UNSHINAGH WIND FARM

Environmental Statement

Volumes 1 - Non Technical Summary

MANAGEMENT SYSTEM CERTIFICATION
ISO 9001 = ISO 14001 = OHSAS 18001
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Preface

This document is Volume 1 of the ES. The ES comprises:

Volume 1: Non-Technical Summary (NTS)
Volume 2: Main Report
Volume 3: Figures (Maps & Illustrations)
Volume 4: Technical Appendices

The aim of the NTS is to summarise the content and main findings of the ES in a clear and concise manner to assist the public in understanding what the environmental effects of the Unshinagh Wind Farm are likely to be. The full ES provides a more detailed description of the Development and the findings of the Environmental Impact Assessment (EIA) process.

The ES has been prepared by RES in consultation with Department of Infrastructure (Planning), various consultees and in collaboration with the subject specialists outlined below.

Specialism	Author
Introduction & the Proposed Development; Design Evolution & Alternatives; Noise; Transport and Shadow Flicker	RES
Planning Policy	Turleys
Landscape and Visual	Shanti McAllister Landscape Planning & Design
Archaeology and Cultural Heritage	Orion
Ecology	Blackstaff Ecology
Ornithology	David Steele
Fisheries	Paul Johnston Associates
Geology and Water Environment Peat Slide Risk & Peat Management Plan	McCloy Consulting
Socioeconomics	Oxford Economics

Commenting on the ES

The full ES, together with supporting documents submitted as part of the planning application (Design and Access Statement and Pre-Application Community Consultation Report) will be available (and CD copies available free of charge) for viewing (**BY APPOINTMENT ONLY DUE TO COVID-19 RESTRICTIONS)** and during normal opening hours at the address below:

Canlough Library,
32 Harbour Rd,
Carnlough,
Ballymena
BT44 0EU
Tel: 028 2888 5552

An electronic version of the reports supporting the application, including the ES, will be available to download free of charge from http://www.Unshinagh -windfarm.co.uk

Paper Copies of the ES can be obtained at a cost of £80 from the address below:

RES Ltd
Willowbank Business Park
Willowbank Road
Millbrook
Larne
BT40 2SF
Email: jennifer.mccorry@res-group.com
Phone: 028 2844 0580

Electronic copies (USB) will also be available on request to the address above.

1. Introduction

1.1 This Non-Technical Summary (NTS) has been prepared in support of a planning application by RES Ltd for the proposed Unshinagh Wind Farm, hereinafter referred to as 'the Development', which is located approximately 4km South west of the village of Cairncastle, Larne, Co. Antrim.

1.2 A planning application has been submitted to Department of Infrastructure (Strategic Planning Directorate) in accordance with the Planning (Environmental Impact Assessment) Regulations, 2017. The regulations require an Environmental Impact Assessment (EIA) to be carried out and the results of the EIA to be included in an Environmental Statement (ES) to accompany the planning application. The application follows a detailed assessment of the environmental and technical aspects of the site's suitability for development.

1.3 The Development comprises 14 three-bladed, horizontal axis wind turbines, each up to a maximum of 180 m to tip height, associated external electricity transformers; underground cabling; a newly created site entrance; access tracks; turning heads; crane hardstanding's; control building and substation compound, energy storage containers, tree felling, off-site areas of widening to the public road and all ancillary works. During construction and commissioning there would be a number of temporary works including a construction compound with car parking; temporary parts of crane hardstanding's; welfare facilities.

1.4 Final wind farm capacity will vary depending on the outcome of planning permission and the turbine type selected. It is estimated that the wind farm could produce enough electricity to meet the needs of 62,800 homes each year[1], over 6,000 more than the current housing stock (of approximately 56,500[2]) in the local area.

The Applicant

1.5 RES is the world's largest independent renewable energy company. At the forefront of the industry for nearly 40 years, RES has delivered more than 22GW of renewable

[1] For Unshinagh a load fact of 0.46 was provided by RES and applied to Oxford Economics' calculations. This load factor allows us to account for wake and electrical losses using typical wind speeds/directions etc. to give a realistic prediction of electricity output (rather than using a theoretical maximum level whereby it is assumed that wind blows for 24 hours a day 365 days a year on every wind farm site.)

[2] Oxford Economics Internal Model Suite.

energy projects across the globe and supports an operational asset portfolio exceeding 7.5GW worldwide for a large client base. RES is active in 10 countries working across onshore and offshore wind, solar, energy storage and transmission and distribution.

1.6 RES has developed 22 onshore wind farms in Northern Ireland totalling 246 MW and operates over 88.7 MW of wind capacity across Northern Ireland, has secured planning permission for a further 109.9 MW awaiting construction and has 80 MW in the planning system.

The Application Site

1.7 There are a number of key technical and environmental factors that influence the suitability of a site for a wind farm. The following are key attributes that contribute to a viable site, which the application site possesses:

- Wind Speeds/Energy Yields: Sufficiently high wind speeds to ensure energy production from the wind turbines that would yield an adequate return on investment
- Planning: A site which complies with planning policy and in particular, avoids unacceptable effects on areas designated by statutory agencies; maintains appropriate distances from dwellings to avoid unduly impacting local amenity and; avoids impeding or interfering with major electromagnetic transmission and airport communication systems
- Area of Site: A site must have sufficient area to accommodate the number of wind turbines required for economic viability
- Access: Adequate vehicular access to a site using existing roads wherever possible to minimise the amount of civil works, particularly during the construction phase
- Local Terrain and Topography: Terrain and topography affect wind flow across a site and need to be considered in relation to turbine performance, specification and life-span
- Ground Conditions: A site must have suitable ground conditions for the construction of wind turbine foundations, erection of the machines and the provision of access tracks and cables.

1.8 The site is located in the Antrim Coast and Glens Area of Outstanding Natural Beauty (AONB) approximately 2.8 km to the South- West of the coastal village of Carnlough and approximately 17 km to the North- East of Ballymena town centre, Co. Antrim. The turbines would be located on upland grazing land between the townlands of

Unshinagh and Ticloy on the Garron Plateau uplands to the south east of Cleggan Forest and below the summits of Berry Hill, Binnagee and Neill's Top. The site will be accessed from the A42 Carnlough-Ballymena Road.

1.9 The Site is currently used for sheep and cattle grazing and predominantly comprises semi-improved agricultural land. The lands are well managed with extensive stoned farm tracks providing access to agricultural fields which are bounded by mature hedgerows and stone walls.

The Need for the Development

Climate Change

1.10 The Paris Agreement establishes a framework for global climate action including the mitigation of and adaption to climate change, support for developing nations and the transparent reporting and strengthening of climate goals. The European Union signed The United Kingdom of Great Britain and Northern Ireland up to the Agreement on 22 April 2016 and it came into force on the 18 December 2016.

COP26

1.11 The 26th UN Climate Change Conference of the Parties (COP26) took place in Glasgow on 21 October – 12 November 2021, attended by the countries that signed the United Nations Framework Convention on Climate Change. At COP 26, Nations adopted the Glasgow Climate Pact, aiming to turn the 2020s into a decade of climate action and support. Key outcomes included strengthened efforts to build resilience to climate change, to curb greenhouse gas emissions and to provide the required necessary finance. Nations reaffirmed their duty to fulfil the pledge of providing $100 billion annually to developing countries. They collectively agreed to reduce the gap between existing emission reduction plans and what is required to reduce emissions in order to limit the rise in the global average to 1.5 degrees. Nations were called upon to phase down unabated coal power and inefficient subsidies for fossil fuels.

1.12 As part of the package of decisions, nations also completed the Paris Agreement's rulebook relating to market mechanisms and non-market approaches and the transparent reporting of climate actions. This set of rules lays out how countries are held accountable for delivering on their climate action promises and self-set targets under their Nationally Determined Contributions (NDCs). At COP26, Nations reached new agreements for market mechanisms, essentially supporting the transfer of emission reductions between countries while also incentivising the private sector to invest in climate-friendly solutions.

Net Zero

1.13 The Strategic Energy Review was first published in 2007 to establish a core energy policy for all of Europe (Commission of the European Communities, 2007). An agenda was agreed in order to achieve the key energy objectives of:

- Sustainability;
- Competitiveness and security of supply;
- Reducing GHG emissions by 20%;
- Obtaining 20% of energy consumed from renewable energy sources; and
- Improving energy efficiency by 20%.

1.14 The Review was updated in 2008 (Commission of the European Communities, 2008), in order to propose an Energy Security and Solidarity Action Plan, which focused on diversification of energy supply, energy efficiency and making the best of the European Union's indigenous energy resources.

1.15 Development of renewable energy reserves, including wind, solar, hydro, marine and biomass energy are seen as the main sources of indigenous energy.

The Energy Road Map 2050

1.16 The Road Map (Commission of the European Communities) sets out a long-term vision for renewable energy sources in the European Union and it forms an integral part of the Strategic European Energy Review. The Energy Roadmap 2050 sets out the transition and cost effective pathways for key economic sectors for achieving an 80-95% reduction in EU emissions by 2050. To achieve this goal, significant investment is needed in new low-carbon technologies and infrastructure, energy efficiency and renewable energy.

1.17 The 2050 target will not be shifted into national targets via EU legislation, but allows more flexibility for Member Countries to meet their greenhouse gas emission reduction targets in the most cost effective method in regards to their own specific circumstances.

1.18 A net-zero GHG target for 2050 will deliver on the commitment that the UK made by signing the Paris Agreement. It is achievable with known technologies, alongside improvements in people's lives, and within the expected economic cost that Parliament accepted when it legislated the existing 2050 target for an 80% reduction from 1990.

1.19 However, this is only possible if clear, stable and well-designed policies to reduce emissions further are introduced across the economy without delay. Current policy is insufficient for even the existing targets.

1.20 Following the publication of this report, the UK Government committed to enshrining in law a commitment to reach net zero carbon emissions by 2050 through an amendment to the Climate Change Act.

Security of Supply

1.21 A key policy driver for the development of renewable energy in Northern Ireland is the need to increase security of supply. There are also potential adverse impacts on local populations and the *economy* through high volatile fuel costs, contributing to fuel poverty and high energy costs for businesses and industry. In addition, increasing focus on renewable energy can deliver environmental and climate change gains, reductions in carbon emissions, as well as investment and employment opportunities. With a lack of indigenous fossil fuels and no nuclear power stations, Northern Ireland is keen to develop the full range of its available renewable energy resources to optimise the contribution that renewables make to the overall energy mix.

1.22 Wind is a free and inexhaustible resource which has an important role to play as part of a balanced energy mix. Wind energy enables us to generate our own electricity without reliance on imports and is not subject to sudden price fluctuations or the uncertainty of global markets. New onshore wind is now the cheapest source of electricity generation bar none. This makes onshore wind developments not only beneficial for the environment but also for bill payers in Northern Ireland.

1.23 The Development will result in a reduction in greenhouse gas emissions from the electricity generating industry by harnessing wind as an alternative to the burning of fossil fuels, in line with the government's energy goals. It is also important to highlight that energy production is not static and additional renewable generation will be required to be connected to maintain the NI targets and subsequently achieve and maintain the UK renewable targets.

1.24 The Department for Economy has set out intentions of an Energy Strategy Options public consultation issued by the end of March 2021, with the responses from this informing a final Energy Strategy to be launched by November 2021.

1.25 Whilst still at consultation stage it is expected that the strategy will set out a 70% target and possible interim targets. Such provisions would be in alignment with the Republic of Ireland's aim of 70% renewable electricity by 2030 as set out within the Region's Renewable Electricity Support Scheme (RESS). It is important to note that there is no cap upon the existing 40% target until it is superseded.

1.26 Furthermore, despite the current lack of an explicit, Northern Ireland specific, post-2020 renewables target, other relevant frameworks and reference points apply, including the Climate Change Act 2008, by which the UK committed itself to reducing greenhouse gas emissions by at least 80% of 1990 levels by 2050. Included in this target is the reduction of emissions from the devolved administrations, including Northern Ireland.

2 Description of the Development

2.1 The main elements of the Development are as follows:

- 14 three-bladed horizontal axis wind turbines of up to 180 m tip-height
- Turbine foundations
- Hardstanding areas at each turbine location for use by cranes erecting and maintaining the turbines
- Electricity transformers
- Approximately 12.07 km of new access track and 0.46 km of upgraded access track
- Wind farm substation compound containing a control building
- Battery Energy Storage Containers
- On-site electrical and control network of underground (buried) cables
- Connection from the substation to the local grid network
- Temporary construction compound
- Permanent and temporary drainage works
- Associated ancillary works
- Temporary enabling works compound
- New site entrance from the public road.
- Tree felling.

2.2 The wind farm layout is shown in **Figure 1.3: Infrastructure Layout**.

2.3 The actual area of permanent land take is limited to the control room and substation compound, energy storage area, wind turbine towers, permanent crane

hardstandings and on-site access tracks, which collectively account for approximately 4.71% of the area within the planning application boundary. In addition, there will be an estimated 12,220m2 of hardstanding required on a temporary basis during construction.

2.4 Prior to construction the locations of the proposed wind turbines would be subject to micrositing, which allows for a small degree of flexibility in the exact locations of turbines and routes of tracks and associated infrastructure (50 m deviation in plan from the indicative design). Any repositioning would not encroach into environmentally constrained areas. Therefore, 50 m flexibility in turbine positioning would help mitigate any potential environmental effects: e.g. avoidance of unfavourable ground conditions or archaeological features not apparent from current records. The micrositing allowance has been taken into account in the EIA.

Wind Turbines

2.5 The wind turbine industry is evolving at a remarkable rate. Designs continue to improve technically and economically. The most suitable turbine model for a particular location can change with time and therefore a final choice of machine for the Development has not yet been made. The most suitable machine will be selected before construction, with a maximum tip height of 180 m.

2.6 For visual and acoustic assessment purposes, the most suitable candidate turbine available in the market place (currently of 4.2 MW nominal capacity and with an overall tip height of 180 m) has been assumed. Exact tower and blade dimensions vary marginally between manufacturers. A diagram of a typical 180 m tip height turbine is given in **Figure 1.4: Typical Wind Turbine Elevation**.

2.7 Each turbine would have a transformer and switchgear. Depending on the turbine supplier, the transformer and switchgear may be located inside or outside each turbine.

2.8 The wind turbines would be erected on steel re-enforced concrete foundations. During the erection of the turbines, crane hardstanding areas would be required at each turbine base consisting of both permanent and temporary elements. After construction is complete, the temporary crane pad areas will be reinstated.

Site Tracks

2.9 The site entrance is located to the north of the Slane road/Ballymena road junction on the A42 Carnlough/Ballymena road.

2.10 Approximately 12.07 km of new access tracks and 0.46 km of upgraded access tracks are required within the site to enable the turbine components and construction materials be transported to their locations, and to enable ongoing access during the operational period for maintenance visits.

2.11 The on-site access track layout has been designed to minimise environmental disturbance by utilising existing track locations and avoiding sensitive habitats where possible whilst keeping the length of track commensurate with the minimum required for operational safety. The track route takes cognisance of the various identified environmental constraints.

2.12 Twenty watercourse crossings will be required as part of the track layout. These crossings would be designed to ensure that fish and mammal movements are not restricted, in addition to ensuring the crossing size is adequate for potential flood flows.

- Six crossing of a significant watercourse.
- Fourteen crossings of minor watercourses.

Electrical Connection, Control Building & Substation and Energy Storage

2.13 Assuming the use of the currently available models, each wind turbine would generate electricity at low voltage and would have an ancillary transformer located either within or outside the base of the tower to step up the voltage to the required on-site distribution voltage. Each turbine would be connected to any adjacent turbines by underground cables.

2.14 The wind farm control building and substation is proposed to be located on the eastern part of the site as shown in **Figure 1.3: Infrastructure Layout**. All power and control cabling on the wind farm will be buried underground in trenches located, where possible, along the route of site access tracks.

2.15 The control building will be designed and constructed to the standard required by NIE for the accommodation of substation equipment. Where possible, local building materials and finishes will be used to ensure that the appearance is in keeping with other buildings in the area. The building will be staffed by maintenance personnel on a regular basis.

2.16 Four permanent containers housing battery energy storage device, inverters and other ancillary equipment will be positioned adjacent to the control building and substation compound on hardstanding used originally for the temporary construction compound. These units are a means of storing electrical energy just like a rechargeable battery, cell phone or electric car. These are means by which power can be stored and released. The application is of course of a larger scale but the basic principle is the same.

Construction Management

2.17 An Outline Construction Environmental Management Plan (oCEMP) is included within the Environmental Statement and a Construction and Environmental Method Plan (oCEMP) will be prepared if planning consent is granted. This will be submitted to the Department prior to any construction works taking place. This will describe the detailed methods of construction and working practices, work to reinstate the site

following completion of construction activities and methods to reinstate the site post operation. The CEMP will:

- provide a mechanism for ensuring that measures to prevent, reduce and where possible offset potentially adverse environmental impacts identified in the ES are implemented;
- ensure that good construction practices are adopted and maintained throughout the construction;
- provide a framework for mitigating unexpected impacts during construction;
- provide a mechanism for ensuring compliance with environmental legislation and statutory consents;
- provide a framework against which to monitor and audit environmental performance.

2.18 The wind farm drainage system will be designed to mimic natural conditions to mitigate against increased flashiness in water courses and reduced groundwater recharge. The drainage system will protect the status of water courses and ground waters.

2.19 Construction will be carried out according to Department of Agriculture, Environment & Rural Affairs (DAERA) and Construction Industry Research and Information Association (CIRIA) guidance for site works. Pollution control measures during the construction phase will be included in the CEMP.

2.20 It is anticipated that the construction would take approximately 18 months. Construction work will take place between the hours of 0700-1900 Monday to Friday and 0700 – 1300 on Saturdays. Outside these hours, work at the site shall be limited to turbine erection, testing/commissioning works and emergency works. Deliveries may occur outside these times to minimise disruption to local residents.

2.21 A programme of reinstatement would be implemented upon completion of construction. This would relate to the construction compound, temporary areas of the crane hardstandings, cable trenches and track shoulders where appropriate. There remains a potential to use cranes during the operational phase of the Development, therefore the main crane hardstanding will remain uncovered.

Operation

2.22 The expected operational life of the Development is 35 years from the date of commissioning. Wind turbines and wind farms are designed to operate largely unattended. Each turbine would be fitted with an automatic system designed to supervise and control a number of parameters to ensure proper performance (e.g. start-up, shut-down, rotor direction, blade angles etc.) and to monitor condition (e.g. generator temperature). The control system would automatically shut the turbine down should the need arise. Sometimes the turbines would re-start automatically (if the shut-down had been for high winds, or if the grid voltage had

fluctuated out of range), but other shut-downs (e.g. generator over temperature) would require investigation and manual restart.

2.23 The Development itself would have a sophisticated overall Supervisory Control and Data Acquisition system (SCADA) that would continually interrogate each of the turbines and the high voltage (HV) connection. If a fault were to develop which required an operator to intervene then the SCADA system would make contact with duty staff via a mobile messaging system. The supervisory control system can be interrogated remotely. The SCADA system would have a feature to allow a remote operator to shut down one or all of the wind turbines. This is monitored 24 hours a day, 7 days a week.

2.24 An operator would be employed to operate and maintain the turbines, largely through remote routine interrogation of the SCADA system. The operator would also look after the day-to-day logistical supervision of the Development and would be on-site intermittently.

2.25 Routine maintenance of the turbines would be undertaken approximately twice yearly to ensure the turbines are maintained to Industry Standard. This would not involve any large vehicles or machinery.

2.26 A Habitat Management Plan will be implemented during the construction and operational phases of the Development, working with the site landowners, which will provide for the restoration and enhancement of blanket bog and heathland habitats on site.

Decommissioning

2.27 One of the main advantages of wind power generation over other forms of energy production is the ease of decommissioning and the simple removal of components from the site. The residual impact on the site is limited to the continued presence of the foundations and access tracks. All above ground structures can be removed from the site.

2.28 If the Development obtains planning approval it is expected that a planning condition would be set to provide for the decommissioning of the site in accordance with a scheme agreed in writing with the Planning Authority.

2.29 The Development will be decommissioned in accordance with best practice and/or in compliance with any planning conditions. Current best practice includes the removal of all above ground structures; the removal of all underground structures where required; and reinstatement of disturbed areas all of which will be subject to any necessary consents. Consideration will be given to the retention of wind farm access tracks if they utilise pre-existing farm infrastructure or are not located on sensitive habitats if such continued use could lead to the long-term degradation of these habitats.

3 The Environmental Impact Assessment (EIA) Process

3.1 The purpose of EIA is to provide adequate environmental information to enable stakeholders to understand the potential environmental effects of a project. The EIA identifies and assesses the potential environmental effects associated with the construction, operational and decommissioning of the Development. The assessment and potential effects are recorded in the ES.

Consultation

Public Consultation

3.2 RES is committed to finding effective and appropriate ways of consulting with all its stakeholders, including local residents and community organisations, and believes that the views of local people are an integral part of the development process. RES began the engagement process with the local community a number of months prior to the submission of the planning application, to facilitate a constructive consultation process which helped RES to understand and address any concerns as the project developed.

3.3 A virtual public exhibition was held in September 2021 which included detailed information about the proposals, including: a map of the proposed layout; photomontages representing how the proposed layout would appear from a range of viewpoints; Zone of Theoretical Visibility (ZTV) drawings. (A ZTV is a map-based diagram of where and how many wind turbines, or wind farms, would theoretically be visible from all parts of a given area.) RES staff were available to answer questions and feedback was encouraged.

3.4 A second stage consultation period was advertised and open from 18th January to 3rd February 2022 to enable members of the community to make any further comments on the proposal. The consultation provided details as to where further information may be obtained concerning the proposed wind farm along with information on how, and by when, persons wishing to make comments to the Applicant relating to the proposal may do so.

3.5 A Pre-Application Community Consultation (PACC) Report has been produced and is available for viewing at the location listed in Section 1 of this NTS.

EIA Consultation

3.6 RES and the various chapter authors have undertaken pre-application consultation with relevant consultees, which has informed the EIA process and is detailed in each of the technical chapters within the Volume 2 (Main Report) of the ES.

Wind Farm Design Evolution & Alternatives

3.7 In accordance with EIA process and best practice the project team employed an iterative approach to the design of the Development. The design evolved throughout the EIA process as different constraints and adverse/ beneficial effects were identified and evaluated. This approach allowed mitigation measures to be integrated into the design in order to alleviate or remove significant effects of the proposed development. It also allowed measures to enhance beneficial effects of the proposed development to be incorporated into the design.

3.8 Following consultation and baseline characterisation of the Site, the following key topics were identified:

- Landscape and visual
- Archaeology and cultural heritage
- Ecology
- Ornithology
- Fisheries
- Geology and water environment
- Noise
- Shadow flicker
- Traffic and transport.

3.9 The topics listed above were considered through the design with the aim of designing out significant effects. Where it was not possible to mitigate by design, the issues were considered further as part of the EIA.

3.10 A key tool in this process was the combined constraints drawing, which identifies constraints to development and sensitive features on the site. This drawing was iteratively updated as new information from surveys, site visits and consultation was received.

Initial Turbine Layout (Feasibility Stage)

3.11 At the beginning of the development process an initial layout was produced to show the maximum potential extent of the development within the space available and in accordance with the design principles, prior to baseline surveys had been completed. The layouts were informed by the following constraints:

- Preliminary watercourse buffers
- Slope

- Known private water supply locations
- 10 x rotor diameter separation from housing (1000m) / Double the minimum separation distance of 500 m).
- 198 m buffer (tip height + 10%) to public roads in accordance with the Best Practice Guidance to PPS 183. This was buffered to ensure adequate setback.

3.12 This initial feasibility layout was reviewed by the Landscape Consultant (Layout 2). A layout comprising 16 turbines was initially assessed. ZTV diagrams were prepared to compare the difference in theoretical visibility for blade tip heights of 150 m versus 180 m and hub height visibility for three potential rotor diameter options (117 m, 126m and 136 m). Comparative wirelines were prepared from six provisional viewpoint locations in key parts of the Study Area.

3.13 The provisional wirelines showed no significant difference in the appearance of the turbines regardless of rotor diameter but 180 m blade tip was deemed to be the preferable tip height if 136 m rotor diameter is used (a larger rotor is able to capture more wind and is therefore more productive). This is because the taller hub creates more clearance/ visual separation between the blade tips and skyline and means that the blades are less likely to interfere with appreciation of the landscape.

3.14 A review of the initial 16-turbine layout based on wirelines of the six PVPs concluded that some refinements to turbine spacing/ groupings could be made to create a more uniform appearance that better reflected to underlying topography.

Primary Turbine Layout (EIA Baseline Stage)

3.15 Prior to detailed site assessments being undertaken by external consultants, RES technical analysts undertook site visits to check that there were no physical characteristics on site that may impact upon the turbine performance such as topography.

3.16 RES engineering and construction undertook site visits with ecological, and to agree principles for the design of the onsite infrastructure based on the constraints determined to date.

3.17 Following this 3 Turbines were added, and this necessitated other changes to maximise the efficiency of the turbines and to create a balanced layout.

3.18 The revised layout was informed by the original constraints with the following amendments:

[3] Best Practice Guidance to Planning Policy Statement 18: Renewable Energy, DOE Planning & Environmental Policy Group, August 2009.

- Hydrological buffer 50 m;
- Hydrological buffer 10 m;

3.19 The relocation of a number of the Turbines enabled some refinements to the layout.

- Turbines were removed from the Curlew territories identified and an 800m buffer area was applied.
- T14 was relocated to the centre of the site in order to reduce turbine numbers within the Antrim Hills SPA and reduces track required in areas identified as Blanket Bog.

3.20 The resulting 14 turbine layout with 136.0 m rotor diameter produced a more sympathetic layout as detailed below.

Combined Constraints

3.21 To ensure that all requirements were captured a combination of desktop and site based surveys were undertaken to refine constraints. Detailed environmental and technical surveys were carried out to characterise the baseline environmental conditions on the Site and associated study areas, as described in more detail in Vol 2 Chapters 4 to 13 of this ES. Any constraints to development resulting from the baseline surveys were used to build up the combined constraints drawing.

Landscape & Visual

3.22 As mentioned above a Landscape Consultant was involved throughout the design process to provide advice regarding the scale of the Development and turbine heights and geometry. The Landcape Consultant prepared ZTV diagrams to compare the difference in theoretical visibility for blade tip heights of 150 m versus 180 m and hub height visibility for three potential rotor diameter options (117 m, 126 m and 136 m). Comparative wirelines were prepared from six provisional viewpoint locations in key parts of the Study Area (full details of this are included in Vol 2 Chapter 4).

3.23 At an early stage of the iterative design process the number of turbines was reduced from 16 to 14. Whilst this had little effect on the theoretical zone of visibility over the 30 km Study Area is has resulted in a number of benefits in landscape and visual terms, namely:

- The number of turbines has been reduced from 16 to 14;
- Turbines have been further set back from higher ground at the northern end of the site to reduce visibility from Carnlough;
- The turbines in the final layout that is presented in this ES are evenly spaced in relation to each other and to the site topography which has resulted in a simpler layout with fewer variations in tip heights in relation to contour AOD levels;
- Turbine 14 has been repositioned within the northern turbine grouping and appears as a coherent element rather than an outlier;
- There are fewer instances where 'stacking' of turbines occurs. Stacking is where

- two or more turbines will appear directly in front of each other in a view and will therefore result in a 'heavier' or more solid, and hence more prominent appearance.

3.24 Discussion with other members of the EIA project team was also carried out as part of the iterative design process. The archaeological consultant in particular has provided input into the selection of Provisional Viewpoints to ensure that cultural heritage sites are adequately represented. Chapters 4: Landscape & Visual and Chapter 5: Archaeology & Cultural Heritage of the ES provide detailed information with regards to these areas.

Ecology

3.25 The site occupies the extensive southern slopes of the Garron Plateau, below a peak called Binnagee which rises to a height of 346 m at (IGR D26583 17070). The initial studies within the site "Blue Line," which encloses an area that is approximately 5.7 km in length and approximately 3.5 km in width (at its widest point).

3.26 The northern-most part of the site consists of a gently undulating upland plateau which descends into improved agricultural fields to the east in close proximity to the A42 Carnlough/Ballymena Road, and to swathes of semi-improved wet grasslands and coniferous forestry blocks to the south. The central part of the site lies on the fringes of an upland lake which supports a wide fringe of sedge fen, wet heath and mire habitats.

3.27 Sites designated at international, national and local level for their conservation value within a potential impact zone were considered. The nearest designated sites to the study area were identified, to assess the potential for remote effects of the scheme on valued habitats and species outside the immediate area.

Vegetation

3.28 The higher elevation areas in the northern-most part of the site are dominated by a complex mosaic of wet heath, mire, rush-pasture and acid grassland habitats which vary according to variations in peat depth, slope, aspect, local topography and a combination of both past and current grazing pressure. Grazing is mostly by sheep, although cattle were also observed on lower ground in the southern part of the site as well as smaller numbers in some of the northern-most, upland fields.

3.29 Grazing pressure differs markedly across the site according to vegetation type and elevation, with higher ground in the north and west of the site being subjected to relatively low intensity grazing whereas lower-lying areas consisting of Holcus lanatus-dominated rush-pasture and acid grassland which are often heavily grazed with a tight sward and associated poor species diversity.

3.30 Grazing pressure is one of the main factors impacting negatively on the favourable condition of areas of NI Priority Habitat within the site, with a reversion from more

typical upland heath and mire communities to grass-dominated communities in those areas subjected to the most sustained high levels of grazing pressure.

3.31 Sloping ground across the site, but particularly at mid-elevation and lower elevation parts of the site, often supports large expanses of marshy grassland consisting of species-poor rush-pastures where Juncus effusus, Molinia caerulea and/or Holcus lanatus can be present with occasionally more species-rich swards where Juncus acutiflorus is often the most dominant species. Wetland forbs present within such species-rich swards can include Jacobaea aquatica, Cirsium palustre, Ranunculus flammula, Galium palustre and Epilobium palustre. Such species-rich habitat falls within the description of the NI Priority Habitat Purple Moor-grass and Rush Pasture.

3.32 A series of four coniferous forestry blocks is present near the southern limit of the application area, each consisting of a monoculture of Sitka Spruce Picea sitchensis.

3.33 A JNCC Phase 1 Habitat Survey was conducted across the Site. This early study described the habitats within an area of approximately 618ha. While a more detailed NVC Habitat Survey was completed within a smaller Red Line, across an area of approximately 208.5 ha. The latter involved recorded detailed botanical information over 130 (2x2m) quadrats.

Terrestrial Fauna

3.34 Signs of mobile species were assessed to determine their point of origin. The study area was thus extended to take account of the potential for species to use the vicinity of the proposed development as part of wider territories or foraging areas. Watercourses within the site, and some tributaries outside the site, were surveyed for signs of otter. Specific study areas for each species are as follows;

- Bats (450m around proposed turbine locations);
- Otter, badger, (planning application boundary +100m buffer);
- Red squirrel & pine marten (forestry plantations);
- Common lizard & smooth newt (site);
- Marsh fritillary Habitat (site);

3.35 Aside from detailed botanical and habitat surveys (as well as surveys for common lizard, smooth newt, pine marten, red squirrel, otter and badger) detailed bat surveys were also undertaken across the entire site, during the 2021 survey season. Overall, during 391 nights of monitoring; during 347-nights bat activity was either negligible or low. Moderate levels were experienced during 21-nights; 19-nights were high and 4-nights with near constant activity. Therefore, a BMMP (Bat Monitoring Mitigation Plan) has been recommended. Once implemented in full this will ensure that there is no significant impact to the local bat population. In addition, a detailed and significant HMP (Habitat Management Plan) has been agreed, the implementation of which will result in a 'Net Gain' in biodiversity terms as a result of the proposed windfarm.

Water Environment and Fisheries

3.36 The hydrology consultant recommended watercourse buffers of 50 m and 10 m depending on the catchment size of the watercourse, which were agreed as appropriate by the fisheries consultant.

Public Roads and Walking routes

3.37 198 m buffers were applied to nearby public roads in line with the Best Practice Guidance to PPS18 which recommends a setback distance of at least tip height plus 10% between turbines and roads.

Finalising Turbine Layout – EIA Baseline Stage – Final Layout

3.38 Using design principles agreed with environmental, engineering and technical disciplines, the infrastructure layout was developed and used to undertake baseline assessments.

3.39 During the course of the baseline surveys changes were made to the turbine layout the revised turbine layout is illustrated in Layout 4 – Figure 3.1: Turbine Layout Evolution.

- The configuration of substation, associated car parking and temporary
- construction compound / energy storage facility was refined;
- Minimization of land take by combining bell mouths at junctions/turning heads with areas of temporary crane hard standing to reduce the extent of infrastructure.

3.40 Key adjustments in response to constraints made through the design evolution are summarised in the following sections.

Infrastructure Design Evolution

3.41 The infrastructure design has evolved through the EIA process as illustrated in **Figure 3.2: Infrastructure Design Evolution**, Designs 1 to 2.

Engineering considerations

3.42 The following general principles were taken into consideration when designing the supporting infrastructure:

- Avoidance of environmental and technical constraints (as shown in Figure 3.3)
- Design of the track layout to follow natural contours as far as possible, to avoid unnecessary amounts of excavation and reduce adverse hydrological impacts using the following methods:
- Maximise the use of existing track locations via upgrades;
- Minimisation of the overall length of access track;
- Minimisation of the number of watercourse crossings, as far as possible

- Watercourse buffers of 50 m and 10 m
- Avoidance of steep slope areas to minimise earthworks (except where existing farm access tracks where in situ);
- Incorporation of measures to improve the visual appearance of the scheme, including reinstatement of temporary infrastructure following the construction period;
- Sympathetically locating control room building / substation / energy storage facility within the site surroundings.

3.43 A number of amendments were made to the design of the infrastructure between Design 1 and Design 2 on (as shown on Figure 3.2) for engineering reasons and these are summarised below:

- Removal of Track to the west of T12 to avoid an area of sensitive habitat;
- The configuration of substation, associated car parking and temporary construction compound / energy storage facility was refined;
- Minimization of land take by combining bell mouths at junctions / turning heads with areas of temporary crane hard standing to reduce the extent of infrastructure.

3.44 Key adjustments in response to constraints made through the design evolution are summarised in the following sections.

Vegetation

3.45 The engineering considerations minimised impact on sensitive habitats by utilising the existing track locations via upgrades where possible. This minimised the length of new track and where new access track is proposed, it is predominantly located in agricultural fields and coniferous shelterbelts of low ecological value.

Water Environment

3.46 The number of watercourse and drainage crossings has been minimised through the principle of avoidance at the layout design stage, and a number of culverts have been sited to coincide with existing culverts which will be upgraded. Proposals submitted in conjunction with this assessment indicate:

- Six crossing of a significant watercourse
- Fourteen crossings of minor watercourses, the majority of which comprise existing track-side drains.

3.47 The location and nature of watercourse crossings were reviewed with the hydrology and fisheries consultants as detailed in **Chapter 8: Fisheries and Chapter 9: Geology & Water Environment.**

Site Entrance Location

3.48 The site entrance is located to the north of the Slane road/Ballymena road junction see ES Vol 3 Figure 1.10. As specified in DCAN 15, visibility splays measuring 160m x 4.5m are provided in both directions.

3.49 Following construction, the site entrance will be reinstated to reduce the extent of hardstanding back to its original pre-construction state see ES Vol 3 Figure 1.10.

Control Building and Substation

3.50 The buildings will be located to the central of the site along which is to the lower slope of the site and is set back from the public road. Visibility will be limited from out with the site. The building will be orientated to be accessed from the south.

3.51 The buildings will be traditional in nature with rendered walls and tiled roofs, common characteristics of many rural buildings. The appearance of the buildings has been selected to reflect the rural character of the area to maximise the integration of the buildings within the wider landscape.

Temporary Construction Compound / Battery Energy Storage

3.52 The temporary construction compound is required to be located close to the main bulk of the construction works and the energy storage facility is co-located adjacent to the Control Building and Substation.

3.53 Energy storage containers will utilise the southern portion of the temporary construction compound on a permanent basis with the remainder of the temporary construction compound being removed and returned to farmland.

Final Infrastructure Layout

3.54 The final infrastructure layout is shown in Design 2 of Figure 3.2: Infrastructure Design Evolution. Once finalised, the Planning Application Boundary was redrawn, ensuring sufficient space within the boundary for all features including SUDS.

3.55 The final infrastructure layout and combined constraints is shown in Figure 3.3: Combined Constraints & Infrastructure.

Environmental Effects

3.56 The following sections summarise the technical chapters of the ES. The term ‘Site’ refers to the Preliminary Site Boundary of the wind farm, which is shown in **Figure 1.1: Site Location**, which is a larger area than the final planning application boundary, which is shown in **Figure 2: Infrastructure Layout**.

Planning Policy

3.57 This section explains how energy and planning policy considerations have been addressed by the Development, principally by reference to the other Chapters within the ES.

3.58 There is a raft of policy and guidance that informs the consideration of windfarm proposals such as this which together form a complex matrix of considerations.

3.59 In part due to the recognition that the 40% target set in the existing Strategic Energy Target has been met, the Department for the Economy published a new Energy Strategy 'The Path to Net Zero' in December 2021 which aims to deliver a 56% reduction in energy-related emissions on the pathway to deliver the 2050 vision of net zero carbon and affordable energy.

3.60 As part of this target the Energy Strategy sets the targets of doubling the size of the low carbon and renewable energy economy to a turnover of more than £2bn by 2030 and meeting at least 70% of electricity consumption from a diverse mix of renewable sources by 2030.

3.61 The rationale for the project is clear. Making an energy infrastructure contribution of the scale proposed (58.8MW) will assist in the achievement of NI strategic energy targets and objectives, consistent with a wide range of International, European, UK and Regional level priorities.

3.62 There is a strategic qualified national presumption in favour of developing renewable energy projects of this type.

3.63 The established Planning Policy Statement 18(PPS18) approach to decision making advocated in planning policy is to balance the wider environmental, economic and social benefits of the project against the environmental impacts, attaching significant weight to the former.

3.64 The Strategic Planning Policy Statement changes this approach insofar as the PPS18 direction to attach significant weight to the benefits is replaced by a discretion for the decision maker to determine the appropriate weight to be attached to the benefits. This must mean that the large scale social, environmental and economic benefits associated with this project are attached significant weight. In weighing the acceptance of the proposals the following must be considered:

- The proposal will offer job creation and economic activity to the regional economy providing catalytic benefits to investment within Northern Ireland.
- Given the 30 year lifetime of the development it is expected that direct operational impacts equate to 35 jobs, £1.32 million direct wages and £8.32 million of direct Gross Value Added over the operational phase.
- Both the construction and operational phases will generate increased tax and business rates revenue and the proposal is estimated to involvea capital spend of £61.71 million.

- Based on rateable values of £15,000 per MW— it is calculated that theproposed development will increase rateable value by £0.9 million each year, or by £30.87 million over the project horizon.
- The amount of electricity that could be produced by the proposed development is estimated at 236.9gWh per year which is enough electricity to meet the needs of 62,800 homes each year, over 6,000 more than the current housing stock (of approximately 56,500) in the local area.
- The proposed development is also estimated to reduce CO_2 emissions by 104,300 tonnes each year.

3.65 The landscape and visual impact of the windfarm is not unacceptably adverse for the purposes of the SPPS and PPS18 Policy RE1 because the inherent characteristics of the landscape provide the capacity to absorb it. The effects – relative to the qualities that underpin the designation – would not undermine the overall AONB or compromise wider landscape and visual amenity to an unacceptable degree.

3.66 With the discretion to attach significant weight to the wider environmental, economic and social benefits arising from the proposal, and having regard to how the project demonstrates that it will have limited adverse impacts, the project is considered to meet the requirements of planning policy because there are no unacceptable adverse effects which are not outweighed by the local and wider environmental, economic and social benefits of the proposed development.

Landscape and Visual

3.67 The purpose of the Landscape and Visual Impact Assessment (LVIA) is to present an objective analysis of the landscape and visual character within a Study Area extending in a 30 km radius from the Development. The potential effects of the Development on these baseline conditions including direct, indirect, permanent, temporary and cumulative effects are then identified and analysed. All information is presented clearly and objectively in a manner that will inform the decision making process with a well-reasoned methodology that is in accordance with best practice guidance. Landscape and visual effects are distinct although closely related to each other and addressed as such. The former relates to the effects on the physical landscape as a resource in its own right. The latter relates to the effects on specific views and general visual amenity as experienced by people (hereinafter referred to as visual receptors). Appropriate mitigation measures are proposed to address likely significant effects, where possible, and to assess any residual effects that would remain following the implementation of these measures.

3.68 The Baseline Assessment has considered statutory landscape designations covering the Study Area contained within current planning policy in Northern Ireland. The Baseline Assessment also considers non-statutory landscape classifications and the

information gleaned through driving and walking surveys of the Study Area to amplify and enhance the understanding of its landscape and visual character. Twenty viewpoints have been shortlisted for detailed analysis in this LVIA as a result of the viewpoint selection process which identified parts of the Study Area and key groups of visual receptors that may be potentially affected by the Development. A detailed description of this selection process and a full list of Provisional Viewpoint Locations (PVPs) are provided in Technical Appendix 4.4. Detailed descriptions of the final Viewpoints are an integral part of the Visual Impact Assessment section of the LVIA chapter (starting at paragraph 4.146). The locations of final Viewpoints are indicated on all map-based Figures (Figures 4.1 – 4.10) and visualisations to accompany the detailed written analysis of these Viewpoints are provided in Figures 4.11 – 4.30.

3.69 In terms of both landscape and visual effects the Development conforms to the general principles laid out in the policy and best practice guidance which are broadly promotive of renewable energy developments as a means of mitigating against the effects of climate change. It is noted that the SPPS requires that a cautious approach be taken to siting renewable energy developments in designated landscapes such as Areas of Outstanding Natural Beauty (AONBs) and the supporting policy principles in PPS 2 states that permission will only be granted in AONBs where the Development would be sympathetic to the character of the AONB in general and also of the particular locality. PPS 2 defers to the descriptions of Landscape Character Areas (LCAs) and AONB Management Plans for further information on these elements and, because the Development is located within the Antrim Coast and Glens AONB these have been analysed in detail.

3.70 The LVIA concludes that the Development is located in conformance with the SPG's guidance for LCA 122 Garron Plateau which is noted as being suitable for wind energy development in theory. The proposed site location is of medium and lesser sensitivity than other parts of LCA 122. This is the lowest level of sensitivity included within the SPG (no LCA in Northern Ireland is deemed by the SPG to be of Low or no sensitivity). Therefore, whilst the Development would have a direct physical effect on the part of the LCA within which it is located, it would be well located and its overall effect on landscape character would be medium and not significant.

3.71 The Development may have indirect effects on the landscape character of some other parts of the Study Area amounting to small areas of four other LCAs and one Seascape Character Area (SCA) which are in proximity to it, or which contain viewpoints used in this LVIA. The SPG's description of these LCAs is very similar to LCA 122 in many respects including their value and levels of sensitivity to wind

energy development. In relation to these other LCAs the magnitude of effects resulting from the Development would range from medium to negligible. Sensitivity would range from high to negligible depending on whether the LCAs would be located in relatively close proximity to the Development or at a greater distance and to what extent existing and consented wind farms define the physical landscape character of these LCAs and their settings. However, in no instances are the physical effects on landscape character deemed to be significant.

3.72 The Antrim Coast and Glens AONB Management Plan4 defines special characteristics and identifies mechanisms by which changes and developments can take place whilst maintaining the AONB's special character. The special characteristics that are identified in the Management Plan include the area's relative isolation from the rest of the country and its visual links with the Scottish coastline; the distinctive character of each of the nine Glens and the sequence of cliffs, headlands and bays along the coastline which are framed by the Antrim Plateau landscape which is located inland and above these parts of the landscape and overlooking this coastal landscape/ seascape (see Chapter 4 paragraph 4.88 onwards for further detail).

3.73 The Development is located towards the south eastern edge of Garron Plateau below the highest parts of the plateau which would effectively prevent views of the turbines from much of the northern half of the AONB. Higher ground to the south of the Development would have a similar effect on visibility from the southern part of the AONB. Whilst the Development would be clearly visible from some close to medium range views, predominantly from other elevated upland parts of the Study Area, it becomes less visible at distances beyond approximately 10 – 15 km where visibility is often restricted to blade tips or entirely absent. There is also a notable absence of views of the Development from the Glens and visibility across the AONB as a whole is also very limited. Visibility from coastal areas is also distinctly absent with the exception of views in proximity to Carnlough.

3.74 Of the 20 Viewpoints which have been selected to represent typical views of the Development within the Study Area only six would experience significant visual effects resulting from the Development. These are Viewpoints 1, 2, 5, 6, 9 and 12 which are all located within 3 km and from where the Development would be both prominent and visible in its entirety or near-entirety. These viewpoints are also all located to the south of the Development and in close proximity to Carnlough. However, it is noted that there are no significant effects from other close range Viewpoints within Carnlough, along other parts of the A42 road corridor or from more elevated viewpoints overlooking Glenarm and Glencloy at higher elevations.

[4] '*Antrim Coast and Glens Area of Outstanding Natural Beauty Management Plan 2008 – 2018'* (June 2008) Causeway Coast and Glens Heritage Trust

From the majority of the Study Area and the majority of the AONB the Development would either have no visibility or no significant visual effects. There is a noticeable absence of visibility from coastal areas aside from Carnlough or from the lower parts of any of the Glens except Glencloy where visibility is also not widespread. Therefore, the effects of the Development on the AONB as a whole are limited.

3.75 In relation to cumulative effects it is noted that wind farms are not an uncommon feature in approaches to the AONB and there is already a pattern of wind farms and single turbines across the Study Area. Existing and consented wind farms are generally located along the south western and western edges of the AONB and are closely associated with the lowlands around the A26 road corridor. The closest existing wind farms, Rathsherry/ Elginny Hill, are sometimes visible from the same locations as the Development but rarely in the same field of view and always with approximately 8 - 10 km separation distance. The nearest consented wind farm would be Ballykeel, located approximately 12.95 km to the south east and not clearly discernible from parts of the Study Area with clear views of the Development. The nearest proposed wind farm would be Carnalbanagh, located approximately 4 km to the south west.

3.76 The overall magnitude of cumulative effects on both landscape and visual character is deemed to medium magnitude and not significant. Whilst the Development would be immediately apparent on a small part of the Garron Plateau LCA it would have no direct physical effects on adjacent LCAs in conjunction with other wind farms or turbines. Neither would it be significantly visible from adjacent LCAs in conjunction with any existing, consented or proposed wind farms that would cause indirect effects on landscape character of any more than low magnitude. There are few instances where the Development would be visible in conjunction with other wind farms in the cumulative baseline and where this does occur it is from elevated viewpoints located at a greater distance from the Development where the Development itself is less visually prominent.

3.77 Taking into account that no parts of the Study Area are deemed to experience significant landscape or cumulative effects and only six of the 20 viewpoints assessed as part of the LVIA are deemed to experience significant visual effects, the LVIA concludes that the Development is acceptable in landscape and visual terms.

Archaeology and Cultural Heritage

3.78 This chapter of the ES assesses the likely significant effects of the Proposed Development on archaeological remains which may be located within the Application Site, and other cultural heritage assets, such as scheduled monuments,

listed buildings and conservation areas, located in the wider area around the Application Site. This chapter has been informed by a Cultural Heritage Baseline Appraisal (CHBA), which provides a detailed assessment of the archaeological and cultural heritage assets which could be affected by the Proposed Development, as well as an understanding of which assets required full assessment within the ES Chapter. The CHBA is included in Appendix 5.1 of the ES.

3.79 This chapter has also been informed by a number of heritage visualisations of the Proposed Development from key locations, which have helped to clarify the nature of the effect the Proposed Development would have on the setting of heritage assets. These visualisations are provided in Appendix 5.2.

3.80 This chapter has assessed the potential effects that the Proposed Development would have on the historic environment. It has considered potential direct physical impacts, indirect effects resulting from changes to the setting of heritage assets in the wider area, and the potential cumulative effects due to the presence of other extant or proposed developments.

Potential for Direct Physical Impacts

3.81 The potential for buried archaeological remains to be present within the Application Site was assessed by a review of the available evidence undertaken within the CHBA, which confirmed that the Application Site is unlikely to contain the buried archaeological remains of settlement activity from any period reviewed. However, the Application Site is known to contain Post-Medieval features of Low interest (identified as feature A1 in the chapter), and also has a general potential to contain additional, prehistoric, archaeological remains (feature A2).

3.82 The Proposed Development has been designed to avoid all recorded archaeological heritage assets whose location is confirmed, and so no known buried archaeological remains – such as the known Post-Medieval features within the Application Site (A1) – would be impacted by the Proposed Development.

3.83 There is potential for localised impacts to result to as yet unknown buried archaeological remains (A2), which could result in a minor to moderate effect. In response a programme of archaeological works is proposed, which would record any remains prior to construction, and would realise the research value of the remains. With the benefit of such a programme works, the significance of any effects to buried archaeological remains would be no more than **slight adverse.**

Potential Indirect Effects due to Changes to the Setting of Heritage Assets

3.84 The assessment provided in this chapter was informed by a comprehensive assessment of the potential indirect impacts the Proposed Development could have on the significance of designated heritage assets in the wider area due to changes to their settings, which was provided by the CHBA provided in Appendix 5.1.

3.85 The assessment of designated heritage assets provided in the CHBA highlighted a number of assets that required more detailed assessment due either to their proximity to the proposed development, their sensitivity, or the complexity of the issues surrounding their assessment which meant that they would benefit from fuller assessment within the ES.

3.86 A total of eight such assets were identified, as follows:

- ANT 029:004 – Doonan Fort scheduled monument
- ANT 029:031 – The Stone House scheduled monument
- ANT 029:092 – Court Tomb scheduled monument
- ANT 029:039 – Wedge Tomb scheduled monument
- HB06/01/020 – Lemnalary House, Grade B+
- HB06/01/055 – House near Ballymena Road, Grade B2
- Carnlough Conservation Area
- AN/121 – Cleggan Lodge Registered Park

3.87 The CHBA recommended that all of these heritage assets should be considered in the EIA, and as a consequence these were considered in detail by this chapter. The assessment in the ES chapter has found that in most cases, the degree of effect which would result from the proposed development would be no more than **slight adverse**, and in no instance would the proposed development result in a significance of effect higher than **minor adverse**. This is due to the design of the Proposed Development, which has been designed to minimise visual impacts on the setting of heritage assets in the wider area.

3.88 The potential for indirect effects to the remaining heritage assets in the wider study area, which could result from the Proposed Development, was considered in detail in the CHBA. It was concluded that the Proposed Development would have no more than a **slight adverse** significance of effect on the remaining heritage assets in the wider area, which would not comprise significant environmental effects. As such, it is not necessary to consider these effects in detail within this chapter. However, the CHBA is provided in Appendix 5.1, where detailed assessments of all the remaining heritage assets can be found if needed.

3.89 In all cases, the effects are medium term and reversible, and in no instance would the proposed development directly affect a key aspect of the significance of any of these assets.

Cumulative Effects

3.90 The potential for cumulative effects has been considered for each of the heritage assets assessed by this chapter. The assessment of potential cumulative effects has been made with reference to the cumulative baseline consisting of a consideration of consented and operational schemes within 30km of the application site, together with information provided in the heritage viewpoints and LVIA.

3.91 The potential for cumulative effects was considered in detail, and it was found that the developments within the cumulative baseline are sufficiently far and well screened that they would not affect the impact assessments within this chapter. As a result, it is concluded that the presence of the developments within the cumulative baseline would not result in a materially higher level of effect to the identified heritage assets than what would result from the Proposed Development on its own.

3.92 In conclusion, the potential effects of the proposed development on the setting of heritage assets have been minimised by the design of the proposed development, and any archaeological impacts could be mitigated by a programme of archaeological works secured via planning condition. It would therefore be possible to implement the proposed development in accordance with the requirements set out in policy RE1 of PPS 18 and paragraph 6.224 of the SPPS.

Ecology

3.93 The study methodology for the Ecological Impact Assessment included both desktop and field survey methods in order to assess the potential impact on local ecological and nature conservation interest. The purpose of an ecological survey is to identify 'valued ecological receptors', those species and habitats that are valued in some way for their ecological function, their contribution to biodiversity or are protected by specific legislation. The following specialist surveys were undertaken during both the 2021 field seasons; both on the site within the appropriate buffer zones:

- JNCC Phase 1 habitat survey
- NVC Phase 2 habitat survey
- Bat (Chiroptera spp) survey

- Otter (Lutra lutra) survey
- Badger (Meles meles) survey
- Red Squirrel (Sciurus vulgaris) survey
- Pine Marten (Martes martes) survey
- Common Lizard (Zootoca vivipara) survey
- Smooth Newt (Lissotriton vulgaris) surveys
- Marsh Fritillary (Euphydryas aurinia) habitat survey

3.94 Features of conservation interest and importance were recorded and their locations were one of the key criteria that affected the wind farm layout. The location of the wind farm infrastructure avoids habitats and species of conservation interest where possible, and where this was not possible, mitigation and/or enhancement measures have been incorporated into the design to balance any detrimental impact.

3.95 The principal habitats on the site are extensive areas of semi-improved wet grassland, acid grassland, marshy grassland, blanket bog, wet and dry heath. Several blocks of coniferous forestry plantaton are also present within the Planning Application Boundary. Overall, the habitats on site are of lower conservation value, while the blanket bog/wet and dry heath and are of moderate/high value.

1.95 Ecological constraints determined from extensive site surveys have been used to evolve the layout and design of the Development. The impact assessment is therefore based on a wind farm design that already includes a number of important mitigation measures.

3.96 A series of generic and specific mitigation measures including a Habitat Management Plan and mitigation for common lizard and smooth newt have been proposed to mitigate effects on NI Priority Habitats and Species.

3.97 The Development will result in permanent and temporary habitat loss of 18.3ha, largely comprising degraded blanket bog, wet (dwarf shrub) heath, acid grassland, coniferous forestry plantation and rush pasture (with both the species-rich and species-poor variant present on site) although small areas of other habitats will also be lost, such as marshy grassland, poor acid grassland and semi-natural woodland.

3.98 The loss of approximately 7.33[5] ha of NI Priority Habitats (i.e., degraded blanket bog, wet heath/heathy acid grassland and PMGRP) is a permanent and direct effect

[5] Includes an additional 10800m2 of loss for permanent spoil storage

of medium to high magnitude on receptors of high value and sensitivity. The extent of habitat loss has been used to inform the prescriptions detailed in the Habitat Management Plan, including a commitment to establish 5-times the area lost for NI Priority Habitats (wet dwarf shrub heath/lowland acid grassland). Three HMA's have been proposed (with a total area of 37.4ha) to compensate for the loss of habitats during the 30-year lifetime of the Development (including the remediation of two blocks of coniferous forestry plantation back to blanket bog/heath).

3.99 After implementation of the mitigation measures proposed in this chapter it is assessed that there would be no significant residual adverse effects on Northern Ireland priority habitats (wet heathland/lowland acid grassland) as a result of the Development. Indeed, it is assessed that the Habitat Management Plan would deliver a net beneficial effect during operation by enhancing currently degraded blanket bog/wet heath and marshy grassland habitats.

3.100 There is no recorded usage of the area by otter, badger or marsh fritillary butterfly, therefore no impacts to these species is likely. Mitigation for the herpetofauna found on site (common lizard & smooth newt) is proposed. This involves both the installation of drift fencing the mowing/hand clearance during the construction phase.

3.101 391-nights of static monitoring for bats was completed at (or in the vicinity of) each of the 14 turbines on the site. Overall, there were 347-nights with either negligible or low levels of bat activity. While moderate levels were experienced during 21-nights; 19-nights were high and 4-nights with near constant activity. Therefore, a BMMP (Bat Monitoring Mitigation Plan) has been recommended as a precaution. In conclusion, and based on current knowledge, this should ensure that the proposed Development will not have a significant impact on the local bat population.

3.102 The potential effects of the Development on ecological receptors have been assessed and it is concluded that with the implementation of appropriate mitigation measures the effects would be reduced to a minor adverse or neutral effect that would not adversely affect the ecological integrity of the site and the wider area.

3.103 An assessment of cumulative impacts on the habitats and fauna of the area was also undertaken, and it was concluded that there will be no significant effects.

Ornithology

3.104 This chapter assesses the potential effects of the Development on bird populations and has been informed by a programme of baseline ornithology surveys commissioned by the Applicant and completed during a two year period from November 2019 to September 2021. The surveys have included breeding bird surveys, winter surveys, vantage point surveys and wider area surveys. All surveys have been completed in line with the relevant current guidance for bird surveys at on-shore wind farms.

Red Grouse

3.105 The baseline surveys have indicated red grouse are not found within the Development boundary or within a 500 m extent of the turbine layout however a small number of birds are present within the surrounding area (1 km extent from the turbine array) and the assessment of effects indicates there are unlikely to be significant adverse effect on the local red grouse population.

Curlew

3.106 The baseline surveys found four pairs of curlew within the survey area of which three pairs were within a 1 km extent from the Development and the assessment of effects indicates the potential displacement of one pair of curlew.

Snipe

3.107 The baseline surveys found five pairs of snipe within the survey area, of which three pairs were within a 500 m extent from the Development and the assessment of effects indicates the potential displacement of one or two pairs of snipe.

Moorland Passerines

3.108 The baseline surveys found seven passerine species breeding within the survey area and an additional ten transient species. All the passerine species were also found in the wider surrounding area and are also widely distributed locally and at a regional level and the assessment of effects indicates there are unlikely to be significant adverse effect on the local populations of breeding moorland passerines.

Winter Birds

3.109 The baseline surveys found a total of 30 bird species during the winter and migration surveys however most of these species are very widespread in distribution locally and regionally and were recorded within the survey area in relatively small

numbers. Golden plovers were occasionally recorded within the survey area during the winter and spring periods however numbers were relatively small and the assessment of effects indicates there are unlikely to be significant adverse effects on the local populations of wintering birds.

Birds at Loughs

3.110 Small loughs are present at two locations within the survey area. The baseline surveys found small numbers of several water bird species (including little grebe, moorhen, water rail and teal) at one of these locations however the assessment of effects indicates there are unlikely to be significant adverse effect on birds at the lough.

Hen harrier

3.111 The baseline surveys found two pairs of hen harriers within a 5 km extent from the Development and both pairs were confirmed to be breeding. Both pairs were located within the local part of the Antrim Hills SPA however neither pair was closer than 4 km from the Development. Hen harriers were observed foraging within the area of the Development however the frequency of observations was low or very low. During baseline year two there were strong indications that the male bird from nest location 1 was foraging within the area of the Development however the frequency of observations was low and there were no particular indications that the male bird from nest location 2 was foraging within the area of the Development. The foraging observations are consistent with guidance on the likely core foraging range of nesting hen harriers and the assessment of effects indicates there are unlikely to be significant adverse effects on the local hen harrier population or on the regional conservation status of the species.

Peregrine

3.112 The baseline surveys found one pair of peregrines (breeding confirmed) within a 2 km extent from the Development. The breeding location was > 1 km from the Development and the frequency of foraging observations within the area of the Development was low. The assessment of effects indicates there are unlikely to be significant adverse effects on the local peregrine population or on the regional conservation status of the species.

Red kite

3.113 During the baseline surveys there were two observations of a red kite (the same wing-tagged bird) within the area of the Development (within a 500 m extent) and two additional observations (in different baseline years) within the wider area

(within a 2 km extent). The observations relate to wandering individual birds and during the baseline period there has been no indication of pair formation or of a defined breeding territory being established.

Golden eagle

3.114 During the baseline surveys there were three observations of golden eagles within the area of the Development (within a 500 m extent). The observations were in January, November and December of the same calendar year and two (November and December) likely related to the same individual bird. There were no observations during the following calendar year and the observations indicate a wandering individual (s) with no indication of a permanent home range or breeding territory.

Buzzard

3.115 During the baseline period buzzards were by far the most frequently observed raptor species within the survey area. At least four pairs of buzzards were found breeding within the survey area (2 km extent) and one of these pairs was within the area of the Development (500 m extent). The estimated collision risk for buzzard is equivalent to one bird every 3.4 years however this needs to be assessed in the context of breeding productivity and also the favourable conservation status and very widespread distribution of this species and the assessment of effects indicates there are unlikely to be significant adverse effects on the local buzzard population and highly unlikely to be significant adverse effects on the regional conservation status of the species.

Kestrel

3.116 During the baseline period kestrels were not found breeding within a 2 km extent from the Development and observations of foraging birds were infrequent and mostly during the period March to September. The estimated collision risk for kestrel is equivalent to one bird every 13.9 years and the assessment of effects indicates there are unlikely to be significant adverse effects on the local kestrel population or on the regional conservation status of the species.

Antrim Hills SPA

3.117 The assessment of effects indicates there are unlikely to be significant adverse effects on the hen harrier population within the local part of the SPA and by extension on the SPA population as a whole.

Garron Plateau ASSI

3.118 The assessment of effects indicates there are unlikely to be significant adverse effects on the red grouse population within the local part of the ASSI and by extension on the ASSI population as a whole.

Mitigation

3.119 Mitigation is proposed for any likely significant adverse effects of the Development on bird populations and includes long term habitat management for breeding waders, an Ornithology Mitigation Strategy for the construction-phase and an Ornithology Management and Monitoring Plan.

Fisheries

3.120 Streams draining the proposed Unshinagh Wind Farm Development are part of two different river sub-catchments, the Glencloy River and the River Braid. Desk studies and field surveys were used to describe the current state of fish populations, fish habitat and the quality of the aquatic environment at these streams and rivers draining the Development. This information was then used to produce a report describing the possible impacts that the construction and operation might have on fisheries and aquatic ecology. A series of mitigations was recommended to prevent or reduce the potential impacts described.

3.121 A number of streams and rivers draining the Development support trout, salmon and invertebrate communities that are sensitive to changes in the quality of their habitat. For the construction phase of the proposed Development, the report identified the main possible impacts on streams and rivers are the release of sediment, the release of other pollutants, and temporary blocking of the movement of fish. For the operation of the proposed Development, the main possible impacts on streams and rivers are surface run-off, permanent blocking of fish movement, and loss of habitat at stream crossings.

3.122 Proposed mitigations include avoiding construction works within stream channels during key periods of fish migration and spawning, careful management of water and adherence to government guidelines when working near watercourses, and the use of culverts at site track crossings that preserve the natural stream bed and permit free movement of fish.

3.123 Full implementation of the mitigations described will ensure that no adverse impacts on fish, their habitats and that of the general aquatic environment will occur.

Geology and Water Environment

3.124 An assessment of the likely effects of the Development on geology and the water environment has been undertaken. The impact assessment involved a combination of desk study, site visits and consultation with various stakeholders including; Department of Agriculture, Environment & Rural Affairs; Mid and East Antrim Borough Council, Northern Ireland Water; Department for Infrastructure, and Department for Economy.

3.125 The assessment identifies the potential impacts on geology, hydrology and hydrogeology, including surface water, groundwater, abstractions, the potential for pollution of watercourses and flooding. It summarises the relevant legislation and guidance and provides appropriate baseline information enabling potential effects to be identified.

3.126 The assessment determined that the site is located on 'moderate quality agricultural land' and 'poor quality agricultural land', and the loss (or partial loss), of agricultural function is not significant and does not constrain the Development. The underlying geology is a mixture of clay, sand, gravel, and boulders varying widely in size and shape, with areas of peat also identified. Bedrock is composed largely of basalt. Mining was once prevalent in the area with part of the now abandoned Cullinane iron ore mine being located within the site boundary. Groundwater flow within the bedrock is expected to be fractured with occasional localised conduit flow, discharging mainly to the local surface water network.

3.127 The current hydrology of the site consists of a number of natural source watercourses and streams and artificially modified drainage ditches and peat drains. The majority of on-site surface water features drain to the Glencloy River and Ticloy Water (a tributary of Braid River). Glencloy River drains into the Irish Sea (North Channel) 2.8 km to the north-east of the Site. Ticloy Water ultimately discharges to Lough Neagh via Braid River and River Main. The hydrological connection to Lough Neagh links these watercourses to designated sites at the lough, though they are located c. 26 km south-west from the Development.

3.128 Aspects of the design, construction, operation, and decommissioning of the Development that may impact on the receiving geological and water environment have been identified and the pathways of potential effects assessed. It has been determined that without mitigation, the Development would likely cause adverse effects on the water environment due to the hydrological link between the

Development and watercourses with significant fisheries interests within and downstream of the Site. Mitigation measures integrated as part of outline design, and others to be implemented throughout the lifetime of the Development to minimise potential adverse effects include:

- Design of site elements to minimise impact on the geological and water environment (e.g., careful consideration of the positioning of wind turbines, foundations, and areas of hard standing);
- Avoidance of significant water features based on baseline constraints mapping (i.e., establishing zones around watercourses where construction works are to be avoided);
- Careful management of minor water features where they come into contact with new infrastructure or upgraded access tracks.
- Implementation of a comprehensive surface water management plan comprising the use of SuDS (drainage) and silt management to prevent pathways for pollution reaching the wider environment as well as reducing any increased risk of flash flooding downstream;
- Establishing pollution prevention procedures in accordance with NIEA requirements and guidance to minimise the risk to the wider environment posed by construction, operation and decommissioning-phase activities (e.g., spillage of oils or chemicals).

3.129 Implementation of the mitigation proposed would result in no significant residual effects to the receiving geology and water environment as a result of the Development. Monitoring the effect of the Development on the water environment and fisheries habitat will be provided through water quality monitoring.

3.130 An assessment of cumulative impacts was also undertaken, and it was concluded that there are no predicted significant water environment or geological effects arising from the Development in conjunction with any other pre-existing or consented Development.

Peat

3.131 A Phase 2 Geotechnical Study including Peat Slide Risk Assessment was undertaken and concluded that there is predominantly shallow or an absence of peat soils with discrete areas of deeper peat at the proposed development. The peat depths across the site are in the majority <0.5m. The peat slide risk assessment cites key control measures which are required to ensure the risk of peat slide remains at residual (low) levels.

Noise

3.132 An assessment of the acoustic impact from both the construction and operation of the proposed Unshinagh Wind Farm was undertaken taking into account the identified nearest residential properties.

3.133 The operational noise impact was assessed according to the guidance described in the 'The Assessment and Rating of Noise from Wind Farms', referred to as 'ETSU-R-97', as recommended for use in relevant planning policy. The methodology described in this document was developed by a working group comprised of a cross section of interested persons including environmental health officers, wind farm operators and independent acoustic experts. It provides a robust basis for assessing the noise impact of a wind farm and has been applied at the vast majority of wind farms currently operating in the UK.

3.134 ETSU-R-97 makes clear that any noise restrictions placed on a wind farm must balance the environmental impact of the wind farm against the national and global benefits that would arise through the development of renewable energy sources. The assessment also adopts the latest recommendations of the Institute of Acoustics 'Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'.

3.135 Representative baseline conditions (the "background noise level") at nearby residential properties were established by undertaking noise surveys. These measured levels were then used to infer the background noise levels at other nearby residential properties as the ETSU-R-97 document recommends. As background noise levels depend upon wind speed, as indeed do wind turbine noise emissions, the measurement of background noise levels at the survey locations were made concurrent with measurements of the wind speed and wind direction. These wind measurements are made at the wind turbine site rather than at the survey locations, since it is this wind speed that would subsequently govern the wind farm's noise generation.

3.136 A sound propagation model was used to predict the noise levels due to the proposed wind farm at nearby residential properties over a range of wind speeds, taking into account the position of the proposed wind turbines, the nearest residential properties, and the candidate wind turbine type. The model employed (which considered downwind conditions at all times) took account of attenuation due to geometric spreading, atmospheric absorption, ground effects and barriers. It has been shown by measurement-based verification studies that this model tends to slightly overestimate noise levels at nearby residential properties.

3.137 The relevant noise limits were then determined through analysis of baseline conditions and the criteria specified by the ETSU-R-97 guidelines. The general principle regarding the setting of noise criteria is that limits should be based relative to existing background noise levels, except for very low background noise levels, in which case a fixed limit may be applied. This approach has the advantage that the limits can directly reflect the existing noise environment at the nearest residential properties and the impact that the wind farm may have on this environment. Different limits are applicable depending upon the time of day. The daytime limits are intended to preserve outdoor amenity, whilst the night-time limits are intended to prevent sleep disturbance.

3.138 The predicted operational noise levels are within noise limits at nearby residential properties at all considered wind speeds. The proposed development therefore complies with the relevant guidance on wind farm noise and the impact on the amenity of all nearby properties would be regarded as acceptable.

3.139 A cumulative operational noise assessment has also been undertaken. The predicted cumulative noise levels are within noise limits at nearby residential properties. Compliance with relevant guidance implies that the cumulative impact on the amenity of nearby properties would be regarded as acceptable.

3.140 A construction noise assessment, incorporating the impact due to increased traffic noise, indicates that predicted noise levels likely to be experienced at the nearest residential properties exceed construction noise criteria for a short period of time although appropriate mitigation measures have been identified.

3.141 An acoustic assessment of the proposed energy storage facility in accordance with BS 4142: 2014 shows that the impact would be low and the levels insignificant.

Traffic & Transport

3.142 An assessment of the potential impact of the Development on traffic and transport was undertaken, involving consultation with Department of Infrastructure (DfI) Roads.

3.143 The proposed access route for AILs from Belfast Port has been used previously for the construction of various wind farms that have utilised the A8. From Belfast the route will travel north on the M2, onto the A26 at Dunsilly Roundabout, continuing

for c. 15.7km. The route exits onto the A42, Raceview Road, continuing on the A42 east c. 19.7km to the site entrance. See Figure 11.1: Delivery Route.

3.144 The proposed return route for the delivery vehicles is similar to the proposed delivery route noted above. Once the turbine components have been delivered, the vehicles will be shortened so they are no longer than a typical articulated HGV.

3.145 Reinstatement will be undertaken to any street furniture which may be removed on a temporary basis. In the unlikely event that a replacement blade is required during the operational phase of the wind farm, the widenings at the site entrance will need to be reopened temporarily, after which they will be reinstated. Any works will be undertaken following consultation with DfI Roads.

3.146 Normal HGV load delivery routes (including stone and concrete) will utilise the A42, with sources of material to be confirmed prior to construction. No passing bays will be required as the roads are two-way with adequate passing provided.

3.147 Where agreed by Dfl Roads, circular HGV haul routes may be implemented for the construction phase of the project.

3.148 The main traffic impacts are associated with the increase in HGV vehicle movements along the A42 during the construction stage of the project. These roads have low levels of existing traffic and a small number of receptors will be affected. At worst, the frequency of vehicle movements is expected to be one vehicle every five minutes during the 6 days when the construction of each wind turbine foundation would occur.

3.149 Consideration has been given to the effect of increased HGV traffic flow on Severance, Driver Delay, Pedestrian Delay, Pedestrian Amenity, Fear and Intimidation, Accidents and Safety and Cumulative Impacts. Furthermore, consideration has been given to the environmental effects of any road improvement/widening works.

3.150 A TMP will be developed and agreed with the relevant stakeholders post consent and pre-construction in order to control and mitigate impacts associated with increased vehicles movements.

3.151 Taking into account the existing vehicle movements on the affected roads, and the proposed type and frequency of vehicle numbers, it is considered that with the appropriate mitigation measures as set out above, there will be no significant impacts.

Shadow Flicker

3.152 A shadow flicker analysis of the Development was performed. Under certain combinations of geographical position, time of day, time of year and meteorological conditions, the sun may pass behind the turbine rotor and cast a shadow over neighbouring buildings' openings (i.e. windows and doors) where the contrast between light and shade is most noticeable. To a person within that room the shadow, depending on its intensity, may appear to flick on and off, giving rise to an effect referred to as shadow flicker.

3.153 The Best Practice Guidance to Planning Policy Statement 18 (PPS18) states that at distances greater than 10 rotor diameters from a turbine, the potential for shadow flicker is very low.

3.154 An analysis of shadow flicker throughout the year from Unshinagh Wind Farm was carried out, taking into account the behaviour of the sun, the local topography and the turbine layout and dimensions. The analysis was performed using a turbine layout consisting of 14 turbines, each with maximum tip heights of 180 m and maximum rotor diameter of 136 m.

3.155 In accordance with The Best Practice Guidance to Planning Policy Statement 18 "Renewable Energy" (2009), as described above, analysis would be performed on all occupied houses within 1410 metres of any proposed wind turbine.

3.156 It should be emphasised that this analysis provides an extremely conservative estimate of the extent that houses will be affected by shadow flicker. Due to frequent cloud cover, turbines not turning on at all times and turbine rotors not being aligned with the sun in a way to cast maximum shadow onto habitations, the actual amount of shadow flicker seen in these areas is likely to be much less.

3.157 Due to both the distance of the nearest residential properties to the Development, and proposed mitigation if required, it is concluded that the Development should not cause a material reduction to residential amenity owing to shadow flicker.

Socioeconomics

3.158 The Development will offer a much-needed boost of activity to the local and regional economy. Job creation and economic activity will result throughout its construction, with a strong likelihood of local labour involvement. Both the construction and operational phase will generate increased tax and business rates revenue payable to central, regional and local government.

3.159 Indeed, the Mid and East Antrim economy has faced a challenging backdrop in recent years; and given its exposure to the manufacturing sector, the local area has struggled to create job opportunities over the last decade. Therefore, the labour market conditions have not been ideal in the lead up to the coronavirus outbreak, and its subsequent lockdowns. Given the lockdown has had a significant impact on local businesses for at least the short term and put upward pressure on local unemployment, investment of this type and scale can provide positive (direct, indirect and induced) benefits across Northern Ireland; helping to provide and support economywide employment opportunities that would not otherwise have existed. It can also bring about catalytic benefits which can in turn attract further investment into Northern Ireland. For example, the knowledge, expertise and skills accumulated can act as a contributing factor to future investments in the area. Other local areas within Northern Ireland may also benefit as a result, helping to reduce the inequality across the region. Funding for such developments are usually project specific and involve a considerable amount of sunk costs. Therefore, if the development does not take place the benefits, including the catalytic impact, are unlikely to be realised elsewhere in the Northern Ireland economy.

3.160 The Development is estimated to involve a capital spend of £61.71 million. Of this total, £24.70 million (nominal prices) will be realised within the Northern Ireland economy. The projected 12-month construction phase is estimated to create or sustain 139-243 total (direct, indirect and induced) job years of employment, £3.37-£5.96 million (2018 prices) of wages and £7.56-£13.04 million (2018 prices) of GVA to the Northern Ireland economy.

3.161 The estimated total (direct, indirect and induced) benefits realised in Northern Ireland by the operational phase of the proposed Development includes wages of £3.2 million (2018 prices) and £12.3 million (2018 prices) in GVA over the 35-year operating period.

3.162 We also expect a fiscal injection from the Development. During the construction, the UK Exchequer is estimated to benefit from increased tax revenue of £1.24-£2.18 million. Over the 35-year operational phase, an estimated £1.08 million revenue

will be generated and a further £0.43-£0.94 million in benefit savings during the construction phase.

3.163 Based on rateable values of £15,000 per MW—we calculate that the Development will increase rateable value by £0.9 million each year, or by £30.87 million over the project horizon. From these values business rates are calculated and collected for local Councils and the Northern Ireland Assembly. By applying Mid and East Antrim non-domestic poundage rates, we estimate additional business rates of £0.55 million each year and £19.30 million, or 59.02 percent of the Development's rateable value, over the 35-year lifetime of the project.

4 Conclusion

4.1 The potential effects of the Development have been assessed in accordance with regulatory requirements and good practice. The ES incorporates technical assessments of the Development based on the requisite legislation and the relevant planning policy framework. The ES has demonstrated that significant environmental effects associated with the construction, operation and decommissioning of the Development have been avoided or minimised through the use of the iterative design process and with the application of mitigation measures.

4.2 The Development is a 58.8MW wind farm consisting of 14 x 4.2MW turbines. The amount of electricity that could be produced by the Development is estimated at 236.9gWh per year which is enough electricity to meet the needs of 62,800 homes each year6, over 6,000 more than the current housing stock (of approximately 56,5007) in the local area.

4.3 The Development is also estimated to reduce CO_2 emissions by 104,300 tonnes each year. This equivalent to 65,700 newly registered cars.

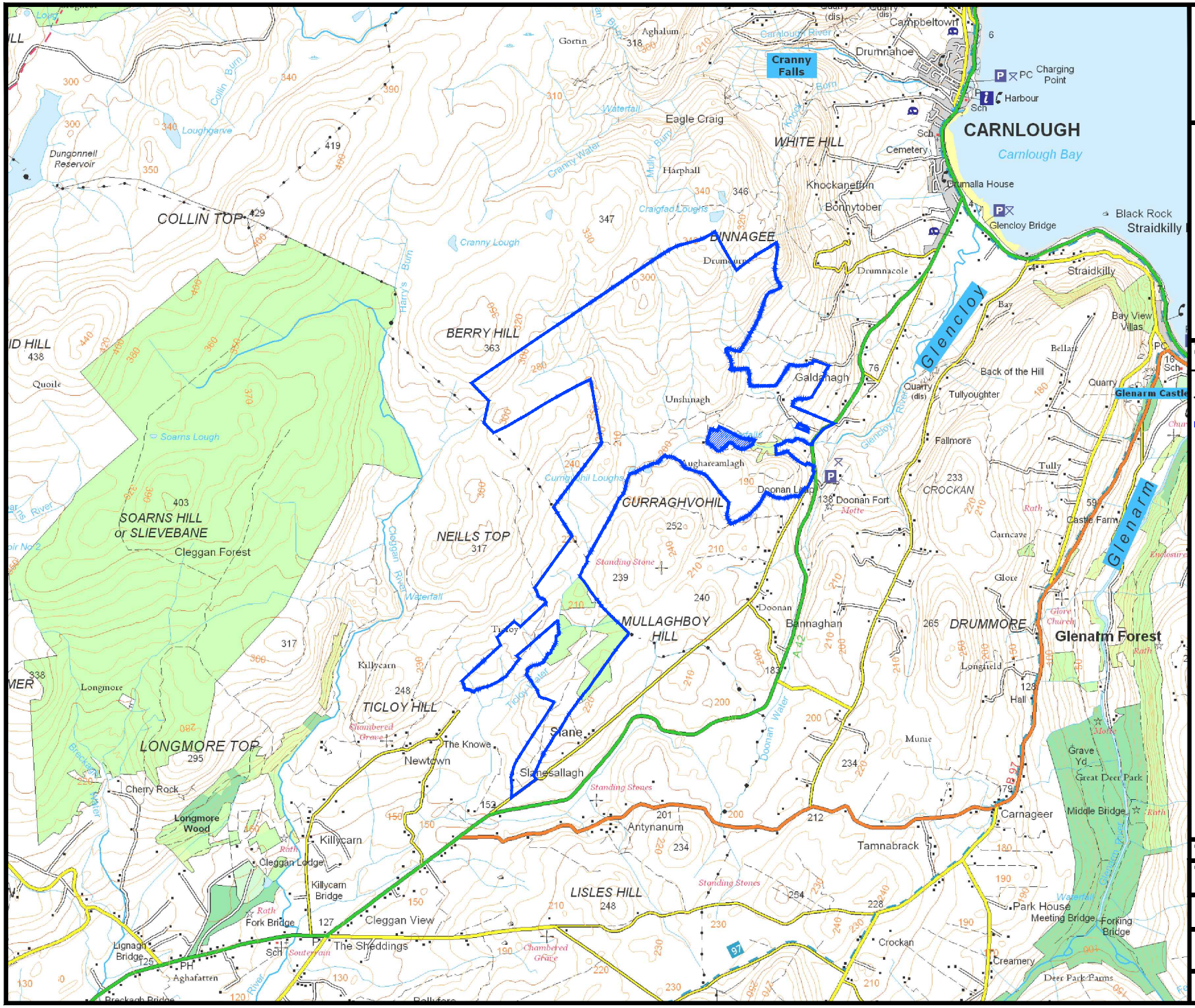
4.4 The Development will result in a reduction in greenhouse gas emissions from the electricity generating industry by harnessing wind as an alternative to the burning of fossil fuels, in line with the government's energy goals. It is also important to highlight that energy production is not static and additional renewable generation will be required to be connected to maintain the NI targets and subsequently achieve and maintain the UK renewable targets. Therefore, it is imperative that we maximise the production of electricity from renewable sources in suitable locations such as Unshinagh, can make an important contribution to Northern Ireland and the UK meeting and maintaining their respective renewable targets.

[6] For the Development we have assumed a load factor of 0.46, which was provided previously by RES, and applied to Oxford Economics' calculations. This load factor allows us to account for wake and electrical losses using typical wind speeds/directions etc. to give a realistic prediction of electricity output (rather than using a theoretical maximum level whereby it is assumed that wind blows for 24 hours a day 365 days a year on every wind farm site.)

[7] Oxford Economics Internal Model Suite.

Figures

1.1 Site Location



res

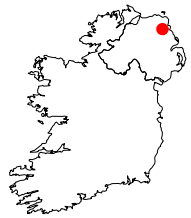
UNSHINAGH WIND FARM

FIGURE 1.1

SITE LOCATION PLAN

KEY

- SITE LOCATION
- LAND NOT INCLUDED



SITE LOCATION - NOT TO SCALE

LAYOUT DWG	T-LAYOUT NO.
N/A	N/A

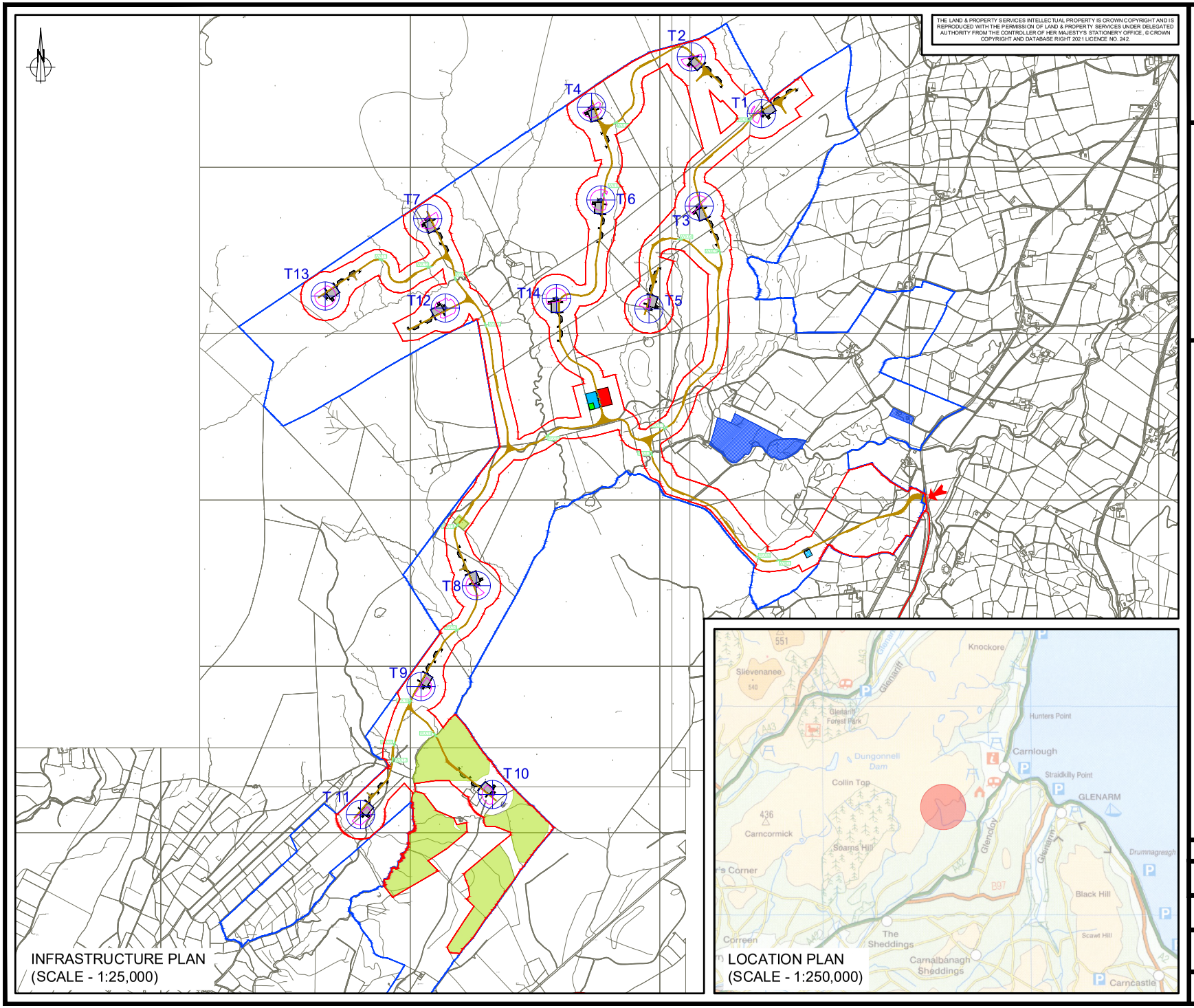
DRAWING NUMBER

04291-RES-LAY-DR-LE-016

SCALE - 1:50,000 @ A4

NON-TECHNICAL SUMMARY

1.3 Infrastructure Layout



UNSHINAGH WIND FARM

FIGURE 1.3

INFRASTRUCTURE LAYOUT

KEY

- PLANNING APPLICATION BOUNDARY
- LAND UNDER APPLICANTS CONTROL
- LAND NOT INCLUDED
- WIND TURBINE LOCATION
- TURBINE MICROSITING
- NEW SITE TRACKS
- WATERCOURSE CROSSING
- CRANE HARDSTANDING AREA
  - PERMANENT
  - TEMPORARY
- TEMPORARY CONSTRUCTION COMPOUND
  - ENERGY STORAGE COMPOUND
- TEMPORARY ENABLING WORKS COMPOUND
- WATERLESS WHEEL WASH
- CONTROL BUILDING & SUBSTATION COMPOUND WITH PERMANENT HARDSTANDING AREA
- SITE ENTRANCE LOCATION
- FORESTRY TO BE REMOVED

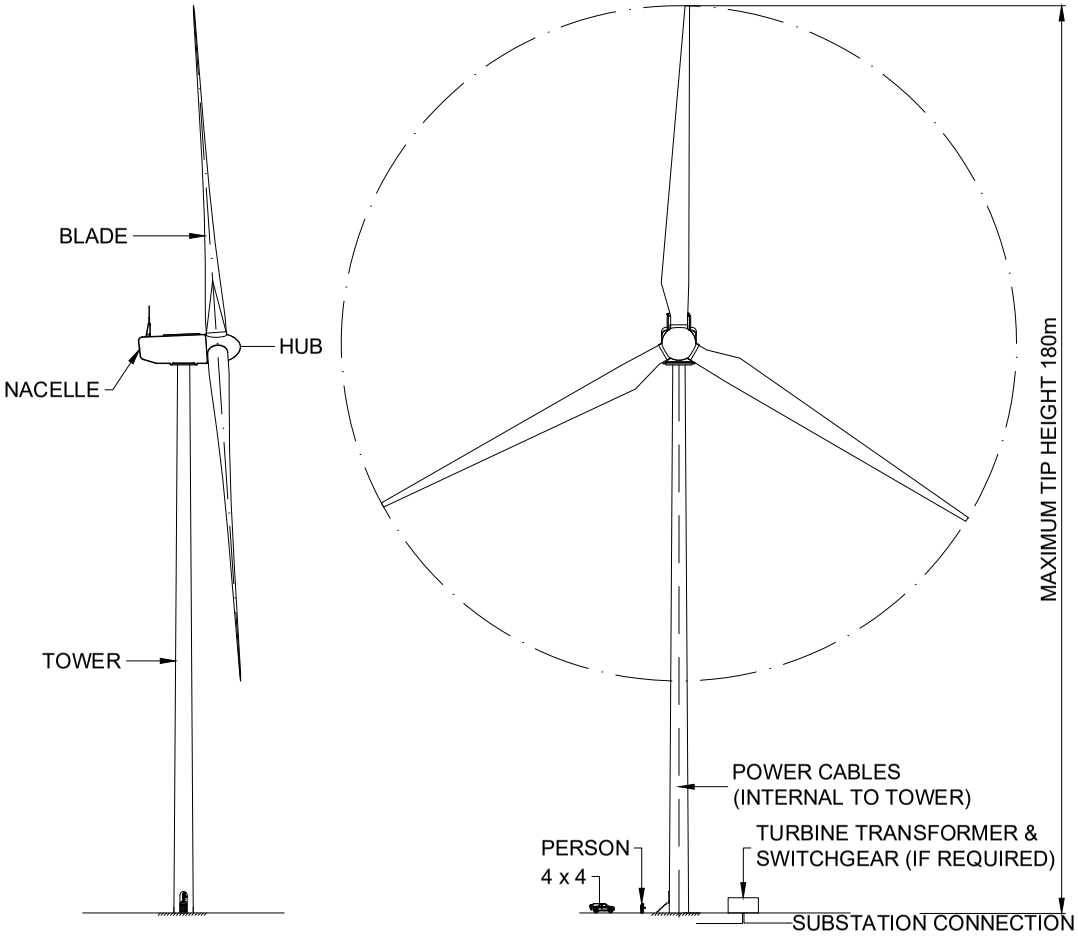
LAYOUT DWG	T-LAYOUT NO.
N/A	PNIRuns024

DRAWING NUMBER
04291-RES-LAY-DR-PE-001

SCALE - AS SHOWN @ A4

NON-TECHNICAL SUMMARY 2021

1.4 Turbine Elevation



SIDE VIEW

FRONT VIEW

PHOTOGRAPH OF TYPICAL TURBINE

UNSHINAGH WIND FARM

FIGURE 1.4

TURBINE ELEVATION

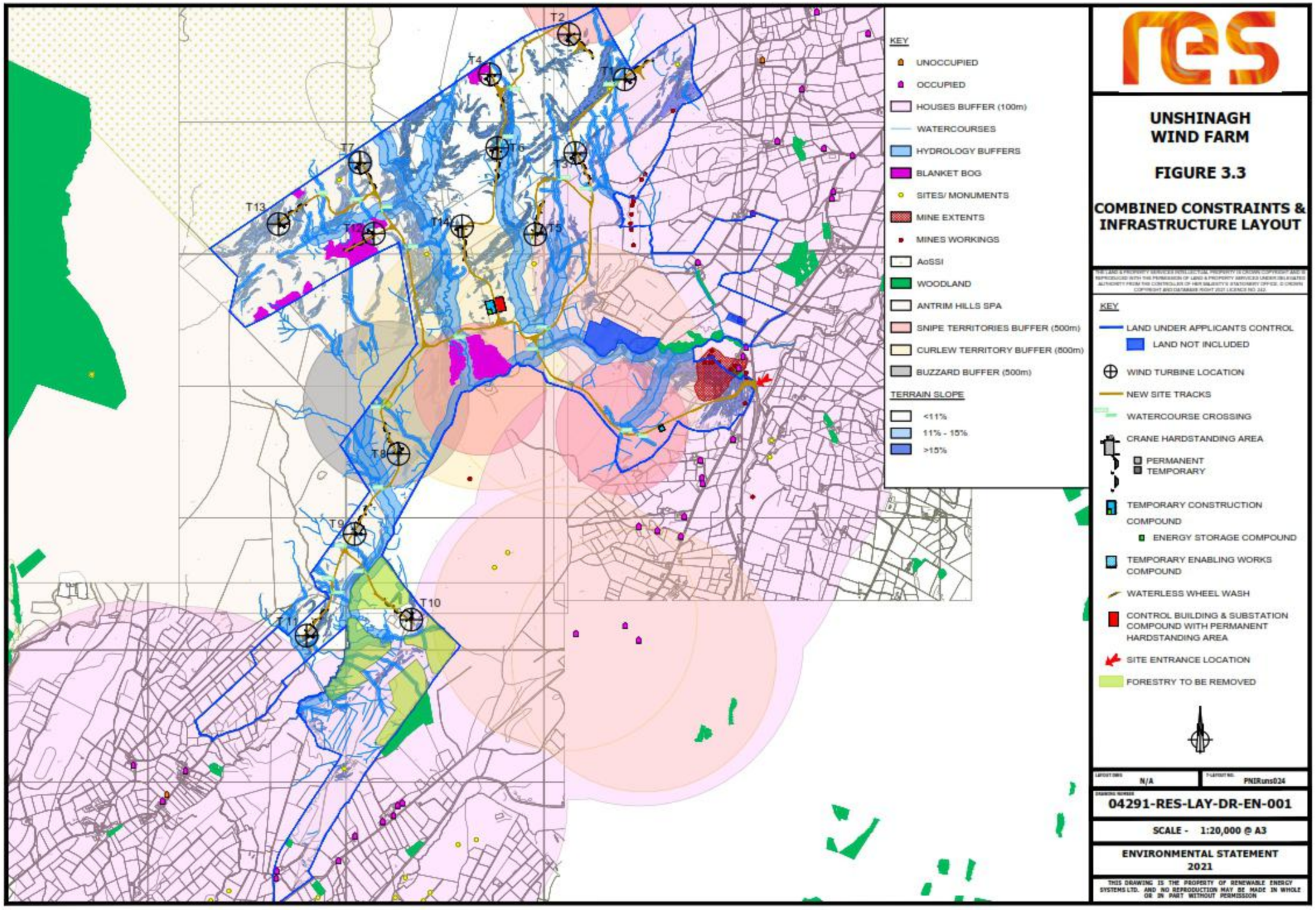
LAYOUT DWG	T-LAYOUT NO.
N/A	N/A

DRAWING NUMBER
04291-RES-WTG-DR-PT-001

SCALE - 1:1,500 @ A4

NON-TECHNICAL SUMMARY

3.3 Combined Constraints and Infrastructure



res

UNSHINAGH WIND FARM

FIGURE 3.3

COMBINED CONSTRAINTS & INFRASTRUCTURE LAYOUT

KEY

- LAND UNDER APPLICANTS CONTROL
- LAND NOT INCLUDED
- WIND TURBINE LOCATION
- NEW SITE TRACKS
- WATERCOURSE CROSSING
- CRANE HARDSTANDING AREA
  - PERMANENT
  - TEMPORARY
- TEMPORARY CONSTRUCTION COMPOUND
  - ENERGY STORAGE COMPOUND
- TEMPORARY ENABLING WORKS COMPOUND
- WATERLESS WHEEL WASH
- CONTROL BUILDING & SUBSTATION COMPOUND WITH PERMANENT HARDSTANDING AREA
- SITE ENTRANCE LOCATION
- FORESTRY TO BE REMOVED

LAYOUT DWG	N/A	PNIRuns024

DRAWING NUMBER: 04291-RES-LAY-DR-EN-001

SCALE - 1:20,000 @ A3

ENVIRONMENTAL STATEMENT 2021