provide safe entrance and egress to the facility. These will remain throughout the operational phase of the Proposed Development.

The recorded and predicted traffic figures show that in 2026, the Hydrogen Plant access junction is predicted to be at approximately 5.3% of its capacity and therefore has the capacity to accommodate additional traffic in the future.

A number of mitigation measures are proposed to minimise effects, including:

- The applicant will confirm the intended timescale for deliveries and every effort will be made to avoid peak times such as school drop off times, church services, sporting events, peak traffic times where it is considered this may lead to unnecessary disruption.
- Prior to delivery of abnormal loads i.e. turbine components, the Applicant or their representatives, will consult with An Garda Síochána and Sligo County Council and Mayo County Council Roads Departments to discuss the requirement for a Garda escort.
- Drivers of all delivery vehicles will be made aware of the presence of schools and other sensitive receptors and that formal pedestrian crossing facilities are not present.
- Wheel cleaning facilities will be provided at the two proposed entrances to the site.
- To reduce dust emissions, vehicle containers/loads of crushed stone will be covered during both entrance and egress to the site.
- The local road network will be monitored and maintenance will be carried out as required with any repairs undertaken at the cessation of the construction phase.
- The site entry points will also be appropriately signed. Access to the Wind Farm Site and Hydrogen Plant Site will be controlled by on site personnel and all visitors will be asked to sign in and out of the site by security / site personnel on entering and exiting the site. All site visitors will undergo a site induction covering Health and Safety issues at the Wind Farm Site Temporary Construction Compound and will be required to wear appropriate Personal Protective Equipment (PPE) while on-site.
- While production of green hydrogen is expected to be a 24 hour a day process, the Developer intends to restrict tube trailers from entering and leaving the premises between the hours of 7:00 and 19:00 as part of a wider traffic management plan. The movement of transportation of hydrogen will comply with The European Communities (Carriage of Dangerous Goods by Road and Use of Transportable Pressure Equipment) Regulations 2011 to 2021, as amended, apply to the transport of dangerous goods by road in tanks, in bulk and in packages and give effect to Directive 2008/68/EC, Directive 2010/35/EU and the ADR. This includes the consignment, packing, loading, filling and unloading of the dangerous goods in relation to their carriage. They apply the provisions contained in the technical Annexes to the "Agreement Concerning the International Carriage of Dangerous Goods by Road" (ADR).
- Appropriate safety signage will be placed on all tube trailers.
- Vehicles will regularly be inspected for damage, leaks or equipment malfunction and maintained in good working order.

- Tube trailers cylinders will have fitted temperature and pressure sensors that can be monitored remotely.
- Vehicle operators will be suitable qualified.
- Detailed telematics monitor vehicle and driver performance to ensure road safety.
- Cylinders will undergo extensive testing, including, cycling tests in which they are pressurized and depressurized many more times than they would be during their lifetime to make sure that they meet these performance requirements. Hydraulic stress testing to test the strength of the cylinders is performed.
- A detailed Emergency Response Plan (ERP) for the operational phase of the Hydrogen Plant, to cover health and safety emergencies as well as environmental emergencies, as part of the H&S Plan will be developed. This ERP shall be activated in the event of an emergency such as an accident, fire, spillage etc. and will provide details on who is required to be notified, first aid facilities and closest hospitals.
- Prior to the commencement of the construction phase of the Proposed Development, a detailed Traffic Management Plan will be prepared by the Contractor for agreement with the relevant local authorities and An Garda Síochána.

A Traffic Management Plan (TMP) has been developed (see Management Plan 7 attached to the CEMP, **Appendix 2.1**). A detailed Traffic Management Plan will be agreed with the relevant authorities and the community and will detail the measures to be implemented during the temporary construction/decommissioning phases.

14 NTS.15 AIR AND CLIMATE

This section assesses the effect of the Project on air quality, given the potential for dust emissions, and the likely carbon dioxide reduction effects of the Proposed Development in operation. Mitigation measures for the reduction of dust are outlined in the EIAR **Chapter 10: Air and Climate**. All turbines are situated greater than 725 m away from inhabited dwelling houses. After mitigation, the residual effects were assessed as having the potential to result in a short-term imperceptible, negative impact on climate during construction. There will be long-term moderate, positive impact on climate as a result of reduced greenhouse gas emission during the operational phase.

The layout of the Proposed Development has been designed to minimise the potential environmental effects while utilising the maximum energy yield from the site's wind resource. The selection of breaking new ground and impacting on natural habitat has been kept to a minimum.

The Proposed Development does not contain any element, which will produce Greenhouse Gas emissions or odorous emissions in operation. Indeed, the Proposed Development will contribute to a net national reduction in the emissions of greenhouse and other gases resulting from the combustion of fossil fuels.

Savings of carbon dioxide arise from the generation of electricity from the Wind Farm such that generation from other sources (which emit carbon dioxide) are offset and production of green hydrogen from the Hydrogen Plant offsetting diesel in HGVs.

The Wind Farm would result in a total installed capacity range of 65 to 78 Megawatts (MW).

The carbon footprint for the Proposed Development 139,107 tonnes of CO_2 equivalent losses at the lower range (5 MW) and 161,093 tonnes of CO_2 equivalent losses at the higher range (6 MW) over its 40 year life. Over the 40 year operational life of the Wind Farm, the Hydrogen Plant and Wind Farm combined will displace between 1.6 and 2.5 million tonnes of CO_2. This is influenced by the size of the electrolyser (10 MW to 80 MW) and the selected turbine in the range (5 MW to 6 MW). The carbon footprint of the Proposed Development will be offset by the Wind Farm and Hydrogen Plant in between 27 and 47 months of operation (or 2 to 4 years). This depends on the selected turbine and the installed capacity of the electrolyser.

The Climate Action and Low Carbon Development (Amendment) Act 2021 commits Ireland to reach a legally binding target of net-zero emissions no later than 2050, and a cut of 51% by 2030 (compared to 2018 levels). The target for 2030 in the Climate Action Plan 2023 is to generate 80% of the country's electricity from renewable sources.

It is considered that the Proposed Development will have an overall positive impact in terms of emissions reductions and climate change. It will assist Ireland in meeting the binding renewable energy target for the EU of 32% by 2030 and assist in meeting Ireland's renewable energy in transport target (RES-T) of 14% by 2030, which needs to increase from 4.3% in 2021.

Also, it will aid in increasing the onshore wind capacity, as per the Climate Action Plan 2023 and contribute to the EU Hydrogen Strategy's target to achieve 40 GW of renewable hydrogen electrolysers by 2030.

In isolation, the Proposed Development will have a significant positive effect on carbon savings and cumulatively, a significant positive effect when considered with Ireland's renewable energy deployment.

15 NTS.16 VULNERABILITY OF THE PROJECT TO MAJOR ACCIDENTS AND NATURAL DISASTERS

This section of the EIAR describes the likely significant effects on the environment arising from the vulnerability of the Project (as detailed in **Chapter 2** to risks of major accidents and/or natural disasters).

Major accidents or natural disasters are hazards which have the potential to affect the Proposed Development and consequently have potential impacts on the environment. These include accidents during construction and operation caused by operational failure and/or natural hazards. The assessment of the risk of major accidents and/or disaster considers all factors defined in the EIA Directive that have been considered in this EIAR, i.e., population and human health, biodiversity, land, soil (peat stability), water, air and climate and material assets, cultural heritage and the landscape.

A desk-study has been completed to establish the baseline environment for which the proposed risk assessment is being carried out. This will influence both the likelihood and the impact of a major accident or natural disaster. Local and regional context has been established prior to undertaking the risk assessment to develop an understanding of the vulnerability and resilience of the area to emergency situations. The scenario with the highest risk score in terms of the occurrence of major accident and/or disaster was identified as 'Transportation of Hydrogen during Operation', 'Peat Stability' during construction, 'Contamination' of the Proposed Development and risk of 'Industrial Accident Fire/Gas Explosion' during the construction, operation and decommissioning phases. The Development has been designed and built in accordance with the best practice measures set out in this EIAR and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design.

The risk of a major accident and/or disaster during the construction of the Development is considered 'low' in accordance with the 'Guide to Risk Assessment in Major Emergency Management' (DoEHLG, 2010).

16 NTS.17 INTERACTIONS OF THE FOREGOING

Any potential impact on one element of the environment as a result of the Project may also impact on another. Chapter 17 of the EIAR provides a summary of the interactions and interrelationships between environmental aspects of the Project. This includes significant effects from each EIAR chapter and also summarises the mitigation measures proposed to reduce either the likelihood or magnitude of these effects to an acceptable level.

Table 17.1 below outlines the different environmental aspects which have potential to interact because of the Project. Interactions have been clearly identified in the early stages of the Project and where the potential exists for interaction between environmental impacts, the EIAR specialists have taken the interactions into account when making their assessment. Potential interactions (both positive and negative) have been considered for the construction, operational and decommissioning phases of each of the different environmental aspects of the Project.

All environmental factors are interrelated to some extent. Having studied the interaction of potential impacts during the construction, operational and decommissioning phases of the Project, it has been determined that no amplification effect is anticipated. The Project will have some positive impacts on an international, national, regional and local level. It is also important to note that the landscape and visual impacts are almost entirely reversible upon decommissioning of the Proposed Development.

Table 17.1: Summary matrix of Interactions of Impacts during Construction, Operational and Decommissioning Phases (Source: Adapted from EIAR Guidelines, 2022)

	Population & Human Health		Biodiversity		Ornithology		Soils & Geology		Hydrology and Hydrogeology		Noise		Landscape & Visual		Material Assets		Cultural Heritage		Traffic & Transportation		Major Accidents and Natural Disasters	
	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper
Population & Human Health																						
Biodiversity																						
Ornithology																						
Soils & Geology																						
Hydrology and Hydrogeology																						
Noise																						
Landscape & Visual																						
Material Assets																						
Archaeology and Cultural Heritage																						
Traffic & Transportation																						
Major Accidents & Natural Disasters																						

17 NTS.18 LEGAL AND POLICY FRAMEWORK (SEPARATE REPORT)

A separate Planning Statement submitted with the EIAR sets out the relevant planning policy and legislative background to the planning application. The Proposed Development has had regard to The National Planning Framework, The Regional Spatial and Economic Strategy (RSES) for The Northern and Western Regional Assembly Area, the Mayo County Development Plan 2022-2028 and the Sligo County Development Plan 2017-2023.

The Climate Action Plan 2023 set outs ambitious and legally binding targets for Ireland. The goal is that Ireland will achieve net-zero greenhouse gas emissions no later than 2050 and a reduction of 51% by 2030. The Proposed Development will contribute towards meeting those targets.

Throughout the policy statement, renewable energy is identified as being required to play a vital role in mitigating climate change by transitioning to a low carbon economy and society. By investing in renewable energy, Ireland can promote sustainable economic development using its own, secure and clean energy. The Proposed Development contributes to supplying the national demand for renewable energy, which in the context of the ongoing climate emergency is an urgent Irish national priority.

Green hydrogen is featured in the Climate Action Plan 2023, National Energy and Climate Plan, National Energy Security Framework, Renewable Fuels for Transport Policy Statement, the Consultation on Developing a Hydrogen Strategy for Ireland, Mayo County Development Plan 2022-2028 and multiple European level policies, including the EU Hydrogen Strategy, European Green Deal and REPowerEU. It is considered across these polices as a renewable and versatile fuel, with the potential to:

- Store excess renewable energy from the grid as back-up for intermittent renewables, or where production is higher than demand.
- To ensure energy security and resilience in energy supplies.
- As a way to decarbonise sectors that in the past have struggled to separate from fossil fuel use such as transportation, industrial processes and building heating.

Ireland missed its 2020 target for renewable energy achieving 12% instead of 16% of overall renewable energy share. Ireland's renewable energy in transport target (RES-T) under REDII is 14% by 2030, the renewable energy share in 2021 was 4.3%. This indicates that there is a strong justification for the decarbonisation of the transportation sector, which could be assisted by the Proposed Development with the production of green hydrogen.