Douglas West Wind Farm Extension

Part of a Coordinated Strategy for the Future of the Hagshaw Wind Cluster

NON-TECHNICAL SUMMARY

APRIL 2019

3R Energy
CHP • Wind • Biomass

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Contents

Full size versions of all figures are available in the accompanying EIA Report

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Background

1. This document is a Non-Technical Summary of the Environmental Impact Assessment Report (EIAR) which accompanies an application by Douglas West Extension Ltd (the Applicant), part of the same group of companies as 3R Energy Solutions Ltd, for a Section 36 (S36) consent and deemed planning consent, under the terms of the Electricity Act 1989, for an extension to the consented Douglas West Wind Farm (the proposed extension is hereafter referred to as the "Proposed Development"), 2.68 km north-west of the village of Douglas, in rural South Lanarkshire.

Purpose of the Proposed Development EIAR

2. ITPEnergised was appointed by the Applicant to assess the environmental impacts of the Proposed Development in accordance with The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

   The EIA process is reported in the EIAR, which describes the methods used to assess the beneficial and adverse environmental impacts predicted to result from the construction and operation of the Proposed Development. Where appropriate, it also sets out mitigation measures designed to prevent, reduce and, if possible, offset any significant adverse environmental impacts. An assessment of residual effects, those expected to remain following implementation of mitigation measures, is also presented.

Availability of the Proposed Development EIAR

3. Copies of the Proposed Development EIAR are available from:

   3R Energy
   Lanark Auction Market
   Hyndford Road
   Lanark
   ML11 9AX

   Tel: (01555) 660244 Email: info@3renergy.co.uk

4. The Non-Technical Summary is available free of charge from the Applicant, a hard copy of the EIAR Report Volumes 1 to 4 are available for £750.00. In addition, all documents are available (as a PDF for screen viewing only) on a DVD for £15.00.

5. Copies of the Proposed Development EIAR will also be available for viewing during opening hours at the following locations:

   South Lanarkshire Council
   Planning and Building Standards HQ
   Montrose House
   154 Montrose Crescent
   Hamilton
   ML3 6LB

   Coalburn Miners Welfare
   42 Coalburn Road
   Coalburn
   ML11 0LH

   St.Brides Centre
   Braehead
   Douglas
   ML11 0PT

Representations to the Application

6. Any representations on the S.36 application should be made directly to the Scottish Government Energy Consents Unit as follows:

Energy Consents Unit
Scottish Government
4th Floor
5 Atlantic Quay
150 Broomielaw
Glasgow
G2 8LU Email: representations@gov.scot Web: www.energyconsents.scot/Register.aspx

Site Location and Description

7. The Proposed Development site comprises the eastern part of the Cumberhead Forest complex that constitutes a gap between Douglas West Wind Farm, Hagshaw Hill Wind Farm, and a number of other wind farms on the north side of the Douglas Valley.

8. The village of Douglas is approximately 2.68 km to the south-east of the nearest turbine and Coalburn approximately 1.56 km to the north. The M74 motorway is approximately 3.75 km east of the proposed turbines. The site boundary incorporates the access route to the proposed turbine locations from Junction 11 of the M74 and the existing timber haulage route from Station Road, Douglas West. The overall site area, including the access roads, extends to approximately 372.6 ha. The location and wider environment of the site is shown on **Figure 1** below.

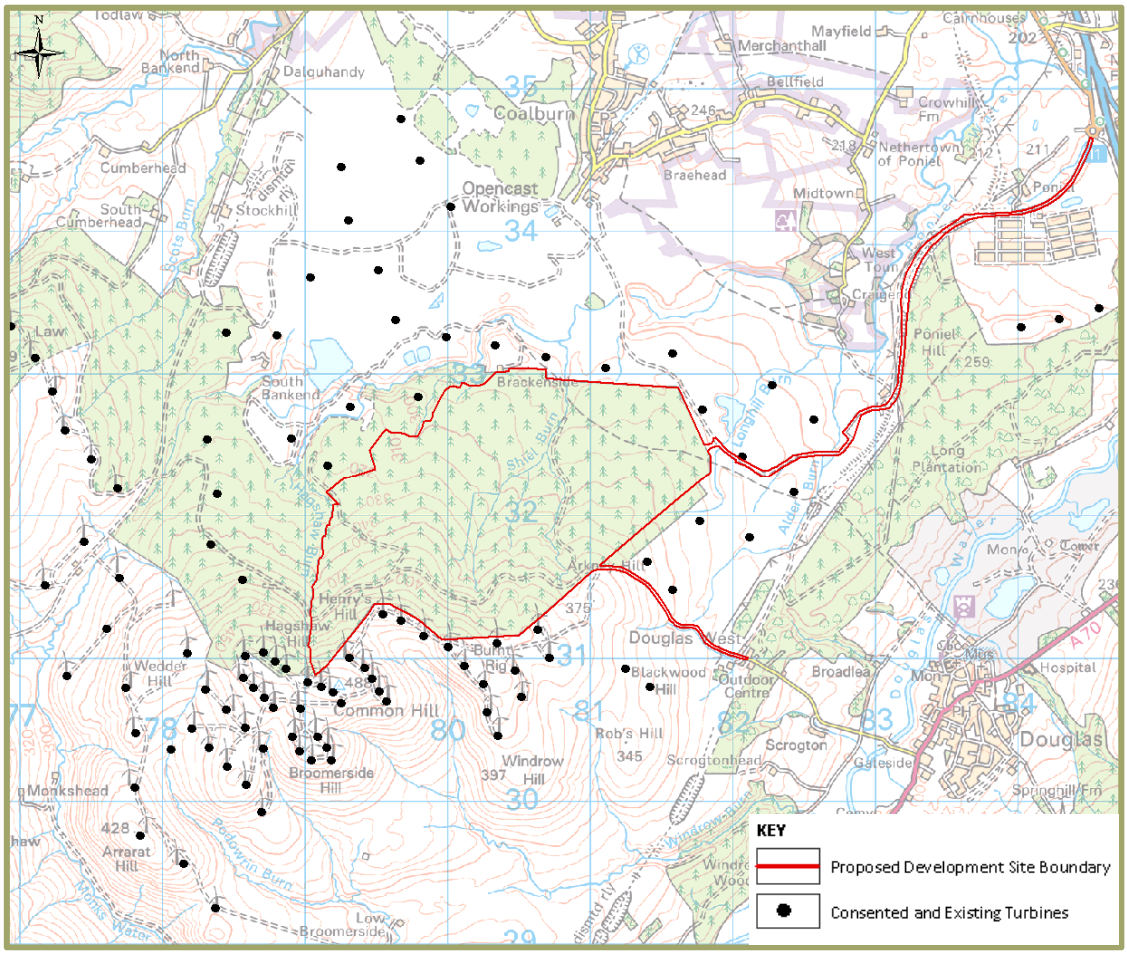


Figure 1 Site Location Plan

Site Selection and Design

Site Selection

9. 3R Energy Solutions Ltd (via fellow group companies William Mitchell & Sons Ltd and Mitchell Energy Ltd) was contacted by a number of third party developers seeking to secure access over their land to develop an 'infill' wind energy development on the eastern part of Cumberhead Forest as an extension to the consented Douglas West Wind Farm (i.e. the Proposed Development). Following careful consideration 3R Energy concluded that there were many benefits in taking both the repowering of Hagshaw Hill Wind Farm and the Proposed Development forward together, as a local business, helping to sustain existing employment levels, maximise local benefits and keep income generated in the local area.

10. When viewing a map of wind farm developments in the local area, the Proposed Development site stands out as an obvious gap in the middle of a wind turbine cluster, the 'Hagshaw Cluster'. The physical extent of the site is limited by the existing and consented wind energy developments surrounding the site. The Proposed Development site boundary was therefore devised on this basis, and design iteration within that boundary then progressed (as shown in **Figure 2** below).

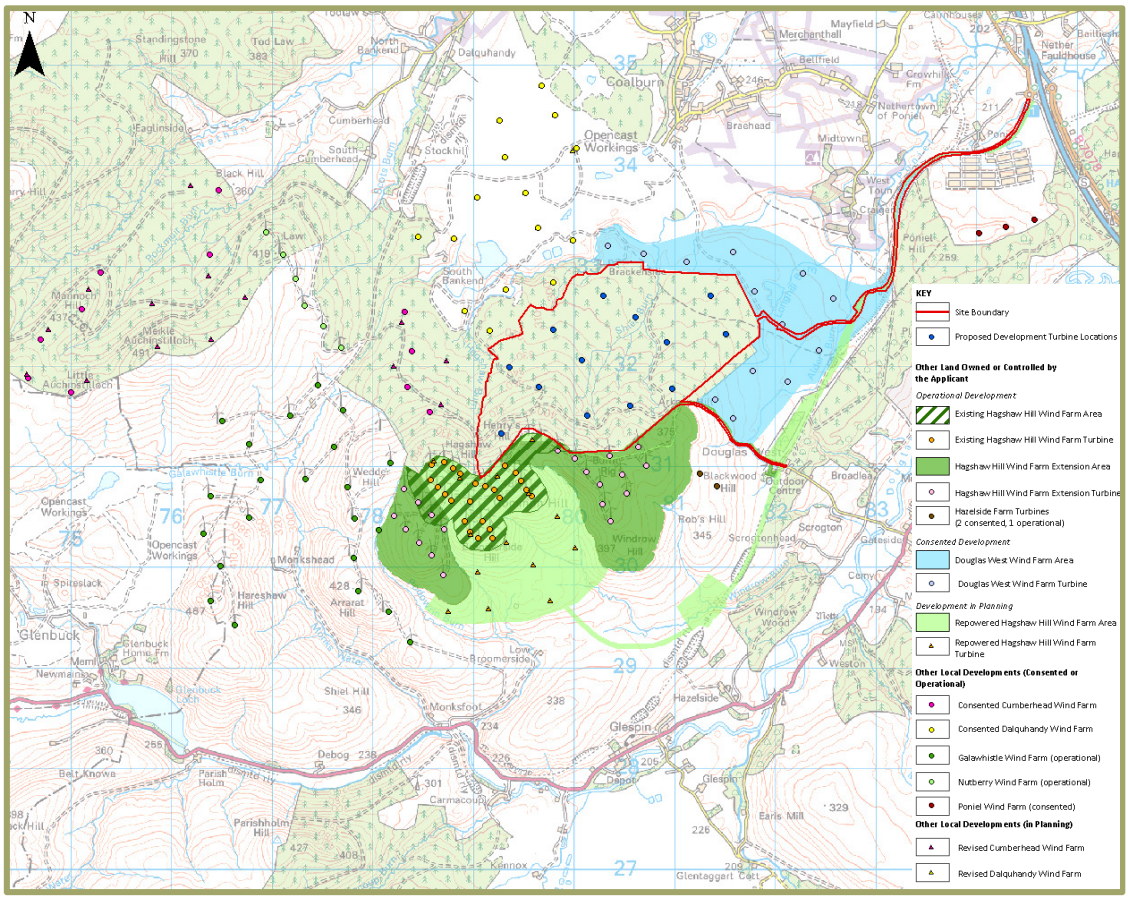


Figure 2 The 'Hagshaw Cluster' – context of the Proposed Development within the local landscape

11. As noted above, the Proposed Development site is surrounded by either operational or consented wind developments. It is therefore considered to be a suitable site for wind energy development, making use of some existing site infrastructure and recognising the accepted principle of wind energy generation within the local landscape (see **Figure 2**).

Design Process

12. As part of the EIA process design iterations were prepared and considered for the turbine locations and on-site infrastructure, including access tracks and the construction compound and substation/energy

storage locations. The following principles were adopted during the design iterations made by the Applicant to ensure that the final design of the Proposed Development was the most suitable for the site:

- the Proposed Development should avoid inconsistent turbine spacing, such as relatively large gaps, outliers or excessive overlapping turbines to minimise visual confusion and ensure a balanced / compact array from key views;
- took account of the positioning of existing and consented wind energy developments in the local area from key views;
- consistency in turbine scale with consented and proposed developments in the immediate vicinity;
- minimise impacts on the existing forestry resource and operations within the site;
- retain a separation of at least 1 km from the closest isolated residential dwellings in the surrounding area; and
- other environmental constraints and associated buffers are to be respected.

Alternatives

Turbine Layout and Scale

13. The Applicant has considered a number of alternative layouts and turbine scales for the Proposed Development. Turbines ranging in tip height from 150 m to 200 m have been considered (see **Figure 3** overleaf), based on the availability of modern turbine models, commercial viability of the project without public subsidy, and landscape considerations. Different rotor diameters, and therefore turbine spacings to deal with wake effects, are applicable to the range of turbine scales considered. Therefore, a number of preliminary layout options were considered, for the range of turbine scales. The preliminary layouts took account of identified technical and environmental constraints based on desk-based study and walkover survey work, as well as preliminary wind yield analysis.

14. Optimisation of renewable electricity generation has been a key facet of the design iteration process. The Applicant has been in discussion with turbine manufacturers to establish suitable candidate turbines which would fit into the "maximum tip height" envelopes for the scenarios tested, as noted above. The review of different turbine scales and layouts by the Applicant's professional advisors established that turbines of 200 m would not give rise to effects on landscape character or visual amenity that would greatly exceed those of the 150 m turbines consented at the Douglas West Wind Farm adjacent (see **Figure 3** overleaf). It is therefore considered that the significant additional generation capacity within the same site area and from the same number of turbines – also resulting in up to £143,000 per year more community benefit – would greatly outweigh any slightly increased landscape and visual effects resulting from the installation of 200 m, instead of 150 m or 175 m turbines.

15. Another important factor taken into the design and positioning of the final turbine layout has been the existing forestry resource across the site. Where possible turbines were micro-sited to minimise the number of forestry blocks that required clear felling as part of the Proposed Development. The design took into consideration the recommended bat habitat standoff distances from blade swept path to key habitat features with the proposed turbines being 'keyholed' within the replanted forestry. A tip height of up to 200 m also reduces the keyhole area by virtue of increasing the rotor clearance above the tree canopy therefore reducing the impacts upon the existing forestry operations.

On-site Infrastructure Layout Iterations

16. Following the evolution of the turbine layout design, the design of the access tracks, construction compounds and substation/energy storage compound was undertaken. The infrastructure required on the site was designed and arranged in such a way as to avoid the main on-site environmental constraints identified.

17. The site benefits from an existing private access direct from the M74 Junction 11, which is tarmac surfaced and suitable for construction and abnormal load delivery traffic. The tracks within the main body of the site are also in part defined by existing infrastructure (forestry tracks), including the construction access route for the operational Nutberry Wind Farm to the west of the site. Proposed new tracks have

been designed to take into account existing wayleaves between forest blocks in order to reduce impacts on the commercial forestry operations and are also based on site topography, ground conditions and to minimise and appropriately locate water crossings.

18. The proposed substation location, which will also incorporate an energy storage facility, is at the entrance to the main development area, providing best access to grid infrastructure. The proposed main construction compound and laydown area are also located at the entrance to the main development area to optimise construction activities and minimise impact on the forest.

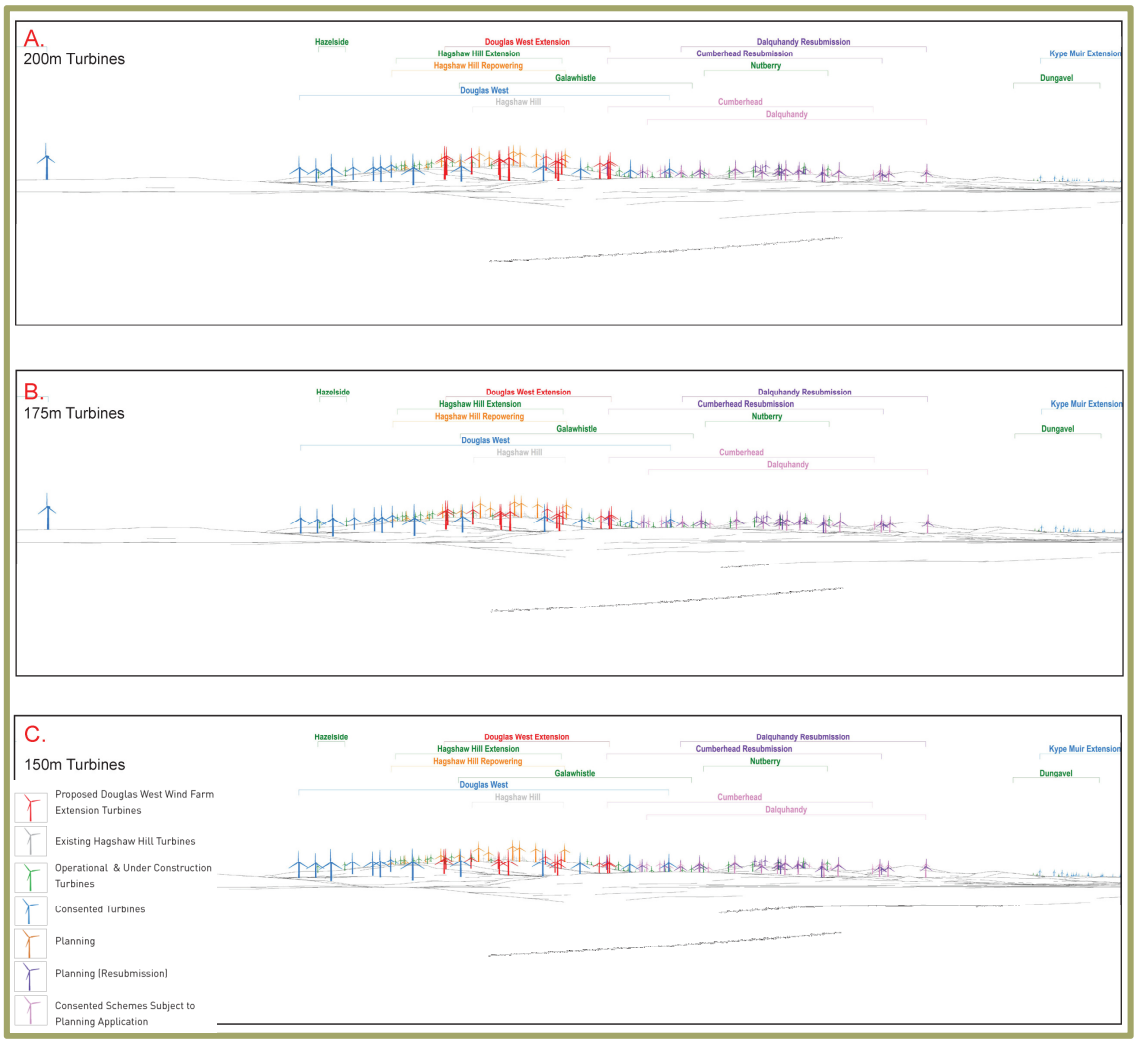


Figure 3 Comparative Wirelines of Different Turbine Heights, Viewpoint 2: M74 Overbridge

The Proposed Development

19. The Proposed Development (**Figure 4**) comprises 13 wind turbines of up to a maximum blade tip height of 200 m when vertical, each being around 6 megawatt (MW) in power rating. A number of ancillary development components are also proposed, including a construction compound and concrete batching area; turbine laydown area; hardstandings adjacent to the wind turbines for construction, maintenance and decommissioning cranes; access tracks; underground cables between turbines; an onsite substation and maintenance building with welfare facility; an energy storage facility of around 20 MW; underground export cable(s) alongside the access track to J11 of the M74; and two new permanent meteorological monitoring masts.

20. The total power generation capacity of the Proposed Development would be around 78 MW. Based on a calculated site specific capacity factor, the annual indicative total power output for the site would be around 220.7 GW hours per annum, indicating the Proposed Development would generate enough electricity to power over 57,000 average UK households (based on RenewableUK, 2018 UK average

domestic household consumption is 3,781 kWH), and displace around 101,522 tonnes of carbon dioxide annually (3.05 million tonnes over the proposed 30 year lifetime of the Proposed Development). The Proposed Development would contribute towards international and national targets for the generation of renewable energy and reduction in greenhouse gas emissions (further information is provided on this matter in Chapter 3 of the main EIAR).

21. The electricity produced will be exported to the electricity network. The proposed point of connection to the wider electricity network is via a new collector substation at junction 11 of the M74 then on to the existing 132 kV Coalburn substation to the north-east of the site. The grid connection is currently being progressed by the Applicant with National Grid and Scottish Power Transmission. The electrical power produced by the individual turbines will be fed to an on-site substation via underground cables. The substation and control room building will accommodate all the equipment necessary for automatic remote control and monitoring of the Proposed Development, in addition to the electrical switchgear, fault protection and metering equipment required to connect the Proposed Development to the electricity network. Permission is being sought within this application to lay underground export cables alongside the main access track to a proposed collector substation at junction 11 of the M74. The design of the substation building and energy storage unit on site is flexible and detailed design will be provided nearer to construction.

22. To enable the construction of the turbines, a crane hardstanding area and turning circle at each turbine location will be required to accommodate assembly cranes and construction vehicles. This will comprise a crushed stone hardstanding area measuring approximately 50 m long by 30 m wide and will remain in place during the lifetime of the Proposed Development to facilitate maintenance works.

AT A GLANCE….

Number of Turbines: 13

Dimensions: Maximum height of 200m to blade tip

Lifespan: 30 years

Generation Capacity: Around 6 MW per turbine or around 78 MW in total

Community Benefit: £390k per year or £11.7m in total*

Energy Generated: Provide electricity for approximately 57,000 households*

Energy Storage: On site energy storage facility of around 20 MW

Principal Access: Via Junction 11 of the M74

**based on 13 x 6MW turbines being installed*

23. Two steel lattice tower meteorological monitoring masts will be required to monitor wind speeds for the operational life of the Proposed Development. It is proposed that these masts will be approximately 100 m in height and be located at grid reference NS 81235 31952 and NS 79835 32132 (indicative locations).

24. It is proposed that vehicular access to the site will principally be from the M74 leaving at junction 11 (Poniel). There is then a private road through the consented industrial area (M74 Heat & Power Park) and consented Douglas West Wind Farm site which heads west, along the existing tarmac road to the corner of the Cumberhead Forest for access to the development site. All construction materials, wind turbine components, site staff and visitors will use this route to access the site. Any timber to be removed from the site to facilitate the Proposed Development will be via the permitted forestry haul route to Station Road at Douglas West, as is presently the case. Any pre-construction Site Investigation works will also use the Station Road access.

25. A transport assessment (Chapter 12 of the EIAR) has been undertaken in support of the S.36 application for the Proposed Development and this provides greater detail on access routes to the site for construction vehicles and provides an estimate of trip generation during construction. The transport assessment includes a review of the proposed route, and construction traffic impacts.

26. Existing onsite access tracks will be retained, re-used and upgraded (as necessary) wherever possible, however some additional areas of new access tracks will be required. The new stretches of access track within the site boundary will be approximately 5 m wide and will cross a small number of watercourses within the site.

27. A construction compound, as well as a concrete batching facility and laydown area, will be required as a control centre for all site activities and to provide facilities for the day-to-day needs of the project and the workforce. The dimensions of the construction compound will be approximately 100 m long by 60 m wide and the turbine laydown area will be approximately 150 m long by 70 m wide. On completion of construction works, it is proposed that all temporary structures be removed and the compound areas be restored for forestry purposes.

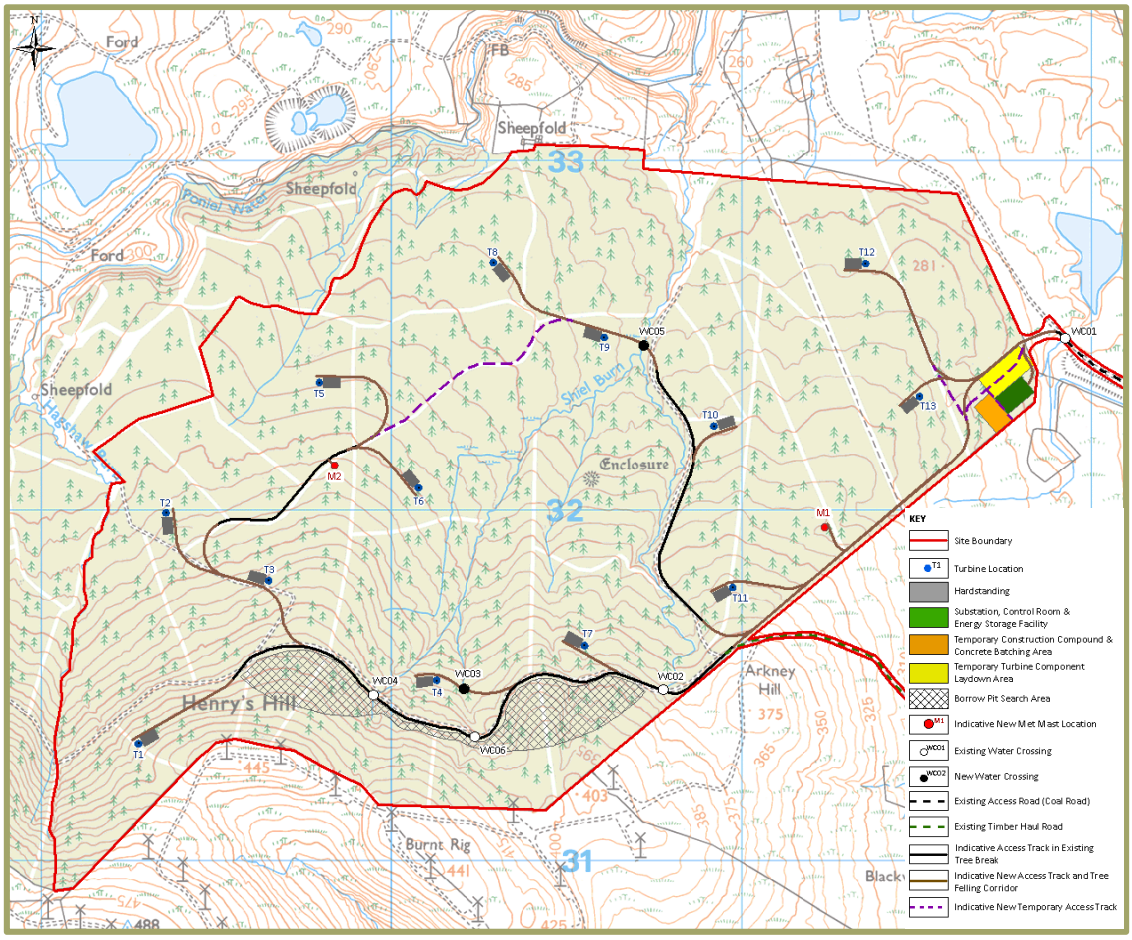


Figure 4 Proposed Development Layout (main site area)

Forward Strategy & Community Benefits

28. During the operational period of the Proposed Development, the Applicant proposes to make community benefit contributions of £5,000 / MW of installed capacity, which means that the project would generate a £11.7 million Community Benefit Contribution (based on a total installed capacity of 78 MW) to local communities over its lifetime. The Applicant is exploring the potential to establish a Douglas Valley Development Trust which would receive community benefit income from the Proposed Development (alongside income from the neighbouring Repowered Hagshaw Hill Wind Farm project) which would yield the financial resources to deliver a Community-Led Investment Strategy for the local villages (Glespin, Douglas, Coalburn, Rigside and Douglas Water). To aid this process, the Applicant proposes that the Community Benefit Contribution from the Proposed Development would fund a full-time Local Development Officer who would be dedicated to the task of developing and delivering the Community-Led Investment Strategy for the area.

29. In addition to the traditional Community Benefit Contribution, the local community could also financially benefit from the Proposed Development through the participation in a shared ownership scheme. The Applicant is committed to exploring the potential to open up a revenue share in the Proposed Development to the local community, creating the opportunity for local community groups in the Douglas Valley to acquire a revenue share of up to 5% in the Proposed Development.

30. As part of 3R Energy's Forward Strategy for their landholding and businesses, the Proposed Development creates opportunities to develop and fund outdoor recreation infrastructure on 3R Energy's landholding which could act as a catalyst for the newly established Development Trust to grow an Adventure Tourism offering in the Douglas Valley, capitalising upon the significantly increased visitor numbers calling at the refurbished Cairn Lodge Service Station. A range of public access and outdoor recreation opportunities

exist on 3R Energy's landholding that the Applicant is keen to help deliver as part of the Proposed Development.

31. The Proposed Development represents a significant investment in the Douglas Valley and the Applicant has committed to taking a number of steps to ensure that benefits from the Proposed Development are maximised locally. The Applicant is committed to a local supplier approach that will ensure that supplier contracts are sourced locally wherever possible, sustaining local businesses and providing employment opportunities for local people. Construction companies will also be encouraged to offer local apprenticeship and work experience places during the construction phase of the Proposed Development as part of a Responsible Contracting Policy.

Programme

32. The on-site construction period for the Proposed Development is expected to be approximately 12 months as shown in **Table 1**.

33. Normal construction hours will be between 07:00 and 19:00 Monday to Friday and 07:00 to 13:00 on a Saturday. These times have been chosen to minimise disturbance to local residents. It must, however, be noted that during the turbine erection phase, operations may proceed round the clock to ensure that lifting processes are completed safely. A fully detailed construction programme will be provided in a Construction Environmental Management Plan (CEMP) prior to the commencement of construction.

34. The operational lifespan of the Proposed Development would be 30 years, after which it would be appropriately decommissioned. It is expected that decommissioning would take approximately twelve months. If, after the operational lifespan of the Proposed Development has expired there is potential for re-powering the development, this would be subject to a new and separate application.

Table 1 Indicative Construction Programme

Task	Month Number											
	1	2	3	4	5	6	7	8	9	10	11	12
Mobilisation												
Access & Site Tracks												
Foundations												
On-site Cabling												
Substation works												
Substation commissioning												
Crane Hardstanding												
Off-site Cabling												
Turbine Delivery												
Turbine Erection												
Commissioning & Testing												
Site Reinstatement												

Consultation

Statutory Consultation

35. A formal EIA Scoping Opinion was requested from the Scottish Ministers in November 2018 through the submission of an EIA Scoping Report. The EIA Scoping Report contained details of the site baseline, the Proposed Development, proposed environmental impacts to be assessed in the EIA, and the assessment methodologies that would be used. The Scottish Ministers consulted with a variety of statutory and non-statutory consultees before providing an EIA Scoping Opinion on the 20 February 2019.

36. Direct consultation has also been undertaken with consultees, to confirm and agree the detailed approach to the technical surveys and assessments on a topic by topic basis. The Applicant met with the Scottish Government prior to the submission of this application to provide information on how the Scoping responses received have been addressed in this EIA Report.

37. Further information on the consultation process is given in Chapter 4 of the Proposed Development EIA Report.

Public Consultation

38. A programme of pre-application community engagement has been undertaken by the Applicant and has included various meetings, correspondence, public exhibitions and other discussions with the communities closest to the Proposed Development site.

39. The Pre-Application Consultation Report which accompanies the S.36 submission details the findings of that work and illustrates the ways in which community engagement has helped identify potential issues arising from the emerging development proposal and, where appropriate, shape the final proposal which is now the subject of this application.

40. Two Public Exhibitions were held by the Applicant on 25 February 2019 in the St. Bride's Centre, Douglas and on 26 February 2019 in the Coalburn Miners Welfare.

41. In summary, feedback from the closest communities (Douglas and Coalburn) to the Proposed Development has been generally positive or neutral.

42. Some comment was made regarding access, both to ensure wind farm traffic would use the access from Junction 11 of the M74 during construction and measures to prevent unauthorised use of the Proposed Development site and surrounding land by motorised trail bikes. Although the Applicant's proposals for public access and outdoor recreation opportunities across the land holding were welcomed.

43. A number of comments were also made in respect to the Community Benefits relating to the Proposed Development, with a key focus on how and where the proposed funds might be distributed. The Applicant has considered these views and has proposed a number of mechanisms to ensure the Proposed Development community benefits funds are appropriately balanced and distributed, such as, by a new Douglas Valley Development Trust and a funded full-time Local Development Officer who would be dedicated to the task of developing and delivering a Community-Led Investment Strategy for the local area.

44. The pre-application consultation exhibitions have helped identify the issues that are important to the local community and, where appropriate, shape the final proposal which is now the subject of this application. The Applicant confirms that the company will continue to liaise with the local community during the S.36 application process and during the construction, operational and decommissioning phases of the Proposed Development.

Environmental Impact Assessment (EIA)

45. The EIA considers the effects of the Proposed Development during construction, operation and decommissioning on the following topics:

- landscape and visual (effects on the character of the landscape and views from agreed locations);
- ecology (the effects on protected habitats, flora and fauna, excluding birds);
- ornithology (the effects on birds and protected bird habitats);
- noise and vibration (effects on local properties from noise and vibration caused by the Proposed Development);
- cultural heritage (effects on the integrity and setting of historic sites);

- hydrology, hydrogeology and geology (the effects on surface water, groundwater, rocks and soils);
- traffic and transport (effects from traffic travelling to, and from, the Proposed Development);
- socio-economics, tourism, and recreation (effects on the local and national economy, local tourism businesses, and recreation facilities);
- aviation, radar and telecommunications (effects on civil and military aviation facilities and air space and telecommunications facilities);
- shadow flicker (effects caused by the passing of the turbine blades in front of the sun); and
- forestry (effects on the commercial forestry operations at the site).

46. Chapter 4 of the EIA Report describes the EIA process in more detail.

47. For each topic the existing conditions (the baseline) was identified and the effects of the Proposed Development on these conditions assessed (the potential effects). Potential effects are assessed on a scale of negligible, minor, moderate and major, with effects of moderate or major deemed to be significant. Mitigation measures have then been proposed to minimise adverse effects where required. Following this, an assessment was undertaken of the effects of the Proposed Development on the existing conditions taking into consideration the proposed mitigation (the residual effects).

48. In addition to the above, the cumulative effects of the Proposed Development in conjunction with other developments in the local area, primarily other wind farms, was assessed.

49. A summary of the baseline conditions, the proposed mitigation, the resulting residual effects and the cumulative effects for each topic is provided below. Full details of the EIA for each of the topics are provided in Chapters 6 to 16 of the EIA Report.

Landscape and Visual

50. The full assessment of the effects on landscape and visuals receptors is provided in Chapter 6 of the Proposed Development EIA Report.

51. The landscape and visual assessment assesses the effects of the Proposed Development against the current baseline environment (i.e. disregarding the number of consented but as yet unbuilt commercial scale wind energy development within the local landscape). Notwithstanding this, it is acknowledged that the landscape change brought about by the consented developments to the immediate east and north (Douglas West and Dalquhandy Wind Farms respectively), is a material consideration as part of the decision making process. The cumulative effects of the consented schemes in the local landscape are considered within cumulative scenario 1 but are also referenced within the main chapter as a material consideration.

52. The main findings of the assessment are that there will be some inevitable significant landscape and visual effects upon the baseline environment as a result of the Proposed Development. In terms of landscape effects, if the consented schemes in the vicinity of the site are not considered to form part of the baseline, there would be significant effects upon some landscape character areas within up to 6 km of the proposed turbines. With respect to visual effects, there would be significant effects upon receptors located within just over 7 km of the proposed turbines. However, given the number of consented schemes in the vicinity of the site, it is the assessment of cumulative scenario 1, described below, where a lower level of effect is identified, which is perhaps the most realistic context against which the acceptability of the Proposed Development should be considered.

53. The Residential Visual Amenity Study concludes that although there would be significant visual effects experienced at seven of the properties or property groups within 2 km (one of which is owned by the Applicant), none of these properties would become an unattractive place to live.

54. The assessment of visible turbine lighting (refer to Appendix 6.5) has identified that the visible lighting would be screened by landform and topography from much of the surrounding 10 km, in particular from large sections of the M74 and A70, with views generally seen in areas where night time lighting is a familiar element of the landscape. There would be the potential for significant effects on the character

of the landscape in the immediate vicinity of the site during low-light levels. In terms of visual effects, significant effects have been identified in the vicinity of Coalburn due to the increased presence of proposed turbine lights visible in the near baseline landscape. From elsewhere, the effects of the proposed aviation lighting would not give rise to significant landscape and visual effects.

55. In terms of cumulative effects, the assessment has considered two scenarios. In the first scenario, other consented (but as yet unbuilt) wind farms are taken into account in the baseline against which the effects of the scheme are assessed. These include the consented Douglas West, Dalquhandy, Poniel, and Cumberhead wind farms (as well as other consented wind farms in the surrounding landscape). To this end a 'future baseline' image has been included amongst the visual material prepared for each of the assessment viewpoints which illustrates this scenario. The findings of this scenario are that the level of effect identified in the main assessment would generally be reduced once the consented developments in the vicinity of the site are considered. The overall combined impact may well increase, but the level of significance would often occur in any event in the absence of the Proposed Development.

56. In scenario 2, it is not considered that the cumulative effects would be discernibly greater given the relatively high number of operational and consented schemes considered in cumulative scenario 1. The effect of the schemes at the planning stage would serve to further reinforce the wind farm landscape that is already present in the vicinity of the site.

57. Overall, the findings of the LVIA are that the Proposed Development would result in a series of landscape and visual effects, which would be expected with any commercial wind energy development. These effects are however reduced by the context of existing and consented wind energy developments that surround the site in which the Proposed Development would be located. With regards the proposed 200 m turbine height, a review was undertaken during the design iteration process which established that the landscape had the capacity to accommodate turbines of this height without giving rise to effects on character or visual amenity that would greatly exceed those of the 150 m turbines consented in the immediate vicinity.

58. Whilst the LVIA identified some significant landscape and visual effects it is considered that the landscape has the capacity to accommodate the effects identified, particularly when the consented but as yet unbuilt wind farms are taken into account in the baseline.

Ecology and Nature Conservation

59. The full assessment of the effects on flora and fauna at the site is provided in Chapter 7 of the Proposed Development EIA Report.

60. A desk based study and a series of field surveys were undertaken to establish the baseline conditions of the site. There are no ecological designations within the site. It was possible to eliminate most species and habitats recorded in the study area from the assessment by virtue of their low conservation value, the type and frequency of field signs present, the small extent of the sensitive habitat, or the negligible scale of potential effects. The two important ecological features taken forward for assessment were blanket bog (including wet modified bog) and *Nyctalus* and pipistrelle bat species.

61. Potential construction effects on blanket bog (including wet modified bog) were assessed. The main effect is direct and indirect habitat loss due to land take for infrastructure. In a worst-case scenario, indirect blanket bog habitat losses, in most cases to already degraded habitat, could be up to 2.95 ha, which would not reach significance at a regional level. No significant effects are predicted.

62. Potential operational effects on *Nyctalus* and pipistrelle bats were assessed. With no roost sites recorded, the main effect addressed was risk of collision with turbines during the operational phase. It was determined that although a collision risk exists for these species, collision rates due to the Proposed Development alone would not be significant in a regional population context. Due to uncertainties in Nyctalus population sizes and the high sensitivity of the species, a precautionary approach suggests that a potentially significant risk may exist, and to address this risk, post-construction monitoring is planned.

63. Pollution prevention measures and a Species Protection Plan will be in place throughout the lifetime of the Proposed Development and will be detailed in the Construction Environmental Management Plan

(CEMP). An Ecological Clerk of Works will be present during the construction phase to monitor construction works to ensure the requirements of the CEMP are met.

64. With the implementation of the mitigation measures as described, it is considered that there will be no significant effects on the ecological features at the Proposed Development site.

Ornithology

65. The full assessment of the effects on birds is provided in Chapter 8 of the Proposed Development EIA Report.

66. Ornithological surveys have regularly taken place for wind farm projects within, and in the immediate vicinity of the Proposed Development site over the last 15 years and as a result, a number of adjacent sites' survey areas have at least in part overlapped spatially with the Proposed Development site. The baseline data for the current assessment, has utilised relevant data recorded for local wind farm sites as well as one season of field surveys in 2018.

67. In general, the bird assemblage recorded in 2018 corresponded with results of surveys undertaken for other wind farm projects in the local area, with few breeding target species present within the study area. Ornithological receptors taken forward in the detailed assessment were wildfowl (whooper swan, pink-footed goose and greylag goose), goshawk, black grouse, lapwing, curlew and golden plover.

68. The ornithological assessment identified habitat loss and disturbance during the construction and decommissioning phases, and displacement, collision risk and lighting effects during the operational phase, as potential impacts. Unmitigated effects from construction, operation and decommissioning activities were assessed as being at worst minor adverse and not significant.

69. A Breeding Bird Protection Plan and pre-construction surveys would be set up as standard to avoid the destruction or disturbance of any nest site, with species-specific temporal and spatial restrictions around construction works.

70. With the implementation of the mitigation measures as described, it is considered that there are no significant effects, or cumulative effects, on the ornithological features at the Proposed Development site.

Noise and Vibration

71. The full assessment of the potential noise and vibration effects from the Proposed Development on local receptors is provided in Chapter 9 of the Proposed Development EIAR.

72. Background noise levels in the local area were surveyed in 2012 and 2015 in connection with the adjacent consented Douglas West Wind Farm which was also developed by 3R Energy. Through consultation with the SLC Environmental Health department it was considered neither necessary nor appropriate to repeat the background noise measurements at any locations for the Proposed Development, because so many additional turbines have been brought into operation in recent years. Therefore, in accordance with industry standard noise guidance, additional background noise measurements have not been undertaken. Rather, data from the previous noise survey campaigns in local area in 2012 and 2015 have been used. Planning conditions were set by SLC when planning permission was granted for the neighbouring Douglas West tip height extension project in 2018, based on the same baseline noise data, and these noise limits and conditions previously set down remain appropriate for the protection of nearby receptors in respect of the Proposed Development.

73. The noise levels from the Proposed Development turbines at local noise-sensitive locations were calculated using internationally recognised prediction methods and a set of robust results were then compared with the relevant noise limits. The design of the Proposed Development was found to be capable of meeting these limits. Its effect on the noise environment experienced by local residents is therefore not significant. Any effects on ground-borne vibration were also assessed as being not-significant.

74. The cumulative effects of the Proposed Development, plus all relevant operational and consented wind turbines within 5 km of the Proposed Development, including the Revised Cumberhead Wind Farm,

Revised Dalquhandy Wind Farm and Repowered Hagshaw Hill Wind Farm, were calculated in the same way. The methodology employed exaggerates the cumulative noise effects, because there are no receptor locations that can ever simultaneously fall downwind of every wind farm in the locality. Nevertheless, the proposed noise limits for the Proposed Development can be met under these circumstances at all but one of the receptor locations, with the sole exception being the consented (but unbuilt) housing development at Gunsgreen. The small excess identified by the methodology at Gunsgreen (only) over the proposed noise limits is slight, and in practice not significant. The increase in noise from the Proposed Development turbines over that already occurring or likely to occur from operational and permitted wind farms in the locality will be subjectively unnoticeable at most locations, and within acceptable limits. The overall effect is therefore not significant.

Cultural Heritage

75. The full assessment of the effects on cultural heritage is provided in Chapter 10 of the Proposed Development EIA Report.

76. A detailed desk-based assessment covering the Proposed Development site and an area extending to 1 km all around has identified that there are three heritage assets within the site boundary: an enclosure of unknown, but possibly prehistoric, date; an old sheepfold; and, a possible location for a small farmstead of 18th century date. The Proposed Development site is almost entirely occupied by commercial forestry which has been planted over the recorded locations of those assets that have been identified. Within 1 km of the Proposed Development site the historic landscape character is largely of a post-medieval farming landscape with historical exploitation of coal as a fuel source having commenced in at least the latter part of the 18th century.

77. All the identified heritage assets within the Proposed Development site have been avoided through design of the wind farm layout and, taking account of the current land-use, the potential for further archaeological discoveries within the Proposed Development site is assessed as being low or negligible.

78. There is one Scheduled Monument and two Category A Listed Buildings within 5 km of the Proposed Development, from the location of which there would be visibility of the Proposed Development. The assessment has concluded that the effect on the setting of one of these (St Bride's chapel and church) would be significant in EIA terms but not to an extent that would diminish or compromise the cultural significance or the special interest of the site. All other effects on the setting of heritage assets between 5 km and 15 km from the Proposed Development, from which there is predicted theoretical visibility, are assessed as being not significant.

79. The cumulative effect of the addition of the Proposed Development to a baseline including the operational and consented wind farm development in the Hagshaw Cluster has also been considered. The assessment, informed by the cumulative photomontages and wirelines produced for the assessment, has concluded that the addition of the Proposed Development to a baseline including the operational and consented schemes within the Hagshaw Cluster would not give rise to any cumulative significant effects. Indeed, it is noted that when the consented turbines at Douglas West are considered in the baseline that the significant effect identified on St Bride's chapel and church (above) would reduce to a non-significant level.

Hydrology, Hydrogeology and Geology

80. The full assessment of the effects on hydrology, hydrogeology and geology is provided in Chapter 11 of the Proposed Development EIAR.

81. The Proposed Development site is located within the Clyde River catchment, with site drainage reaching the Clyde via the Poniel Water, which itself receives drainage from the on-site watercourses, the Hagshaw Burn and Shiel Burn system. The Poniel Water and the on-site watercourses are considered within the assessment to have moderate water quality.

82. The rock beneath the site is typically sedimentary overlain by till, forming a moderate productivity aquifer and published geological mapping shows small, localised pockets of peat. A peat depth survey has identified minimal peat across the Proposed Development area, with most probes identifying no peat. A peat slide risk assessment has identified negligible risks across the site.

83. Potential construction and operational effects, in the absence of any mitigation measures, include changes to the groundwater flow regime, the risk of pollution of watercourses resulting in adverse effects on water quality, and effects on the integrity of watercourse banks.

84. Proposed mitigation measures to avoid or reduce potential impacts include developing and implementing a Construction Environmental Management Plan (CEMP), key-hole forestry felling and re-planting, felling works in accordance with good practice, undertaking pre-construction site investigations to inform micro-siting and avoid sensitive receptors where possible, and surface water quality monitoring.

85. Outline drainage design provisions and water crossing designs have been developed to ensure appropriate control of run-off, and continuous greenfield flows. Detailed designs will be agreed with SEPA and SLC in advance of construction.

86. These mitigation measures are considered to be robust and implementable and will reduce the potential impacts on watercourses which have been identified as high and medium, to low. Therefore, the significance of residual effects on geology, surface water and groundwater, following the implementation of these mitigation measures, is considered to be minor or negligible and therefore not significant. No cumulative effects are predicted.

Traffic and Transport

87. The full assessment of the effects on traffic and transport is provided in Chapter 12 of the Proposed Development EIA Report.

88. The Proposed Development has the potential to affect the surrounding transport network during its construction, operation and decommissioning periods. During construction, potential effects could arise from traffic travelling to and from the site delivering materials, wind farm components and plant. The Applicant has confirmed that with the exception of timber traffic and pre-construction Site Investigation works, all vehicles associated with construction and operation of the Proposed Development will arrive at and depart from the site via the M74 to the north of Junction 11. No significant additional effects from timber-related traffic, over and above that which would occur from routine forest management, are expected as timber removal from the site would occur via the existing permitted forestry haul route to Station Road at Douglas West as part of the ongoing forestry operations irrespective of the Proposed Development.

89. As part of the Proposed Development, the principal contractor will prepare a Construction Traffic Management Plan (CTMP), detailing the management processes and proposed measures during the construction phase. The effects of the additional traffic estimated to be generated during the construction of the Proposed Development have been assessed as negligible and not significant. No mitigation is proposed, but 'good practice' measures will be implemented.

90. The Proposed Development will generate only the occasional maintenance or inspection vehicle during its operation and the effects of this traffic are also considered to be negligible. The number of vehicles generated during the decommissioning of the Proposed Development is considered to be less than during construction and is also considered to be negligible.

91. Potential cumulative effects could arise from the traffic generated by the Proposed Development and other consented developments. However, the traffic estimated to be generated by the Proposed Development is relatively small compared to that estimated to be generated by the consented developments. Furthermore, the traffic generated during the construction of the Proposed Development is expected to last for only around a year after which the Proposed Development will be operational and traffic volumes will reduce. The cumulative effects arising from the Proposed Development and the other consented developments is considered to be negligible.

Socio-Economics, Tourism and Recreation

92. The full assessment of the effects on socio-economics, tourism and recreation is provided in Chapter 13 of the Proposed Development EIAR.

93. It found that the local area has a population older than the South Lanarkshire and Scottish averages with limited opportunities for young people and employment concentrated in relatively low value sectors. The local economy has been adversely affected by the decline of coal mining and other local industries, and there are a limited number of tourism assets and accommodation providers in the local area. The challenges faced by the area suggest that creating employment opportunities is an important priority.

94. Based on an installed capacity of 78 MW, the assessment of the Proposed Development's economic impact found that:

- during the development and construction phase it would generate up to:
  - £15.9 million and 141 job years of employment in South Lanarkshire; and
  - £42.8 million and 393 job years in Scotland (including South Lanarkshire).
- during each year of the operational phase it would generate up to:
  - £0.7 million and 5 jobs in South Lanarkshire; and
  - £1.0 million and 8 jobs in Scotland.

95. The assessment also found that there would be wider benefits associated with the Proposed Development as a result of the offer to the local communities of up to 5 % shared ownership, in addition to Community Benefit funding of £5,000 per MW per year (so a total of up to £390,000 per year, based on a total installed capacity of 78 MW). This would enable the local communities surrounding the Proposed Development, such as Douglas, Glespin, Coalburn, Rigside and Douglas Water, to invest in the local area, and meet the objectives set out in their community action plans. This could involve developing the area's adventure tourism offering resulting in increased visitor numbers and tourism related jobs. The socio-economic impact of the shared ownership scheme could support up to 8 jobs and £340,000 Gross Value Added (GVA) per year, including the benefits from leveraged funding.

96. There would also be benefits to the public sector from payment of non-domestic rates estimated to be worth around £0.8 million each year.

97. A review of the latest research found no evidence of wind farm developments adversely affecting the tourism economy of Scotland. A specific assessment of the potential effect of the Proposed Development on local tourism assets, accommodation providers and tourism routes also found that there were not expected to be any adverse effects. The assessment notes that there may be beneficial effects on the tourism economy as revenue from the community benefit and shared ownership is invested in developing the local area's adventure tourism offering.

98. Overall, there are no significant adverse effects identified, and there are likely to be economic impacts associated with the Proposed Development, such as shared ownership revenues and construction expenditure, which could have positive, long-term benefits that assist the local area to overcome its economic challenges.

Aviation, Radar and Telecommunications

99. The full assessment of the effects on aviation, radar and telecommunication infrastructure is provided in Chapter 14 of the Proposed Development EIAR.

100. An initial scoping study relating to aviation, radar and telecommunications identified those stakeholders potentially affected by the Proposed Development. The scoping process involved considering all military and civil aerodromes in the wider area out to circa 60 km, all radar installations out to the limit of their range, all navigational aids, air-ground-air communications stations and low flying activities, as well as operators of telecommunications links. The scoping process identified potential impacts to primary radars operated by NATS and Glasgow Airport.

101. Consultations were conducted with NATS, Glasgow Airport, Glasgow Prestwick Airport, Ministry of Defence (MoD), Atkins, the Joint Radio Company (JRC) and Arqiva; additionally, the Ofcom online

database of fixed links was interrogated to identify any links near the Proposed Development site (note that Ofcom no longer provides such information directly).

102. Identified potential impacts to the NATS and Glasgow Airport primary radars will be mitigated through the blanking of the affected radars and the provision of in-fill coverage from the unaffected Terma radar at Glasgow Airport. Legal agreements with these organisations will be put in place to secure the mitigation proposal, to allow their conditional approval of the Proposed Development.

103. Following implementation of the proposed mitigation scheme it is concluded that there will be no significant effects on aviation or telecommunication infrastructure as a result of the Proposed Development.

Shadow Flicker

104. The full assessment on the effects of shadow flicker is provided in Chapter 15 of the Proposed Development EIAR.

105. This assessment considers whether the effect known as 'shadow flicker' is likely to be caused by the Proposed Development and assesses the potential for impact on sensitive receptors. Shadow flicker is the effect of the sun passing behind the moving rotors of the turbines, casting a flickering shadow through the windows and doors of neighbouring properties. This occurs in certain combinations of geographical position, time of day, time of year and specific weather conditions.

106. The study area within which properties could potentially be affected by shadow flicker covers a distance of 10 rotor diameters from each turbine and lies 130 degrees either side of north (relative to each turbine). In the case of the Proposed Development, this area extends to 1,550 m from each turbine.

107. No shadow flicker impact can occur during the construction or the decommissioning of the turbines.

108. A shadow flicker assessment was undertaken at the three identified receptors within the study area with potential to experience flicker effects. Realistic scenario calculations have shown that the maximum occurrence of shadow flicker was at Station House where the effect amounts to approximately 3 hours per year, well within the accepted limits of shadow flicker, of either 30 minutes per day or less than 30 hours per year.

109. A cumulative assessment was undertaken of the potential shadow flicker effects from the Proposed Development in combination with the Dalquhandy and Douglas West Wind Farm developments. It concluded that no significant effects would result through the operation of all three developments.

110. It is important to note that these results do not take into account existing screening features (structures and vegetation), dwelling orientation and local mitigation measures such as blinds or curtains which will reduce potential effects further. Receptors may also be in rooms that are not generally used at the affected times, therefore, the amount of time when shadow flicker is actually 'experienced' will likely be significantly less than what has been predicted.

111. Proposed mitigation measures in this case relate to the imposition of a Shadow Flicker Protocol to be agreed with SLC which could include a programme of selective automatic shutdown of certain turbine(s) under certain conditions, if required.

112. As a best practice mitigation measure, turbine components will be covered in industry standard non-reflective paint to reduce the occurrence of glinting.

113. The residual effect of shadow flicker is therefore, expected to be of no significance for all receptors during the operational phase of the Proposed Development.

Forestry

114. The full assessment of the effects on forestry is provided in Chapter 16 of the Proposed Development EIA Report.

115. The Proposed Development is situated within an extensive area of commercial forestry known as the Cumberhead Forestry Complex, which was originally planted between 1974 and 1989. Felling and replanting has been taking place under a Forestry Commission Scotland (FCS) approved Forest Plan since 2006, steadily restructuring the age and species profile of the forest.

116. The Proposed Development will have an infrastructure and associated tree free area footprint of 39.36 ha, requiring 32.25 ha of conifer woodland to be felled. As the Proposed Development precludes replanting in certain infrastructure areas, 35.08 ha (1.6 % of the total forest area) will be subject to compensatory planting, to be delivered through the Compensatory Planting Plan on land in the ownership of the neighbouring landowner in South Lanarkshire.

117. The Proposed Development results in relatively minor changes to the approved Forest Plan to accommodate the Proposed Development which is reflected in the timber production forecasts: a 2 % decrease in total production over the 20-year Forest Plan period compared to the approved Forest Plan.

118. Timber harvesting to facilitate construction will occur ahead of the main construction phase, with all timber extracted via the existing forest haul road to Station Road at Douglas West. As the Proposed Development has been designed to fit closely with the approved Forest Plan, there is little generation of forestry residues, however a Forest Residue Management Plan has been produced detailing how the small volumes generated will be utilised.

119. Overall, the Proposed Development is considered to have a good fit with the approved Forest Plan and a correspondingly modest effect on the social, economic and environmental benefits delivered by the Cumberhead Forest Complex, with the Proposed Development Forest Plan having an overall minor beneficial effect.

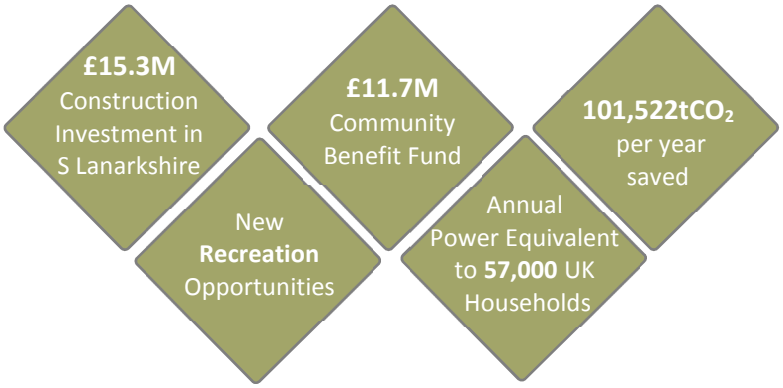
Benefits of the Proposed Development

120. The Proposed Development will deliver the following key benefits.

- The principle of wind development in this general location has already been established by the existing and consented wind developments immediately surrounding the site.
- The Proposed Development would contribute to the attainment of the UK and Scottish Government policies of encouraging renewable energy developments; and in turn contribute to the achievement of UK and Scottish Government targets for renewable electricity generation. The Proposed Development, with an installed capacity of approximately 78 MW, would make a valuable contribution to such unmet targets.
- The Government has confirmed its long-term commitment to the decarbonisation of electricity generation and the Proposed Development would help advance this policy objective.
- The Proposed Development would have a total capacity of 78 MW, generated by thirteen ~6MW turbines which together would produce around 220.7 GWh/year of clean power which would generate enough electricity to supply over 57,000 average UK households.
- The Proposed Development is expected to save approximately 101,522 tonnes of carbon dioxide per year, resulting in a total saving of 3.05 million tonnes over the 30-year lifetime of the development, through displacing carbon-emitting generation.
- Energy generated from renewable sources makes a significant contribution to Scotland and the UK's energy security. The Proposed Development will increase indigenous production of renewable energy in Scotland, reducing the country's reliance on foreign fossil fuels, generating wealth from our own natural resources, and improving the country's energy security. All at a time when the country's demand for electricity is set to soar with the move to electric vehicles, and it is important that the additional generation capacity to meet that demand comes from renewable sources.
- Based on an installed capacity of 78 MW, the Proposed Development will deliver £390,000 per annum in Community Benefit Funding or around £11.7 m in total over its 30 year operational life.
- The Applicant proposes that a new Douglas Valley Development Trust be established to receive Community benefit Funding, supported by full-time Development Officer, to deliver a Community-

Led Investment Strategy for the local villages of Douglas, Coalburn, Glespin, Rigside and Douglas Water.

- The Applicant has also confirmed that there will be a Shared Ownership offer made to the local community, comprising an opportunity for local community groups to acquire up to a 5% revenue share in the Proposed Development.
- Total construction and operational spend on the Proposed Development over its 30-year lifetime is estimated at approximately £104.3 million, with the Applicant committed to a local supplier approach which aims to deliver a significant proportion of construction and operational contracts to local companies.
- Investment in Public Access and Outdoor Recreation opportunities to support the development of the local area's adventure tourism offering.
- If approved, the Proposed Development will be capable of rising to the challenge set by the Scottish Government for the onshore wind industry in Scotland to start building wind farms without public subsidy.



Conclusion

121. This Non-Technical Summary of the EIAR provides an overview of the EIA undertaken for the Proposed Development. Within Chapter 18 of the EIAR a schedule of commitments can be found which details the environmental mitigation measures, summarised above, which the Applicant has committed to implement.

122. Chapters 17 to 19 of the EIAR summarise the potential effects, the mitigation to be implemented and the resulting residual effects. It also provides a summary of the cumulative effects of the Proposed Development in combination with other proposed, consented and operational developments in the local area.

123. The final layout has been informed by a robust EIA and lengthy design iteration process, considering potential environmental impacts and their effects, physical constraints, and health and safety considerations. The information used to inform the design iteration process included consultation responses received, baseline data and the impact assessment undertaken.

124. Consideration has been given to a range of design issues such as relevant planning policy, turbine models, turbine locations as well as various environmental, ecological and technical requirements. Predicted environmental effects arising from the Proposed Development have been mitigated as far as possible, if not eliminated during the iterative design process.

125. The Proposed Development site is considered an appropriate and viable location for a wind energy project due to:

- proven good average wind speeds and generation capacity, given the successful operation of the Existing Hagshaw Hill Wind Farm and its associated Extension adjacent to the site, and the potential to achieve substantially greater electrical generation using modern turbines;

- the site lies within an established wind farm landscape, where there is an opportunity to progress a coordinated layout strategy for the future of the 'Hagshaw Cluster';
- easily accessible direct from the M74 without passing through any communities;
- ability to re-use the existing coal and forestry haul roads for access in and out of the site and limit the number of new roads required through the upgrading of existing forestry tracks;
- in close proximity to a viable (existing) grid connection point; and
- can provide a series of significant social and economic benefits for the local area.

Overall the Proposed Development is an appropriately designed, and sensibly located wind farm which is in line with policies in the local and strategic development plans and conforms to national policy. The Proposed Development has been designed to maximise energy production from an existing wind farm landscape, within acceptable environmental limits. The Proposed Development will provide a valuable contribution towards the ambitious national targets for electricity generation from renewable sources and contribute towards sustainable economic growth in South Lanarkshire and Scotland as a whole.

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