

Technical Appendix 5.7

Residential Visual Amenity Assessment

1 Appendix 5.7 Residential Visual Amenity Assessment

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1 Appendix 5.7 – Residential Visual Amenity Assessment

1.1 Introduction

- 1.1.1 This Technical Appendix presents a Residential Visual Amenity Assessment (RVAA) of the Proposed Development. It has been carried out in accordance with The Landscape Institute Technical Guidance Note 2/19: Residential Visual Amenity Assessment (15 March 2019). The Technical Guidance Note (TGN) states that:

“The purpose of carrying out a Residential Visual Amenity Assessment (RVAA) is to form a judgement, to assist decision makers, on whether a proposed development is likely to change the visual amenity of a residential property to such an extent that it becomes a matter of ‘Residential Amenity’.”

- 1.1.2 It goes on to state that:

“Changes in views and visual amenity are considered in the planning process. In respect of private views and visual amenity, it is widely known that, no one has ‘a right to a view.’ ...

It is not uncommon for significant adverse effects on views and visual amenity to be experienced by people at their place of residence as a result of introducing a new development into the landscape. In itself this does not necessarily cause particular planning concern. However, there are situations where the effect on the outlook / visual amenity of a residential property is so great that it is not generally considered to be in the public interest to permit such conditions to occur where they did not exist before.”

- 1.1.3 This RVAA aims to report at a level that is reasonable and proportionate upon identifying potential significant effects upon the visual amenity of residential properties within the 2 km of the proposed turbines located in the northern development area. Effects on residential properties in the vicinity of the southern development area have been assessed in the **Section 5.8** of the LVIA Chapter.
- 1.1.4 The RVAA identifies if the residents would experience a significant effect on any view from their property (the dwelling or its curtilage) during the operational period of the Proposed Development (40 years) and specifically details which views would be affected.
- 1.1.5 It is important to stress that this Technical Appendix solely considers the visual component of residential amenity and that any consideration of residential amenity in the broader sense must also take account of any noise and shadow flicker effects, which are addressed elsewhere within the Environmental Impact Assessment Report (EIA Report). Therefore, this RVAA does not comment on the acceptability of the Proposed Development, it does however provide a reasoned professional opinion on the likely visual effect on living conditions of the nearest residents.
- 1.1.6 It should be noted that this study is limited to a consideration of the potential visual impacts the residents might experience within their property, i.e. their dwelling and its curtilage. It is acknowledged that the occupiers of most dwellings experience the wider landscape in passing on a regular basis as they go about their day-to-day activities and that the components of this wider landscape also influence their broader sense of amenity. Residents would most likely have views of the Proposed Development on a regular basis as they leave and approach their properties through the wider landscape.
- 1.1.7 It is beyond the scope of this study to determine trends in the day-to-day activities of the residents in the study area, or to define the features and qualities of the surrounding landscape which influence residents’ broader amenity. Whilst not discounting this issue, based on previous wind farm appeal decisions, it appears that greatest weight is usually given to impacts on views from the dwelling itself



and its curtilage, as these impacts are likely to have the greatest influence on living conditions. Beyond their property, residents are considered to experience visual effects as users of local roads, footpaths etc. These effects are assessed as such within the LVIA Chapter.

Approach

- 1.1.8 TGN 2/19 advocates a four step process to RVAA with the first three falling broadly within the scope of LVIA where the magnitude and significance of visual effects is assessed.
- 1.1.9 The fourth step involves a further assessment of the change to visual amenity of individual properties identified as *“having the greatest magnitude of change”* and identifying whether *“the effect on the outlook / visual amenity of a residential property is so great that it is not generally considered to be in the public interest to permit such conditions to occur”* and the Residential Visual Amenity (RVA) threshold is reached.
- 1.1.10 However, as noted at **paragraph 1.1.2** above, it is not uncommon for a significant visual effect to occur at a residential property and that does not automatically engage the RVA threshold.

Methodology

- 1.1.11 The methodology followed for this RVAA follows the overarching guidelines for LVIA, namely The Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (2013), Landscape Institute and the Institute for Environmental Management and Assessment and latterly, the principles set out in Technical Guidance Note 2/19.
- 1.1.12 In accordance with the above guidelines, the level of visual effect experienced in any given view is ascertained by considering in tandem the sensitivity of the baseline visual receptor and magnitude of change in the view as a result of the development. Professional judgement is then employed to determine whether the effect is significant or not, although this is still based within a recognised framework in line with existing LVIA guidance.
- 1.1.13 The LVIA assessment criteria used acknowledges that different receptor groups (e.g. residents, users of public rights of way, people at their place of work) have varying degrees of sensitivity to change in the view. It is generally accepted that residents are of high sensitivity to change in their view, and in all cases in this assessment, residents at each property have been considered to be of **high sensitivity**. It is acknowledged, however, that this is a simplified approach which arrives at a worst-case assessment. Sensitivity may, in fact, vary dependent upon the more complex factors such as the functions within the dwelling, for instance residents are generally considered to be more sensitive to changes in the views from certain rooms such as the primary day time living rooms (e.g. lounge, dining room, kitchen or conservatory) than rooms such as bedrooms, bathrooms or utility rooms, notwithstanding the overall high sensitivity for the property as a whole. Similarly, residents are usually more sensitive to changes in the view from certain parts of their garden or curtilage than others.
- 1.1.14 Visual impacts are caused by the introduction of new elements into the views of a landscape or the removal of elements in the existing view. Professional judgement has been used to determine the magnitude of impacts using the following criteria as guidance:
 - **Very Low Magnitude of Change**
 - No change or negligible change in views;
 - **Low Magnitude of Change**
 - Some change in the view that is not prominent but visible to some visual receptors;
 - **Medium Magnitude of Change**
 - Some change in the view that is clearly notable in the view and forms an easily identifiable component in the view;



- **High Magnitude of Change**
 - A major change in the view that is highly prominent and has a strong influence on the overall view;
 - **Very High Magnitude of Change**
 - A change in the view that has a dominating or overbearing influence on the overall view.
- 1.1.15 In general, the magnitude of visual impact on residential properties is likely to increase with proximity to the turbines. However, distance from the nearest proposed turbine is only one of the factors that needs to be considered when determining the magnitude of visual impacts on any given view from a residential property. Other modifying factors include:
- Whether the view of the turbines is in a direct or oblique angle from the primary orientation of the view (as explained illustratively at **Technical Appendix 5.7 Figure 5.7.2**);
 - The extent to which the view is obstructed or filtered by vegetation, landform or built structures;
 - The extent to which the current view is influenced by existing built structures (e.g. buildings, roads, pylons);
 - The difference in elevation between the property and the base of the nearest turbine;
 - The horizontal and vertical field of view which is occupied by turbines;
 - The spacing or relative clustering of the turbines in the view;
 - The scale and openness of the receiving landscape; and
 - The availability of other features in the view, which provide a comparison of scale and perspective.
- 1.1.16 As previously indicated, the level of the visual effect experienced in any given view is determined by considering in tandem the sensitivity of the view with the magnitude of change. The level of effect is described as either **‘Major’**, **‘Moderate major’**, **‘Moderate’**, **‘Minor moderate’**, **‘Minor’**, **‘Negligible’** or **‘No effect’**. Professional judgement is then used to inform whether the level of effect identified is significant or not.
- 1.1.17 In this analysis, those effects described as **‘Major’**, **‘Moderate major’** and in some cases **‘Moderate’**, are identified as **‘significant effects’** in line with the Electricity Works (Environmental Impact Assessment) (Scotland) 2017 Regulations as amended.

Study Area

- 1.1.18 The TGN states that there is no standard criteria for defining the RVAA study area and that it should be determined on a case by case basis taking both the type and scale of the Proposed Development and the landscape context into consideration. The guidance note identifies that for large structures, such as wind turbines, a preliminary study area of 1.5 to 2 km radius may be appropriate to begin identifying properties for inclusion within RVAA. As agreed at scoping, a 2 km RVAA study area has been adopted.
- 1.1.19 For each of the properties within the 2 km RVAA study area the following information was gathered through a combination of desk study and site visits, including:
- Name of property;
 - General direction of views from the property to the nearest turbine;
 - Distance from the property to the nearest turbine;



- Approximate elevation of property (AOD);
 - Orientation of the main elevations of the property;
 - Angle of the turbines in the view from a representative point on the façade facing the Proposed Development or part of the curtilage with a view of the Proposed Development (as explained illustratively in **Figure 5.7.2**);
 - A record of any intervening obstructions (e.g. screening from vegetation, landform or built structures);
 - A record of any built structures or other such elements which influence the outlook;
 - A record of any other features in the foreground view which provide a comparison of scale; and
 - The availability of other views from the property that are not affected by the Proposed Development.
- 1.1.20 Where a distance between a residential property and a turbine is provided, the figure given is an approximate measurement between the centre point of the turbine tower and the corner of the nearest façade to the proposed turbines in the northern development area.
- 1.1.21 Defining the limits of private gardens can be subjective and considering the view from all corners of any individual garden is not possible. Therefore, this assessment has appraised what is considered to be the worst-case scenario from gardens. Where a property is set back from the public road along an access track that extends beyond the curtilage of the property, views on approach and departure from the property are also assessed.
- 1.1.22 For each of the properties assessed in detail a wireframe model was generated to help identify the scale, arrangement and visibility of the proposed turbines. These wireline images were reviewed to factor in how natural and built screening would affect visibility of the turbines. In many cases this screening would be such that the wireline images illustrate a far greater potential visibility that would be seen in reality.
- 1.1.23 A bare earth wireframe showing a 90-degree cylindrical angle of view towards the proposed turbines in the northern development area, from the corner of the nearest façade of each property is provided at **Figures 5.7.3 to 5.7.13**. This wireframe does not take account of any vegetation screening.

1.2 Assessment

Preliminary Assessment

- 1.2.1 **Figure 5.7.1** illustrates the 2 km RVAA study area as agreed at scoping. In total there are 11 receptor locations within 2 km of the proposed turbines in the northern development area. The cluster of 20 properties at Hamilton Drive and the neighbouring Detention Centre have been grouped (G1) as they share a similar outlook. Similarly, the two properties Greenhead House and Greenhead Steading have been grouped (G2), as have the two properties at High Plewlands, comprising High Plewlands Farm and Glengavel View (G3). The final list of properties included in this RVAA is set out in **Table 1** below.

Initial Assessment

- 1.2.2 An initial assessment has been undertaken in order to identify those properties that would experience the highest magnitude of change and consequently where there is the potential for the RVA threshold to be reached. The assessment has been informed by the desk study, wirelines from each residential property and site visits.



Table 1 – Initial Assessment of RVAA Properties

Property	Comments	Financially Involved	Detailed Assessment Required
G1 Hamilton Drive & Detention Centre	Group of 20 properties originally associated with the neighbouring Dungavel Detention Centre.	No	Yes
G2 Greenhead House/Greenhead Steading	Currently occupied and potential for significant effects.	No	Yes
G3 High Plewlands Farm & Glengavel View	Currently occupied and potential for significant effects.	No	Yes
P1 North Halls Farm	Currently occupied and potential for significant effects.	No	Yes
P2 South Halls Farm	Currently occupied and potential for significant effects.	No	Yes
P3 Bankend Farm	Currently occupied and potential for significant effects.	No	Yes
P4 Geil Mill Cottage	Property is not currently in residential use and is derelict.	No	No
P5 Templelands Cottage	Currently occupied and potential for significant effects.	No	Yes
P6 Laigh Plewland Farm	Property is not currently in residential use and is derelict and located within the Drumclog Off Road Centre	No	No
P7 Glengavel House	Currently occupied and potential for significant effects.	Yes	Yes
P8 Dippal Lodge	Property is a short-term holiday let. Potential for significant effects.	No	Yes



1.3 Detailed Assessment

RVAA Property	Distance & Direction	Horizontal Angle of View	Visibility	Assessment
G1 Hamilton Drive & Detention Centre	1.6 km NW	42.1°	<p>This group of 20 two-storey properties, located to the north of Dungavel House Detention Centre, is accessed via the B743 to the west. The properties and the detention centre are surrounded by mixed woodland and coniferous plantation to the north, east and south sides. Views are well contained. The primary orientation of views is towards the access road which passes between the properties in a WNW-ESE alignment. The proposed turbines would be located to the SSE of this group of properties, beyond the three-storey detention centre, which is surrounded by a high security fence and areas of plantation.</p> <p>Other operational and consented wind farms in the surrounding landscape are well screened by the intervening trees, including the consented Hallsburn Farm turbines, which would be in closer proximity.</p>	<p>The blade tip ZTV indicates that up to all 18 turbines would be theoretically visible during daylight hours, however intervening trees, fences and buildings would screen potential views so that there would be no perceivable change, resulting in at most a negligible effect which is not significant.</p> <p>During the hours of darkness, 5-6 aviation lights are theoretically visible, however intervening trees, fences and buildings would again screen potential views of aviation lights in practice. Should any glimpses of aviation lights be possible between gaps in the woodland cover, it is noted that, with reference to the lit turbine lighting intensity ZTV at Figure 5.9, due to the difference in elevation between the lit turbines and the properties, the turbine lights would be perceived at a much lower intensity. Existing street lighting and flood lighting at the detention centre would reduce any potential for visual effects even further. To the NE, the existing Kype Muir Extension turbine lights would be screened by the intervening trees. It is therefore considered that there would be at most a negligible effect on views during hours of darkness which is not significant.</p>
G2 Greenhead House/Green head Steading	1.9 km NW	35.4°	<p>These two detached properties, located to the NW of Dungavel House Detention Centre, are accessed via a private access track leading to the B743 to the east. Areas of mixed woodland adjacent to the north, south and east sides of Greenhead House filter views in most directions. Greenhead Steading, located to the west of Greenhead House also provides partial screening. Views from</p>	<p>The blade tip ZTV indicates that up to all 18 turbines would be theoretically visible during daylight hours, however trees to the immediate SE of the properties would reduce the actual visibility from the dwellings. A glimpsed open view of the Proposed Development turbines would be available from the access track at a slightly oblique angle when travelling eastwards. It is</p>



RVAA Property	Distance & Direction	Horizontal Angle of View	Visibility	Assessment
			<p>Greenhead Steading are generally more open, especially to the SW. Glimpsed open views are available from the access track on approach to the B743.</p> <p>The Proposed Development turbines would be located beyond a small area of deciduous trees to the SE of the properties. Where open views are available, the existing Dungavel and Kype Muir Extension turbines and the consented turbines at Hallsburn Farm would be apparent above intervening trees in the same direction of view.</p> <p>In other directions, the consented turbines at Mill Rig wind farm would be visible in open views to the SW of the properties, particularly in direct views from Greenhead Steading. Where open views are available towards the south, the operational turbines at Bankend Rig wind farm would be visible together with consented turbines at Bankend Rig II and the in planning turbines at Bankend Rig III.</p>	<p>anticipated that blade tips would be visible above the trees adjacent to the B743. Due to the proximity and scale of the turbines, the magnitude of change from the access track would be medium and the level of effect moderate, which is considered significant due to the high sensitivity of residential receptors. The level of effect would be lower from the dwellings and would not be considered significant.</p> <p>During the hours of darkness, 5-6 aviation lights are theoretically visible, however intervening trees would provide a good degree of screening from the properties. In addition, with reference to the lit turbine lighting intensity ZTV at Figure 5.9, due to the difference in elevation between the lit turbines and the properties, the turbine lights would be perceived at a much lower intensity. Existing lighting in the direction of the site includes transient lights from vehicles on the B743. In other directions aviation lighting at Kype Muir Extension would be largely screened by intervening trees, the consented Mill Rig wind farm would be visible in direct views from Greenhead Steading towards the SW and in oblique views from the access track. The aviation lighting of the in planning Bankend Rig II and Bankend Rig III would also be visible to the SE. The magnitude of change would be low, which would result in a minor moderate effect during hours of darkness, which is considered not significant.</p>
G3 High Plewlands Farm and Glengavel View	1.1 km W	86.7°	<p>There are two properties at High Plewlands comprising the original farmhouse and Glengavel View which are located adjacent to the north bank of Glengavel Reservoir. The main orientation of views from both dwellings extend across lawns to the south and over the reservoir beyond. There are also open views available in the direction of the</p>	<p>The blade tip ZTV indicates that up to all 18 turbines would be theoretically visible during daylight hours, although the wireline indicates that the lower parts of more distant turbines would be screened by landform. The closest turbines would be visible above the intervening conifer trees in direct views along the access</p>



RVAA Property	Distance & Direction	Horizontal Angle of View	Visibility	Assessment
			<p>proposed turbines in the east, particularly from garden areas, although a small block of trees in the intervening landscape provides some partial screening. The conifer plantation in the distance provides screening of operational turbines at Dungavel wind farm.</p> <p>Views towards operational turbines at Bankend Rig Wind Farm to the SW are filtered through a line of trees to the west of the property.</p> <p>Views towards consented turbines at Mill Rig to the W, Bankend Rig II to the W and SW will be available from garden areas and the west facing side of High Plewlands Farm.</p> <p>Open views are available towards the in planning Bankend II and Bankend Rig III scheme across Glengavel Reservoir to the SE from both properties and garden areas.</p>	<p>track, and from the gardens. This would give rise to a high magnitude of change, resulting in a major level of effect, which would be significant. The level of effect from the dwellings would be lower due to the orientation of windows and partial screening of views from the farm house by the tree within the central courtyard, however effects would still be considered significant at both properties.</p> <p>During the hours of darkness, 5-6 aviation lights are theoretically visible. With reference to the lit turbine lighting intensity ZTV at Figure 5.9, due to the difference in elevation between the lit turbines and the properties, the turbine lights would be perceived at a much lower intensity. Existing transient lights from vehicles on the B743 would be visible in intervening views.</p> <p>Additionally, aviation lighting at the consented Mill Rig Wind Farm would also be visible in other views, as would the aviation lighting from the in planning Bankend Rig II and Bankend Rig III schemes should these become operational. The magnitude of change resulting from the Proposed Development would be medium, which would result in no greater than a moderate effect during hours of darkness, which is considered significant from the access track due to its direct alignment towards the proposed turbines. It would not be considered significant from the dwellings due to the primary orientation of the windows.</p>
P1 North Halls Farm	2 km NW	30.7°	<p>This single-storey detached property is located off the minor road between the B743 and the B745. It is enclosed to its SE by outbuildings and trees that restrict views in the direction of the Proposed Development turbines.</p>	<p>The blade tip ZTV indicates that 13-15 turbines would be theoretically visible during daylight hours. However, views from the dwelling would be screened by adjacent outbuildings and the extensive vegetation that surrounds the property to the SE. The magnitude of change is</p>



RVAA Property	Distance & Direction	Horizontal Angle of View	Visibility	Assessment
			<p>There are limited views towards the operational Dungavel turbines from its access. However, views are largely screened by a combination of topography and existing vegetation.</p> <p>In other views, the operational turbines at Bankend Rig and the consented Bankend Rig II turbines to the south are screened by trees around the property whilst the consented turbines at Mill Rig would be visible in views to the south-west.</p>	<p>anticipated to be no higher than very low from the property or its curtilage and the level of effect minor, which is considered to be not significant due to the high sensitivity of residential receptors.</p> <p>During the hours of darkness, 3-4 aviation lights are theoretically visible. With reference to the lit turbine lighting intensity ZTV at Figure 5.9, due to the difference in elevation between the lit turbines and the property, the turbine lights would be perceived at a much lower intensity. However, intervening trees would screen views. Existing lights in the direction of the site include those from vehicles on the B743 and potentially glimpsed Kype Muir Extension lighting through any gaps in the trees. In other views, there are transient light sources from vehicles on the B745 to the west, whilst aviation lighting at the consented Mill Rig wind farm would be visible to the SW, along with the in planning Bankend II and III schemes. The magnitude of change would be very low, which would result in no greater than a negligible effect during hours of darkness, which is considered not significant.</p>
P2 South Halls Farm	1.8 km NW	31.1°	<p>This 1.5-storey detached property, located to the south side of the B745 has relatively open views along the road to the WNW, which is its primary orientation. Outbuildings to the south and an area of mixed woodland to the SE restrict views in the direction of the Proposed Development turbines.</p> <p>Operational turbines at Dungavel and Kype Muir Extension wind farms and consented turbines at Hallsburn wind farm would be largely screened by a belt of woodland to the SE of the property.</p>	<p>The blade tip ZTV indicates that 13-15 turbines would be theoretically visible during daylight hours. However views from the dwelling would be screened by the belt of woodland to the SE. Views from the curtilage to the south of the property would be filtered through intervening trees which would reduce the actual visibility. The magnitude of change is anticipated to be no higher than medium from the curtilage and the level of effect moderate, which is considered significant due to the high sensitivity of residential receptors. The level of effect</p>



RVAA Property	Distance & Direction	Horizontal Angle of View	Visibility	Assessment
			In other views, operational turbines at Bankend Rig are visible from the curtilage in filtered views to the south, whilst consented turbines at Bankend Rig II and Mill Rig, and in planning turbines at Bankend II and III, would be visible in views to the SW should they become operational.	<p>would be lower from the dwelling and would not be considered significant.</p> <p>During the hours of darkness, 5-6 aviation lights are theoretically visible, however intervening trees would largely screen views. With reference to the lit turbine lighting intensity ZTV at Figure 5.9, due to the difference in elevation between the lit turbines and the property, the turbine lights would be perceived at a much lower intensity. Existing lights in the direction of the site include those from vehicles on the B743 and potentially glimpsed Kype Muir Extension lighting through any gaps in the trees. In other views, there are transient light sources from vehicles on the B745 to the NW, whilst aviation lighting at the consented Mill Rig wind farm would be visible in the distance to the SW, along with the in planning Bankend II and III wind farms should they become operational. The magnitude of change would be low, which would result in no greater than a minor moderate effect during hours of darkness, which is considered not significant.</p>
P3 Bankend Farm	1.7 km W	32.5°	<p>This 1.5-storey property is accessed via a private access track which runs adjacent to Glengavel Water in a roughly NNW-SSE orientation and connects to the B745 to the NNW.</p> <p>Relatively open views are available from this property across surrounding fields.</p> <p>The blade tips of operational turbines at Dungavel and Kype Muir Extension wind farms are visible in the views to the east in the direction of the site. In the other directions operational turbines at Bankend Rig are visible in direct views to the south, whilst the consented turbines at</p>	<p>The wireline for this property indicates that up to all 13-15 of the Proposed Development turbines would be theoretically visible in views to the SE, however there would be some screening of the lower parts of more distant turbines by intervening landform and conifer plantations. The open nature of the views in this direction combined with the proximity of turbines T1 – T5 would result in a high magnitude of change during daylight hours and a major level of effect which is considered significant.</p> <p>During the hours of darkness, aviation lights would be visible on T1, T4, T6 and T9. The remaining lights would be screened by landform or intervening conifer plantations</p>



RVAA Property	Distance & Direction	Horizontal Angle of View	Visibility	Assessment
			Bankend Rig II and Mill Rig would be visible to the SW, and in planning turbines at Bankend III to the SE.	on the horizon. With reference to the lit turbine lighting intensity ZTV at Figure 5.9 , due to the difference in elevation between the lit turbines and the property, the turbine lights would be perceived at a much lower intensity.. Existing light sources in the intervening landscape towards the site include distant scattered properties. In other views, aviation lights would be visible at the consented Mill Rig wind farm to the SW, and at the in planning Bankend II and III to the S/SE. It is anticipated that the magnitude of change during the hours of darkness would be medium, resulting in a moderate level of effect, which is considered significant due to the sensitivity of visual receptors.
P5 Templelands Cottage	1.1 km W	38.5°	<p>This detached property is accessed via a private driveway which is connected to the B743 to the east. The property is bordered by a single row of trees to the north, with garden trees to the SW and SE of the property. There are outbuildings to the west, south and east, which together partially screen and filter views in all directions. More open views are available to the north and south from the access track, but views in the direction of the site to the east are restricted by areas of coniferous plantation adjacent to the road.</p> <p>Existing operational turbines at Dungavel wind farm are screened from view. In other directions, operational turbines at Bankend Rig wind farm are visible in oblique views from the access track. Consented wind turbines at Bankend Rig II would also be visible in oblique views whilst those at Mill Rig wind farm would be visible in slightly oblique views from the access track. The in planning Bankend Rig II and III wind farms would be visible in views to the SW and SE should become operational.</p>	<p>The blade tip ZTV indicates that 10-12 turbines would be theoretically visible during daylight hours, however the wireline indicates that the lower parts of the more distant turbines would be screened by landform. Trees surrounding the property would reduce the actual visibility from the dwelling. The upper parts of the closest turbines would however be visible in direct views along the access track above the intervening conifer trees. This would potentially give rise to a high magnitude of change from the access track, resulting in a major level of effect, which would be significant. The level of effect from the dwelling would be lower due to a greater degree of screening, but it would still be considered significant.</p> <p>During the hours of darkness, 3-4 aviation lights are theoretically visible. With reference to the lit turbine lighting intensity ZTV at Figure 5.9, due to the difference in elevation between the lit turbines and the property, the turbine lights would be perceived at a much lower intensity.. Existing transient lights from vehicles on the</p>



RVAA Property	Distance & Direction	Horizontal Angle of View	Visibility	Assessment
				B743 would be visible in intervening views. In other directions, aviation lighting at the consented Bankend II and Mill Rig wind farms would be visible to the SW, with aviation lighting from the in planning Bankend II and III schemes potentially visible in the distance to the S. The magnitude of change is anticipated is assessed as medium from the access track, which would result in a moderate effect during hours of darkness, which is considered significant due to the sensitivity of residential receptors. Due to intervening screening, the level of effect from the dwelling however would be not significant .
P7 Glengavel House (Financially Involved)	0.5 km W	122.4°	This two-storey property, located adjacent to the B743 has open views towards the NW (its primary orientation) and to the S/SW. Views are available towards the operational Bankend Rig wind farm and the consented Bankend Rig II and Mill Rig wind farms, and the in planning Bankend II and III schemes. Views towards the SE are partially filtered through trees to the rear of outbuildings within the curtilage. Views in the direction of the site are screened by trees within the property's own curtilage and coniferous plantation adjacent to the road. Existing wind turbines at Dungavel and Kype Muir Extension wind farms are screened beyond this plantation.	<p>The blade tip ZTV indicates that 10-12 turbines would be theoretically visible during daylight hours, however screening from intervening trees would greatly reduce the actual visibility to a very low magnitude of change, resulting in a minor level of effect, which would be considered not significant.</p> <p>During the hours of darkness, 3-4 aviation lights are theoretically visible. With reference to the lit turbine lighting intensity ZTV at Figure 5.9, due to the difference in elevation between the lit turbines and the property, the turbine lights would be perceived at a much lower intensity and the intervening trees would obscure the lights in practice. Existing light sources include transient lights from vehicles on the B743. In other directions where open views are available, aviation lighting at the consented Mill Rig wind farms would be visible, along with aviation lighting at the in planning Bankend Rig II and III schemes should they become operational. It is considered that there would be at most a negligible effect on views during hours of darkness as a result of the Proposed Development which is not significant.</p>



RVAA Property	Distance & Direction	Horizontal Angle of View	Visibility	Assessment
P8 Dippal Lodge	1.6 km SE	78.9°	<p>This property is located on an access track from the B743 and is located to the SE of the Proposed Development turbines in the valley of Dippal Burn. The property is operated as a short-term holiday let.</p> <p>Views from the property are open but are restricted to the NW (in the direction of the Proposed Development turbines) and to the SE by the landform of the valley.</p> <p>Views are available to the NE towards the operational Cumberhead and the under construction Cumberhead West wind farm.</p>	<p>The blade tip ZTV indicated that 4-6 turbines would be theoretically visible during daylight hours. However, the landform of Dippal Rig, Millstone Rig and Regal Hill to the NW largely screens the Proposed Development turbines with views limited to blade tips only, resulting in a very low magnitude of change and a minor level of effect, which would be considered not significant.</p> <p>With reference to the wireline at Figure 5.7.13, during the hours of darkness, none of the lit turbines would be visible. Therefore, it is considered that there would be no effect on views during hours of darkness as a result of the Proposed Development which is not significant.</p>



Visual effects during the hours of darkness

- 1.3.1 As set out in **Section 5.7 of Chapter 5**, a reduced visible aviation lighting scheme has been agreed with the CAA. In total eight of the 18 turbines (T1, T4, T6, T9, T11, T13, T16 and T18) are proposed to be fitted with visible red 2,000/200 candela (cd) lights on the nacelle of each turbine. These will operate in the reduced 200 cd intensity where meteorological visibility is greater than 5 km and where visibility is less than 5 km the lights will operate at 2,000 cd. The lights are required to be at maximum intensity at 3 degrees above and 1 degree below horizontal. The intensity of the lights reduces beyond these parameters. This has been illustrated at **Figure 5.9** which shows the reduction in the intensity of the lights at varying angles above and below the horizontal.
- 1.3.2 All of the residential properties located within 2 km of the Proposed Development turbines are located at much lower elevations compared to the elevation of proposed turbine lights. Therefore, at each of the properties, the intensity of any of the Proposed Development turbine lights would be perceived by people at the properties at a much lower intensity than the stated 2,000/200 cd.
- 1.3.3 Referring to **Figure 5.9**, at Group 1 – Hamilton Drive and Detention Centre, the difference in vertical angle between the turbine lights and this group of properties is between -2 and -4 degrees. Therefore, at 2000 cd intensity, the lights would be perceived at between approximately 413 cd and 172 cd and at 200 cd the lights would be perceived at between 41 cd and 17 cd.
- 1.3.4 At Group 2 – Greenhead House/Greenhead Steading, the difference in vertical angle between the turbine lights and this group of properties is between -2 and -3 degrees. Therefore, at 2000 cd intensity, the lights would be perceived at between approximately 413 cd and 217 cd and at 200 cd the lights would be perceived at between 41 cd and 21 cd.
- 1.3.5 At Group 3 – High Plewlands and Glengavel View, the difference in vertical angle between the turbine lights and this group of properties is between -3 and -4 degrees. Therefore, at 2000 cd intensity, the lights would be perceived at between 217 and 172 cd and at 200 cd the lights would be perceived at between 21 cd and 17 cd.
- 1.3.6 At Property 1 – North Halls Farm, the difference in vertical angle between the turbine lights and this property is between -3 and -4 degrees. Therefore, at 2000 cd intensity, the lights would be perceived at between 217 and 172 cd and at 200 cd the lights would be perceived at between 21 cd and 17 cd.
- 1.3.7 At Property 2 – South Halls Farm, the difference in vertical angle between the turbine lights and this property is between -2 and -3 degrees. Therefore, at 2000 cd intensity, the lights would be perceived at between approximately 413 cd and 217 cd and at 200 cd the lights would be perceived at between 41 cd and 21 cd.
- 1.3.8 At Property 3 – Bankend, the difference in vertical angle between the turbine lights and this property is between -2 and -3 degrees. Therefore, at 2000 cd intensity, the lights would be perceived at between approximately 413 cd and 217 cd and at 200 cd the lights would be perceived at between 41 cd and 21 cd.
- 1.3.9 At Property 5 – Templelands Cottage and Property 7 – Glengavel House, the difference in vertical angle between the turbine lights and these properties is between -3 and -4 degrees. Therefore, at 2000 cd intensity, the lights would be perceived at between 217 and 172 cd and at 200 cd the lights would be perceived at between 21 cd and 17 cd.
- 1.3.10 At Property 8 – Dippal Lodge, the visible aviation warning lights would not be visible, as set out above.
- 1.3.11 Having reviewed the cumulative wirelines at **Figures 5.7.3 to 5.7.13**, considered the reduction in intensity of the lights due to the difference in vertical angle between the Proposed Development turbine lights and the levels of intervening screening provided by vegetation around the properties, such as at Property 1 – North Halls Farm, Property 2 – South Halls Farm and Property 7 – Glengavel House, it is considered that there is no potential for significant visual effects to occur during the hours of darkness.
- 1.3.12 Furthermore, lights at the residential properties would also reduce the susceptibility of residential receptors as their vision would be less adapted to the dark.



Cumulative Effects

- 1.3.13 The primary purpose of cumulative impact assessment is to consider the additional effects that might arise as a result of the Proposed Development if other consented and in-planning scheme were operational and already formed part of the baseline landscape. Two scenarios are considered, Scenario 1 assumes that other consented schemes are operational and Scenario 2 assumes that all consented and also in-planning schemes are operational. From Group 1 – Hamilton Drive & Detention Centre, it is not considered that there would be any change to the solus effects identified above for this group in either cumulative scenario. This is because of the level of screening surrounding these properties which restricts views of the consented Hallsburn Farm and the in-planning Bankend Rig II and III schemes.
- 1.3.14 From Group 2 – Greenhead House and Greenhead Steading, in cumulative scenario 1, there would be in combination views of the consented Hallsburn Farm in the same direction as the Proposed Development turbines and successive views of the consented Mill Rig to the south-west and the consented Bankend Rig II to the south. In this scenario, there would be a moderate significant effect from the dwelling. However, in cumulative scenario 2 where in-planning schemes are also considered to form part of the baseline, the cumulative effect would remain moderate significant. This is because the in-planning Bank End Rig II and Bankend Rig III schemes would be added into the same part of the landscape as the operational Bankend Rig and the consented Bankend Rig II and Mill Rig schemes at greater distance from the property.
- 1.3.15 From Group 3 – High Plewlands and Glengavel House, it is not considered that there would be any change to the solus effects identified above for this group in either cumulative scenario. There would be successive views of the consented Mill Rig and Bankend Rig II schemes to the west and south-west and of the in-planning Bankend Rig II and Bankend Rig III schemes to the south-west and south.
- 1.3.16 From Property 1 – North Halls Farm, in cumulative scenario 1, there would be in combination views of the consented Hallsburn Farm in the same direction as the Proposed Development turbines and successive views of the consented Mill Rig to the south-west and the consented Bankend Rig II to the south. In this scenario, there would be a moderate cumulative effect that is considered to be not significant. In cumulative scenario 2 where in-planning schemes are also considered to form part of the baseline, the cumulative effect would remain moderate and not significant. This is because the in-planning Bank End Rig II and Bankend Rig III schemes would be added into the same part of the landscape as the operational Bankend Rig and the consented Bankend Rig II at greater distance from the property.
- 1.3.17 From Property 2 – South Halls Farm, in cumulative scenario 1, there would be in combination views of the consented Hallsburn Farm in the same direction as the Proposed Development turbines and successive views of the consented Mill Rig to the south-west and the consented Bankend Rig II to the south. In this scenario, there would be a moderate cumulative effect that is considered to be significant. In cumulative scenario 2 where in-planning schemes are also considered to form part of the baseline, the cumulative effect would remain moderate and significant. This is because the in-planning Bank End Rig II and Bankend Rig III schemes would be added into the same part of the landscape as the operational Bankend Rig and the consented Bankend Rig II at greater distance from the property.
- 1.3.18 From Property 3 – Bankend Farm and Property 5 – Templelands Cottage, it is not considered that there would be any change to the solus effects identified above for these properties in either cumulative scenario. There would be successive views of the consented Mill Rig and Bankend Rig II schemes to the south-west and of the in-planning Bankend Rig II and Bankend Rig III schemes to the south-west and south-east.
- 1.3.19 From Property 7 – Glengavel House (financially involved), in cumulative scenario 1, there would be successive views of the consented Mill Rig to the west and the consented Bankend Rig II to the south-west. In this scenario, there would be a moderate cumulative effect that is considered to be significant. In cumulative scenario 2 where in-planning schemes are also considered to form part of the baseline, the cumulative effect would remain moderate and significant. This is because the in-planning Bank End Rig II and Bankend Rig III schemes would be added into the same part of the



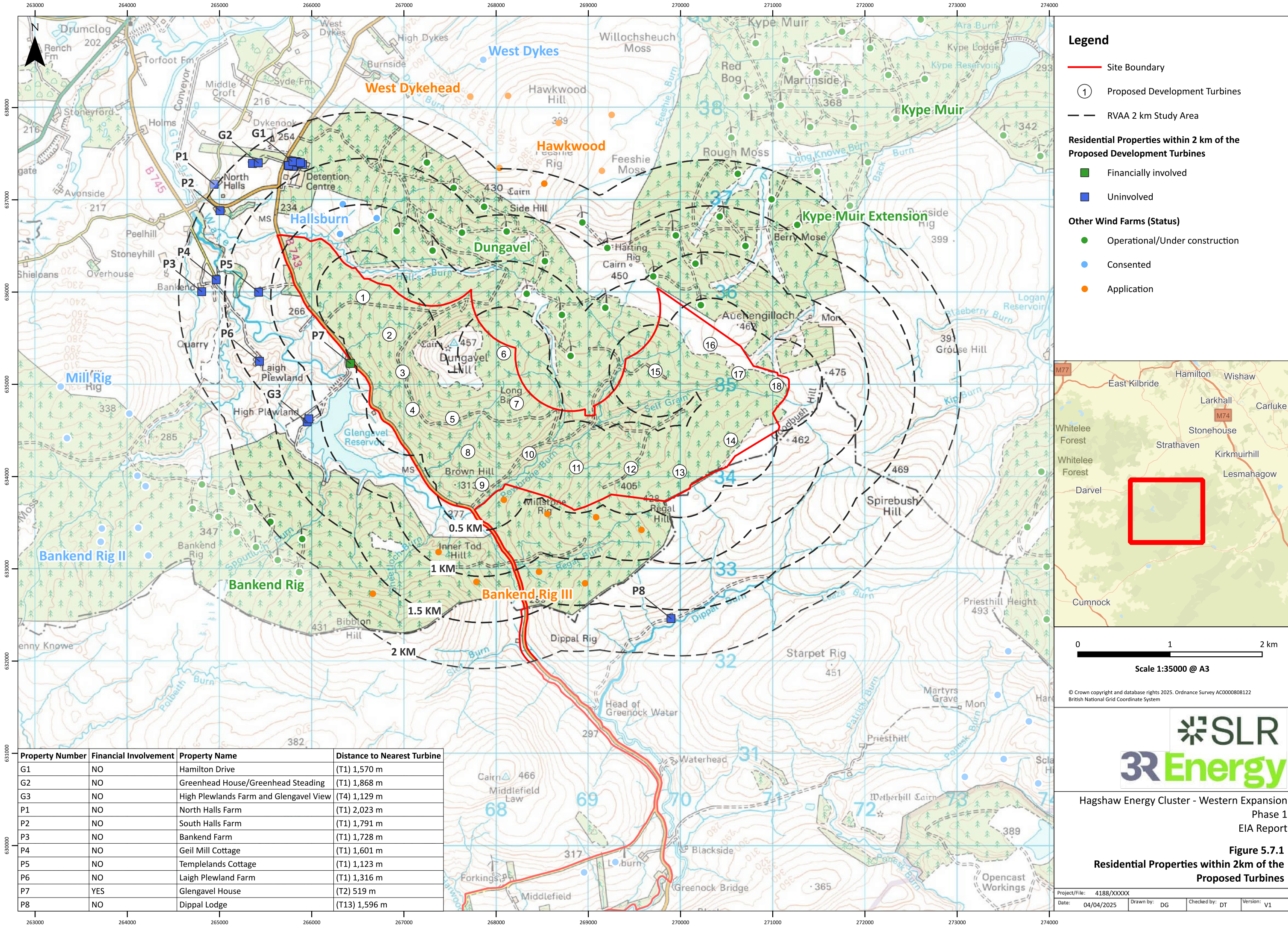
landscape as the operational Bankend Rig and the consented Bankend Rig II at greater distance from the property.

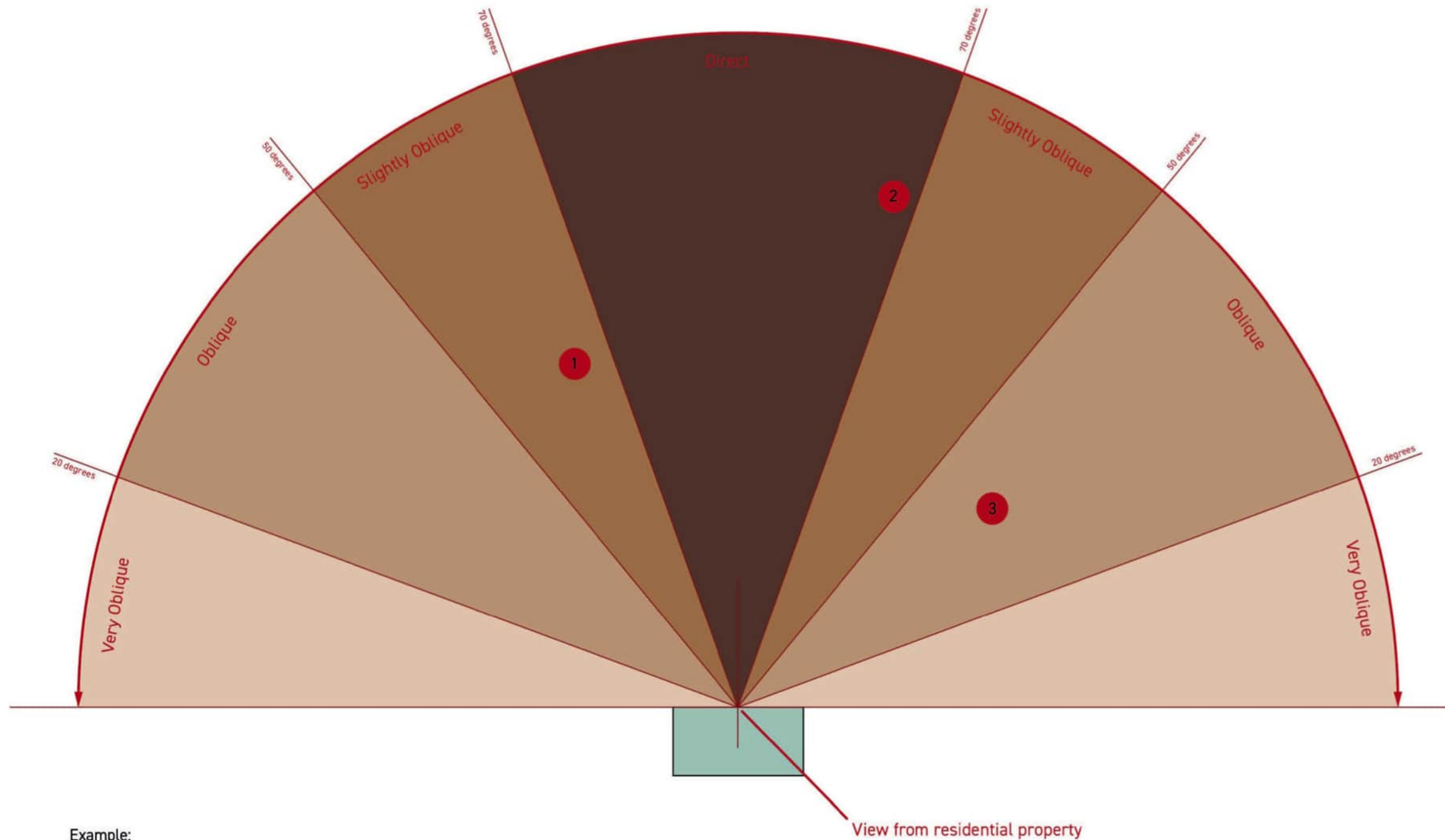
- 1.3.20 From Property 8 – Dippal Lodge, in cumulative scenario 1, there would be no change to the solus effects identified for the Proposed Development. In cumulative scenario 2 where in-planning schemes are also considered to form part of the baseline, there would be a moderate significant cumulative effect resulting from the introduction of Bankend Rig III wind farm which is situated to the south of the Proposed Development turbines, in closer proximity to this receptor. However, it is considered that a significant effect would occur on this receptor without the addition of the Proposed Development turbines. As illustrated by **Figure 5.7.13**, views of the Proposed Development turbines are limited to blade tips only and as such it is the Bankend Rig III turbines that contribute the majority of this cumulative effect.

2 Conclusion

2.1 Summary

- 2.1.1 Having undertaken an appraisal of the relationship between the Proposed Development and the residential properties within the 2 km RVAA study area, it is assessed that of the six properties and three groups of properties brought forward into detailed assessment, two groups and three properties would experience some significant visual effects during daylight hours.
- 2.1.2 Two of these (Group 2 – Greenhead House/Greenhead Steading, and Property 2 – South Halls Farm) would only experience significant effects from their access tracks. The remaining three (Property 3 – Bankend Farm, Property 5 – Templelands Cottage, and Group 3 – High Plewlands and Glengavel View) would also experience significant effects from the dwelling.
- 2.1.3 Three properties (Property 3 – Bankend Farm, Property 5 – Templelands Cottage and Group 3 – High Plewlands Farm and Glengavel View) would experience significant effects during the hours of darkness, however from Property 5 – Templelands Cottage and Group 3 – High Plewlands Farm and Glengavel View, this would only be from their access tracks.
- 2.1.4 Although it is acknowledged that all properties brought forward into detailed assessment would experience some level of visual effects as a result of the Proposed Development, it is concluded that when the experience from each property is considered in the round, none of the residents of any occupied property would experience such an overbearing or overwhelming effect on their visual amenity that their properties would become unattractive places in which to live. All properties would still have other open views available that would prevent the Proposed Development turbines being the single-most dominant characteristic of the available views.
- 2.1.5 When the other cumulative schemes are taken into consideration, the properties would experience cumulative views of other consented or in planning schemes often in successive views in other directions to the Proposed Development.
- 2.1.6 However, in all cases, the cumulative schemes would be positioned at distance from the properties and, in the case of the in planning Bankend Rig II Revised and Bankend Rig III schemes they would be positioned in the same part of the landscape as the operational Bankend Rig and consented Bankend Rig II schemes.
- 2.1.7 When the Proposed Development turbines are considered along with the other consented and in planning schemes, it is not considered the cumulative visual effects on any of the properties would be so great as to be collectively cumulatively overbearing or overwhelming such that the properties would become unattractive places in which to live. None of the properties would be surrounded on all sides by wind turbines and all properties would have open views in directions which do not include wind turbines.





Example:

1

Turbine Location and Number

Slightly Oblique - Turbine 1
Direct - Turbine 2
Oblique - Turbine 3

NOT TO SCALE



Hagshaw Energy Cluster - Western Expansion
Phase 1
EIA Report

Figure 5.7.2
RVAA Angle of Views

Project/File:	4188/XXXXX	Drawn by:	DG	Checked by:	DT	Version:	V1
Date:	27/03/2025						

Hagshaw Energy Cluster – Western Expansion Phase 1

Technical Appendix 5.7

Residential Visual Amenity Assessment - Cumulative Wirelines



Group 1 - Hamilton Drive and Detention Centre

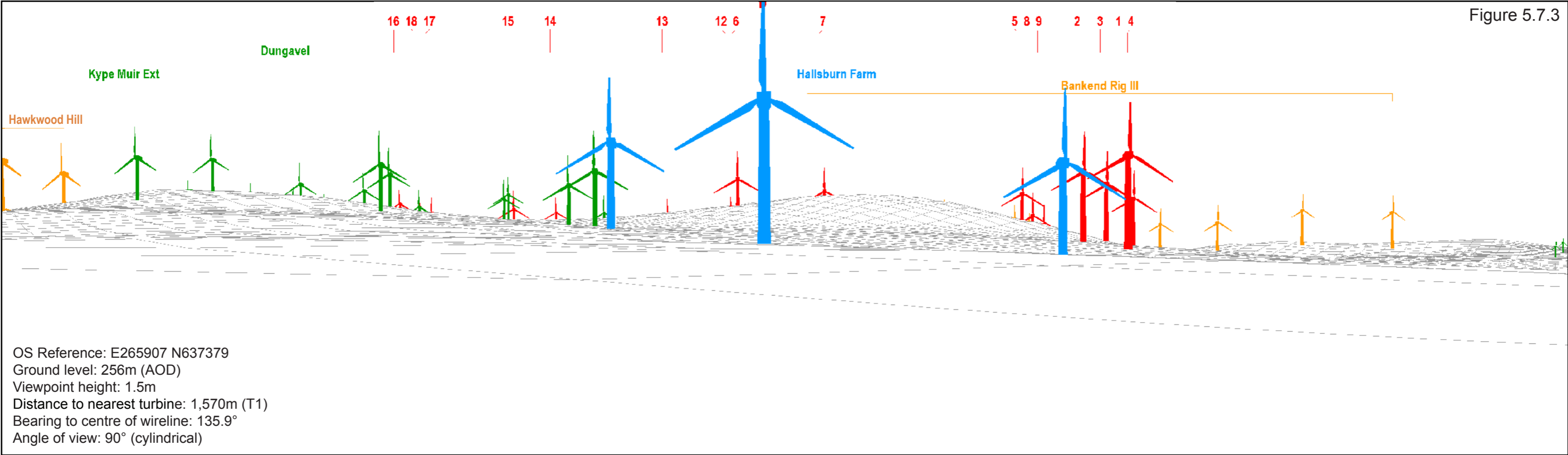


Figure 5.7.3

KEY: Proposed Hagshaw Energy Cluster - Western Expansion Phase 1 Operational / Under Construction Wind Farms Consented Wind Farms Application Wind Farms

Group 2 - Greenhead House/Greenhead Steading

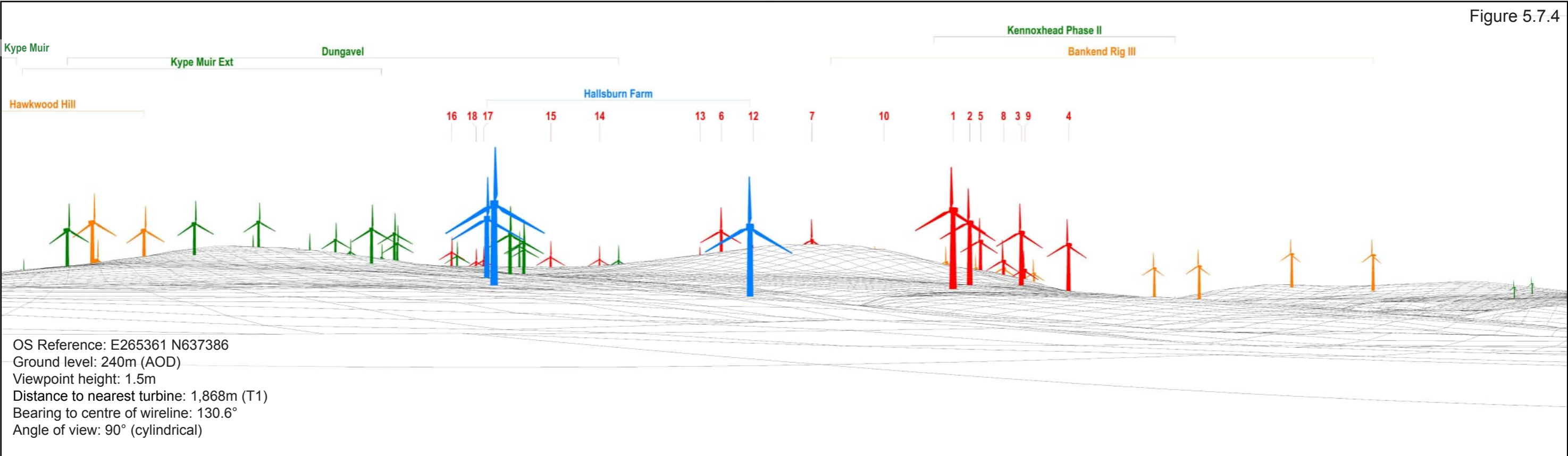
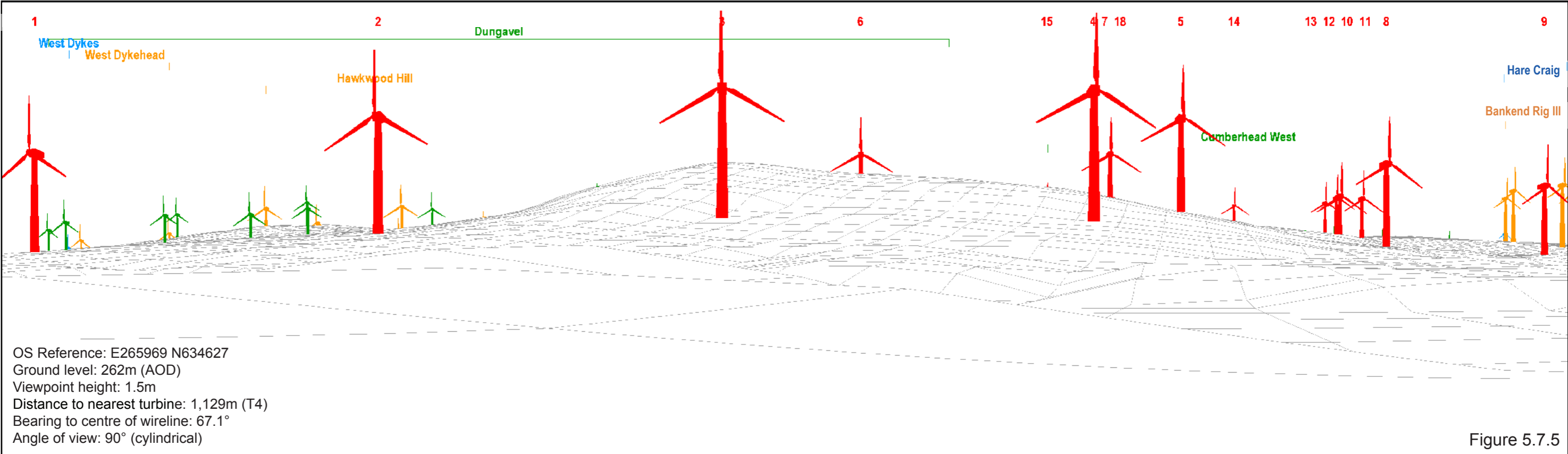


Figure 5.7.4

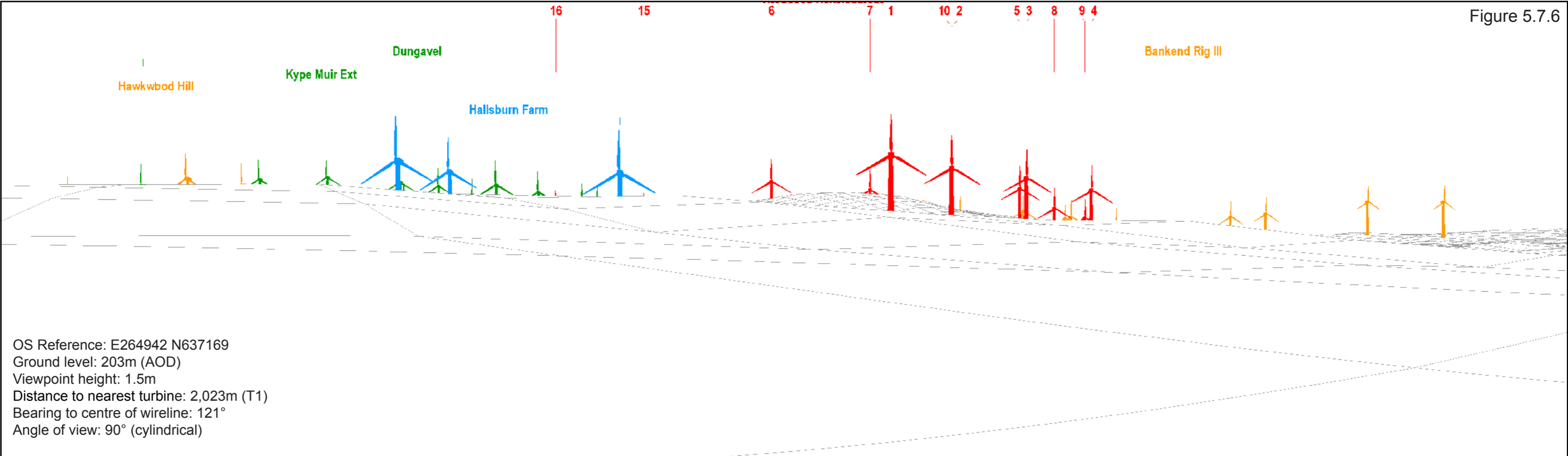
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Group 3 - High Plewlands and Glengavel View



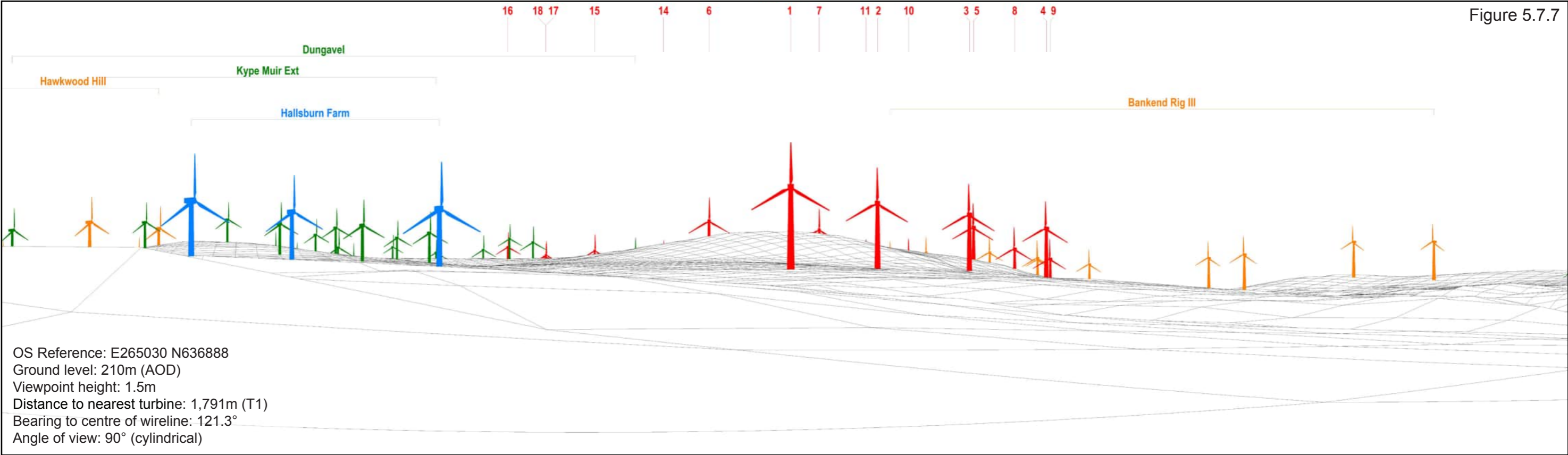
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Property 1 - North Halls Farm



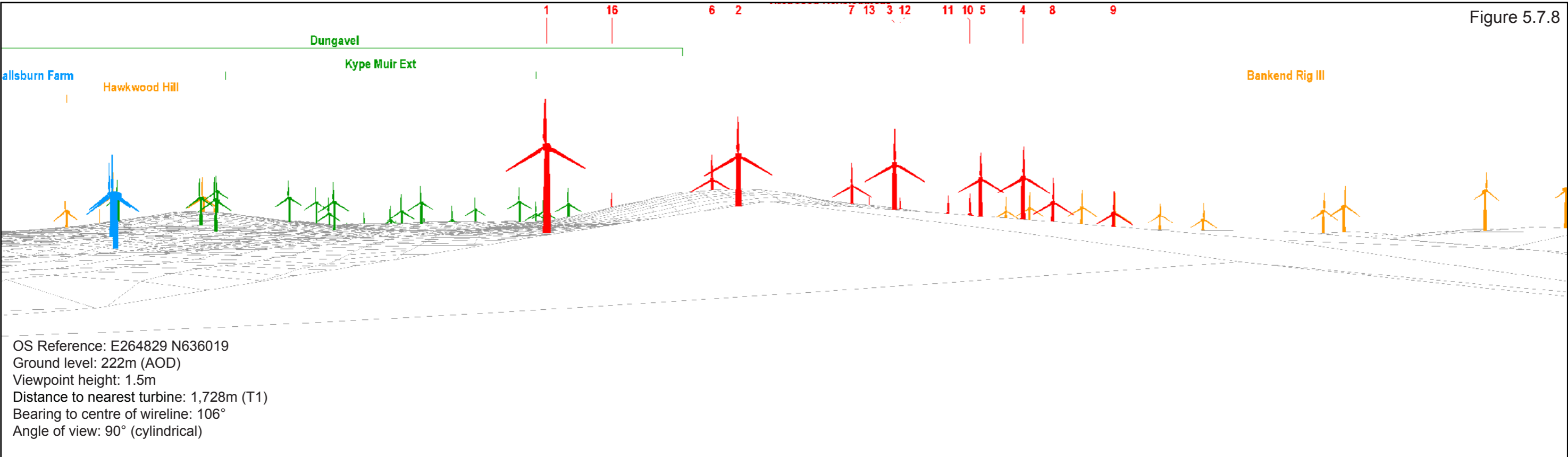
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Property 2 - South Halls Farm



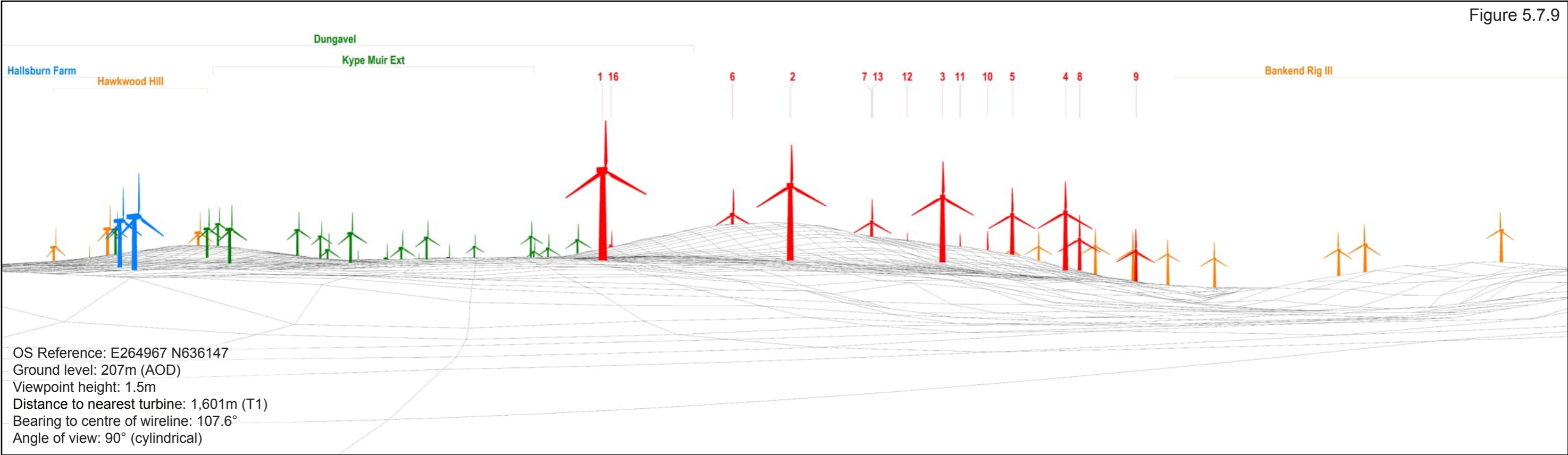
KEY: Proposed Hagshaw Energy Cluster - Western Expansion Phase 1 Operational / Under Construction Wind Farms Consented Wind Farms Application Wind Farms

Property 3 - Bankend Farm



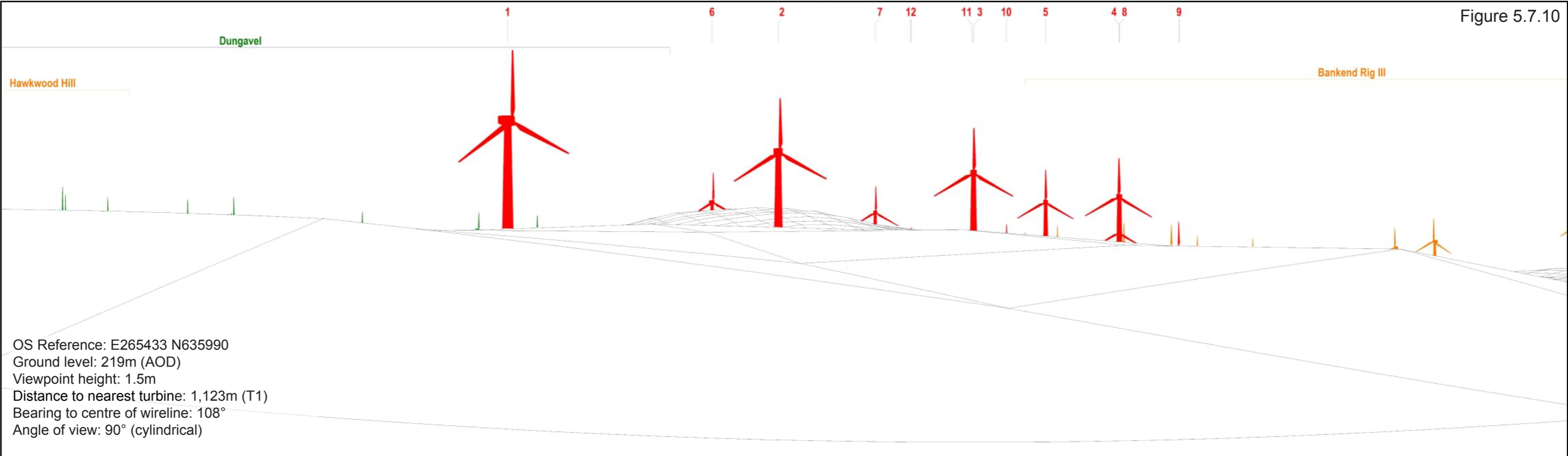
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Property 4 - Geil Mill Cottage (currently not in residential use)



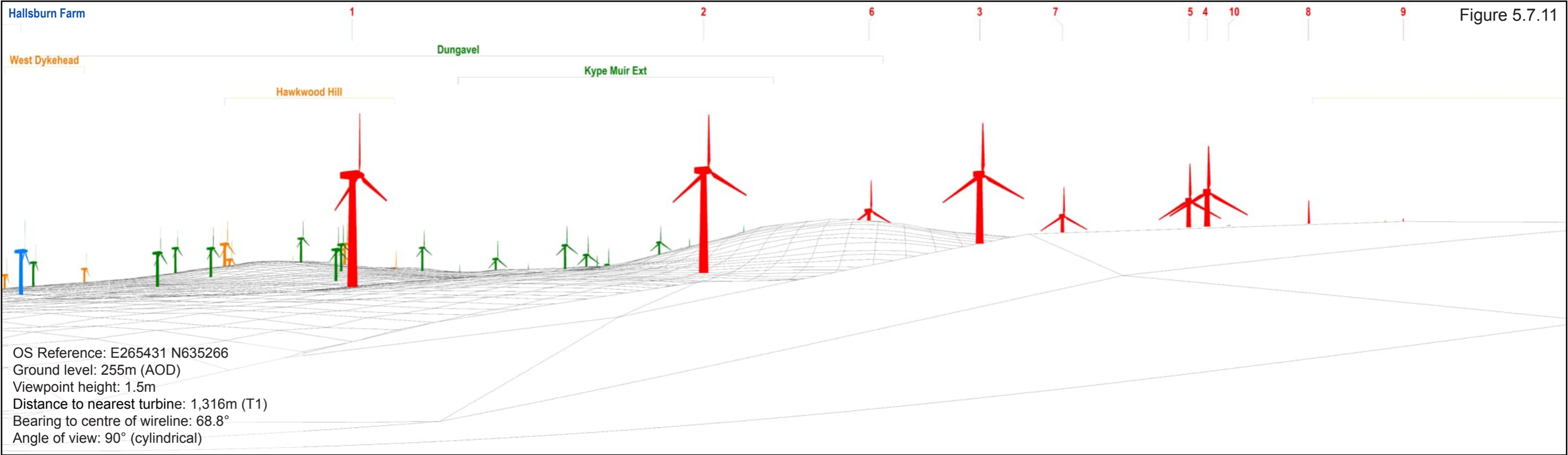
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Property 5 - Templelands Cottage



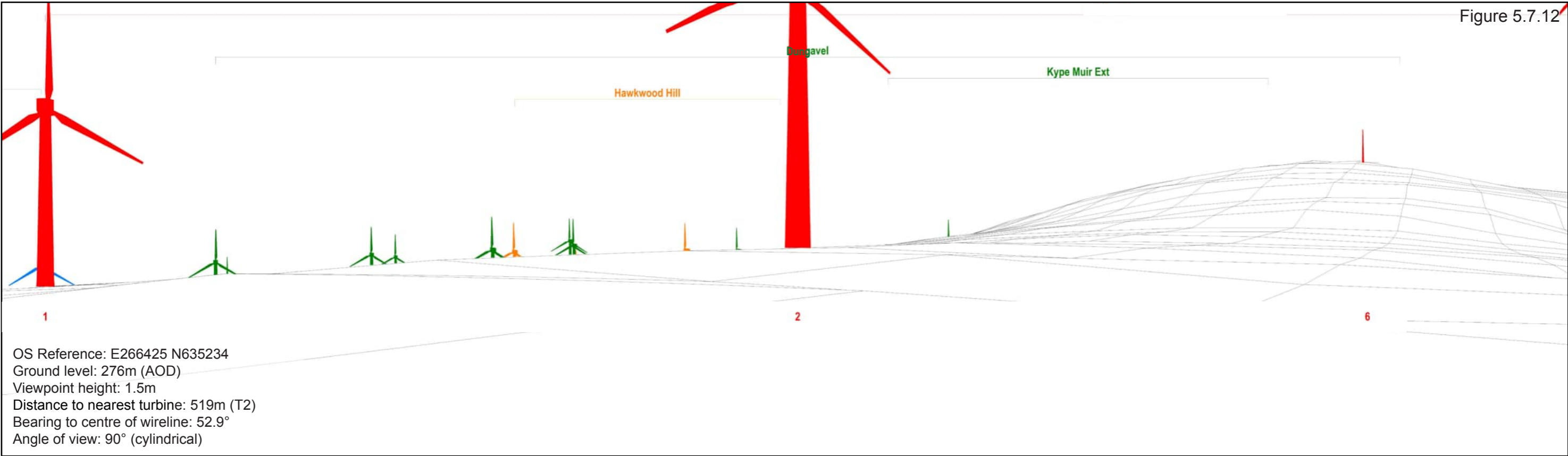
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Property 6 - Laigh Plewland Farm (currently not in residential use)



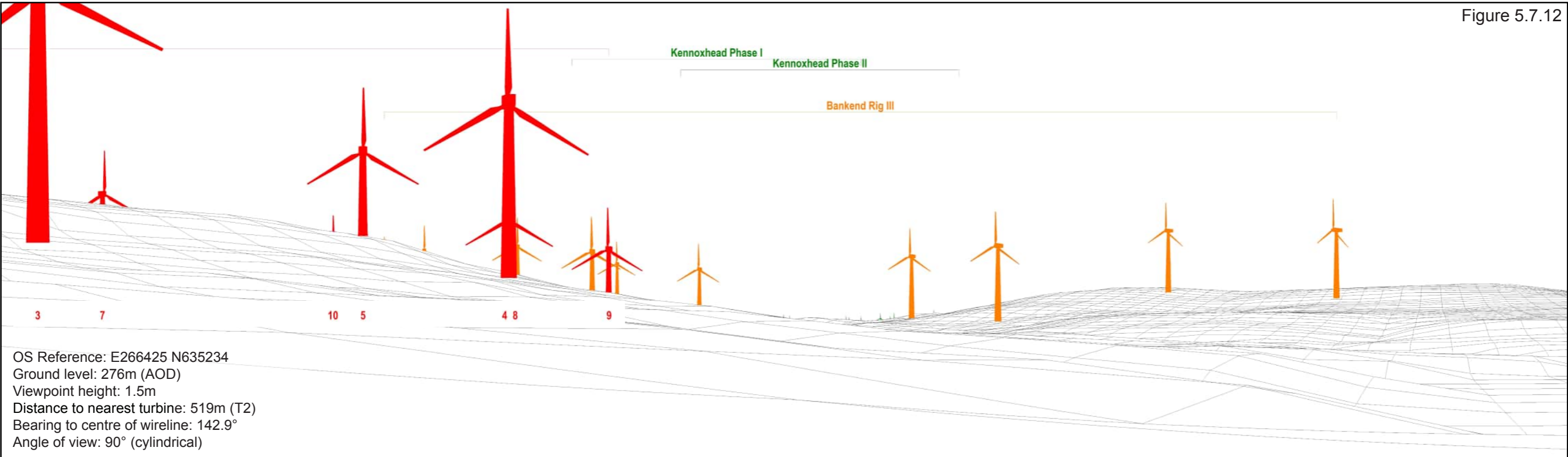
KEY: Proposed Hagshaw Energy Cluster - Western Expansion Phase 1 Operational / Under Construction Wind Farms Consented Wind Farms Application Wind Farms

Property 7 - Glengavel House (financially involved) - LEFT



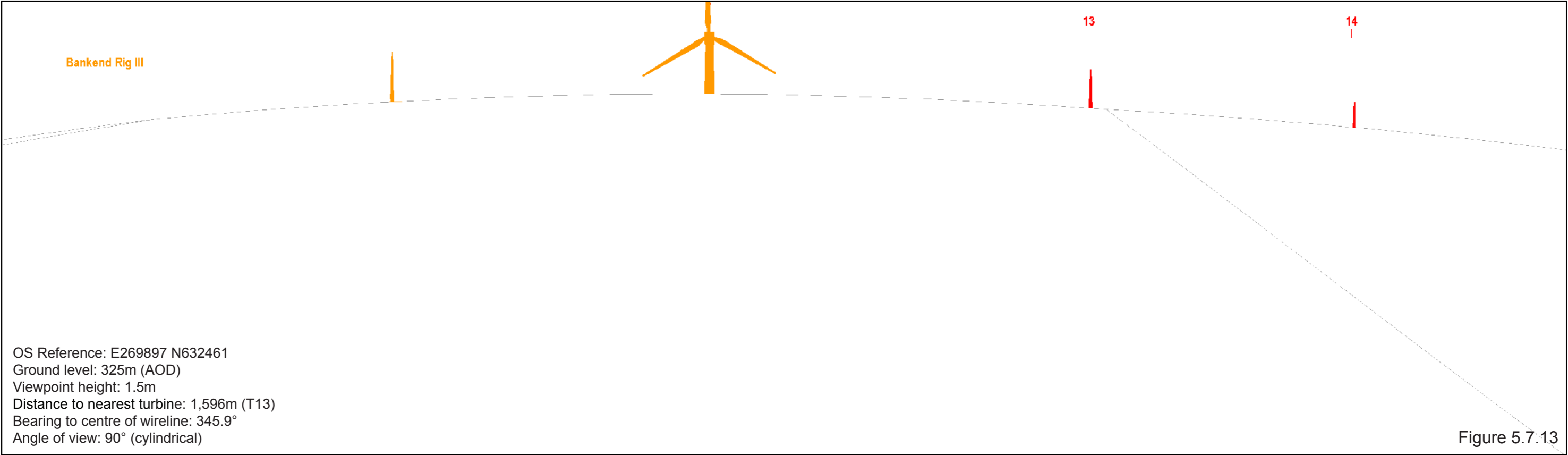
KEY: Proposed Hagshaw Energy Cluster -Western Expansion Phase 1 Operational / Under Construction Wind Farms Consented Wind Farms Application Wind Farms

Property 7 - Glengavel House (financially involved) - RIGHT



KEY: Proposed Hagshaw Energy Cluster -Western Expansion Phase 1 Operational / Under Construction Wind Farms Consented Wind Farms Application Wind Farms

Property 8 - Dippal Lodge



KEY: Proposed Hagshaw Energy Cluster - Western Expansion Phase 1 Operational / Under Construction Wind Farms Consented Wind Farms Application Wind Farms