



Corkey Windfarm Repowering

Non Technical Summary

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Non-Technical Summary

NTS.1 Introduction

1. This Non-Technical Summary (NTS) summarises the Environmental Statement (ES) which accompanies the application for planning permission to “repower” the Operational Corkey Windfarm, which is situated approximately 18 km north of Ballymena, in County Antrim, as shown on Figure NTS-1. Repowering is the process of the removal of older, first generation wind turbines and their replacement with modern machines, which are generally quieter, and capable of producing more electricity, more efficiently.
2. ScottishPower Renewables (UK) Ltd (referred to as ‘the Applicant’), is part of the ScottishPower group of companies operating in the UK under the Iberdrola Group, one of the world’s largest integrated utility companies and a world leader in wind energy. ScottishPower now only produces 100% green electricity – focusing on wind energy, smart grids and driving the change to a cleaner, electric future. The company is investing over £4m every working day in 2019 to make this happen and is committed to speeding up the transition to cleaner electric transport, improving air quality and over time, driving down bills to deliver a better future, quicker for everyone.
3. Planning permission is being sought for the decommissioning of the Operational Corkey Windfarm and the subsequent erection and operation of up to five wind turbines (referred to as ‘the Development’). The Development is located within the Causeway Coast and Glens Borough Council (CCGBC) administrative area in Northern Ireland. The Site is identified in Figure NTS -1 and NTS-2. The Development, will have an installed capacity of around 20 Megawatts (MW) and will also include an ancillary Energy Storage Unit.
4. Consent for the initial Operational Corkey Windfarm was granted in 1994 by the Department of the Environment for Northern Ireland. To date, the Operational Corkey Windfarm has made an important contribution to Northern Ireland’s Renewable Energy targets and low carbon objectives, and the Applicant is seeking to secure and build on this contribution by repowering the scheme. International, European, UK and Northern Irish energy policy all provide a framework and targets for the development of more renewable energy.
5. The Environmental Statement (ES) presents information on the identification and assessment of the potential significant environmental effects of the Development and reports the findings of the Environmental Impact Assessment (EIA), which has been undertaken in accordance with the Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017 (the EIA Regulations). The ES comprises the following documents:
 - This Non-Technical Summary;
 - The main report (Volume 1);
 - Supporting figures (Volume 2); and
 - Technical Appendices (Volume 3).
6. These documents inform readers of the nature of the Development, likely environmental effects and measures proposed to protect the environment during each phase of the Development. The sections in this NTS summarise the chapters in the main report, using the same numbering.
7. The Development will comprise the following phases:
 - Decommissioning of Operational Corkey Windfarm (initial phase of the Development);
 - Construction of the Development (likely to occur in tandem with the above phase);
 - Operation of the Development; and
 - Decommissioning of the Development (final phase).

NTS.2 Environmental Impact Assessment

8. The EIA Regulations list developments for which an EIA is required where there are likely to be significant effects on the environment by virtue of factors such as the nature, size or location of the development proposal. Windfarms of the scale of the Development typically require EIA, and the Applicant decided that an EIA should be carried out and is submitting this ES as part of the planning application.

9. The ES has been prepared following a systematic approach to EIA and project design, with knowledge of the potential effects being used to change the design so as to reduce those effects. The main stages to EIA are:
- Scoping (which is a formal process of asking relevant organisations for their opinion on what should be included in the EIA) and ongoing consultation, including consideration of responses from all parties and how these responses should be addressed;
 - Technical environmental assessments - including baseline studies, input to the design process, identification of potential significant environmental effects and identification of measures to reduce undesirable effects;
 - Preparation of the ES; and
 - Submission of the planning application and ES.
10. The process of scoping and pre-application consultation is critical to the development of a comprehensive and balanced ES. The request for a Scoping Opinion was submitted to the CCGBC in August 2017. The request was accompanied by the Scoping Report which described the Development, the proposed EIA methodology and the key areas to be 'scoped in' or 'scoped out' of any further assessment. The document was also sent to a range of consultees as agreed in advance with the Council by the authors of the ES. A copy of the Scoping Report is included as Technical Appendix A2.1. The Scoping Opinion was issued by the Council and received on 28th February 2018, a copy of which is included as Technical Appendix A2.2. This included agreement on excluding from the ES, assessment of effects on certain receptors or features, where it was agreed there was no potential for significant effects.
11. The applicant held two rounds of Public Information Days (PIDs) for the Development, on the 22nd and 23rd August 2017, and then on the 4th and 5th of July 2019, at the Glenravel Sports and Community Complex in Ballymena and Loughgiel Millennium Centre respectively. The aim of the first round of information days was to invite comments and obtain feedback in the early design stages to ensure that local considerations helped to inform design decisions. The aim of this second round was to present the final design reached following the rigorous EIA process.
12. Environmental effects have been assessed in chapters of the ES, broadly with one chapter per technical discipline, generally representing a type of receptor of potential effects (e.g., birds). The assessments in each chapter follow a similar, systematic approach, to identify any effects that may be significant in the context of the EIA Regulations. The approach includes establishing the "baseline", this being the current state of the environment, to which the Development will be added. This identifies the key receptors, including how sensitive they are to the sort of change that might be caused by the Development. The potential size (or magnitude) of change caused by the Development is then assessed, and the sensitivity and magnitude are considered together to form a conclusion on significance. Effects can be desirable (or "positive", or "beneficial"), or undesirable (or "negative", or "adverse"). Mitigation is proposed where possible to prevent significant undesirable effects. The final, proposed effects are those after mitigation has been applied, and are "residual effects".
13. In accordance with the EIA Regulations, the assessment has considered 'cumulative effects'. These are effects that result from cumulative changes caused by past, present or reasonably foreseeable actions together with the Development.

NTS.3 Proposal for the Repowering of the Operational Corkey Windfarm

14. The layout of the Development is shown on Figure NTS-2. The Development will comprise of the following main components:
- Decommissioning of the existing 10 turbines;
 - Removal and restoration of the existing substation building and compound;
 - Removal and restoration of redundant access tracks;
 - Erection of 5 three-bladed horizontal axis wind turbines of up to 137 m height to tip;
 - Turbine foundations;
 - Construction of approximately 2 km of new access tracks;
 - Upgrade of approximately 2 km of existing access tracks;
 - Construction of temporary and permanent hardstanding areas for each turbine to accommodate turbine component laydown areas, crane hardstanding areas and external transformers and/or switchgears;
 - 3 temporary construction compound/laydown areas;
 - New road junction with Reservoir Road;
 - Three upgraded water crossings and five new water crossings;
 - Installation of a meteorological mast;
 - Buried underground electrical and communication cables;

- Construction of a substation, with roof mounted solar panels, and associated compound;
- Energy Storage Unit; and
- Associated ancillary works.

15. A micro-siting allowance of 50m deviation (in all directions) from the indicative design footprint has also been requested. Being able to move some elements of infrastructure nearer the time of construction, means that any unfavourable ground conditions or unforeseen environmental constraints can be further avoided at the request of an on-site ecologist or archaeologist.

Wind Turbines

16. The five turbines will have a height from base to tip of up to 137 m, but the specific make and model is not yet fixed. The turbines will be of a typical modern, three blade, horizontal axis design, light grey in colour and the finish of the tower and blades will be semi-gloss and semi-matt respectively.
17. The final choice of turbines will be guided by an assessment of the wind conditions and will take account of the available technology at the time of construction. It is likely that turbines with up to 4 MW capacity may be available at the size proposed. For the purposes of the assessments a "candidate turbine" has been selected based on the precautionary principle of assessing the worst-case scenario.
18. Turbines are typically of a variable speed type, so that turbine rotor speed will vary according to the energy available in the wind. Turbines of the size proposed typically have a rotational speed of between 9 and 19 revolutions per minute (rpm), depending on variations in wind speed, generating power for all wind speeds between c. 4 metres per second (m/s) (approximately 8 miles per hour) and c. 25 m/s (approximately 50 miles per hour). At wind speeds greater than c. 25 m/s, which are very unusual, the turbines will automatically shut down for self-protection.
19. The turbines are computer controlled to ensure that at all times, the turbine faces directly into the wind to ensure optimum efficiency. The rotors of all five turbines will rotate in the same direction relative to the wind direction.
20. Each wind turbine needs an area of compacted stone adjacent to the turbine base, known as a hardstanding. This is used principally by the crane for the erection of the turbine.

Access to the Development

21. The Development will be accessed via the access track for the Operational Corkey Windfarm. A new junction to Reservoir Road is required to the west of the current operational access due to the geometry of larger turbines. The turbines are expected to arrive in Northern Ireland at either Belfast or Larne, and the potential effects of transporting them and other materials is set out in section NTS-12 and Chapter 12 of the ES.
22. Where possible, the existing spine road and access tracks serving the Operational Corkey Windfarm will be kept, utilised and upgraded as necessary to access the proposed turbine positions. These will be supplemented by new access tracks where required. Tracks required to access new elements of the Development will be retained throughout the operational life of the Development to enable maintenance of the turbines and replacement of any turbine components. In total, approximately 2 km of new access tracks will be required, with approximately 2 km of existing track requiring localised widening.

Grid Connection

23. Underground cabling, laid where possible alongside the new access tracks, will link the turbine transformers to the onsite substation building. Where existing track is being re-used, the cables will be laid in a cable trench alongside the existing track.
24. It is likely that a new connection to the electrical grid will be required to accommodate the Development, because it will generate more electricity than the Operational Corkey Windfarm. Based on initial discussions with Northern Ireland Electricity (NIE), it is possible that the Development substation would be connected to the Rasharkin 'cluster' substation, which is approximately 16 km south-west of the site. The final route selection will be determined by NIE.

Energy Storage Unit

25. The Energy Storage Unit will be located within the substation compound. The units are likely to consist of containers each approximately 6.0 m x 25 m x 2.2 m high.

26. The current energy storage technology favoured today is lithium-ion (Li-ion) batteries, which have characteristics that make them suitable for being connected to the grid. The final selection of energy storage technology used will be based on the latest technology available at the time of construction.

Initial Decommissioning / Construction Phase

27. The construction phase of the Development will run in parallel with the initial decommissioning of the Operational Corkey Windfarm and take approximately 8 months in total, depending on the final layout and weather conditions. In general, working hours for decommissioning / construction activity will be from 07:00 to 19:00 throughout the week, with reduced working hours at weekends.
28. The first phase of the Development will comprise the decommissioning and removal of the existing turbines, external transformers and wind monitoring masts from the Site. It is anticipated that the turbines and external transformers will be carefully dismantled and transported offsite, possibly for resale in the second hand market.
29. The turbines will be located across a wide area of hillside, however the land taken by the turbines and other infrastructure is a very small proportion of this, and substantial efforts have been made to re-use existing infrastructure rather than using new land. During the initial decommissioning/construction phases, the total land-take required for the Development will be 10.7 ha, including the 2 ha of land used by the Operational Corkey Windfarm. Towards the end of these phases, around 2.5 ha of land would be reinstated.
30. The Applicant will appoint an Infrastructure Contractor who will have overall responsibility for management, including environmental management, on the construction site. The Infrastructure Contractor will ensure the decommissioning/construction activities are carried out in accordance with the mitigation measures outlined in the ES and as required by the planning permission, such as the Outline Decommissioning and Construction Environmental Management Plan included in the ES as Technical Appendix A3.1. The services of specialist advisors will be retained as appropriate, such as an archaeologist and ecologist, to be called on as required to advise on specific environmental issues.

Site Restoration

31. A draft Habitat Management Plan, included in the ES as Technical Appendix A3.2, sets out measures for soil management and restoration. Site restoration will involve the restoration of track and hardstanding verges and the temporary decommissioning and construction compound to provide a natural ground profile. Restoration will be undertaken at the earliest opportunity to minimise storage of turf and other materials.

Operational Phase

32. During the operational phase of the Development, turbine and infrastructure maintenance will be ongoing and regular. This is expected to continue to employ approximately 2 or 3 people on a permanent basis for regular operational and maintenance activities.
33. No time limits are proposed on the operational lifespan for the Development. In the event that the Development requires to be decommissioned, the process would be similar to the decommissioning of the Operational Corkey Windfarm. Given the fewer number of turbines in the repowered scheme, the potential effects arising from its future decommissioning will be less than the effects arising as a result of the initial decommissioning of the existing turbines alone. The initial decommissioning/construction phase therefore represent the worst-case parameters for assessment purposes.

NTS.4 Site Selection and Design

34. The Operational Corkey Windfarm was constructed in 1994 and, whilst the turbines currently perform well, replacement of the existing turbines with newer turbines would increase the renewable energy generation capacity from 5 MW to around 20 MW.
35. Repowering an existing windfarm not only increases renewable energy generation capacity, but also leads to lesser environmental effects compared to constructing a similar development on a new site. For example, when compared with a site of similar scale elsewhere that does not currently have windfarm development, repowering an existing site would have lesser landscape and visual effects as the wind turbines are already a feature in the landscape. Likewise, existing infrastructure such as hardstandings and access tracks can be reused, reducing the overall footprint of new infrastructure serving the Development. Therefore, repowering allows the Development to benefit from the use of the existing infrastructure, whilst also reducing associated environmental effects.

36. The Site layout design has evolved through a series of changes, to avoid or minimise potential effects, including effects on views, hydrology, peat, ecology and fisheries, ornithology, noise and archaeological features. Technical criteria such as wind speed, prevailing wind direction, existing infrastructure, topography and ground conditions were considered during the design process, in response to guidance documents, survey findings and responses from consultees. Overall it is considered that the proposal represents an optimum fit within the technical and environmental parameters of the project.

NTS.5 Legal and Policy Framework

37. Chapter 5 of the ES sets out legislative planning and policy background to the application. This includes the local development plan, which is the Northern Area Plan (2016), and other material considerations, such as regional planning policy and guidance for Northern Ireland. These policies are relevant to the determination of the application by Council decision-makers, and a compliance assessment of the Development with these policies is set out in the Planning Statement that accompanies the application (but which is not part of the ES).
38. The Northern Ireland Investment Strategy 2011-2021 highlights the importance of renewable sources in electricity generation. The long-term targets are emphasised, underlining that the UK Climate Change Act 2008 legislated for an 80% mandatory cut in the UK's carbon emissions by 2050 (compared to 1990 levels), with a target of 35% by 2025.
39. The Onshore Renewable Energy Action Plan 2013-2020 considers the contribution of onshore renewable technologies to the 40% renewable energy target by 2020 and recognises the impact that onshore wind has on the electricity network in Northern Ireland. The Development will contribute towards meeting the Northern Irish key renewable targets through the repowering of the Operational Corkey Windfarm which will result in an increased overall generating capacity as well as securing continuity of renewable energy provision.

NTS.6 Landscape and Visual

40. Chapter 6 of the ES presents a Landscape and Visual Impact Assessment for the Development. The assessment of landscape and visual effects has been carried out to identify the significant effects that are likely to arise as a result of the Development. It has considered the effects on landscape and visual receptors, as well as the cumulative effect of the Development in addition to and in combination with other windfarm developments. The process involved identifying those receptors with the potential to be significantly affected and assessing the potential effects that the decommissioning of Operational Corkey Windfarm and the construction and operation of the Development would give rise to. The significance of these effects has been assessed through combining the sensitivity of each receptor with a prediction of the magnitude (size) of change that would occur as a result of the Development.
41. The Development is located on the western periphery of the Antrim Hills, which lies adjacent to the western boundary of the Antrim Coast and Glens Area of Outstanding Natural Beauty (AONB). The low-lying valley of the River Main is situated to the west and the broader range of the Antrim Hills to the east. The predominant orientation of the uplands and the valley is from south-east to north-west, towards the coastline, with ridgelines and roads generally following this alignment. While rural settlement and roads occur extensively across the valley landscape, these features are sparse in the upland landscape.
42. The Study Area for the Development covers a radius of 30 km and, within this area, those receptors with the potential to be significantly affected (as agreed with consultees through the EIA Scoping process) have been assessed in detail. This has included one landscape element, four landscape character areas (LCAs), two designated landscape areas and 18 viewpoints. Photomontages have been prepared for the viewpoints, with the exception of Viewpoint 15 which lies at a range of approximately 20 km, and the figures also include a wireline of the Development on its own and a wireline with all other cumulative developments. These visualisations have helped assist in the assessment process.
43. In respect of effects on landscape elements, the assessment found no significant effects would arise. The losses of rough grass moorland as a result of the initial decommissioning of Operational Corkey Windfarm and construction of the

¹ Northern Ireland Executive (2015). Investment Strategy for Northern Ireland 2011 – 2021. Available online at: <https://www.infrastructure-ni.gov.uk/publications/investment-strategy-northern-ireland-2011-2021> [Accessed on 07/07/2017]

² Department of Enterprise, Trade and Investment (2013). Onshore Renewable Electricity Action Plan. Available online at: <https://www.economy-ni.gov.uk/articles/onshore-renewable-electricity-action-plan> [Accessed on 07/07/2017]

Development would comprise only a small proportion of a much wider landscape element and would occur in an area where operational windfarms are currently sited.

44. In respect of effects on landscape character, the assessment found there would be significant effects within a localised 5 km radius of the Development. The effects on landscape character would be moderated by the existing presence of the Operational Corkey Windfarm which would be replaced by the Development. Not all areas within this 5 km radius would incur significant effects owing largely to the screening effect of landform and forestry. Beyond 5 km, no significant effects are predicted. The Moyle Moorlands and Forests LCA would incur a significant effect only within 0 to 2 km of the Development and in places between 2 to 5 km away from the Development, including across the Bush Valley to the north, across Slievenanee and Slieverush to the south-east and along the Slieveanorra ridgeline to the north-east. The Cullybackey and Clough Mills Drumlins LCA would incur a significant effect locally, and the Central Ballymena Glens would incur a temporary significant effect during the initial decommissioning / construction phases only, out to approximately 3 km away from the Development but not beyond and with no significant effects occurring during the operational phase.
45. In respect of landscape designations, the assessment found that there would be significant effects in those parts of the Antrim Coasts and Glens AONB, coinciding with the extent of the significant effects identified in respect of the Moyle Moorlands and Forests LCA and the Central Ballymena Glens LCA above. However, visibility of the Development would largely occur in those areas where visibility of operational windfarms already occurs with the vast majority of the AONB remaining unaffected by the Development. All other designated areas in the Study Area would remain unaffected during the initial decommissioning / construction and operational phases of the Development. This assessment includes Lissanoure Historic Garden, which despite its relatively close range, is well enclosed by mature tree cover and would, therefore, not incur a significant effect.
46. In respect of effects on visual amenity, of the 18 viewpoints assessed, the assessment found that ten of the 18 viewpoints assessed, and one of the five principal visual receptors assessed, would be subject to significant effects. These viewpoints and principal visual receptor are listed below.
- Viewpoint 1: Corkey;
 - Viewpoint 2: Lislaban;
 - Viewpoint 3: Reservoir Road;
 - Viewpoint 4: Loughguile;
 - Viewpoint 5: Altnahinch Road south;
 - Viewpoint 6: Altnahinch Reservoir;
 - Viewpoint 7: Slieveanorra;
 - Viewpoint 11: Ballyweeny, Ballyveely Road;
 - Viewpoint 12: Altnahinch Road north;
 - Viewpoint 14: Kilmandil; and
 - Moyle Way long distance footpath (part of the Ulster Way) over a 1.3 km section to the south of Slieveanorra summit and the 1.5 km section to the west of Trostan summit and no effect where there would be no visibility across the majority of the route.
47. The viewpoints would mostly be affected as a result of their close proximity to the the Development, with all viewpoints undergoing significant effects lying within 5.5 km of the Development. All viewpoints beyond this range, and many others within this range from where views are not available or are restricted, would not incur a significant effect as a result of the Development.
48. For the assessment of cumulative effects, the most relevant windfarms are operational, and these form part of the baseline. The assessment of the Development in addition to the cumulative situation is, therefore, largely covered by the main assessment as this takes into account all the operational windfarms. There are a number of consented wind turbines located in the Cullybackey and Clough Mills Drumlins LCA to the west and the Central Ballymena Glens LCA to the south, which are mostly single or paired turbines. The cumulative effect of the Development in conjunction with these turbines is assessed as not significant.
49. In summary, the Development would give rise to limited significant effects on landscape character during the decommissioning/construction phases contained within approximately 5 km of the site. It would give rise to some significant effects on visual amenity out to approximately 5.5 km, but while landscape and visual receptors beyond the 5 km and 5.5 km

radii may be affected by the influence of the Development, these effects would not be significant. Not all landscape and visual receptors within the 5 km and 5.5 km radii would incur significant effects, for example Slieveanorra Forest where no visual influence occurs. All effects during the initial decommissioning/ construction phases of the Development would be short term and reversible and all effects during the operation of the Development would be permanent and reversible.

NTS.7 Hydrology, Geology and the Water Environment

50. Chapter 7 of the ES evaluates the effects of the Development arising from the construction/decommissioning and operational phases on the hydrology, hydrogeology and geology resource within and surrounding the Site. The hydrological and hydrogeological assessment for the Development was based on a desk study, site surveys, and consultation with the CCGBC, NIEA, Northern Ireland Water and the Drinking Water Inspectorate.
51. There are no statutory designated sites within the study area that are hydrologically connected to the Development. None of the Development infrastructure has been assessed as being at risk from flooding.
52. Two private water supplies are located within the catchment of Development infrastructure, though both lie beyond 250 m of any Development infrastructure and as such fall outside the distance that the Northern Ireland Environment Agency recommend should be assessed.
53. A total of 766 peat probes were sunk during two phases of investigation, in a Study Area covering the wider area of land considered for Development during the EIA Scoping stage. Pockets of deep peat, 1.5 m or greater, were recorded across the upper regions of the hill, with peat thinning on the steeper areas. Peat depth generally varied across the remainder of the Study Area with thicknesses in the region of 0.5 m or less dominating the western Site area.
54. Standard, good-practice measures will be implemented to minimise the potential for effects such as pollution, erosion or changes to groundwater and surface water flows at the Development to occur. These established and effective measures are included in the Outline Decommissioning/Construction Environmental Management Plan (Technical Appendix A3.1) and the Water Construction and Environment Management Plan (Technical Appendix A7.2) which the Applicant will be committed to undertake through conditions of the planning consent. With these measures in place the Development has been assessed as having the potential to result in effects of negligible significance with the exception of chemical pollution and erosion and sedimentation associated with the installation of turbine 2 and turbine 5.
55. It has been necessary to place the turbine 2 hardstanding within 20 m of a man-made drain and the hardstanding at turbine 5 encroaches on a watercourse. Additional mitigation has been proposed at these locations consisting of placement of cut-off ditch between the turbine 2 hardstanding and the drain and diversion or over pumping during culverting (if this is required) of the watercourse encroached on by the hardstanding at turbine 5. Following these measures, effects on these watercourses are assessed as negligible.
56. The potential disturbance of peat presents a medium risk in the north-eastern Site area at turbine 1. Specific mitigation included in the draft Habitat Management Plan (Technical Appendix A3.2) is proposed to compensate for potential peat disturbance and reduce the effect to low, which is not significant in terms of the EIA Regulations. During the decommissioning / construction and operational phases of the Development, a number of established good practice measures will be put in place to minimise peat disturbance, peat stability, and loss and compaction of soils. With effective and well managed mitigation measures in place, no significant residual effects on geology and peat are predicted as a result of the Development.

NTS.8 Ecology and Fisheries

57. Chapter 8 of the ES considers the potential for effects on ecological and fishery features. A range of surveys was carried out in accordance with good practice and following advice from consultees. These were used to identify "Important Ecological Features", following the approach set out in relevant professional guidance. These features included sites protected for their nature conservation interest, specific habitats (Blanket bog, Wet modified bog, Dry modified bog, Wet dwarf shrub heath, Running water and Gorse scrub), certain fisheries features (Killagan Water and River Main) and certain protected species (Badger and Bats).
58. The Site is not within or adjacent to any sites that are designated for nature conservation, but it is within the flight range of birds from the Antrim Hills Special Protection Area (SPA) and the Slieveanorra and Croaghan Area of Special Scientific

Interest (ASSI), and has a distant hydrological connection to the Lough Neagh and Lough Beg SPA. Potential effects on birds are summarised in section NTS.9 Ornithology.

59. The layout of the Development has been designed to avoid effects on blanket bog (which is active peat) and other habitats of highest ecological value, but there will be some small-scale effects on blanket bog in locations that cannot be avoided (e.g. existing roads with acute bends). With this exception, the Development will take place on the existing infrastructure of the Operational Corkey Windfarm, and on habitats of lower ecological value. Direct impacts on habitats will be offset by the restoration of 9.41 ha of degraded blanket bog, as set out in Technical Appendix A3.2 Draft Habitat Management Plan. This will result in a slight positive effect on habitats and active peat in the medium-term.
60. All identified badger setts are located more than 400 m from proposed infrastructure or construction activity, and will not be affected. The Site is used by Leisler's bat and common pipistrelles on an occasional basis, but 99% of survey nights had negligible or low activity, and that the risk of collision-related fatalities during the operation of the Development is negligible. There are desktop records of other protected mammals in the surrounding area, but none are expected to use the Site on a regular basis. Smooth newts and common lizards were not observed during walkover surveys, and are unlikely to be present in significant numbers, no detailed surveys are required. No habitat suitable for the protected marsh fritillary was found.
61. Subject to the successful implementation of the proposed mitigation measures, which will be monitored by a qualified ecologist during construction, the Development will have neutral or slight-positive effects on all Important Ecological Features. Therefore, the Development will not cause any significant negative effects on designated sites, habitats, legally protected species, or any other features of ecological importance.

NTS.9 Ornithology

62. Chapter 9 of the ES presents an ornithological impact assessment of the Development. A baseline survey was used to collect data and inform an assessment of potential effects of the Development due to collision, disturbance and/or displacement of birds.
63. A review of ornithological data and designated sites was undertaken for the Development and wider hinterland up to 10 km. The Site is not located within a protected area for birds, but is located approximately 1 km away from the Antrim Hills Special Protection Area (SPA).
64. Baseline ornithology monitoring was undertaken to establish the distribution and abundance of bird populations in the vicinity of the Development. The baseline bird data provided information used to inform the design of the windfarm layout and inform potential effects of the Development due to collision, disturbance and/or displacement of birds. Monitoring during the breeding, wintering and migration seasons were completed during a five-year period (March 2014 – April 2019). Surveys followed techniques based on widely accepted guidance for similar surveys.
65. Only small numbers of breeding and/or wintering bird species are likely to be directly impacted within the Development footprint and there is negligible difference between the existing and proposed footprints, with only small numbers of territories predicted to be affected during the decommissioning/construction phase, and these can be protected during construction by mitigation measures.
66. There was evidence of habituation to the operational windfarm for snipe and red grouse in particular with breeding pairs recorded less than 100 m away from operational turbines.
67. Predicted effects of the Development on ornithology during the initial decommissioning/construction phases are minor to negligible, on the basis of observed field data and findings, published information and research and best practice guidance, when coupled with precautionary mitigation measures to minimise disturbance, particularly for snipe and small passerines.
68. There are considered to be no specific cumulative operational effects on individual birds or territories as a result of the Development. The reduction in the numbers of turbines results in increased separation distances to some species including snipe and red grouse. There are fewer turbines proposed and the collision risk for key species, including hen harrier are therefore lower.
69. Overall, no significant effects on ornithology are predicted.

NTS.10 Noise

70. Chapter 10 of the ES presents an assessment of the effects of noise due to the Development.
71. Noise would be emitted by equipment and vehicles used during the initial decommissioning/construction phases. However, as the Development consists of the repowering of an existing windfarm, a number of elements of the existing site infrastructure such as access tracks will be reused, thereby minimising the amount of construction works required. Decommissioning/construction noise will be limited in duration and confined to working hours as specified by the CCGBC and therefore can be adequately controlled through the application of good practice measures and secured by planning condition. This will ensure that any noise from the Development site during decommissioning/construction will be adequately controlled. Good practice measures will be implemented by the Infrastructure Contractor to manage the effects of noise during operations, the most important of these being suggested restrictions of hours of working.
72. During operation, wind turbines can generate noise from the machinery housed within the turbine and from the movement of blades through the air. Modern turbines are designed to minimise noise and planning conditions are used to ensure compliance with specified noise limits. The assessment of operational noise has been undertaken in accordance with the method of assessing wind turbine noise recommended by Government guidance, and following the current best practice methods. It has been shown that noise due to the Development, including cumulative noise with surrounding windfarms and wind turbines, would meet all current requirements at all receptor locations.
73. The Development includes an energy storage facility. Such facilities emit relatively low levels of noise. The energy storage facility will be housed within its own building, with the primary noise sources being the air conditioning units used to keep the facility cool. Given this, coupled with the substantial (approximately 800 m) separation distance between the energy storage facility and the closest noise-sensitive location, no significant effects are anticipated.

NTS.11 Archaeology and Cultural Heritage

74. Chapter 11 of the ES presents a baseline study of and impact assessment on, the cultural heritage of the Site and the surrounding region. Site visits and desk studies were undertaken to identify and record any archaeological and cultural heritage assets which may be affected by the Development. The significance of effect on an asset is considered by establishing the asset's sensitivity, and how that may be impacted based on the proposed design of the Development.
75. There are no known archaeological remains within the footprint of the Development, and hence there will be no physical effects on any known archaeological or heritage features during any phase of the Development.
76. The Site has a low potential for unknown archaeological remains due to its exposed upland, moorland nature. The potential for effects on unknown archaeological remains during the decommissioning/construction phases is low, given the re-use of existing windfarm infrastructure on the site combined with the limited extension of the Development into undisturbed ground, but if it were to occur, the remains would be likely to suffer major damage. Mitigation is proposed for potential effects on unknown archaeological remains, in the form of a qualified archaeologist watching the initial digging activity into undisturbed portions of the Development footprint so as to identify any remains that may be present at the earliest opportunity and record their features prior to any damage occurring.
77. There is a total of 11 Scheduled Monuments, 18 Listed Buildings (of all categories) and one Historic Park, Garden and Demesne within a 5 km study area. These have the potential to receive indirect effects associated with changes to their visual environment, caused by the Development, however all have been assessed in detail and found, due to their location and immediate surroundings, to receive no effect or negligible effect as a result of the Development.
78. The assessment does not predict any residual effects or cumulative effects on archaeological resources that are significant in terms of the EIA Regulations.

NTS.12 Access, Traffic and Transport

79. Chapter 12 of the ES sets out the effect that decommissioning/construction traffic would have on the road network, and the consequent effects that that could have on people and communities nearby.
80. Potential effects associated with windfarm development are presented in two key forms: those from the transport of wind turbine components, and those as a result of the import of construction material, equipment and personnel.

81. Technical Appendix A12.1: Abnormal Load Route Assessment sets out potential routes for the turbine components, which are typically longer and/or wider than conventional heavy goods vehicles (HGVs) and are therefore referred to as “abnormal”, to reach the site from a suitable port. Routes from the ports of Larne and Belfast have been assessed and found to be suitable, subject to minor, temporary alterations to street furniture (such as chevron signs, bollards, etc.). These components would be transported with an escort vehicle as standard practice, to help ensure safe passage.
82. HGVs are likely to use the following haul route:
- Exit the A26 at the roundabout with the A44;
 - Continue northbound on the A44;
 - Turn right onto Kilmandil Road;
 - Turn left onto Ballyveely Road;
 - Turn right onto Ballyweeny Road;
 - Turn right onto Corkey Road;
 - Turn left onto Reservoir Road; and
 - Turn right onto the Site entrance junction.
83. Current traffic flows on these roads have been estimated from measured data and projected forward to an anticipated construction start date, to provide “baseline” traffic flows. The amount of traffic that will be generated by the initial decommissioning/construction phases of the Development and potential effects on people and nearby communities were assessed as negligible, except for the following:
- Driver delay during the short periods of time when the abnormal loads are moving, at points highly localised to the abnormal loads;
 - Pedestrian amenity (the pleasantness of the pedestrian experience) through Corkey (including past St Anne’s Primary School) and along Reservoir Road;
 - Severance of communities either side of a road that is made busy, in this case through the village of Corkey; and
 - Vibration caused by large vehicles, either airborne or ground-based as a result of a rough road surface.
 - A number of mitigation measures are proposed to minimise effects in Corkey, including:
 - As far as reasonably possible, deliveries should be scheduled outside of school opening and closing times;
 - Where deliveries are required to take place during school opening and closing times, these should be routed via the abnormal loads delivery route through Armoy, in order to avoid passing through Corkey;
 - Drivers of all delivery vehicles should be made aware of the presence of schools within these settlements and that formal pedestrian crossing facilities are not present; and
 - Drivers should be made aware of the 30 mph speed limit in Corkey and reminded that strict adherence to this is expected.
84. The above measures are recommended; however, a detailed Traffic Management Plan to be agreed with the relevant authorities would detail the measures to be implemented during the temporary decommissioning/construction phases.
85. No significant effects related to operational phase traffic will occur due to the minimal traffic that would be generated during that phase of the Development.

NTS.13 Socio-economics, Tourism, Recreation and Land Use

86. The potential effects of the decommissioning/construction and operation phases of the Development on socio-economics, tourism and recreation and land-use have been identified and assessed in Chapter 13 of the ES following the desk-based collection of data, site visits and consultation with local stakeholders. The range of potential receptors to be considered was reduced through consultation and use of maps, provided in support of Chapter 6 of the ES, which define those areas from which the Development turbines would and would not be visible.
87. During the decommissioning/construction and operational phases, the effects of the Development on tourism and recreation receptors (the Moyle Way, Lissanoure Castle and Gardens and Altnahinch Reservoir) would be negligible, as a result of the absence of direct effects and the very limited visual effects.
88. Land use effects of the Development during the decommissioning/construction phase within the Site would be minor, with effects arising from a temporarily increased land-take and ceasing of agriculture within the construction site. During the

operational phase, the land value would increase as a result of the Development, resulting in a minor beneficial effect on land use within the Site.

89. In advance of the decommissioning/construction phase, the Applicant will hold a series of meet-the-buyer events as early as possible, allowing local contractors to learn about opportunities to bid for contracts, time to upskill and time to prepare prior to bidding. The Applicant has significant experience in organising these types of events and has a good understanding of the local area's capacity given that it currently operates Corkey Windfarm. It was estimated that Causeway Coast and Glens could secure contracts worth £1.5 million which is equivalent to 7% of capital expenditure and bring wider benefits estimated to be worth £6.7 Million to Northern Ireland. Effects on the economy during decommissioning/construction would be minor, both direct and indirect, and positive, due to the creation of job opportunities and subsequent spending of income in the local area and within Northern Ireland as a whole. This effect would last for the duration of the decommissioning/construction phases.
90. Once operational, the Development will require routine maintenance and servicing. It is estimated that the Causeway Coasts and Glens area could secure 38% of operation and maintenance contracts worth £0.3 million annually. It is estimated that turnover generated by the operation and maintenance could support 2 jobs in Causeway Coast and Glens and be worth £10.6 million over an illustrative 30 year period to Northern Ireland.. Given the long duration of the operational phase, effects on the economy during operation would be minor, both direct and indirect, and positive, due to the creation of job opportunities and subsequent spending of income in the local area and within Northern Ireland as a whole.
91. Cumulatively, together with other proposed windfarm developments in the region, if these are progressed, the effects would be positive and of minor significance at the level of Causeway Coast and Glens and also Northern Ireland.

NTS.14 Other issues

92. Chapter 14 of the ES considers a number of other issues associated with windfarm development, including potential effects on telecommunications and utilities, shadow flicker, aviation and radar, human health, climate change, and in-combination effects associated with the interrelationships between ES chapters.

Telecommunications and Utilities

93. Operators of microwave communication links were contacted during the EIA, and no links were identified that the Development would interfere with. No disruption to television reception is anticipated following the switch over to digital broadcasting. Utilities, such as power lines, along road sides would be managed through the decommissioning/construction phases in consultation with their operators. Where any modification to utilities is required to ensure continued function, this will be carried out using normal procedures, which are well developed for such operations. Consequently, no significant effects on telecommunications and utilities are anticipated.

Shadow Flicker

94. Shadow flicker is the effect of light levels in a sun-lit room dramatically varying down and up as a result of the shadow of a turbine blade covering the whole window as the blade moved across the sunlight, and this can cause a nuisance through a narrow window opening. Industry standard software was used to model the potential for shadow flicker to occur, based on the proposed turbine locations and dimensions, and the locations of residential properties. Properties within 10 rotor diameters (1,200 m) and 130 degrees either side of north were assessed, in accordance with Government guidance, on the basis that effects beyond this are very unlikely to occur. Potential effects may occur at one property although the assessed effects are considered to be worst case due to the orientation of the property and the lack of narrow window openings facing the Site. The duration and frequency predicted are generally below the guideline thresholds, including for cumulative effects, however mitigation is proposed in the eventuality that shadow flicker does cause a nuisance to the residents. Several forms of mitigation are available, depending on the nature/timing of the effect and the resident's preference and, if necessary, the turbine can be temporarily switched off, eliminating the effect. Experience shows this is unlikely to be required in practice. Residual shadow flicker effects are not significant.

Aviation and Radar

95. Aviation effects from the operation of wind turbines can include:
- Physical obstructions;
 - Generation of unwanted returns on Primary Surveillance Radar (PSR); and
 - Adverse effects on overall performance of Communications, Navigation and Surveillance (CNS) equipment.

96. Consultation with aviation operators was undertaken, with a response only from the Ministry of Defence. It requested infra-red lighting (which is not visible) be fixed to the turbines to allow the turbines to be seen with night-vision equipment. It is proposed that turbines 1, 3 and 5 be lit with infra-red light compliant with MOD requirements. The turbines of the Operational Corkey Windfarm are within radar line of sight of Belfast International Airport's radar, and have been accommodated to date by both the airport and air traffic controllers. The Operational Corkey Windfarm is not in radar line of sight of Belfast City Airport's radar while the City of Derry Airport does not currently have radar facilities. The turbine locations will be added to aviation maps prior to construction, to ensure aviation safety protocols are followed. Therefore, potential effects on aviation as a result of the Development will be negligible.

Human Health

97. Effects on human health have been considered in context of Traffic and Transport, Noise, Residential Amenity, Shadow Flicker and Health and Safety at Work. The effects are summarised below:
98. Traffic and Transport and Noise have been assessed in chapters 12 and 10 of the ES, respectively, with no significant effects identified;
99. Residential Amenity is assessed in Chapter 6 of the ES. As the Development would replace the Operational Corkey Windfarm, and would be seen in context with the adjacent Gruig Wind Farm, the change in setting of local properties would be slight and a negligible magnitude of change. The effect on residential amenity is therefore considered to be negligible which is not significant in terms of EIA Regulations;
100. As noted above, following mitigation (if required), shadow flicker effects will be not significant; and
101. The Development will be constructed and operated in accordance with relevant health and safety legislation and good construction practice, and following this, no significant effects on human health are anticipated.
102. Key detriments to human health, including mental health aspects associated with changes to amenity as a result of the Development, have been considered, concluding that the Development is unlikely to negatively affect people's health and wellbeing in its widest sense. As a result, no significant effects on human health are predicted for any phase of the Development.

Climate Change

103. A climate change assessment has been carried out focusing on the potential effect the Development could have on the climate, through the emission, or saving of emissions, of carbon dioxide or other 'greenhouse' gases. Site-specific information was used, based on field observations, and other reference sources such as Government statistics. Emissions of carbon dioxide from the Development occur principally from the manufacture and construction of the turbines, and from the use of a small amount of electricity from the grid to operate the windfarm's 'standby' functions when the wind speed is low and the turbines are not generating electricity. The total emissions of carbon dioxide are estimated at almost 40,000 tonnes of carbon dioxide over the life of the Development.
104. Savings of carbon dioxide arise principally from the generation of electricity from the Development, such that generation from other sources (which emit carbon dioxide) are offset. The estimates of savings depend on the assumption of which source of electricity is displaced, and the savings range from 15,000 to 50,000 tonnes of carbon dioxide per year. Comparing the savings to the emissions, the Development is expected to 'pay back' its total carbon emissions in between 0.7 and 2.4 years of operation. Given the Development will operate for substantially longer than this, the carbon dioxide emissions savings would be a positive net benefit of the Development to reducing climate change. The cumulative effect of the Development with other UK renewables generation is considered to be a fundamental change in the climate effects of UK energy supply, which is a major, positive, effect.

Interrelationships

105. Interrelationship effects may occur where two or more effects arise that have the potential to have an effect on the same receptor during any particular phase of a development. An effect taken in isolation may not have a significant effect on a receptor, but where several effects are considered in an interrelated manner, the resultant combined effect may be considered significant, depending on the nature of the effects. For the decommissioning/construction phase, potential interrelationship effects not already considered elsewhere in the ES include visual and traffic-related effects on local

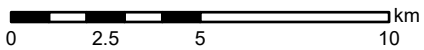
residents. For the operational phase, potential interrelationship effects not already considered elsewhere in the ES include visual and increased turbine noise effects on local residents. These are each considered for individual or groups of properties, and the combined effect is considered in comparison to the largest individual effect, to conclude if the additional effect is significant. Where the additional effect would be described as a “material” or “fundamental” change to residential amenity, this would be assessed as significant. In all cases, the additional effects were assessed as either negligible or minor, and not significant in terms of the EIA Regulations.

NTS.15 Summary

106. Chapter 15 of the ES provides a summary of the effects from each ES chapter, and also summarises the mitigation measures proposed, for ease of reference.



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Corkey Windfarm Repowering Site Location Figure NTS-1

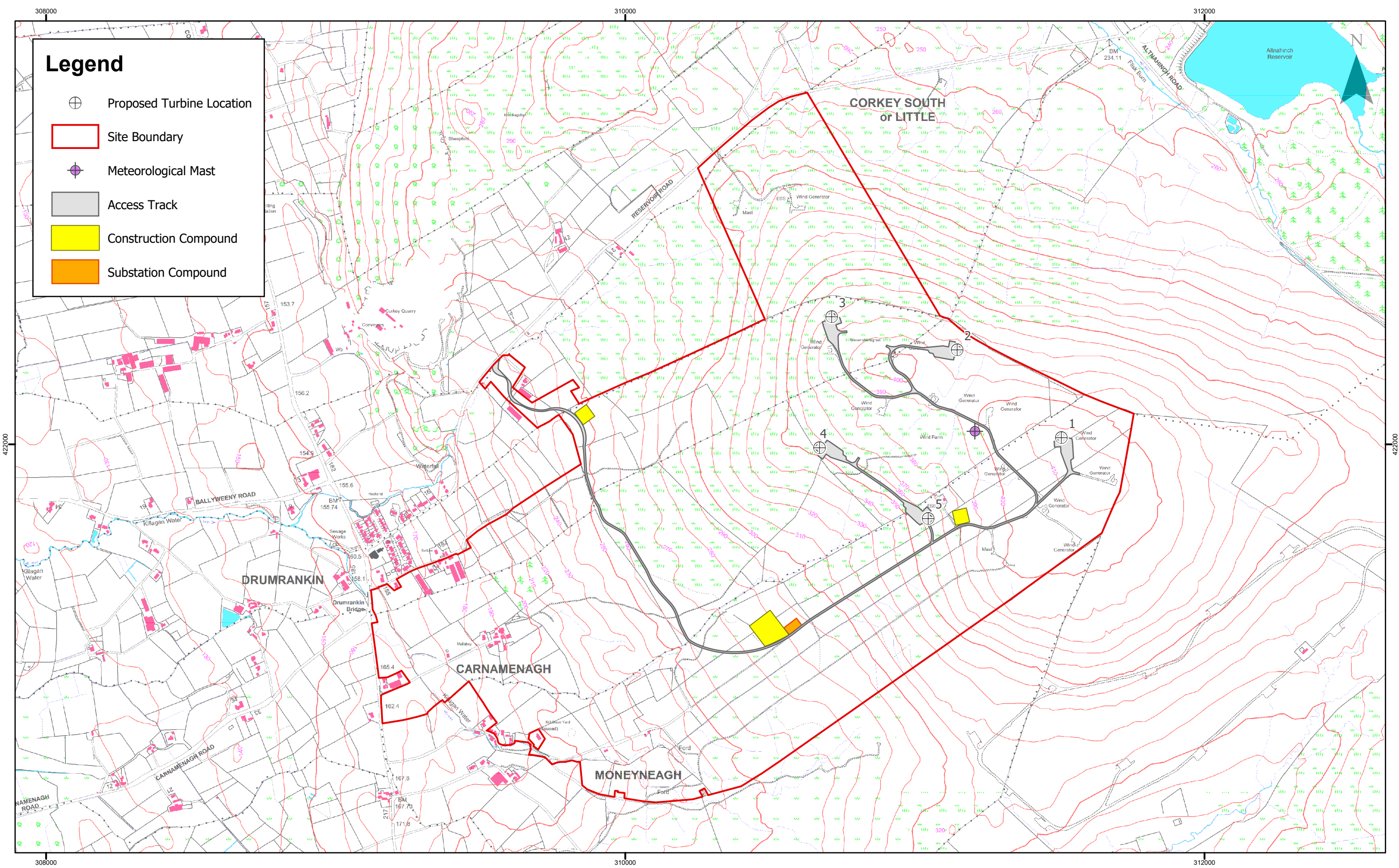
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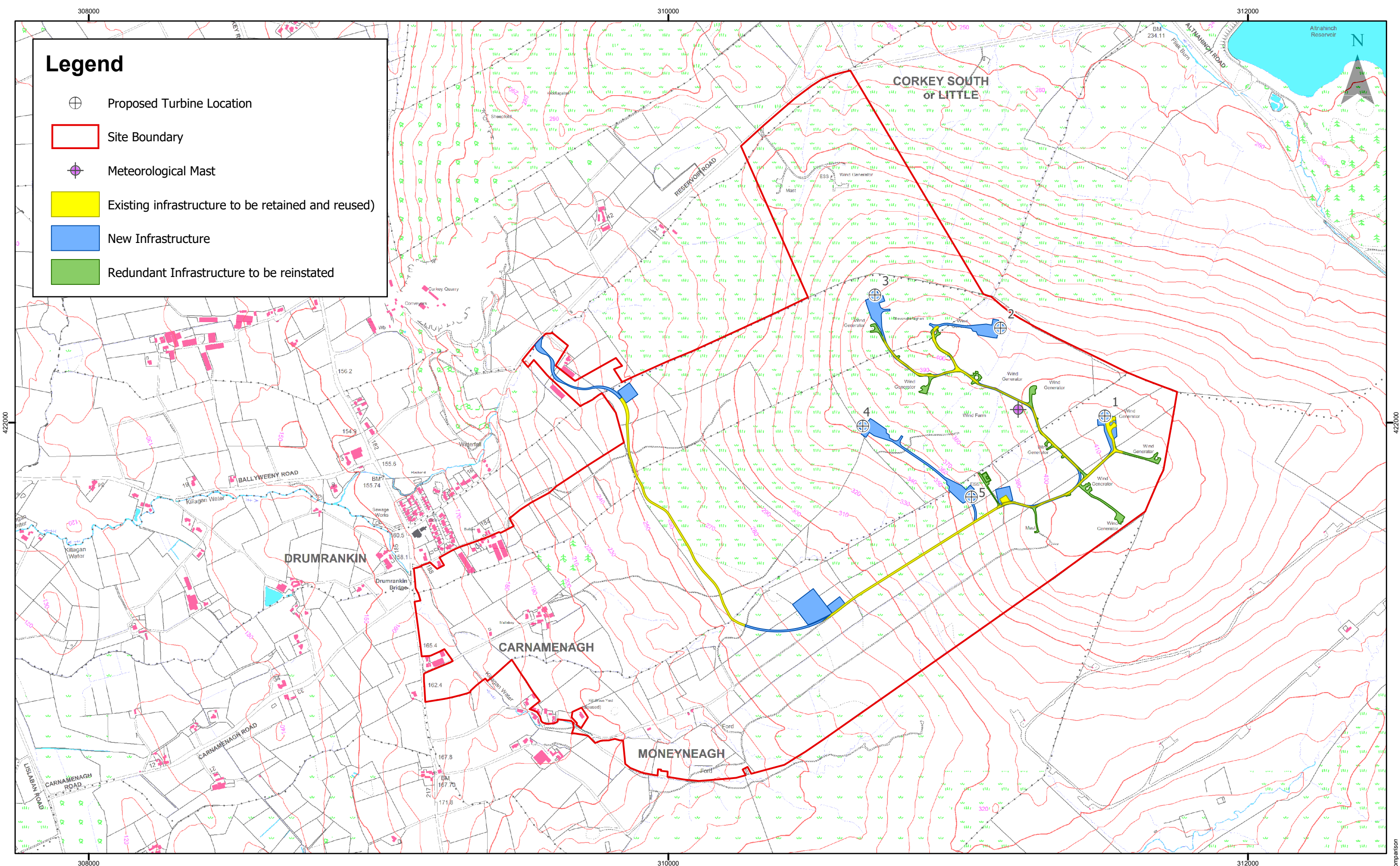
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Corkey Windfarm Repowering

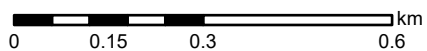
Site Layout

Figure NTS-2

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Corkey Windfarm Repowering Site Layout Comparison Figure NTS-3

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Scale @ A3 1:12,000	Drawing produced by Arcus Consultancy Services	

2606-REP-088 Figs03 Site Layout Comparison

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