Vale of Glamorgan **Local Development Plan** 2011-2026

Renewable Energy

Draft Supplementary Planning Guidance

January 2019

VALE of GLAMORGAN
BRO MORGANNWG

Local Development Plan
Cynllun Datblygu Lleol

Renewable Energy
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Contents

1. Introduction

1.1. The Welsh Government has committed to undertaking a whole system transition to low carbon energy to revolutionise the way Wales will meet and manage its energy needs. As such the adopted development plan has a number of enabling policies to meet the Welsh Government's aim through the promotion of renewable energy.

1.2. Renewable energy is defined as energy from a source which is either unlimited or which can be renewed without harming the environment. This also includes low carbon energy which is energy derived from non-renewable sources but the design of the system produces far less carbon emissions than contemporary methods.

1.3. Some renewable energy development can be undertaken without the need for permission from the Council such as certain types of Micro-generation. Permitted development rights remove the need to obtain planning permission for a range of micro-generation technologies for both domestic and commercial properties as long as they meet certain criteria set out within the General Permitted Development Order. However, if permission is required for the development, applicants must submit either a householder or full application depending on the size and nature of the development.

1.4. When submitting a planning application for renewable energy projects applicants need to be aware of the process, design and quality of the proposed development to help identify landscapes which are best suited to accommodate renewable technologies while maintaining the other aspirations of the development plan such as conserving and enhancing natural heritage.

1.5. This guidance relates to planning applications for renewable forms of energy up to 10MW. For developments over this threshold different consenting regimes apply outside of the Council's scope, depending on the type of renewable technology. Renewable technologies between 10-50MW the Welsh Government are the deciding authority under the Development of National Significance (DNS) consenting regime. Whereas developments which would produce over 50MW are decided upon by central government through the Nationally Significant Infrastructure Projects (NSIPs) consent regime.

2. Status of the Supplementary Planning Guidance

2.1. This draft guidance was approved for public consultation on 3rd December 2018. The Council will take account of comments received during the consultation exercise before finalising the document for publication. Once adopted, this guidance will be a material consideration in relevant planning decisions and appeals.

2.2. Planning Policy Wales (PPW) advises that SPG may be taken into account as a material consideration where it has been prepared in consultation with the general public and interested parties and it has been the subject of a Council resolution.

3. Purpose of the Supplementary Planning Guidance

3.1. This Supplementary Planning Guidance (SPG) has been produced to support and add detail to the Vale of Glamorgan Local Development Plan (LDP) 2011-2026. It is intended to provide clear and precise guidance to assist homeowners, land owners, developers and other interested parties involved in the planning process on how to fully consider renewable energy in development proposals.

3.2. This SPG represents a material consideration in the determination of planning applications and appeals and will be used to assist officers and Council members in determining planning applications. For applicants seeking to obtain permission for development relating to renewable energy it is important to take this guidance into account when designing the proposal to increase the likelihood of obtaining planning permission.

3.3. The purpose of this document is to provide advice to assist and guide applicants in designing their proposals for renewable development and help case officers and members make informed decisions on applications relating to renewable energy. Furthermore, the guidance seeks to ensure the benefits of renewable energy development are balanced against economic, social and amenity impacts on communities as well as the environmental impacts which include biodiversity and preserving the visual landscape.

3.4. Furthermore the SPG builds upon LDP policies and identifies areas within the Vale of Glamorgan which have a higher potential to accommodate renewable energy development. This is based on assessments of the potential for renewable and low carbon energy generation using Welsh Governments practice guidance “Planning for Renewable and Low Carbon Energy – A Toolkit for Planners” (2015). The SPG includes the updated maps which are the result of the Renewable Energy Assessment (REA) undertaken in 2018 which updates the findings from the 2016 REA in support of the LDP to account for factual changes in the source data. This will ensure renewable energy developments are promoted through the planning system as the updated maps will aid developers in locating the most suitable locations within the Vale of Glamorgan for renewable technologies.

3.5. The SPG looks in detail at the 3 main renewable energy sources within the Vale of Glamorgan and undertakes a broad level study identifying areas which have the potential to support future development for renewable and low carbon energy production for:

- Wind Energy
- Solar Energy
- Biomass

4. Legislative and Policy Context

4.1. Relevant Legislation

4.1.1. The **Planning (Wales) Act 2015** - seeks to deliver a planning system which is fair, resilient, enables development and helps create sustainable places.

4.1.2. The **Well-Being of Future Generations (Wales) Act 2015** - seeks to improve the social, economic, environmental and cultural well-being of Wales. The Act contains seven well-being goals which local authorities as well as other public bodies must seek to achieve in order to improve well-being both now and in the future. It means that for the first time, public bodies listed in the Act must do what they do in a sustainable way and make sure that when making their decisions they take into account the impact they could have on people living their lives in Wales in the future.

4.1.3. The **Climate Change and Sustainable Energy Act (2006)** makes provisions for the reduction of greenhouse gases, the alleviation of fuel poverty, the promotion of micro generation and the use of heat produced from renewable sources. The Act seeks to enhance the UK's contribution to combating climate change through the promotion of renewable energy sources which generate >50kW of electricity or produce >45kW thermal energy.

4.1.4. The need to reduce greenhouse gases is further emphasised in Wales through the **Environment (Wales) Act (2016)**. The Act seeks to position Wales as a low carbon, green economy which is ready to adapt to climate change. Part 2 of the Act gives Welsh Government powers to place statutory emission reduction targets in relation to Climate Change; the Act includes an 80% reduction target for emissions by 2050. Renewable Energy generation will play a key role within Wales in achieving this target and ensuring the progress of decarbonisation.

4.1.5. The **Planning and Energy Act (2008)** enables Local Planning Authorities (LPAs) to set requirements for energy use and efficiency in their LDPs. This includes local policies which impose requirements relating to the proportion of energy used in development that is obtained from renewable sources or low carbon energy sources within the locality of the development. Furthermore, it allows LPAs to set policies for developments to comply with energy efficiency standards which exceed the energy requirements of building regulations.

4.1.6. The primary legislation relating to renewable energy is contained within the **Energy Act (2016)** and the previous enactments of the legislation which are still in force. The Act makes provision for the development, regulation and encouragement of renewable energy sources in the UK. The most recent version of the Act gained royal ascent in 2016 and transferred consent powers for onshore wind farms to LPAs.

4.1.7. The **EU Renewable Energy Directive (2009)** sets out the legally binding target of achieving 15% of overall energy demand from renewable sources by 2020.

4.2. National Policy

4.2.1. The **Renewable Energy Strategy (2009)** sets out how the UK will increase the use of renewable electricity, heat and transport to meet the 15% EU target and address the challenges of climate change and the national security of energy supply.

4.2.2. Wales has also produced a **Climate Change Strategy for Wales (2010)** to aid in the reduction of greenhouse gas emissions. The strategy includes a specific action "*to ensure that land use and spatial planning promote sustainable development and enable a move towards a low carbon economy which takes account of future climate impacts*"; one of the key areas which underpin these actions is energy generation.

4.2.3. **Planning Policy Wales (PPW)** Edition 9 (2016) sets out the land use planning polices of the Welsh Government. Chapter 4 of PPW Planning for Sustainability states as part of Welsh Government's aim to promote sustainability through the planning system, "*tackling climate change is a fundamental part of delivering sustainable development*". In reference to the need for renewable energies PPW states:

"*Planning to minimise the cause of climate change means taking decisive action to move towards a low carbon economy by proactively reducing the demand for energy, facilitating the delivery of new and more sustainable forms of energy provision at all scales and minimising the emissions of greenhouse gases to the atmosphere.*"

4.2.4. PPW Chapter 12 Infrastructure and Services expands further on the need to promote renewable and low carbon energy but notes, "*the delivery mechanisms for most of our energy aspirations are outside the control of the planning system [in Wales]*", and the key area of responsibility for the Welsh planning system "*is onshore development less than 50MW*". For the purposes of planning the following scales are outlined in PPW in relation to renewable energy developments:

Table 1: Renewable and Low Carbon Energy Scales for Planning (Source: PPW)

Scale of Development	Threshold (electricity and heat)
Strategic	Over 25MW for onshore wind and over 50MW for all other technologies
Local Authority-wide	Between 5MW and 25MW for onshore wind and between 5MW and 50MW for all other technologies
Sub-Local Authority	Between 50kW and 5MW
Micro	Below 50kW

4.2.5. PPW states the planning system should be used to optimise renewable energy generation, optimise low carbon energy generation, facilitate combined heat and power systems (and combined cooling, heat and power) where feasible and recognise that the benefits of renewable energy are part of the overall commitment to tackle climate change by reducing greenhouse gas emissions as well as increasing energy security. However, these objectives need to be viewed alongside obligations to protect designated areas, species and habitats as well as the historic environment; ensuring mitigation measures are used to offset potential detrimental effects on local communities whilst ensuring the potential impact on economic viability is given full consideration and; encourage the optimisation of renewable and low carbon energy in new development to facilitate the move towards zero carbon buildings.

4.2.6. In regards to development management considerations, PPW states that in the determination of applications relating to renewable energy and low carbon energy development, local planning authorities should take account of:

- The contribution a proposal will play in meeting identified national, UK and European targets and potential for renewable energy, including the contribution to cutting greenhouse gas emissions;
- The wider environmental, social and economic benefits and opportunities from renewable and low carbon energy development;
- The impact on the natural heritage, the Coast and the Historic Environment;
- The need to minimise impacts on local communities to safeguard quality of life for existing and future generations;
- Ways to avoid, mitigate or compensate identified adverse impacts;
- The impacts of climate change on the location, design, build and operation of renewable and low carbon energy development. In doing so consider whether measures to adapt to climate change impacts give rise to additional impacts;
- Grid connection issues where renewable (electricity) energy developments are proposed; and
- The capacity of and effects on the transportation network relating to the construction and operation of the proposal.

4.2.7. **Technical Advice Note 8 (TAN 8) – Planning for Renewable Energy (2005)** emphasises Welsh Government's commitment to developing renewable and low carbon energies. TAN 8 states the "*design, infrastructure and site layout are key to achieving energy efficient development by optimising passive solar gain in domestic and non-domestic buildings. The main aspects to consider are the orientation of the buildings and the overall site layout, to avoid overshadowing and exposed locations and to optimise sunlight penetration*".

4.2.8. In terms of development management TAN 8 stresses the importance of the consideration of renewable energy sources, energy efficiency and conservation measures at the outset of any new development. It further notes the need for:

"*Preliminary enquiries and pre-application discussions are also crucial to the success of integrating these elements into any proposed schemes. Local planning authorities should be acquainted with, and have an understanding of the various forms of renewable energy technology currently available and should have access to experts when necessary. It is helpful to be able to discuss options for the inclusion of a range of renewable energy technologies into developments and to direct developers to the variety of sources of advice available to facilitate renewable energy and energy efficiency measures. Developers and local planning authorities should endeavour to enter into discussions with local communities at the earliest possible opportunity when formulating proposals.*"

4.3. Local Planning Policy

4.3.1. The adopted Vale of Glamorgan Local Development Plan (LDP) sets out the strategic objectives and land management policies for the authority. Strategic **Objective 2** of the LDP seeks to ensure that development within the Vale of Glamorgan makes a positive contribution towards reducing the impact of and mitigating the adverse effect of climate change. To contribute towards meeting the national renewable energy targets and the strategic objective, the LDP includes monitoring targets to meet 21.19% of projected electricity demand and 1.48% of projected heat demand in the Vale of Glamorgan through renewable sources by the end of the plan period in 2026.

4.3.2. **Policy MG30 – Local Search Areas for Solar Energy** identifies 6 broad areas within the Vale of Glamorgan where solar energy generation schemes of up to 50MW will be permitted where there are no unacceptable impacts upon amenity, heritage assets or the environment. The identified areas should only be used as an indication of potential solar resources as the mapping exercise was only based upon the land elevation, orientation and existing key constraints to development. Therefore, further refinement will be needed in relation to the identified areas for detailed development proposals.

4.3.3. **Policy MD2 - Design of New Development** sets out the key principles developers should consider to create attractive, safe and accessible environments. Criterion 12 of the Policy states development proposals should *"mitigate the causes of climate change by minimising carbon and other greenhouse gas emissions associated with their design, construction, use and eventual demolition, and include features that provide effective adaption to, and resilience against, the current and predicted future effects of climate change."* Through implementing this policy the Council hope to encourage energy conservation and generation from renewable sources to ensure the planning system can make a positive contribution towards reducing the impact of new development on climate change.

4.3.4. **Policy MD7 - Environmental Protection** seeks to ensure new development proposals do not lead to unacceptable levels of pollution. The Council will consult with professional bodies such as Natural Resources Wales and the

Health and Safety Executive to determine whether a development proposal would lead to unacceptable pollution or exacerbate an existing issue which would lead to planning permission not being granted. To ensure development proposals reduce any impact of pollution the Council encourages developers to assess pollution impacts at the earliest stages of development process. Low carbon producing technologies such as biomass proposals would need to consider the impacts of pollution that could be caused by these types of developments

4.3.5. **Policy MD19 – Low Carbon and Renewable Energy Generation** sets out the criteria enabling low carbon and renewable energy development to be permitted. These types of development will be permitted where it can be demonstrated there is no unacceptable impact on the interests of:

- Best and most versatile agricultural land;
- Aviation safeguarding;
- Electrical, radio or other communication systems;
- Landscape importance;
- Natural and cultural heritage;
- Nature conservation;
- Residential amenity; and
- Soil conservation.

4.3.6. However, the cumulative impacts of renewable energy schemes will also be an important consideration.

4.4. Supplementary Planning Guidance

4.4.1. The Council has produced a number of Supplementary Planning Guidance (SPG) in support of the LDP. The following SPGs may be relevant to new development proposals relating to renewable energy:

- Residential and Householder Development
- Biodiversity and Development
- Design in the Landscape
- Parking Standards SPG

4.4.2. The Council has produced Conservation Area Management Plans (CAAMPs) for the 39 Conservation Areas in the Vale of Glamorgan. These identify the special attributes and features within these areas that contribute towards their character. The CAAMPs would be particularly relevant to micro generation developments within conservation areas.

5. Household and Small Scale Renewable Energy Developments

5.1.1. The Welsh Government acknowledges the scientific evidence which demonstrates climate change is being brought about by human activity. Therefore, it is imperative the planning system is able to promote low carbon and renewable technologies to help cut emissions and encourage the transition to zero carbon in Wales. The Environment (Wales) Act (2016) places a duty on Welsh Ministers to ensure that the net Welsh emissions are lower than 80% than the baseline by 2050. The planning system plays an important role in achieving that target which includes permitted development rights which permit most small scale renewable energy schemes without planning permission. Although the use of renewable energy developments should be promoted, other less direct forms of development can help achieve zero carbon. This can include using electric vehicles (EVs); however, this would require the installation of electric charging points. The Council's Parking Standards SPG contains further information regarding the use of electric charging points in new development proposals and should be consulted when considering proposals for commercial and residential development schemes.

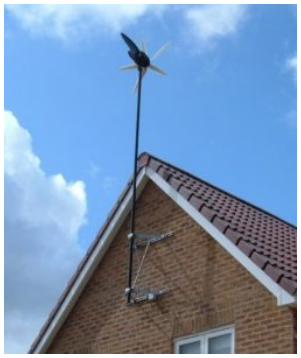
5.1.2. Planning Policy Wales defines micro generation schemes as proposals generating electricity or heat below 50kW. In 2012 the Town and Country Planning (General Permitted Development) Order 1995 was amended in Wales, which resulted in many forms of domestic and non-domestic small scale (micro-generation) development benefiting from permitted development rights, meaning they do not usually require planning permission. However, this is subject to specific criteria outlined in Schedule 2 of the Town and Country Planning (General Permitted Development) Order (Wales) 2012 amendment.

5.1.3. Householders and small scale developers should be aware of the current types of renewable energy developments which are available to them which can help reduce energy bills and in some cases feed in to the national grid which can be subject to feed in tariffs (FITs) which are payments to ordinary energy users for the renewable electricity they generate. The following pictures show different kinds of renewable and low energy developments which are currently available:

Example 1: Solar PV Panels

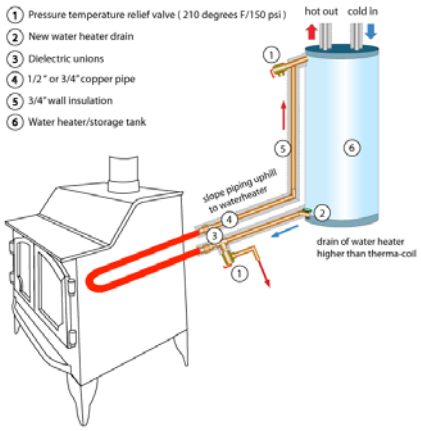
Example 2: Solar Roof Tiles

Example 3: Solar Thermal Panels



Example 4: Wall Mounted Turbine

Example 5: Medium Scale Turbine (22m)



Example 6: Wood Burning Stove & Thermal Coil

Example 7: Wood Chip Boiler

5.1.4. To inform householders, local communities and businesses of the permitted development rights, the Welsh Government published clear and concise guidance known as “Generating Your Own Energy: A Planning Guide for Householders, Communities and Businesses”[1].

[1] http://gov.wales/topics/planning/policy/guidanceandleaflets/generaterenewable/?lang=en

Solar Energy Developments

5.1.5. Solar panels that are not 'permitted development' and which, therefore, require planning permission, should be sited as sensitively as possible on the host building. There are more likely to be concerns with highly prominent proposals on listed buildings, in conservation areas and on other historically notable buildings (including County Treasures and Positive Buildings in conservation areas), however, an appraisal of a site's context and the visual impact of the panels should be undertaken in every case. When submitting applications relating to solar panels, developers should consider:

- Integrating solar panels into development proposals at the outset, rather than relying upon future occupiers to retrofit them to a building e.g. the use of photovoltaic roof tiles in new housing schemes at the point of construction.
- The positioning of solar panels on less visible roof slopes;
- Installing solar panels flush with the roof plane and situated away from the eaves, verges and ridge of the roof;
- The use of photovoltaic roof tiles in place of solar panels to minimise the visual impact of the development, particularly in 'sensitive' locations.

Wind Energy Developments

5.1.6. Domestic wind turbines also benefit from permitted development rights. However where proposals do not meet the criteria, planning permission must be sought. Most wind turbines have a contemporary / functional appearance and there are more likely to be concerns with highly prominent proposals on listed buildings, in conservation areas and on other historically notable buildings (including County Treasures and Positive Buildings in conservation areas), however, an appraisal of a site's context and the visual impact of the turbine should be undertaken in every case. Developers should consider the balance between the visual impact of the turbine and its performance. When submitting an application for domestic turbines the following should be considered:

- Wind Turbines should be positioned to minimise their visual impact e.g. away from public roads and footpaths;
- Noise pollution generated as a by-product of wind turbines should be minimised to safeguard the amenity of neighbouring properties. This can be achieved through sensitive siting of proposals away from neighbouring boundaries.
- Topple distances of turbines need to be considered when deciding where to place them in relation to sensitive development such as residential premises. To ensure the safety of adjacent sensitive uses, proposed wind turbines should be positioned at a minimum horizontal distance equal to the tip height

of the turbine plus 10% of its overall height measured from ground level to tip height away from sensitive development[2].

- Shadow flicker is where sunlight or other light sources pass through the blades of a wind turbine while it is moving causing the shadow of the blades cast by the light to flicker. This can have a detrimental impact upon residential amenity and turbines placed within close proximity to residential premises will be resisted where it is likely to cause an unacceptable impact from shadow flicker.

Biomass Developments

5.1.7. Biomass heating can be used at the micro generation level, and this includes a variety of different approaches such as standalone stoves or boilers which are fuelled by burning organic material like wood fuel. For example, a wood burning stove can be used to heat all or part of a dwelling's water system. Where the proposed development for biomass technologies would require external works such as flues or outbuildings to house larger biomass generators, only the flues required for biomass heating have permitted development rights subject to the specific criteria found within Schedule 2 of the Town and Country Planning (General Permitted Development) Order (Wales) 2012 amendment. Internal works which include installing a wood burning stove within a listed building are likely to require permission and it is advised further information is sought from the Council's Planning Department before any works proceed.

5.1.8. Biomass heating developments at the small and medium scale generally provide heat for an individual or group of buildings and are normally located within a garage or other appropriate outbuilding to offer a base level of heating throughout the year. Homeowners considering applying for permission for biomass heaters should consider the following:

- Biomass heaters and their storage buildings should be positioned to minimise visual impact;
- Noise pollution generated by biomass boilers should be minimised to safeguard neighbouring properties' amenity through the use of noise attenuation measures such as sound absorbent cladding to outbuildings / garages or siting the generator away from sensitive development (e.g. residential uses). Where it is considered noise pollution is likely to be an issue, a noise impact assessment[3] will be required to evidence whether the noise produced would be acceptable;
- Air quality should be maintained through the incorporation of proprietary pollution control systems;

[2] Based upon Principle of Good Practice produced by the Energy Networks Association - https://www.spenergynetworks.co.uk/userfiles/file/Energy_Networks_Association_Separation_Wind_Turbines_Overhead.pdf

[3] TAN 11 - Noise (1997) contains guidance for undertaking a noise impact assessment under Annex A - https://gov.wales/topics/planning/policy/tans/tan11/?lang=en

- Ensure sufficient storage space for fuel to minimise the impact of regular fuel deliveries.

5.2. Micro Generation and the Historic Environment

5.2.1. To aid in Welsh Government's commitment to reduce CO_2 emissions and greenhouse gases owners of historic buildings can consider installing micro-generation systems in or near a historic building, a conservation area, a historic park or garden, an ancient monument or on an archaeological site. However, due to the importance of the historic environment to the cultural heritage and identity of the Vale of Glamorgan, proposals would need to be considered carefully, with particular thought given to protecting the fabric or character of the building or landscape and its setting. Through the careful consideration of the design and siting of micro-generation systems owners of historic buildings can help improve sustainability while also preserving the historic environment.

Siting

5.2.2. When deciding on where to site micro-generation systems, applicants should firstly look for appropriate locations situated away from the main historic asset of the site. For example it is highly unlikely equipment proposed to the principal elevation of a listed building or on a dominant roof line would be approved. In relation to the installation of solar panels it is considered preferable to locate this equipment as free standing units in a less prominent position or in the second instance on outbuildings such as garages.

Figure 1: Free Standing Solar Panels Sited Away From an Historic Building (Source: Cadw)

5.2.3. In some cases it will not be feasible to locate development away from the historic asset however; less prominent aspects of the building would be more appropriate such as hidden roof valleys or rear extensions. Positioning the development in screened locations can also help to lessen the potential visual impact of the proposal.

Figure 2: Solar Thermal Collectors Located within Hidden Roof Valley (Source: Cadw)

5.2.4. The setting of an historic asset is also a key consideration in terms of the location of a proposal. Applicants should seek to ensure all free standing equipment is integrated into the landscape or screened from view to maintain the setting of the historic asset. However, integration in relation to free standing wind turbines can be difficult to achieve, therefore, turbines should be sited against a landscape rather than open sky and have the lowest height feasible to reduce its impact on the historic setting. Where this is unlikely to mitigate the potential harm of development in sensitive locations applicants should consider other renewable technologies which are likely to have less of an impact.

Design

5.2.5. As the technology has developed there are likely to be a better variety of different design options available to applicants which need to be considered in relation to the possible impact on the character of the historic asset. For example darker matte finishes should be sought where possible which help to minimise a proposal's prominence in relation to the historic building. Furthermore, the design and colour of visible ancillary equipment can be crucial to ensuring the proposal respects the historic environment such as pipes, frames, stands, poles or the housing of equipment. These should reflect the design of existing features such as guttering, chimney stacks or outbuildings where appropriate to ensure they do not detract from the character of the historic environment. The applicant should seek to reflect a building's scale and architectural form in proposals to ensure the development fits in with the overall character of the property.

Figure 3: Sensitive Housing of Biomass Boiler in Respect of Listed Builidng (Source: Cadw)

Cumulative Visual Impact

5.2.6. In the majority of cases historic buildings are capable of accommodating a degree of change; however, multiple installations are likely to inappropriately affect the historic environment due to a cumulative visual impact which would detract from the character that led to its designation. Furthermore, this is not restricted to developments relating to an individual building but also applies to buildings within a group such as within a Conservation Area. Therefore, the cumulative impact of proposals on the visual amenity of the historic environment must be considered.

6. Types of Large Scale Renewable Energy Developments in the Vale of Glamorgan

6.1.1. Large scale renewable energy developments are defined in national policy as ranging from 50kW to 10MW. Those developments which generate more than 10MW are considered under different consent regimes. However, Welsh Government is currently changing legislation to allow authorities to permit renewable energy developments up to 50MW.

6.1.2. To aid developers seeking to invest in large scale renewable energy developments in the Vale of Glamorgan, the Council undertook a factual update in 2018 to our Renewable Energy Assessment (REA). The REA is based upon the Welsh Government's "Practice Guidance – Planning for Renewable and Low Carbon Energy – A Toolkit for Planners" (2015) and consists of an assessment of the potential for low carbon energy generation within the authority. The update includes recent changes to mapping data relating to flooding and agricultural land classification produced by Natural Resources Wales (NRW) and Welsh Government. However, any future proposals would require more in-depth site assessments (see section 7).

6.1.3. The updated maps identify possible areas which have the potential to achieve a high yield of energy based upon the update to the high level studies undertaken by the Council. In regards to development management, the evidence produced by the toolkit will allow officers assessing applications for new development sites to understand the opportunities for alternative energy sources such as CHP schemes and can help officers understand why developers have chosen a particular location to develop a renewable or low carbon energy scheme. However, it is advised that further more detailed assessments will need to be carried out to support any future application coming forward in the Vale of Glamorgan. The maps produced by the updated REA (2018) can be viewed at Appendix 3 through to 6.

6.1.4. Within the Vale of Glamorgan area there are 3 forms of renewable energy which are considered to be the most prevalent: wind energy; solar energy; and biomass energy developments.

6.2. Onshore Wind Energy Development

6.2.1. Onshore wind energy generation is an established and proven technology with many examples currently used across the world. The UK has one of the largest wind energy resources in Europe, with Wales holding significant opportunities due to its environment. The Vale of Glamorgan shares these characteristics which have created potential areas that could support wind energy production.

6.2.2. Wind energy uses Turbines to generate energy from the wind by using the currents of air to move a rotor connected to an electrical generator. Most

turbines are designed using a horizontal axis three-blade rotor system mounted on a steel mast. However; there are various other design options which can be used. Generally the smaller scale turbines can be installed with a free standing mast or mounted to a building. These types of turbines are commonly used to supply specific buildings or developments with electricity and are deployed as individual machines. Larger scale turbines can also be deployed as single machines but are more commonly used in groups which form wind farm developments. Wind farms are more likely to be situated within remote areas and directly supply power to the national grid.

6.2.3. In relation to the scale of wind turbines there are no rigid categories, however, the majority of on-shore wind turbines fall within four size bands: Micro, Small, Medium, and Large. The different sizes of turbines each produce different ranges of power; Table 2 demonstrates the typical power ranges for each scale of turbine. These ranges are not definitive but allow for a better understanding of the amount of power different turbines can generate.

Table 2: Typical Scales of Individual Wind Turbine Technologies

Scale	Typical Turbine Range	Typical Turbine Height (to blade tip)	Potential No. of Homes Supplied
Micro (<2.5kW)	2.5kW	11m	0.7
Small (1.5 – 50kW)	20kW	20m	6
Medium (50kW – 750kW)	500kW	65	205
Large (>750kW)	2.5MW	Up to 135m	1536

6.2.4. Large scale wind turbines also require additional infrastructure which is essential for the running of the turbine and should be included as part of any planning application. This can include the following:

- Access roads to the site and on-site tracks (large enough to accommodate HGVs for construction)
- A temporary construction compound and lay down area for major components.
- A concrete foundation pad for each turbine.
- An area of hard standing next to each turbine to act as a base for cranes during turbine erection, which is generally removed after construction.
- Underground cables connecting the turbines (buried in trenches).
- One or more anemometer mast to monitor wind direction and speed.
- A control building (to ensure the turbines are operating correctly) and a substation (which are often located in the same building).

6.2.5. Appendix 4 details the 3 areas within the Vale of Glamorgan which have the greatest potential to support large scale wind energy development based upon applying a series of constraints which restrict wind energy developments as outlined in Welsh Government guidance known as “Practice Guidance – Planning for Renewable and Low Carbon Energy – A Toolkit for Planners”

(2015). The identified areas also have the highest generation capacity likely to be available in the Vale of Glamorgan area.

6.2.6. The Vale of Glamorgan has various aircraft related sites within the authority boundary. The safeguarded areas (Aviation Safeguarding Zones) are shown on the LDP Constraints Map. It is likely larger turbines located within the Civil Aviation Authority (CAA) aerodrome safeguarding area would not be permitted, therefore it is advised larger turbines are positioned outside of these safeguarding areas to ensure compliance with CAA guidelines contained within CAA Policy and Guidelines on Wind Turbines (CAP 764).

Figure 4: Example of a Medium Sized Turbine in the Vale of Glamorgan

6.3. Solar Energy Development

6.3.1. Solar energy development involves two types of solar energy production. The first involves the use of the sun's energy to provide hot water via solar thermal systems. The second uses the sun's energy to produce electricity through solar photovoltaic systems (PV).

Solar Thermal Systems

6.3.2. Solar thermal systems use solar collectors which are normally placed on the roof of a building and are used to pre-heat water for domestic use. Although the UK climate is not as hot and sunny as other countries, an effective solar thermal system can supply between 50-60% of heat demand from May to September.

Solar PV Systems

6.3.3. Solar PV systems come in two forms, building integrated systems or solar arrays. Building Integrated Systems is where the use of solar cells generate electricity for a specific building. These systems are normally roof mounted, however, recent technological advances are seeing the use of solar roof tiles within the UK which can be integrated into new buildings or used alongside existing roofing tiles/slates. This is predominately used to produce electricity for domestic use. Commercial scale solar energy is created using Solar Farms. These consist of freestanding arrays of solar panels mounted on fixed frames or

systems that track the sun and feed the generated electricity into the national grid.

6.3.4. For all solar energy development within the UK the best performance of solar energy systems is created when collectors/panels are inclined at an angle of 20 to 45 degrees, facing due south and clear from shade.

Solar Farms

6.3.5. Both forms of Building Integrated Solar Generation (PV and Thermal) are permitted under general permitted development rights where they meet the specific criteria set out within the Town and Country Planning (General Permitted Development) (Amendment) (Wales) Order 2009. However, Solar Farms are not classed as permitted development and would therefore require planning permission.

6.3.6. Given the nature of Solar Farms and the common requirement for large parcels of land to support the development it is recommended that developers submit a request for a Screening Opinion to the Council to consider whether an Environmental Impact Assessment (EIA) is required under the EIA Regulations at the initial stages of the proposal.

6.3.7. Large commercial and industrial buildings present an opportunity to utilise under used roof space to position large solar arrays in appropriate positions. This approach can minimise the land capacity issues usually faced by typical solar farm developments.

Figure 5: An example of Solar Panels used on Industrial Buildings at the Renishaw Site

6.3.8. Appendix 7 shows the areas within the Vale of Glamorgan which are considered to have the highest potential in terms of generation capacity and the lack of

major planning constraints for solar energy developments. This map builds upon the 6 local search areas identified under LDP Policy MG30 - Local Search Areas for Solar Energy based upon the update to agricultural land classification which now differentiates between 3a and 3b agricultural land.

6.4. Biomass Developments

6.4.1. Biomass is the broad term relating to heat and electricity generation which is derived from materials of biological origin such as plant and animal matter. Biomass heating technology can be stored to provide heat to a variety of buildings of all sizes through the use of individual boilers or using district heating networks (DHNs). More recently Biomass technology has been used to generate electricity and within combined heat and power (CHP) plants due to the low carbon emissions it produces.

6.4.2. The main types of Biomass used in the UK are sourced from wood-fuel, energy crops, wood waste, agricultural residues and the biodegradable matter contained within municipal solid waste (MSW). Unlike the previous forms of energy production, Biomass does produce carbon emissions which are released when the energy is generated. However, it is still considered a sustainable fuel due to carbon balancing where the CO2 released when energy is generated from biomass is balanced by the CO2 absorbed during the biological matters growth. Where carbon balancing is not effective the CO2 emissions produced per unit of energy are still much lower than those produced through fossil fuels.

6.4.3. Like other forms of energy production biomass comes in a range of different sizes. Table 3 below sets out the typical scales used for biomass energy plants:

Table 3: Typical Scales of Biomass Energy Plants

Scale	Typical Capacity	Description
Small	<500kW$_{th}$	Currently small scale applications below a few hundred kilowatts are virtually all designed as heat plant for domestic and small commercial use. These may comprise of standalone stoves or boilers.
Medium	500kW$_{th}$ – 10MW$_{th}$	This range is used largely for the production of heat, covering a wide range of applications including individual buildings and larger developments serving multiple buildings. The use of biomass CHP for the production of both heat and electricity currently tends to fall in this category, although larger scale plants are also now being encouraged to find ways to utilise any heat that is generated.
Large	>10MW$_{e}$	Plants at this scale are used primarily for the production of electricity. Some types of biomass are also used in very large conventional power plants alongside coal – this is known as 'co-firing'.

6.4.4. Appendix 5 identifies the land within the Vale of Glamorgan which could be used to produce biological material which could fuel biomass plants subject to the relevant planning permissions and permits being approved. Appendix 6 identifies the areas in the Vale of Glamorgan which would benefit from DNS and CHP schemes which could be fuelled by small to large scale biomass developments.

7. Planning Considerations for Large Scale Renewable Energy Developments

7.1.1. There are a variety of issues which need to be assessed when considering the implications of new renewable energy developments. This section seeks to draw out the main factors developers / landowners need to consider when forming their proposals for renewable energy schemes within the Vale of Glamorgan. Many of the considerations are shared across all forms of renewable energy development, however, where specific consideration needs to be given to certain types of development this has been specified below.

7.1.2. Appendix 1 outlines the likely requirements needed to support a planning application for large scale renewable energy developments where relevant to the type and scale of the proposal.

7.1.3. The most common considerations relating to proposed renewable energy development are listed below; however, each case should be assessed individually upon its own potential constraints and merits. Therefore, the following should be used as a guide and not a definitive list.

7.2. Vehicular Access and Wider Transport Network

7.2.1. Vehicular access is essential for all forms of renewable energy development during the construction phase and the ongoing operation of the facility.

7.2.2. Large scale turbines and wind farms are generally located within rural / remote areas. Therefore, transport routes need to be planned carefully and considered at the early stages of the process to take account of the potential size of the components needed to construct the turbines and limitations along the minor roads which serve remote areas which could limit the suitability of sites. The amount and type of traffic movements during the construction and operation of a wind turbine / farm will depend on the number and type of turbines proposed and the length of the construction period.

7.2.3. Biomass plants need biomass fuels to generate energy and also create subsequent by-products which may need to be transported from the site. These traffic movements to and from the site during the plants operation need to be considered.

7.2.4. To minimise the potential impacts a proposed development can have on the transport network, a Traffic Management Plan should be prepared to determine the most appropriate times and routes for construction traffic. The Traffic Management Plan should include measures for vehicle sharing and the avoidance of HGV deliveries during peak periods to minimise vehicle movements on minor roads. In some cases temporary traffic management

systems for site access and reduced speed limits on identified roads might be appropriate mitigation methods that should be considered.

7.3. Landscape and Visual Impacts

7.3.1. The Vale of Glamorgan benefits from having large areas of high quality landscape, which have been designated within the LDP. These include the Glamorgan Heritage Coast and Special Landscape Areas (SLAs) at a local level and other national designations which must be considered in any application. Therefore, it is essential that appropriate measures are taken in the siting, design and layout of large scale renewable energy developments. A Design and Access Statement (DAS) should be submitted which explains how the landscape and visual considerations have been taken into account in the design of the scheme. The DAS should be informed by a Landscape and Visual Impact Assessment (LVIA) and Cumulative landscape and Visual Impact Assessment (CLVIA). These assessments should employ tools such as photomontages and assess the wider landscape and visual impact of proposed development. A detailed description on what is required for a LVIA can be found in Guidelines for Landscape and Visual Impact Assessment (GLVIA)

7.3.2. In regards to the CLVIA, the assessment needs to look beyond the study area identified in the LVIA. Although only effects that occur within the LVIA study area are assessed these assessments need to consider the consequence of other developments located outside of the study area but their identified impact area is within the proposed developments LVIA study area. Therefore the search area for operational, consented and planned developments will always be larger than the study area in which the effects occur. The greater scale of development, such as the height of the turbine, the more extensive the required search area, table 4 shows the required CLVIA search area for turbines of different heights:

Table 4: CLVIA Search Areas

		Typology of Proposed Turbine(s)				
		Micro	Small	Medium	Large	Very Large
Height of Operational, Consented and planned Turbine(s)	Micro	2km	2km	2km	2km	2km
	Small	2km	8km	8km	8km	8km
	Medium	2km	8km	12km	12km	12km
	Large	2km	8km	12km	17km	17km
	Very Large	2km	8km	12km	17km	23km

The search area extends from the proposed turbine(s).

7.3.3. Large scale wind turbines are tall structures which can have a significant impact on the surrounding landscape because they are likely to be visually prominent. Appendix 8 details the different information required for the different sized turbines.

7.3.4. It should be noted that the impacts not only relate to the renewable energy equipment alone but the various ancillary infrastructure related to the development such as new or widened access roads.

7.3.5. Due to their potential size solar farm developments can have a significant impact upon sensitive landscape areas particularly where there is a proliferation of solar farm developments concentrated in one area which can lead to a cumulative impact. A proposal's potential impact upon sensitive landscapes will be a key consideration in determining the need for an EIA. Therefore, proposals should avoid development in sensitive locations wherever possible.

7.3.6. One of the potential effects of the cumulative impact of Solar Farms on the landscape is the creeping urbanisation of the countryside as the regular pattern of PV panels and the associated infrastructure needed to support development covers large areas of land and do not reflect the typical characteristics of a rural area.

7.3.7. Large biomass schemes are industrial in character and can result in landscape and visual impacts to the surrounding area if they are not considered fully. The siting and design of these plants is therefore very important in minimising these potential adverse impacts. These types of biomass plants should be situated in an area which reflects their industrial character and does not interfere with existing landmarks such as existing industrial sites. To help a proposed biomass plant integrate with its surroundings, developers should use materials and colours which reflect the surrounding landscape of the development to ensure the proposal respects its setting.

7.3.8. Possible mitigation methods for potential adverse impacts upon landscape and visual amenity can include the incorporation of existing landscape features within the development or using new planting to help screen the development reducing its visibility within the landscape. However, new planting will need to avoid potential shading of the proposed PV panels. Furthermore, screen planting can change the sense of enclosure within the landscape; therefore, careful planning at the design stage is necessary to ensure new planting reflects the existing characteristics of the landscape.

7.3.9. With regards to the potential cumulative impact renewable energy developments can have on an area Appendix 3 identifies all the known renewable energy and low carbon schemes which either have planning permission or are operational at the time of publication (December 2018) in the Vale of Glamorgan to help inform CLIVAs. Please contact the Council's Planning Department for more detailed information if required.

7.4. Noise Pollution

7.4.1. Operating wind turbines have two sources of noise; mechanical noise created from the generator / gearbox and aerodynamic noise created by the rotor blades

moving through the air. Modern designs have attempted to reduce the mechanical noise to mirror the level of aerodynamic noise produced which is considered to be more acceptable. However, an increase in noise levels at nearby residences would still likely occur, therefore, careful consideration to the siting and layout of proposals is important to ensure that increases in noise levels are kept to acceptable levels. The most effective way to mitigate noise pollution is to ensure that it is located away from noise sensitive development such as housing. Where this is not possible the operational noise levels must fall below the established limit set out under ETSU-R-97 (The Assessment and Rating of Noise from Wind Farms (1997) Energy Technology Support Unit). This should be demonstrated by the submission of a noise impact assessment to support a planning application for wind turbine development. Where noise limits have been identified these will be included within the planning conditions for a proposal to ensure development is kept within reasonable sound levels during operation.

7.4.2. Where it is considered a proposed wind turbine is within close proximity to residential development the general rule of siting a wind turbine 500m away from the nearest residential property should be applied unless supporting documentation such as a noise impact assessment can evidence the proposal would have less of an impact. TAN 8 Planning for Renewable Energy contains further guidance relating to noise impact assessments for wind turbine developments.

7.4.3. Biomass plants can also create substantial noise pollution which is caused by the combustion process and additional traffic noise generated by HGV deliveries. An appropriate site layout is imperative to reducing the potential noise pollution caused by a proposed plant. For example, locating loud equipment away from existing sensitive uses near the proposed site will help to minimise noise pollution to existing neighbouring occupiers and uses. Furthermore, when constructing a Biomass plant, noise attenuation features should be used in the walls and roof of the plant to reduce the potential noise ‘break-out’. Where appropriate, planning conditions will be used to further limit the impacts created from noise pollution through restricting the operational hours of the plant to reasonable working hours in the day.

7.5. Ecological Impacts

7.5.1. Wind energy schemes have specific ecological impacts which can result in the loss of habitat and the disturbance and fragmentation of plant and animal species. However, the operation of the wind turbine can also have ecological impacts such as the disturbance of habitats and aerial animal species such as birds colliding with the turbine blades. Further guidance relating to the impact

developments can have upon biodiversity can be found within the Council's Biodiversity and Development SPG[4].

7.5.2. In regards to mitigating the impact caused by site infrastructure, buffer protection zones should be used for identified sensitive habitats and species on the application site to allow infrastructure to be situated away from sensitive areas. Furthermore, species specific measures can also be taken to minimise the potential ecological impacts. In relation to the turbine blades colliding with animals such as birds and bats, the micro-siting of turbines within a development site away from identified areas of high flight activity will minimise the potential for collisions.

7.5.3. The ecological impacts of all proposed renewable energy developments will be a key determining factor when considering the need for an EIA. Developments should be located away from identified sites of ecological importance. Both the construction and the operation of the development can cause adverse effects on the ecology of an area. However, there are a variety of mitigation methods which can be appropriate to reduce the impact upon these sensitive areas. Within the construction phase of development this can include:

- Retaining existing habitat features
- Avoid construction during breeding seasons of relevant species
- Translocation of sensitive species if appropriate

7.5.4. Possible mitigation methods during the operation of development include:

- Increasing separation of solar panels
- Including wildlife highways
- Avoid excessive security lighting.

7.5.5. Additionally, based upon the scale of developments, developers should seek to enhance biodiversity where appropriate. Opportunities for enhancement should be identified through the preparation of a Habitat Management Plan.

7.5.6. Solar farms can present an opportunity to enhance habitats, for example, the inclusion of hedgerows to the boundaries of developments creates nesting and foraging areas and a means for wildlife to move between habitats. Where there are existing hedgerows developers should seek to minimise any loss of habitat by using existing entrances to the site and refraining from removing hedgerows where possible. Furthermore, developers are encouraged to consider strengthening existing hedges through planting gaps using suitable species appropriate to the locality. Proposals should also include buffer strips between the solar panels and the boundaries of the site. Buffer strips should aim to be 7 to 10 metres wide to ensure the best benefit to biodiversity on a site. These

[4] Biodiversity and Development SPG (2018) - http://www.valeofglamorgan.gov.uk/Documents/Living/Planning/Policy/Biodiversity-and-Development-SPG-2018.pdf

buffer strips are wild sections of land which are usually left uncut for 2 to 3 years to allow the habitat to develop. Post development, effective management of the site is vital to ensure the success of biodiversity enhancements.

Figure 6: Example of Hedgerows to Site Boundaries (Source: BRE)

7.5.7. The development of a Biomass plant can also result in potential adverse impact upon ecology within the proposed area through the loss of habitat, disturbance and fragmentation of species caused by the construction and operation of the plant. Furthermore, due to the noise, airborne and waterborne emissions caused by the operation of the plant can also disturb local habitats and species and will need to be considered as part of the application process.

7.5.8. Most of the impacts caused by the construction and operation of the plant can be appropriately mitigated through implementing the following methods over the development:

- Locating plant and ancillary buildings away from sensitive habitats
- Exclusion fencing and translocation programmes
- Covering excavation works
- Providing escape ramps for wildlife
- Use of speed limits on site
- Undertaking clearance work outside of breeding season (March-August)
- Protecting watercourses and maintaining hydrological regimes

7.6. Drainage

7.6.1. Renewable energy schemes and their associated works have the potential to impact upon watercourses, bodies of water and groundwater as a result of the

construction process. To understand how the development will impact upon these areas applications should be supported by an Environmental Management Plan prior to the construction of the development to mitigate any potential risk caused by the proposal.

7.6.2. In general, developments need to minimise the potential flood risk and surface water run-off through:

- Minimising the area of impermeable surfaces.
- Reinstating vegetation where possible.
- Providing storage and attenuation ponds in line with sustainable drainage techniques (SuDs).
- Using appropriate culverts and drains to maintain existing hydrological regimes.

7.6.3. Most biomass plants will require a water supply for steam production and condensing to generate power. The responsibility for the control of water quality and water abstraction is with the Natural Resources Wales (NRW). Therefore, the developer will need to consult with NRW to discuss what permits are required at the earliest opportunity. Development cannot begin until an Environmental Management Plan has been submitted and agreed to ensure any potential risk to ground water and surface water is mitigated.

7.7. Historic Environment

7.7.1. All renewable energy developments have the potential to impact upon cultural heritage and / or archaeological features. However, it is more likely large scale schemes would have an impact upon these features due to the size of the development site. Where necessary, trial trenching and an archaeological watching brief should be undertaken prior to and during the construction phase of proposed schemes. PPW notes that where nationally important archaeological remains and their settings are likely to be impacted, there should be a presumption in favour of their preservation in situ. Where the remains are of lesser importance the LPA needs to weigh the relative importance of the archaeological features against the need for the proposed development.

7.7.2. In relation to sensitive historic environments such as conservation areas, listed buildings and locally designated historic buildings (known as County Treasures) proposed schemes which are above the micro scale are unlikely to be permitted within or in close proximity to these designations due to the impact such development can have on the historic setting of these areas. Applicants should seek to locate development away from these designations and their settings to ensure the historic fabric is preserved in the Vale of Glamorgan.

7.8. Agricultural Land

7.8.1. Based on the nature of Solar Farms it is likely they will be located on agricultural land, this can also be true of wind energy developments and anaerobic digestion biomass facilities. However, these forms of development can be considered as farm diversification schemes[5] which allow for more flexibility in terms of planning considerations. However, in other instances PPW protects the best and most versatile (BMV) agricultural land (grades 1, 2 and 3a) and states BMV land "*should only be developed if there is an overriding need for the development, and either previously developed land or land in lower agricultural grades is unavailable, or available lower grade land has an environmental value recognised by a landscape, wildlife, historic or archaeological designation which outweighs the agricultural considerations.*"

7.8.2. To help mitigate against potential adverse effects these types of schemes can have on BMV land, steps should be taken at the construction phase to enhance the reversibility of the development and should be evidenced within a planning application. Possible considerations are the:

- Use of removable mats as access tracks
- Use of ground screws to secure PV panels
- Avoidance of soil compaction and contamination

7.8.3. Due to the nature of solar farm developments and wind turbines, the agricultural land can still offer some benefit through the use of low intensity grazing. This provides a low cost means of managing grassland and enables the land to remain agriculturally productive. Where low intensity grazing is an option, a professional ecologist should be consulted to ensure an effective grazing regime for the site that would be best suited to the area's characteristics and the biodiversity objectives for the development.

Figure 7: Example of Low Intensity Grazing (Source: BRE)

[5] See TAN 6 Planning for Sustainable Rural Communities (2010) - https://gov.wales/topics/planning/policy/tans/tan6/?lang=en

7.9. Aviation and Telecommunications Constraints

7.9.1. In regards to wind turbines, they can pose a significant danger to air traffic safety as they represent a collision risk for low flying aircraft and they can interfere with air traffic control radar and aircraft landing instruments. The Civil Aviation Authority (CAA), the Ministry of Defence (MoD), and National Air Traffic Services (NATS) should be consulted on wind energy schemes at the earliest stages of the planning process.

7.9.2. The Vale of Glamorgan has various aircraft related sites within the authority boundary. The LDPs Constraints Map details the safeguarded areas (Aviation Safeguarding Zones) within the Vale of Glamorgan where the Civil Aviation Authority (CAA) should be consulted for structures which exceed 45m within these zones. The LDP Constraints Map can be viewed using the following link:

http://myvale.valeofglamorgan.gov.uk/LDP2017Constraints.html

7.9.3. In particular the presence of Cardiff International Airport and the St Athan MoD effect the acceptability of turbine development above the micro scale which exceeds the permitted development criteria of 15m for wall mounted turbines and 11.1m for free standing turbines. It is likely larger turbines located within the Civil Aviation Authority (CAA) aerodrome safeguarding area would not be permitted, therefore it is advised larger turbines are positioned outside of these safeguarding areas to ensure compliance with CAA guidelines contained within CAA Policy and Guidelines on Wind Turbines (CAP 764). In any case, it is advised developers should consult with the CAA and aerodrome operators when proposing turbines above permitted development rights to ensure aerodrome operators are aware of possible obstructions to flight paths and radar ranges. The Council has undertaken a high level assessment of potential wind resource areas likely to be appropriate for future development for wind turbines, the spatial results of this assessment can be found under Appendix 4 which accounts for the CAA safeguarding areas.

7.9.4. In regards to telecommunications, wind turbines can interfere with the transmission signals by blocking, deflecting or scattering signals. Where a telecommunication link crosses a wind farm development site, Ofcom should be consulted to advise the developer on the appropriate fixed link operator. Furthermore, developers should contact interested bodies directly; this includes local utility companies and emergency services where applicable.

7.10. Shadow Flicker

7.10.1. Shadow flicker is caused when the sun passes behind the rotor blades of a wind turbine which casts a shadow that flicks on and off as the blades rotate. These incidents can cause serious disturbances for affected neighbouring residents in properties within close proximity of the proposed development and even result in

harmful impacts upon sufferers of photo-sensitive epilepsy. These potential impacts can be mitigated through the micro-siting of turbines as far away from sensitive residential development as possible. Furthermore, the use of vegetation to screen the shadow flicker can also minimise the potential impact. If the shadow flicker impact is severe this may result in the refusal of a planning application.

7.11. Wind Speed

7.11.1. This is an important factor for considering the suitability of a proposed location for wind turbines. Turbines operate between a range of wind speeds defined as:

- Cut-in – This is the speed at which a turbine begins to generate power. Below this speed the turbine will remain stationary.
- Rated – This is the speed at which the turbine produces its rated power generation i.e. 750kW
- Cut-out – This is the maximum speed the turbine can operate safely. Above this speed the turbine will stop moving and remain stationary until the wind speed returns to a safe range.

7.11.2. Based on the cut-in and cut-out ranges the typical turbine in the UK will be operational for approximately 70-85% of the time. To ensure a potential site for wind turbines is suitable a wind profile of the area should be taken to monitor the small variations in annual average wind speed, as power produced from wind is equal to the cube of the wind speed. For example, an area with an average wind speed of 8m/s would produce approximately twice as much power of an identical machine located in an area with an average wind speed of 6m/s. Wind speed profiles should take place during the feasibility stage of the development process to establish average wind speeds and to inform the modelling of turbine positioning to optimise energy yields. Common practice for wind speed monitoring for large scale turbines involves the erection of a meteorological mast at the site which must be equal in height to the hub of the proposed turbines.

7.12. Land Capacity

7.12.1. One of the main constraints relating to the development of Solar Farms is the availability of suitable land. To maximise the solar radiation gained from the land, a site needs to be facing due south as the UK receives the highest amount of solar irradiation in the southern and western areas of the country. In regards to the Vale of Glamorgan it is geographically well-placed to receive a significant amount of solar radiation making it a good opportunity area for solar development; Appendix 7 identifies the best areas for potential solar energy to aid future development of this resource. Furthermore, to produce a viable amount of energy from solar schemes 2.5 to 3ha of land is required on average to produce 1MW of energy. Additionally, a sites proximity to a suitable national grid connection will also need to be considered when identifying a suitable land.

7.13. Glint / Glare of Solar Arrays

7.13.1. Although PV panels are designed to be dark in colour and use a non-reflective coating to maximise the potential solar radiation absorption, direct intense sunlight, bright skies and the metal supporting frames of panels can result in the reflection of sunlight. This can create a glint or glare affect which can cause safety concerns as it becomes a distraction to viewers and it also emphasises the potential impact the development will have on the surrounding landscape. Therefore, developers should submit glint and glare assessments to support planning applications for Solar Farms in the Vale of Glamorgan to ensure the safety of development and reduce its impact on the landscape.

8. Further Information and Contacts

8.1. Further advice on all aspects of this guidance can be sought from the Council's Planning Department. Prior to formal submission of a planning application, the Council encourages applicants to utilise the Council's pre-application service which can save unnecessary work, costs and delays caused by negations. Further information on the Council's pre-application advice service can be found on the Council's website: www.valeofglamorgan.gov.uk

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9. Further Guidance and Information

- Agricultural Good Practice Guidance for Solar Farms. July 2014. BRE. Available at: https://www.bre.co.uk/filelibrary/nsc/Documents%20Library/NSC%20Publications/NSC_-Guid_Agricultural-good-practice-for-SFs_0914.pdf

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- Technical Advice Note 8: Planning for Renewable Energy. July 2005. Welsh Government. Available at: https://gov.wales/topics/planning/policy/tans/tan8/?lang=en

10. Appendices

10.1. Appendix 1: Planning Application Requirements for Renewable Energy Proposals

10.1.1. In general renewable energy proposals which are above the micro scale (more than 50kW) should be supported by the following evidence where relevant alongside the submission of a planning application and relevant plans:

- **Design and Access Statement** - This should be included where the proposal would be classed as major development (i.e. where the development carried out on a site having an area of 1 hectare or more). This document assesses the design of the proposal and evaluates its context. The scope of the document should be proportional to the scale of development.
- **Scale and Capacity Information** - The size of development and the potential energy return once installed.
- **Landscape Visual Impact Assessment** - Assesses the proposal in terms of its surrounding landscape and visual impact. The assessment should identify the sensitivity of the area to the proposed change. It should also differentiate between the likely impact the proposal would have on the local and wider landscape character. The assessment should clearly assess the physical effects of the proposal on the landscape separately from the visual impact. Regarding the visual impact, the assessment can be done through various methodologies such as Zones of Theoretical Visibility (ZTV) or accurate photo-montages from a comprehensive range of viewpoints. Included within the assessment should be details relating to any proposed or existing mitigation to identified visual impacts e.g. screening through the use of existing vegetation or new fencing / planting.
- **Historic Environment Assessment (where relevant)** - Where the development would have a direct impact on the historic environment, scheduled ancient monuments, listed buildings, conservation areas, buildings of local significance (county treasures) and archaeological sites of interest, an assessment of the potential impacts and any appropriate mitigation methods would be required.
- **Ecological Study** - An ecological survey which identifies any species or habitats present on the site / area affected by the proposal. It should also include an assessment of the local and wider impact on the natural environment, habitats and species and any proposed mitigation and / or enhancement. The Council's Biodiversity and Development SPG (2018) contains further details in relation to what is required from an Ecological Study and the possible methods of mitigation.
- **Traffic Assessment and Infrastructure Considerations** - This assessment should consider the impacts on public rights of way and the local / strategic road networks. It should also include any requirements for new or upgrading existing infrastructure required to facilitate construction and the ongoing maintenance of the proposal. A traffic management plan may also be required but this will be dependent on the scale of the development.

- **Hydrological Assessment** - This should assess the possible changes to hydrology in the area caused by the proposal and the potential increase in surface water run-off. Depending on the area and the possible impacts a flood consequences assessment might be required.
- **Noise Assessment (where relevant)** - Assesses the noise implications of a proposal.
- **Light Assessment** - An assessment of light implications which could include, glare, shadow flicker, aviation considerations etc.
- **Air quality assessment -** This will be required on proposals which produce emissions such as low carbon technologies e.g. biomass developments. Depending upon the scale of development, the quantity and type of emissions produced a simple or detailed assessment would be required. A Simple Assessment is one relying on already published information and without quantification of impacts, in contrast to a Detailed Assessment that is completed with the aid of a predictive technique, such as a dispersion model. An air quality assessment should demonstrate the likely changes in air quality or exposure to air pollution, as a result of a proposed development.
- **Cumulative Impact** - Is an assessment of the proposal in relation to similar developments in the surrounding area which could detract from the character of an area.

Environmental Impact Assessments (EIAs)

10.1.2. EIAs are intended to prevent, reduce or offset the detrimental environmental impacts development can create and also allows an opportunity for proposals to enhance positive outcomes the development could have on the environment. The requirement for EIAs comes from the EU directive 2011/92/EU and is included in Welsh law through the Town and Country Planning (Environmental Impact Assessment (Wales)) Regulations 2017[6]. Where a landowner / developer is unsure whether an EIA applies, they should seek a screening opinion from the Local Planning Authority which will assess whether an EIA would be required for the proposed development.

10.1.3. If an EIA is required an Environmental Statement (ES) must be submitted alongside any planning application. At this stage the applicant may wish to apply for a further scoping opinion from the Local Planning Authority which would detail the extent of the ES. Schedule 4 of the EIA Regulations outlines the information which should be included within an ES.

Habitats Regulations Assessments (HRA)

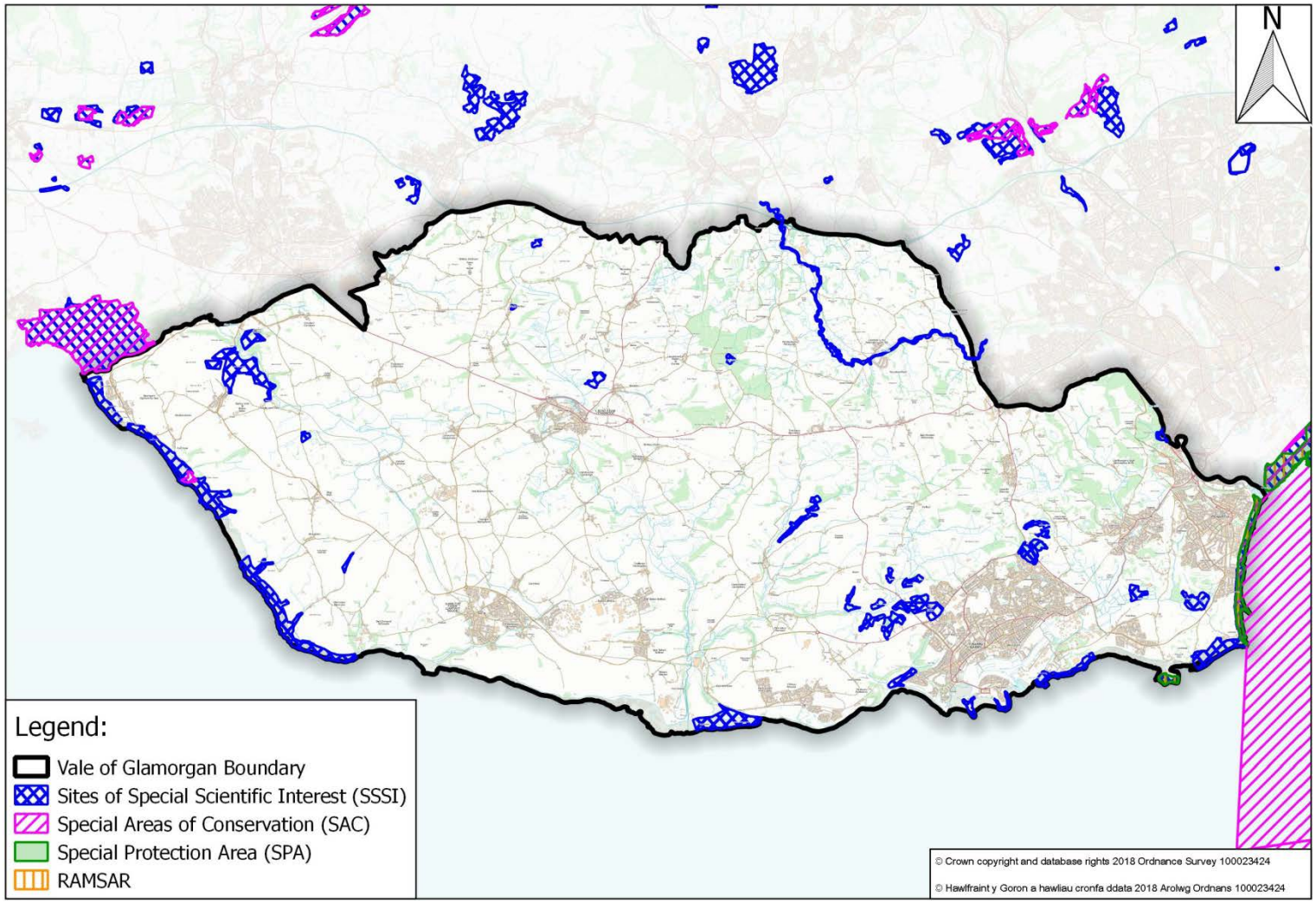
10.1.4. HRAs are required under the Conservation of Habitats and Species Regulations 2017 which is directed by the Habitats Directive 92/43/EEC. A HRA is used to determine whether a project would likely have significant impacts on the conservation objectives of sites designated for their European importance for

[6] The regulations can be viewed at https://www.legislation.gov.uk/wsi/2017/567/contents/made

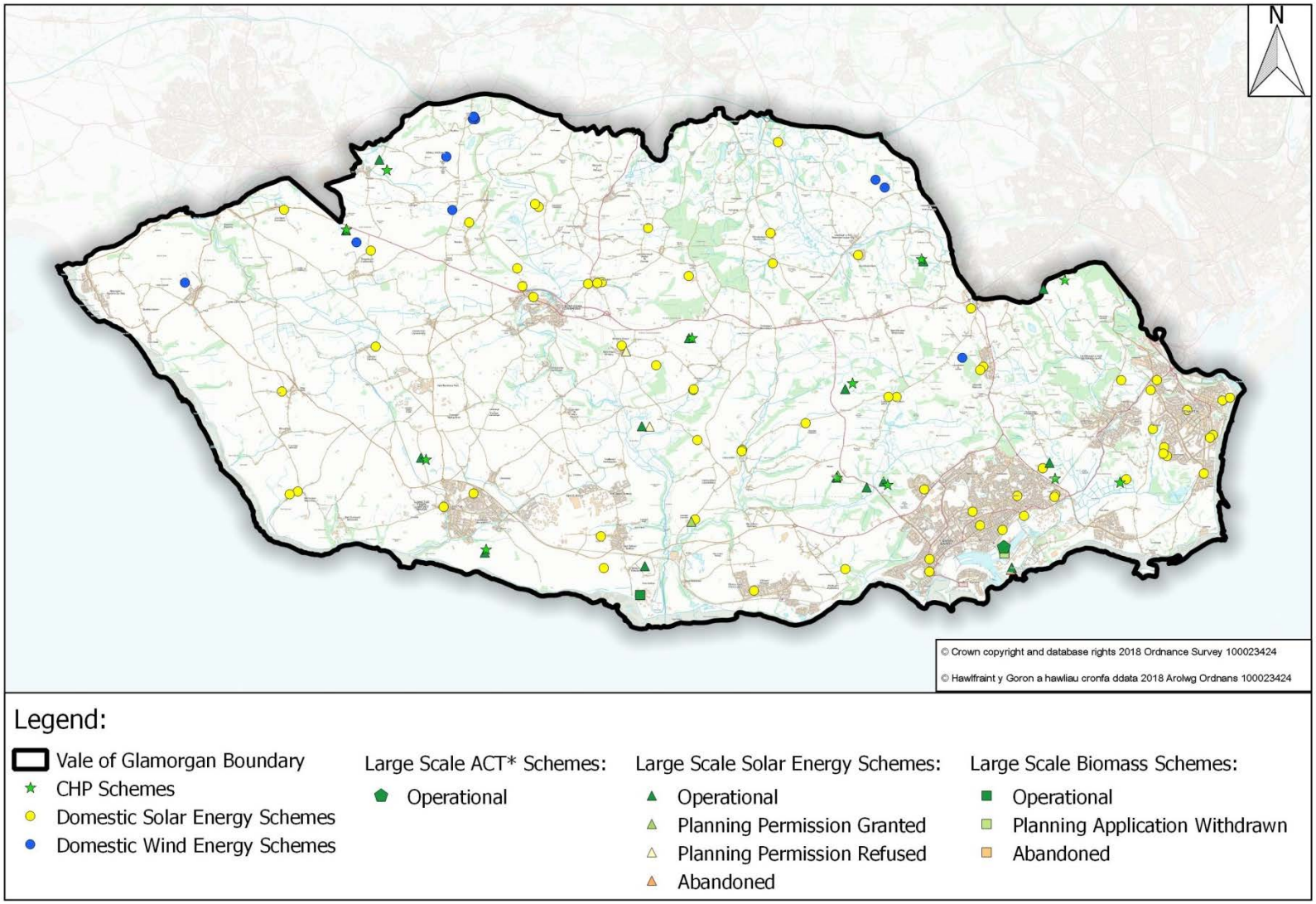
nature conservation, which include Special Protection Areas (SPAs), Special Areas of Conservation (SAC), Sites of Special Scientific Interest (SSSI), Marine Conservation Zones (MCZs) and RAMSAR sites. Any project which has the potential to impact upon these designations will be subject to a HRA; therefore, Appendix 2 details the European sites within or adjoining the Authority which could be affected by a proposed project. Different consents are also likely to apply to those developments which affect these European sites which work outside of the planning system. Natural Resources Wales (NRW) can provide further details regarding the species and marine licences which would likely be needed.

10.1.5. Where a HRA is considered to be required, the Local Planning Authority must undertake a screening test known as a Test for Likely Significant Effect (TLSE). If the findings of the test indicate the potential impact would have a detrimental effect this triggers an Appropriate Assessment. This assessment is carried out by the Council, however, the applicant must supply the information required to undertake the evaluation. Any assessment must precede the planning decision and where the outcome of the Appropriate Assessment is unfavourable it is unlikely the development would obtain planning consent. As NRW are the conservation body for Wales they would play an integral role in any HRA and would need to be consulted on all applications which would require one.

10.2. Appendix 2 - Map of European Designated Sites

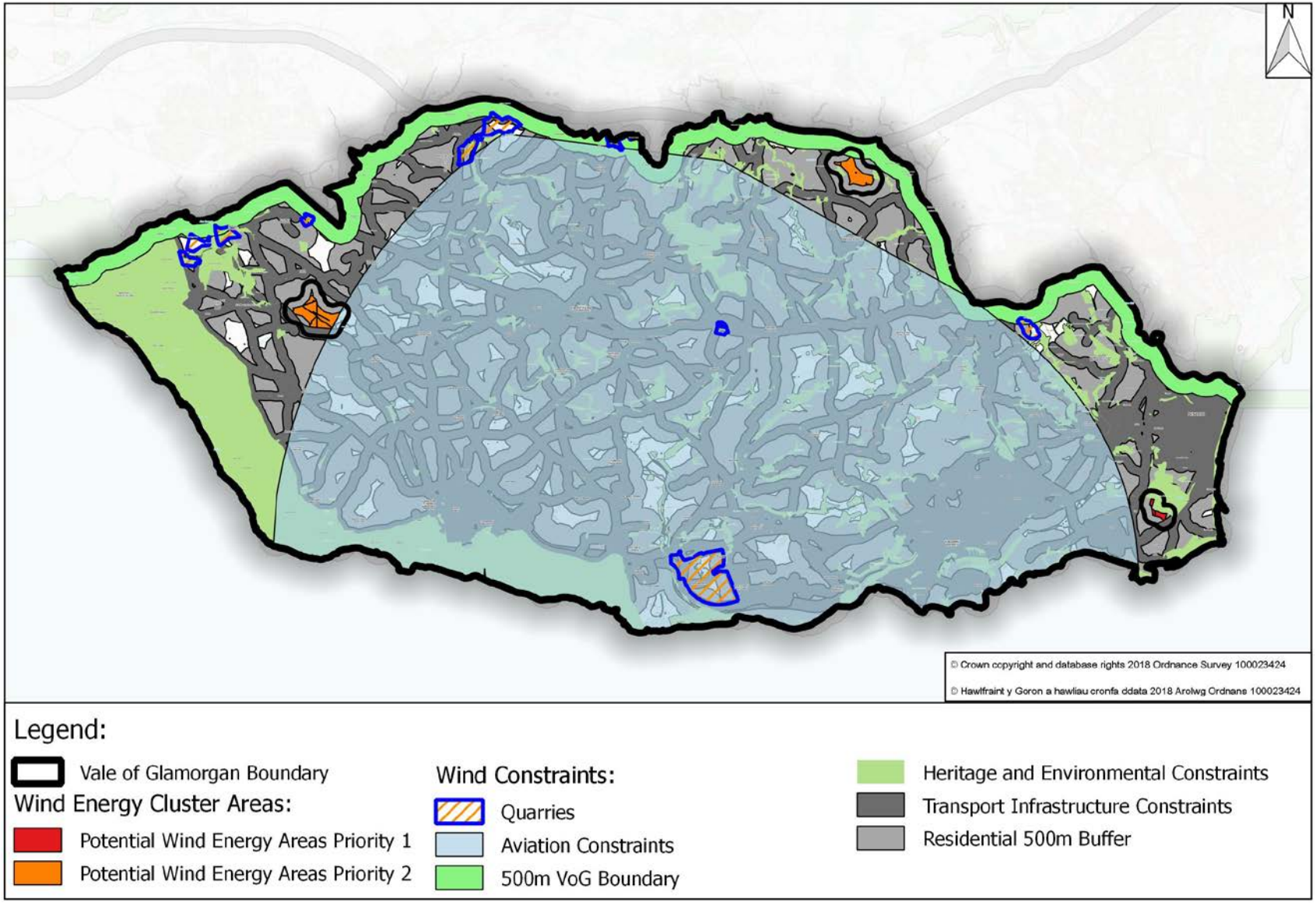


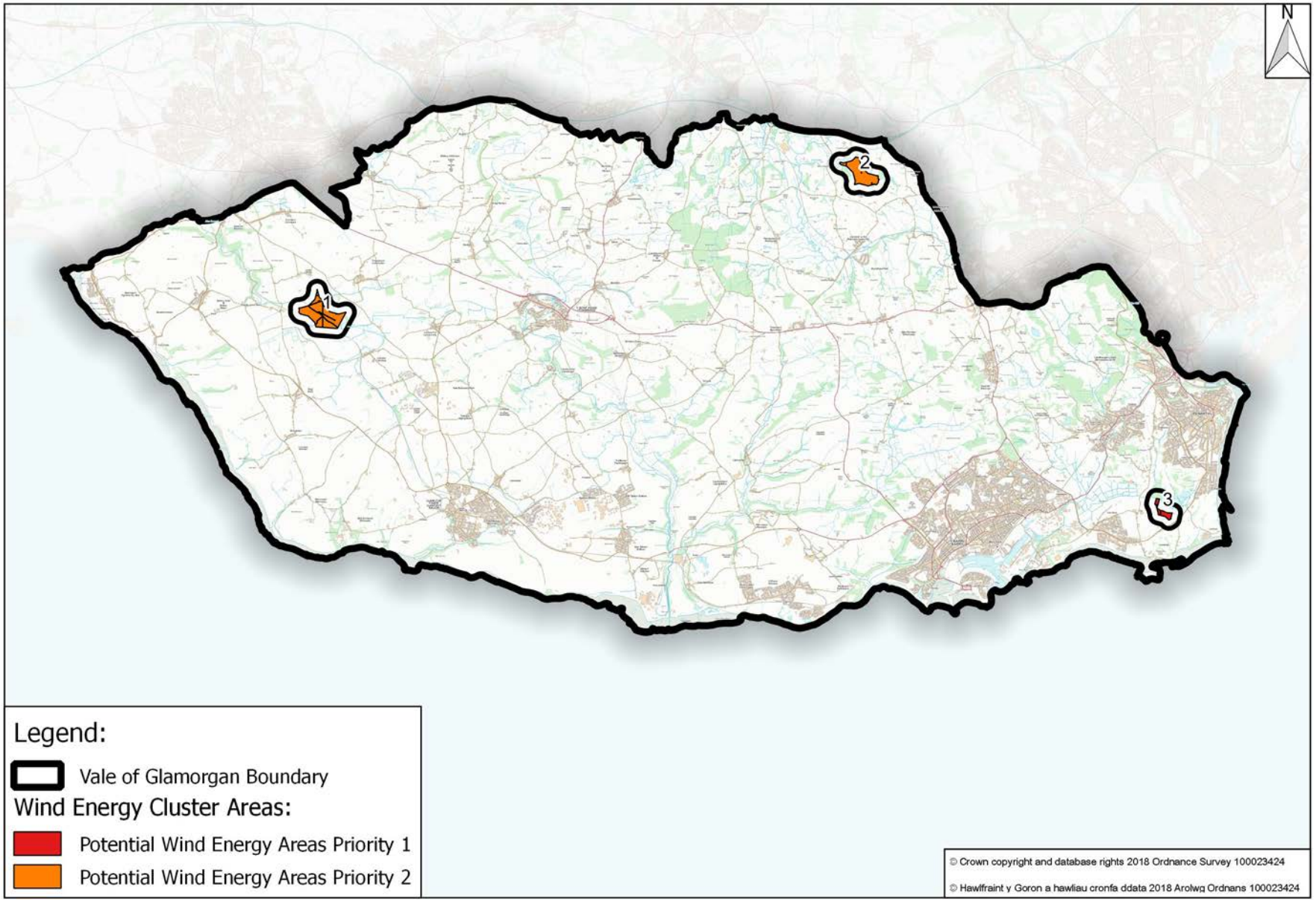
10.3. Appendix 3 - Existing and Proposed Low and Zero Carbon Energy Schemes



*ACT - Advanced Conversion Technology

10.4. Appendix 4 - Wind Energy Resource




N
1
2
3
Legend:
Vale of Glamorgan Boundary
Wind Energy Cluster Areas:
Potential Wind Energy Areas Priority 1
Potential Wind Energy Areas Priority 2
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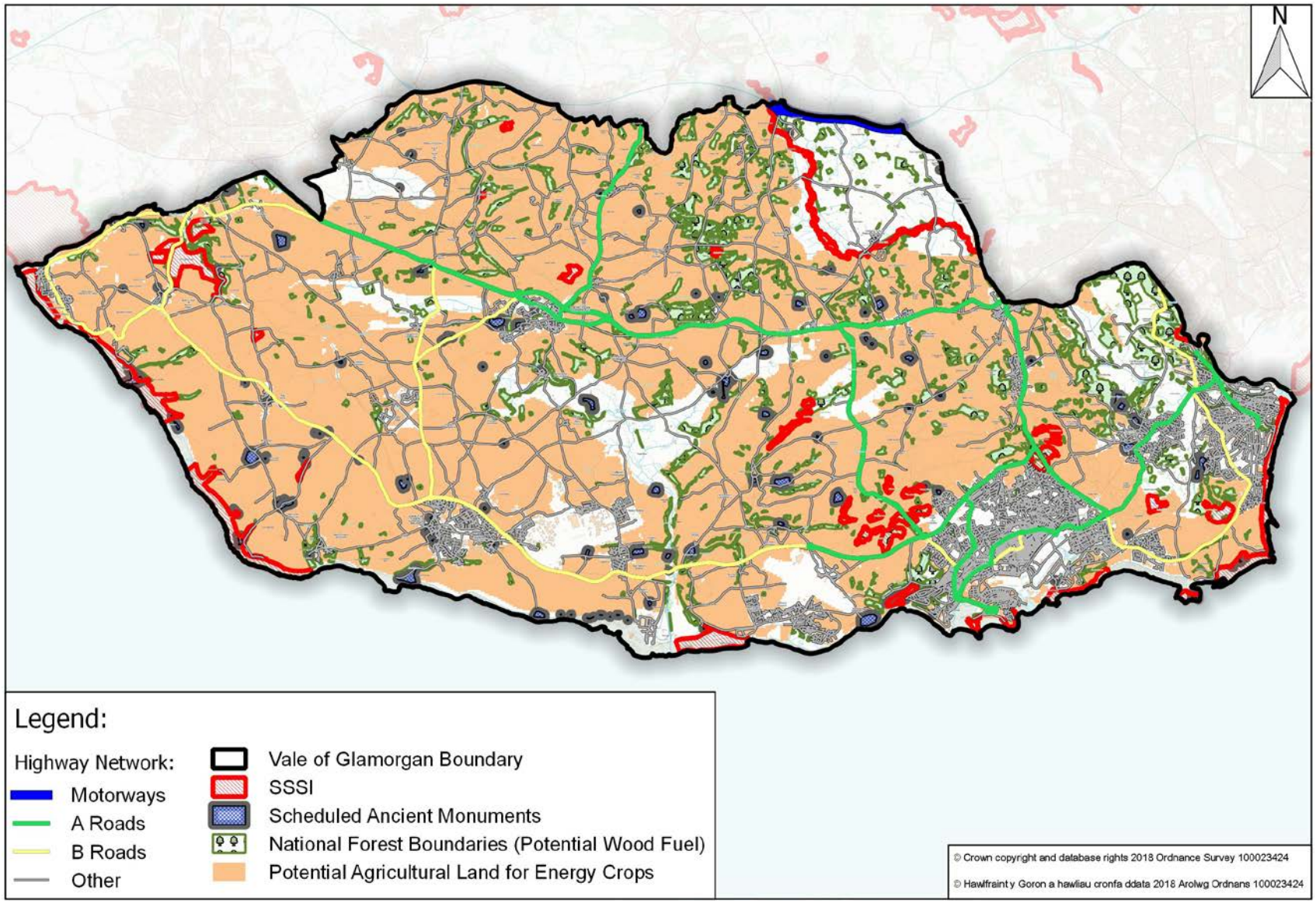
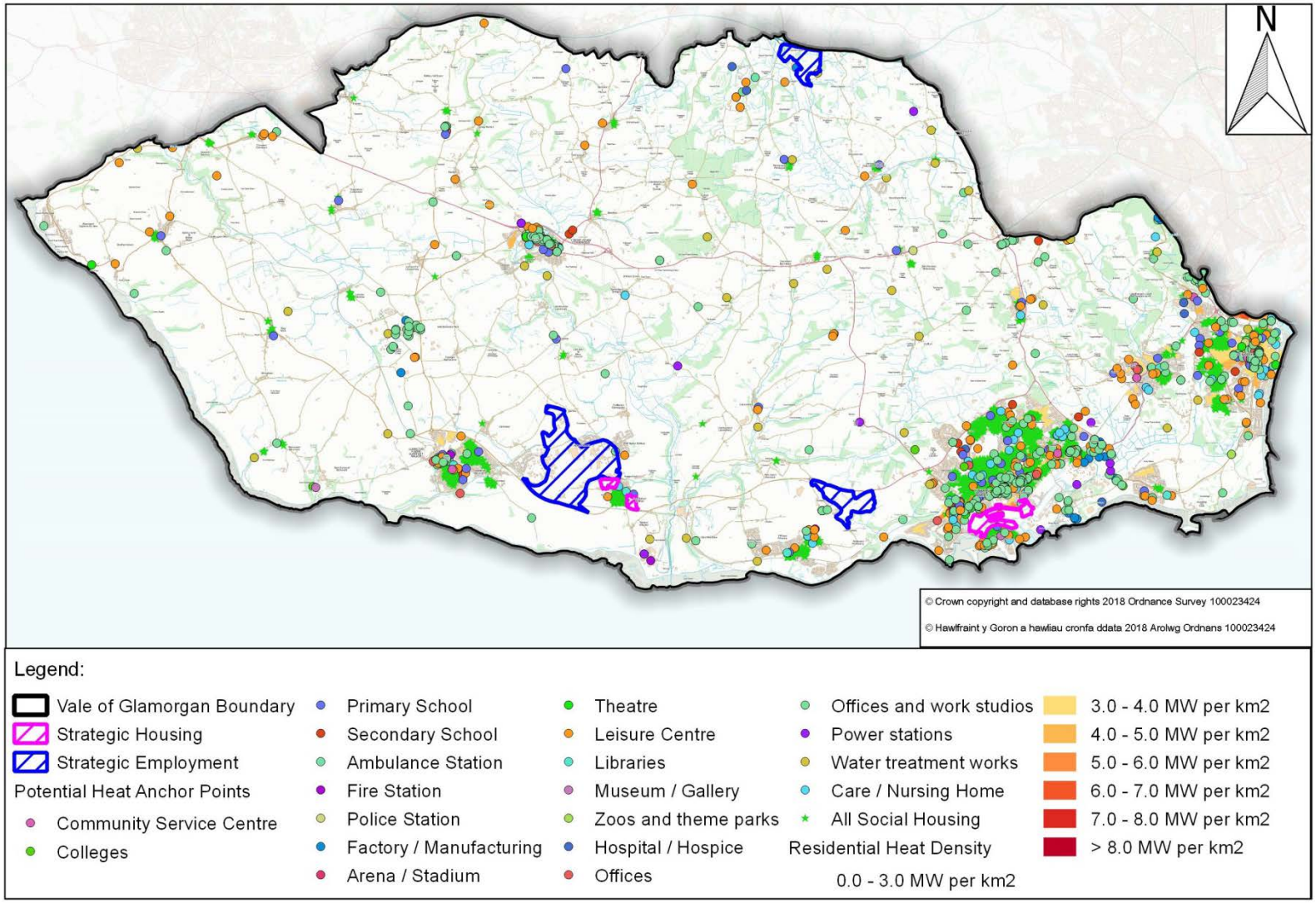
10.5. Appendix 5 - Wood Fuel and Energy Crops Resource for Heat and Power Generation

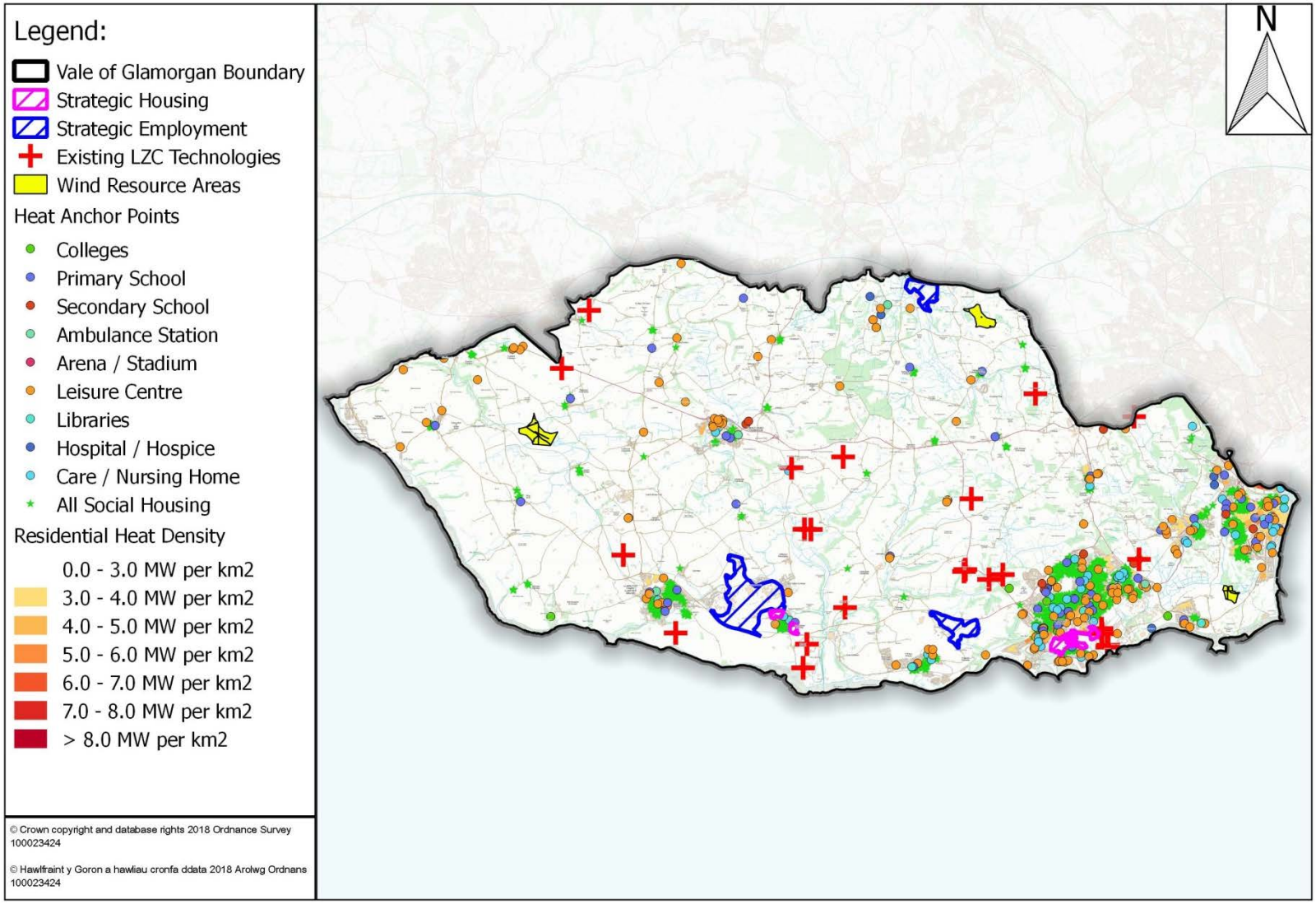


10.6. Appendix 6 - Heat Opportunities Mapping

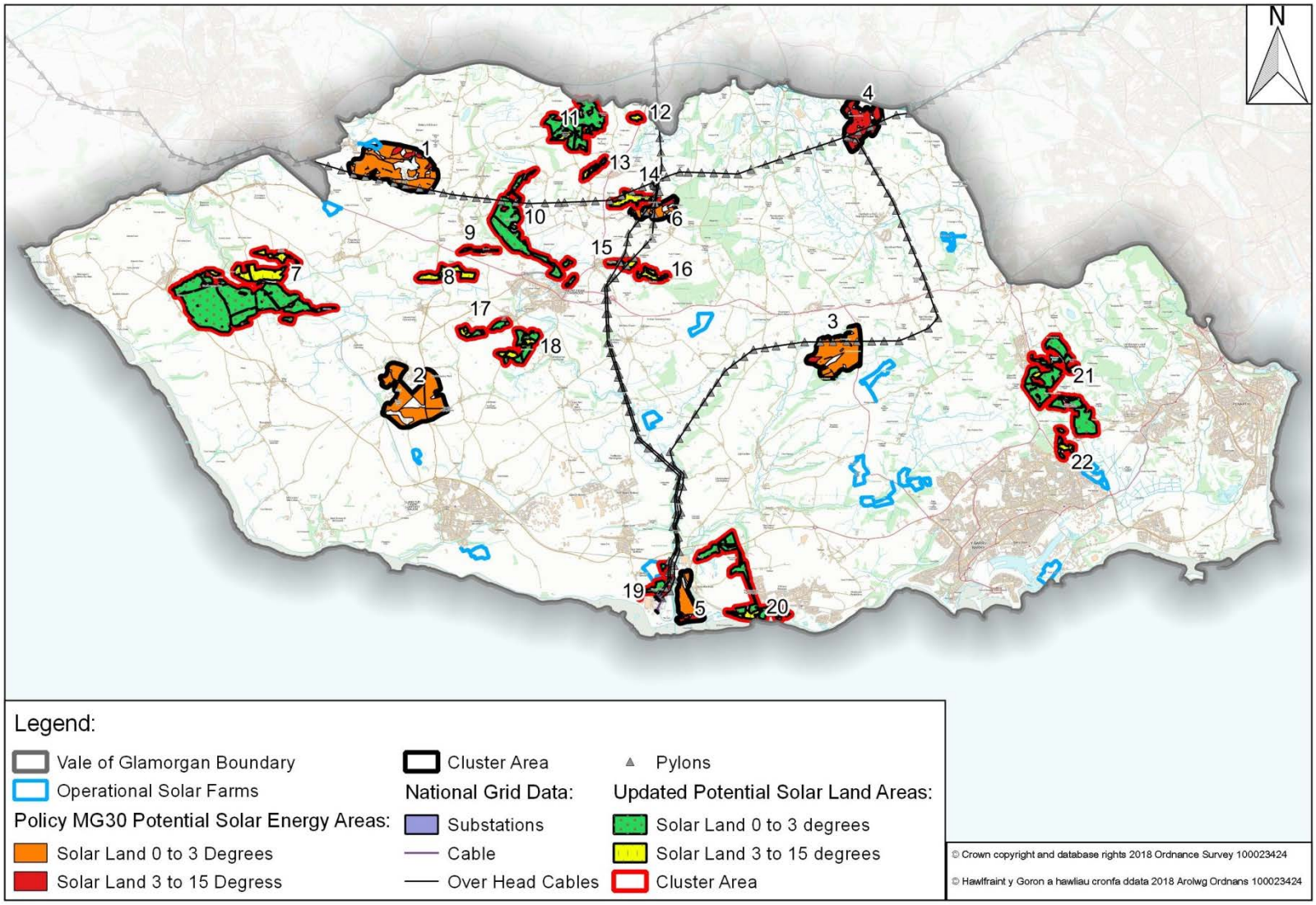
Potential Heat Anchor Points Map



Energy Opportunities Map



10.7. Appendix 7 - Assessing Solar Photovoltaic (PV) Farm Resource



10.8. Appendix 8: Landscape and Visual Information required for Wind Turbines

Typology	Study Area	ZTV[7]	Visualisations	Cumulative Assessment	Residential Study Area[8]	Application of LANDMAP Data	Seascape Assessment
Micro <20m	2km	No[9]	Not required	Location plan Written assessment	10 x the height to the blade tip	Identification of Aspect Areas within study area.	Where the ZTV for the study area Extends across coastal areas the Seascape Assessment of Wales (CCW 2009) and any other local seascape assessments should be taken into account.
Small <20m (1 turbine)	5km	Yes	3-5 visualisations. If EIA is required the location and number of visualisations will be agreed in scoping. Wirelines without photomontages may be acceptable.	Location plan. Cumulative ZTV may be required. Cumulative wirelines / photomontages may be required. Written assessment.	10 x the height to the blade tip	All aspect areas affected by the footprint of the development should be considered in detail. Aspect areas outside the site should be considered in line with LANDMAP Guidance Note 3: Using LANDMAP for Landscape and Visual Impact Assessment of Onshore Wind Turbines. (See Part 3: Section C of this guidance). LANDMAP Guidance Note 3: Using LANDMAP for Landscape and Visual Impact Assessment of Onshore Wind Turbines provides more detailed guidance.	
Medium <65m (4 turbines or less)	8km	Yes	5-7 visualisations. If EIA is required the location and number of visualisations will be agreed in scoping. Wirelines without photomontages may be acceptable.	Location plan. Cumulative ZTV likely to be required. Cumulative wirelines / photomontages likely to be required. Written assessment.	10 x the height to the blade tip		
Large <135m (5 turbines or less)	11km	Yes	The location and number of visualisations will be agreed in scoping. Photomontages and wirelines required.	Location plan. Cumulative ZTV Cumulative wirelines / photomontages required. Full CLVIA.	10 x the height to the blade tip		
Very Large ≥135m (6 turbines or more)	15km	Yes	The location and number of visualisations will be agreed in scoping. Photomontages and wirelines.	Location plan. Cumulative ZTV. Cumulative wirelines / photomontages. Full CLVIA.	10 x the height to the blade tip		

[7] Zone of Theoretical Visibility (ZTV) – A computer generated plan which shows the visibility of the turbines in the surrounding landscape.
[8] This is the area which a residential amenity assessment should be undertaken.
[9] A ZTV will be required where a micro scheme is within 10x blade tip height of statutorily designated landscapes.

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