17 Summary of Cumulative Effects

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17 Summary of Cumulative Effects

17.1 Introduction

17.1.1 Schedule 4(5) of *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017* states the need for cumulative impacts to be considered at a project level. Cumulative impacts are those new impacts, or enhancements of existing impacts, that occur only because of the interaction of the construction and operation of the Proposed Development with other developments, in particular wind energy developments, or from the interaction of different aspects of the Proposed Development.

17.1.2 Consideration has been given to the potential for cumulative effects to arise from the interaction of the Proposed Development with other wind energy developments within up to 35 km of the site that were either operational, consented and/or under construction, or were in planning either with an application that was not yet determined or subject to an appeal, as at September 2020. Table 3.1 in Chapter 3 Proposed Development lists the wind energy developments within 5 km of the Proposed Development site which are also shown on Figure 3.4. These are the principal projects which were considered to have the potential to give rise to cumulative effects.

17.1.3 The following sections provide a summary of the potential cumulative effects already described in detail within each of the technical chapters (Chapters 6 to 16).

17.2 Cumulative Effects

Landscape and Visual

17.2.1 The cumulative LVIA assessment focuses primarily on other wind energy developments within approximately 15 km of the Proposed Development as these are considered to have the greatest potential to give rise to significant cumulative effects. It was recognised that wind farms over 15 km away were highly unlikely to give rise to significant cumulative effects which would not occur in any case with the existing distribution of immediately surrounding wind farms (i.e. in the absence of the Proposed Development).

17.2.2 The wind farms identified are detailed within Table 6.13 of Chapter 6: Landscape & Visual.

17.2.3 The methodology adopted in the main LVIA, considered two different baseline scenarios. Firstly, a consideration is given to the addition of the Proposed Development to the current baseline landscape (i.e. including all operational/built wind farms but excluding any consented schemes which are yet to be constructed, or any planning application stage schemes). Secondly, consideration is then given to the addition of the Proposed Development to the 'future baseline' landscape (i.e. including all operational/built wind farms and also including any consented schemes which are yet to be constructed, but excluding any planning application stage schemes).

17.2.4 The cumulative LVIA therefore considers the additional effects that might arise as a result of the Proposed Development if other in planning schemes were also operational.

Cumulative Effects on Landscape Character

17.2.5 In general, the greater the number of turbines in the baseline landscape the less significant the addition of further turbines may be in landscape character terms, as the landscape will be more heavily characterised by turbines in the baseline situation. Therefore, in the scenario where additional schemes were already present in the baseline landscape, it would be generally expected that the

potential for the Proposed Development to bring about significant effects on landscape character would be reduced.

17.2.6 The landscape in the vicinity of the site is one which, with reference to the typologies referred to in the Landscape Capacity Study, would represent a 'wind turbine landscape'. However, due to the location of the Proposed Development adjacent to a large number of other operational and consented schemes, this 'wind turbine landscape' would already arise, irrespective of the addition of the Proposed Development. In that regard, the Proposed Development would largely serve to consolidate the existing effects on landscape character that would be already brought about by other schemes.

Cumulative Effects on Visual Amenity

17.2.7 It is acknowledged that the more wind turbines that are visible in any given landscape, the greater will be the magnitude of overall (or combined) change to the visual amenity that prevailed prior to the introduction of the first turbines. However, it is also noted that in any given view where turbines are already present the additional effect on visual amenity of introducing further turbines may not be as significant as the initial introduction of turbines. Furthermore, in general, the greater the number of turbines in the baseline view, the less significant the addition of further turbines may be in visual amenity terms as the landscape will be more heavily characterised by turbines in the baseline situation. Considered in this context, the additional effects arising as a result of introducing the Proposed Development into the scenario whereby the application schemes were also in the baseline, would typically be less significant than the effects reported earlier in the main LVIA (refer to Chapter 6).

17.2.8 The addition of the schemes at Glentaggart and Kennoxhead Extension to the baseline view would make no material difference to the assessment of visual effects already set out in the main LVIA. The schemes would simply serve to consolidate the existing wind energy infrastructure in that part of the landscape to the south of the Douglas Water Valley.

17.2.9 Whilst Douglas West Extension would serve to further characterise the baseline view with wind energy development there are no judgements in the main LVIA which would change should the scheme be considered to form part of the baseline.

17.2.10 The Hare Craig proposal would serve to reinforce the extent of large-scale wind energy infrastructure which was already visible in the direction of the Proposed Development and as a result would mean that there was less potential for the Proposed Development to bring about visual effects in some directions, however, there would be no change to the level of effects identified in the main LVIA.

17.2.11 It is recognised that there would be some sequential cumulative visual effects along the M74, A70, B7078 and NCN 74. However, in the context of the already consented and operational wind farms in this landscape, the additional effect of introducing the Proposed Development would not be significant. The overall effect on these routes is likely to be significant, but this effect would occur in any case in the absence of the Proposed Development.

17.2.12 As with the consideration of the overall total combined impact on landscape character, it is clear that significant visual effects would already be brought about on a number of receptors in the local area, as a result of the other existing and consented wind farms. The Proposed Development would largely therefore serve to consolidate these existing effects rather than introducing notable new significant visual effects in its own right. However, even when considered collectively it is noted that there is generally a good separation between the cluster of development and the nearest visual receptors such that, considering the overall collective extent of wind energy in the area, the significant effects would be relatively limited and localised in their nature.

17.2.13 Lastly, in terms of any potential for coalescence between wind farm clusters, the LVIA notes that the Proposed Development has been designed as a coherent extension of the Hagshaw Cluster array that is contained with the Rolling Moorland Forestry landscape character sub-type which already hosts substantial wind development (both existing and consented). Whilst the Proposed Development does extend the Hagshaw Cluster westwards towards the Kype Cluster of wind farms, care has been taken to ensure there remains a sufficient stand-off between the two clusters and that turbines in the Proposed Development do not extend onto the Rolling Moorland separating the two areas. The LVIA acknowledges that from certain viewpoints the Hagshaw and Kype Clusters can be seen in the same plane of view, however, the LVIA concludes that it remains clear to the observer that they are two separate wind farm arrays and that the design of the Proposed Development has been successful in avoiding coalescence (either actual or perceptual) between the Hagshaw and Kype Clusters.

Ecology

17.2.14 It is considered unlikely that any significant adverse cumulative effects on blanket bog at a regional level would arise as a consequence of the Proposed Development adding to habitat loss associated with other projects. Other local wind farm projects have been located on similarly low-quality habitats common to the area i.e. commercial forestry and former opencast land and as such no significant cumulative effects are predicted for blanket bog and wet modified bog. Therefore, cumulative effects on blanket bog are assessed as negligible and not significant.

17.2.15 Significant construction-related cumulative effects on *Nyctalus* bats are considered unlikely, with only localised changes to potential foraging habitats making little difference to the regional population. Residual cumulative construction effects on *Nyctalus* bats are therefore considered to be minor adverse and not significant.

17.2.16 Although a small number of suitable roost features for *Pipistrelle* bats were recorded during baseline surveys for wind farm projects within 10 km, no roosts were confirmed in locations that may be affected by construction activities. Residual cumulative construction effects on *Pipistrelle* bats are therefore considered to be negligible and not significant.

17.2.17 A theoretical cumulative collision risk may exist for bats, however, in general the activity rates at most sites within 10 km were very low, and levels of collisions reaching regional significance are unlikely. When including all sites cumulatively, a potential significant collision risk may exist for *Nyctalus* bats in a worst-case scenario if all projects are operational and if the Scottish population is as low as estimated, however this situation is considered unlikely. Furthermore, a number of local wind farms, including the Proposed Development, have committed to the implementation of Bat Mitigation and Monitoring Plans which will reduce any potential for cumulative effects on bats. Residual cumulative collision effects on bats were considered to be minor adverse and not significant.

Ornithology

17.2.18 The assessment of ornithological effects associated with the Proposed Development alone predicted unmitigated non-significant effects for every Important Ornithological Feature (IOF), due to the low suitability of habitat within the site, lack of breeding records, and/or the low activity levels of IOFs recorded during baseline surveys. Consequently, no breeding activity is likely to be significantly affected for any IOF, and collision rates are likely to be negligible within a population context, both when considering all wind farm projects within the local area and at a Natural Heritage Zone (NHZ) level.

17.2.19 It is therefore considered that the magnitude of impacts of the Proposed Development on IOFs would contribute very little to the overall cumulative effect for each potential impact at an NHZ level. It is also considered that there would be no adverse cumulative effects on the integrity of the Muirkirk and North Lowther Uplands SPA.

Noise

17.2.20 The cumulative noise predictions considered other wind farms within a radius of 5 km of the Proposed Development turbines.

17.2.21 The broad brush cumulative noise approach taken exaggerates the cumulative noise effects, as it assumes every receptor simultaneously falls downwind of every wind farm in the locality, which in reality cannot occur. Nevertheless, the proposed noise limits for the Proposed Development can be met at all but two of the receptor locations in such circumstances.

17.2.22 The predicted exceedance at the dwellings at Dunside Waterworks Cottages and Dunside using the broad-brush approach, is slight and would be applicable during daytime and evening hours (not at night). The turbines with most influence over the noise immission levels at the Dunside locations are those in the Auchrobert Wind Farm and in the Proposed Development, however the geographical relationship between the Proposed Development and the Auchrobert Wind Farm is such that when one is substantially downwind of the receptors at Dunside, the other is substantially upwind. Accounting for this geographical relationship results in a reduction in noise propagation by 5dB, therefore the cumulative noise immission levels at Dunside and Dunside Waterworks Cottages would in reality be at least 1dB below the noise limits set out in Chapter 9. Slight further reductions in levels can be deduced when screening of the furthermost Proposed Development turbines from Dunside is taken into account.

17.2.23 The cumulative noise effect on local receptors is therefore considered to be not significant.

Cultural Heritage

17.2.24 The Proposed Development site adjoins the northern edge of an established cluster of wind farms around Hagshaw Hill (Known as the 'Hagshaw Cluster'), and it is in combination with this group that cumulative impacts upon cultural heritage assets are most likely to arise. The cumulative cultural heritage assessment addresses the effect of adding the Proposed Development to a baseline that includes other, in planning developments in the context of that baseline of operational and consented developments.

17.2.25 For most of the heritage assets within the Outer Study Area, the addition of the Proposed Development would result in a cumulative effect assessed as being of negligible magnitude. The Proposed Development would sit at the north western edge of the cluster and would extend the size and extent of this group whilst still remaining connected to, and viewed as part of, the cluster. It is considered that the Proposed Development would not add appreciably to the visual impact from the operational and consented developments.

17.2.26 For the Scheduled Monuments of Cairn Table, Dungavel Hill and Black Hill, the extensive views and intervisibility between cairns would remain unaffected by the introduction of the Proposed Development, and the cumulative effect of the addition of the Proposed Development would be of negligible magnitude and not significant.

17.2.27 For the New Lanark World Heritage Site and Falls of Clyde Garden and Designed Landscape, although occasionally visible from within the outer boundaries of these assets, the cumulative effect of the addition of the Proposed Development would be of negligible magnitude and not significant.

Hydrology, Hydrogeology and Geology

17.2.28 The geology assessment has concluded that there will be no significant effects on geological resources associated with the Proposed Development. As such, no significant cumulative effects on geological resources associated with the Proposed Development, in combination with other similar local developments currently operational, consented or in planning, are predicted.

17.2.29 In terms of hydrology and hydrogeology, a number of operational and proposed wind energy projects in the vicinity lie partially within the catchment of the River Nethan. A proportion of the drainage from these wind farms are likely to drain into the River Nethan, although flows are also likely to be distributed to other watercourses. All of these wind farms either have or will be required to prepare their own drainage strategies to protect all receiving watercourses from pollution and increased run-off. Therefore, with negligible or minor predicted residual effects on the River Nethan from the Proposed Development, it is considered that the combined effect on hydrology will be minor and no additional mitigation measures over and above those committed to in the chapter (refer to Chapter 11) are considered necessary to address potential cumulative effects on hydrology or hydrogeology.

Traffic and Transport

17.2.30 A number of wind farm developments are consented in the area surrounding the Proposed Development site with construction traffic expected to use the same part of the road network as the Proposed Development:

17.2.31 The construction programmes for these potential cumulative developments are not yet known and so it cannot be said with any certainty whether any of them would be constructed at the same time as the Proposed Development. Any additional traffic from other consented wind farms in the locality using relevant sections of the road network at the same time as traffic from the Proposed Development is likely to cause only negligible increases in traffic, given the capacity of the M74 and the short stretch of the B7078 which would be affected. Any potential cumulative effects would also be temporary and relatively short in duration.

17.2.32 Several industrial and residential developments are also planned in the area and could affect traffic volumes on the roads in the study area. The anticipated vehicle movements that the Proposed Development could be expected to generate is a relatively small amount in the context of the potential additional traffic from these other committed developments.

17.2.33 Furthermore, the traffic generated during the construction of the Proposed Development is of relatively short duration, and cumulative effects arising from the Proposed Development and the other consented developments is considered to be negligible.

Socio-Economics, Tourism and Recreation

17.2.34 There are three main ways in which the Proposed Development could contribute to cumulative socio-economic effects. Two of these could result in beneficial cumulative effects and the other could result in an adverse cumulative effect.

17.2.35 Adverse cumulative effects on tourism, recreation and socio-economics could occur if the Proposed Development was expected to have a significant cumulative visual impact on important tourism receptors and this resulted in a change of visitor spending behaviour. The cumulative visual impact of the Proposed Development is assessed in Chapter 6, Landscape & Visual and sections 17.2.1 to 17.2.12 above. which concludes that the Proposed Development will not result in significant adverse cumulative effects on views from recognised local tourism assets such as the New Lanark World Heritage Site.

17.2.36 The Proposed Development also has the potential to generate beneficial cumulative impacts if it were to help encourage the development of a significant local renewable energy supply chain. Investigations undertaken by the Applicant have identified several potential suppliers in the local area so there is some evidence that this positive effect may already be occurring.

17.2.37 The development of a strong local supply chain would help to increase the economic benefits of the Proposed Development and similar projects in the local area, which could help to increase the

magnitude of the long-term beneficial economic effects considered in Chapter 13. The Applicant's preference for securing supplies locally wherever possible should help to support this.

17.2.38 Furthermore, if additional community benefit and shared ownership income was secured from other similar developments in the area, this would enable the local community to leverage more funding and investment into the area resulting beneficial cumulative effects.

Aviation, Radar and Telecommunications

17.2.39 It is considered that as none of the consented wind farm developments have significant residual effects on aviation, radar or telecommunication interests, the potential for cumulative effects is negligible.

17.2.40 Therefore, it is considered that there will be no significant cumulative effects on aviation, radar or telecommunication interests as a result of the Proposed Development.

Shadow Flicker

17.2.41 In order to assess the potential for cumulative impact from other wind developments in the surrounding area or from turbines within the Proposed Development, any turbines within the 3.1 km study area of the turbine locations were reviewed. Auchrobert Wind Farm was identified as being located within 3.1 km of the proposed turbine locations and having a shadow flicker study area that overlaps with one of the identified receptors (Dunside) for the Proposed Development.

17.2.42 The cumulative shadow flicker assessment concludes that the total number of cumulative shadow hours per year is indicated to be at non-significant levels at the identified receptor with a duration of less than 8 hours per year.

Forestry

17.2.43 In order to assess cumulative forestry impacts on Cumberhead Forest, woodland removal has been used as the principle indicator. The Proposed Development seeks to install 21 turbines with a generating capacity of around 6 MW into Cumberhead Forest, with an associated impact of 0.49 ha of woodland removal per megawatt. With the exception of the proposed Douglas West Extension Wind Farm, this is the lowest impact of any of the operational or consented wind farm development within Cumberhead Forest.

17.2.44 The Proposed Development has adopted a similar approach to the other wind farms in relation to minimising woodland removal, taking advantage of advances in accepted approaches to turbine tip heights and enhanced generating capacity of the turbines. The use of up to 200 m tip heights and higher hub heights results in greater clearance between the swept edge of the rotor and tree canopy, significantly reducing the need for woodland removal.

17.2.45 In combination with the other cumulative developments within the Forest, the Proposed Development would see a total of 54 turbines, generating 269 MW of renewable energy located across Cumberhead Forest at a loss of 171.02 ha of Sitka spruce dominated woodland within the forest, representing 8.4 % of the total forest area.

17.2.46 It is important to note, the consented Cumberhead Wind Farm, the Proposed Douglas West Extension Wind Farm and the Proposed Development will all deliver compensatory planting to mitigate the loss of productive conifers and as such the actual loss of woodland related benefit is limited to the areas previously removed for Nutberry Wind Farm.

17.2.47 The cumulative loss of 8.4 % of Cumberhead Forest is considered minor in the context of the property.

17.3 Conclusions

17.3.1 All the technical assessments, with the exception of ecology and landscape and visual, conclude no significant cumulative effects as a result of the Proposed Development.

17.3.2 The ecological impact assessment concluded a potential significant collision risk may exist for *Nyctalus sp.* bats however it is considered unlikely and required all projects to be operational and for the Scottish population to be as low as estimated. Furthermore, a number of local wind farms, including the Proposed Development, have committed to the implementation of Bat Mitigation and Monitoring Plans which will reduce any potential for cumulative effects on bats. Residual cumulative collision effects on bats were considered to be not significant.

17.3.3 The landscape and visual cumulative assessment concluded that, in general, where visible, the proposed turbines would reinforce the presence of turbines in views rather than introduce turbines into any views which are currently unaffected by turbines. For the most part, the additional effect of introducing the Proposed Development would not be significant. Where combined effects would be significant, this level of significance would in most cases occur in any event in the absence of the Proposed Development.

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