South Gloucestershire Council

Renewables

Supplementary Planning Document

Adopted November 2014

www.southglos.gov.uk

South Gloucestershire Council

Contents

Background Papers:

Habitat Regulations Assessment:
https://consultations.southglos.gov.uk/gf2.ti/f/407042/11377733.1/PDF/-/Renewables_SPD_HRA.pdf

Strategic Environmental Assessment (SEA) Screening Report:
https://consultations.southglos.gov.uk/gf2.ti/f/407042/11377861.1/PDF/-/Renewable_SPD_SEA_Screening_Report.pdf

This Renewables Supplementary Planning Document was adopted by the Planning, Transportation and Strategic Environment Committee on 12 November.

1. Introduction

Purpose

The principal objectives of this Supplementary Planning Document (SPD) are to:

- Help secure delivery of renewables targets and technologies in South Gloucestershire,
- Provide guidance for Development Management, developers and the general public as to the local authority's expectations when receiving planning applications and the methodologies / criteria by which they should be assessed.
- To encourage local community engagement with proposed renewables projects, and provide guidance for community led projects.

It is acknowledged that renewables proposals can have positive effects: for example contributing to climate change targets, plus potentially benefits to local employment and businesses, including farm diversification. There may also however be local concerns particularly about environmental impacts. This document seeks to guide the location and form of development proposals to ensure that impacts are avoided or managed to an acceptable level that is consistent with planning policy and guidance.

Text highlighted in green throughout this SPD indicates particular information or guidance that amplifies and clarifies how Core Strategy and other relevant policy will be interpreted when considering proposals for renewable energy development.

The SPD proposes a case by case assessment of proposals for renewable energy generation infrastructure and will be a material consideration in the determination of planning applications submitted to the local planning authority.

Given the significant and often fine grain variation in the character and make up of the landscapes of South Gloucestershire and the range of scales of technologies (e.g. small to large turbines or solar parks of various scales), it is not considered feasible to identify specific areas that are suitable for the construction of the wide range of renewable energy generation facilities.

Offshore wind and tidal energy schemes are excluded from this SPD as these would be considered Nationally Significant Infrastructure Projects. Similarly low carbon proposals such as the proposed new nuclear power station at Oldbury which is also a Nationally Significant Infrastructure Project that would be examined by the Planning Inspectorate and determined by the Secretary of State.

2. National Context

National planning policy on renewable and low carbon energy development promotes a positive stance towards such development proposals and makes it clear that local authority decisions must take the same positive approach, however it is clear that impacts must also be considered and addressed.

National Policy Statement (NPS) for Energy (EN-1) states that, 'there is an urgent need for new large-scale renewable energy projects to ensure that we meet the 2020 target and wider decarbonisation ambitions' and the UK has since signed up to achieve a legally binding EU target that 15% of total energy consumed will come from renewable sources by 2020.

National Planning Policy Framework (NPPF)

The NPPF (paragraph 97) states that 'Local planning authorities should have a positive strategy to promote energy from renewable and low carbon sources and to design their policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily, including cumulative landscape and visual impacts'.

Planning Practice Guidance for Renewable and Low Carbon Energy (NPPG)

Guidance issued by the Department for Communities & Local Government (DCLG) provides advice on the planning issues associated with the development of renewable energy.[1]

This guidance re-enforces the important role planning has to play in the delivery of new renewable and low carbon energy as set out in the National Planning Policy Framework (NPPF), and that it is the responsibility of all communities to help increase the use and supply of green energy. However the guidance also seeks to ensure that planning decisions get the environmental balance right in the consideration of local impact. In line with the NPPF, it continues to recognise that the need for renewable energy does not automatically override environmental protections and the planning concerns of communities.

Green Belt

The NPPF is clear at paragraph 87 that in the case of proposals which come forward in the Green Belt, inappropriate development is, by definition, harmful to the Green Belt and should not be approved except in very special circumstances.

[1] http://planningguidance.planningportal.gov.uk/

Paragraph 91 states: 'When located in the Green Belt, elements of many renewable energy projects will comprise inappropriate development. In such cases developers will need to demonstrate very special circumstances if projects are to proceed. Such very special circumstances may include the wider environmental benefits associated with increased production of energy from renewable sources.'

Wind energy development

With respect to wind energy development, the NPPF states that local authorities should follow the approach set out in the National Policy Statement for Renewable Energy Infrastructure (EN-3)[1a] which includes consideration of factors such as landscape and visual impact, green belt, residential amenity, noise etc.

Heritage

For development likely to affect heritage assets or their setting, applicants will be expected to submit a heritage statement that describes the significance of any heritage assets affected, including any contribution made by their setting, and that assesses the potential impact of the development on that significance.

The level of detail for a heritage assessment should be proportionate to the asset's importance and no more than is sufficient to understand the potential impact of the proposal on their significance. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, an appropriate desk-based assessment and, where necessary, a field evaluation should be submitted in support of the application.

Under Sections 66(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990, South Gloucestershire Council has a statutory duty to have special regard to the desirability of preserving listed buildings or their setting or any features of special architectural or historic interest which they possess. Furthermore, under Section 72(1) of the aforementioned Act, the council also has a statutory duty to pay special attention to the desirability of preserving or enhancing the character or appearance of conservation areas. The settings of heritage assets such as scheduled monuments, Conservation Areas, registered parks and gardens and registered battlefields are also material planning considerations, and will be part of the council's consideration during pre-application discussions and assessment of a planning application.

In order to ensure balanced planning decisions, this SPD should be read alongside all other relevant national and local planning policy and guidance.

[1a] Written Ministerial Statement: Local Planning and Onshore Wind 07 June 2013 https://whitehall-admin.production.alphagov.co.uk/government/uploads/system/uploads/attachment_data/file/37048/1940-nps-renewable-energy-en3.pdf

3. Renewables covered by this SPD

This document covers a range of technologies for which applications may be made to South Gloucestershire Council. However, the decision making process for an energy generation project depends on the nature, scale and/or generation capacity of the proposed development.

Some types and/or scales of development may be permitted under the General Permitted Development Order (GPDO). However it is always advisable to check with the Council as to whether planning permission may be required. Part 40 (Installation of Domestic Microgeneration Equipment) and Part 43 (Installation of Non-Domestic Microgeneration Equipment) are the relevant sections of the GPDO.[2]

All development with a generating capacity over 50 MW would be a Nationally Significant Infrastructure Project examined by the Planning Inspectorate and determined by the Secretary of State.

The renewables technologies covered by this SPD are:

- Anaerobic digester
- Biomass
- Ground mounted solar
- Heat pumps (air, ground and water)
- Hydropower
- Landfill gas
- Solar – roof mounted
- Wind turbines

The cumulative impact of a proposed development should include consideration of any necessary new grid connections.

[2] http://www.planningportal.gov.uk/permission/responsibilities/planningpermission/permitted

4. South Gloucestershire Climate Change Strategy

The South Gloucestershire Climate Change Strategy document sets local targets on carbon reduction and renewable energy which have been derived from the legally binding UK targets and from an assessment of local renewable energy resources.

This document establishes a target to deliver 7.5% of South Gloucestershire's total projected 2020 energy demand from renewable sources. Illustrative scenarios are set out to show how a varying mix of technologies could meet the 7.5% target. The Strategy may be found at:

http://www.southglos.gov.uk/climatechangestrategy

All planning applications should state their proposed installed capacity (kW), predicted energy generation (kWh/yr) and associated CO2 savings (tonnes/yr). It is also helpful to state the number of residential properties electricity equivalent for the southwest.

5. Local planning policy context

Core Strategy

Policy CS3 of the South Gloucestershire Core Strategy or 'Local Plan' (December 2013):

POLICY CS3 - RENEWABLE AND LOW CARBON ENERGY GENERATION

Proposals for the generation of energy from renewable or low carbon sources, provided that the installation would not cause significant demonstrable harm to residential amenity, individually or cumulatively, will be supported.

In assessing proposals significant weight will be given to:

1. The wider environmental benefits associated with increased production of energy from renewable sources;
2. Proposals that enjoy significant community support and generate an income for community infrastructure purposes by selling heat or electricity to the National Grid;
3. The time limited, non-permanent nature of some types of installations; and
4. The need for secure and reliable energy generation capacity, job creation opportunities and local economic benefits.

Renewable or low carbon energy installations will not be supported in areas covered by national designations and areas of local landscape value unless they do not individually or cumulatively compromise the objectives of the designations especially with regard to landscape character, visual impact and residential amenity.

Developments will also be required to meet objectives of Policy CS1 (High Quality Design), as far as engineering requirements permit.

South Gloucestershire's approach to Landscape Policy

South Gloucestershire has a well established landscape policy, having moved away from local landscape designations to a character based approach in its 2005 Adopted Landscape Character Assessment Supplementary Planning Document, reviewed in 2014. Therefore:

All applications for renewables development will be assessed in terms of impact on and/or integration with their particular context. A lack of designations does not imply that there are not significant characteristics or features that are highly valued locally and which will be considered when assessing the potential impact of a particular development proposal.

In addition, South Gloucestershire's particular settlement pattern is such that there are relatively few areas that are remote from human habitation, and those that do exist are relatively small in scale when compared with for example the open mountains and moors of some other parts of the country. This results in an inherent limitation on the capacity of South Gloucestershire to accommodate some technologies, including for example extensive wind farms.

Landscape Character Assessment SPD

South Gloucestershire comprises many contrasting and often complex landscapes, ranging from the distinctive scarp and hills of the Cotswolds Area of Outstanding Natural Beauty to the flat expanses of the Severn levels and the urban landscape around the edge of Bristol. Some landscapes have undergone significant change as a result of the expansion of the Bristol urban area, while other historic landscapes remain relatively undisturbed and /or include large areas of importance for biodiversity.

In parallel with the development of this Renewables SPD, a review of the Landscape Character Assessment SPD (2005) has also been undertaken, to reflect recent changes to the local landscape, to incorporate consideration of biodiversity and to include strategic guidance that sets out how Core Strategy policy will apply to South Gloucestershire's landscapes.

The Revised Landscape Character Assessment provides a statement of the existing character of the landscapes of South Gloucestershire and their distinctive attributes and features, subdividing the authority area into 21 landscape areas. Many of the character areas have strong visual interrelationships with other character areas, and therefore it is possible that large development in one character area may affect the views from or the setting of another.

The Council will expect planning applications to demonstrate how the Revised Landscape Character Assessment 2014[2a] has been taken into account when submitting development proposals.

Additional South Gloucestershire statutory planning documents

Consideration will also be given to other South Gloucestershire adopted DPD's or SPD's, where applicable, for example:

- West of England Joint Waste Core Strategy (adopted March 2011)
- Development in the Green Belt SPD (2007)
- Conservation Area Character Assessments
- Emerging and future Development Plan Documents and Supplementary Planning Documents
- Neighbourhood Plans

Other considerations

The Council will also have regard to the Cotswolds AONB Management Plan[2aa], including reference to the Position Statement on Renewable Energy Projects, and Position Statement on development in the setting of the Cotswolds AONB

Development proposals may be of a scale that they have potential implications beyond the boundary of South Gloucestershire, and therefore other Local Planning Authorities may need to be consulted.

Although it is recognised that Parish Plans and town strategies etc are not statutory plans, and do not therefore have the same weight as Neighbourhood Plans, they nonetheless express the views and values of local communities and therefore will be a material consideration in any planning decision.

[2a] http://www.southglos.gov.uk/environment-and-planning/countryside/planning-landscape-character-assessment/
[2aa] http://www.cotswoldsaonb.org.uk/planning-management-advice/management-plan/

6. Environmental Impact Assessment

Environmental Impact Assessment (EIA) is the process undertaken to determine whether a proposed development may have potential effects (positive or negative) on the environment, before any planning decisions are made. By integrating EIA into the planning and design process, alternatives will be considered at an early stage and where possible negative impacts should be avoided, designed out, mitigated or as a last resort compensated for.

EIAs have been required for certain major developments since the implementation in the UK of the European Council Directive on Environmental Assessment (85/337/EEC). The Directive was implemented in the UK in 1988 and subsequently amended by Directive 97/11/EC and 2011/92/EU. Directive 2011/92/EU is implemented by the EIA Regulations in the UK under the Town and Country Planning (EIA) Regulations 2011.

Schedule I of the Regulations lists large scale or high impact developments which will always require an EIA, whereas Schedule II lists developments which may or may not require an EIA depending on the characteristics and location of the development and the significance of the potential impact. The requirement for a full EIA for a proposed development can be determined via a request to the local planning authority for a screening opinion under Part 2 Regulation 5 of the EIA Regulations.

The EIA process plays an important role in project development, ensuring that all environmental aspects are considered through a scoping process, and any environmental constraints are identified at an early stage. The results of an EIA are presented in an Environmental Statement (ES). The ES is submitted with an application for planning permission.

Where Environmental Assessment regulations are not applicable, applicants will still be expected to provide an appropriate level of information on and assessment of the likely environmental, social and economic effects. This assessment should be proportionate to the scale, nature and predicted impact of the project and should highlight both positive and negative impacts and effects of all phases of the development, including construction, operation and decommissioning.

Where schemes are likely to have significant impacts locally or more widely, applications should be supported by fully framed legal agreements or undertakings that demonstrate effective impact mitigation.

Sustainability Appraisal & Habitats Regulations Assessment

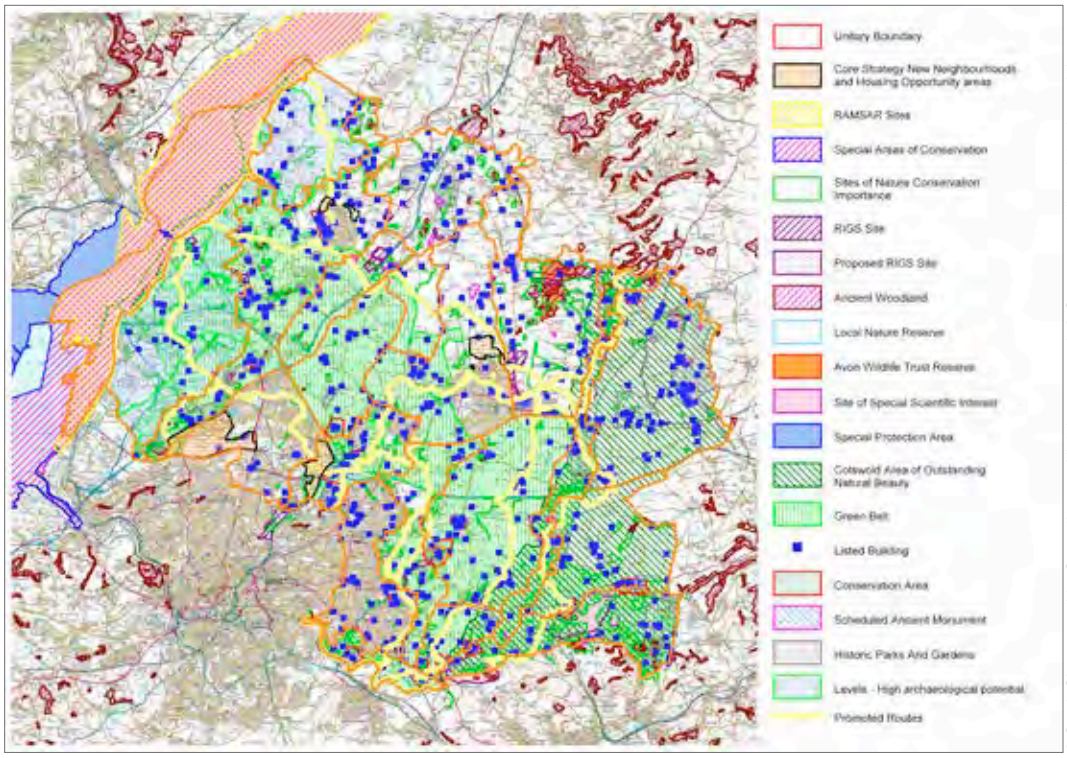
The Planning and Compulsory Purchase Act 2004 required Local Authorities to produce Sustainability Appraisals (SA) for all local development documents to meet the requirement of the EU Directive on Strategic Environmental Assessment (SEA).

However neither the Town and Country Planning (Local Development) (England) (Amendment) Regulations 2009 nor the 2012 Town & Country Planning Regulations, require SA to be undertaken on SPDs. This is because SPDs do not normally introduce new policies or proposals or modify planning documents which have already been subject to SA at a higher level. However the requirement to undertake SEA where required does still remain.

A full SA, including Habitats Regulations Assessment, was carried out in relation to the Adopted South Gloucestershire Core Strategy and therefore is not required in relation to the Renewables SPD. A SEA screening was undertaken, but not found to be required for this SPD. A copy of the SEA Screening Report for the Renewables SPD is published as a Background Paper[2b]. This explains the full reasons why an SEA is not required.

Figure 1 gives an indication of the wide range of planning and environmental designations that apply to South Gloucestershire, and which may have implications for the planning of renewables related development. It should be noted that due to the importance of factors such as protected species, relationships with the Severn estuary and landscape character, a lack of designation does not necessarily mean an area is suitable to host renewable technologies. Furthermore, the presence of a designation does not necessarily mean an area is not suitable to host renewable technologies. Each application will be assessed on its merits taking into account the compatibility of the proposal with the purposes of relevant designations and any other material considerations.

Figure 1: Planning and environmental designations



This map is only intended to give an impression of the complexity of designations applying in South Gloucestershire. Developers are advised to always check designations at an early stage of site investigation.

[2b] https://consultations.southglos.gov.uk/gf2.ti/f/407042/11377861.1/PDF/-/Renewable_SPD_SEA_Screening_Report.pdf

7. Local community involvement and engagement

There is a legal requirement to carry out pre-application consultation with the local community for planning applications for wind turbine development involving more than 2 turbines or where the hub height of any turbine exceeds 15 metres as identified in Article 3A of the Town and Country Planning (Development Management Procedure) (England) Order 2010[3].

Policy CS3 of the Core Strategy states that 'significant weight' will be given to renewables proposals that enjoy significant community support and generate an income for community infrastructure purposes by selling heat or electricity to the National Grid. In order to demonstrate this:

Proposals for renewable energy development should be developed through local community engagement, demonstrate local community support and deliver local community benefits where appropriate.

Consultation and engagement should be proportionate to the scale of development proposed. For more minor schemes, early consultation would be expected with immediate or affected neighbours, so that their views can be taken into account during the planning and design of the proposals.

For larger schemes that will have an impact beyond the immediate surroundings, the Council will expect, in addition to the above, to see documentary evidence as follows:

- that local community involvement and engagement have formed an integral part of the pre-application planning and design process, and
- how the engagement has accorded with the requirements of the Council's Statement of Community Involvement, and
- the content of local community feedback and how local community input has influenced the final nature and form of the submitted proposals, and
- the specifics of proposals and /or arrangements for community leadership, buy in and/or benefits, where appropriate.

'Local community' means the host community where the proposed development will be built and who may be directly affected by the proposal.

It is strongly recommended that local community engagement includes an exhibition and drop in session early on in the development of the scheme, to discuss both the potential scale and nature of the proposals and what opportunities for community buy in and/or community benefit will be offered. It is also likely to be helpful to offer the opportunity for local people and Councillors to visit the potential site at an early stage in the planning of the scheme, to assist in understanding the issues relating to the site in question.

[3] Paragraph 025, Renewable and Low Carbon Energy, NPPG

Further consultation should then be repeated once the nature of the development and the proposals for community engagement, buy in and or benefit are more fully known. In doing this, views and suggestions can be sought and used to inform the planning, development and design of the scheme.

The South Gloucestershire Statement of Community Involvement sets out the Council's expectations with respect to engagement, and it is expected that this will include consultation with local residents and businesses that may be affected by the scheme and its construction, as well as relevant amenity groups (for example include fishing groups for a hydro scheme and or rights of way groups). Particular attention should also be paid to engaging with hard to reach groups.[4]
It will be important to ensure that technical information is presented in a way that is clear and accessible to the general public.

If there is any doubt as to the appropriate level of or arrangements for local community engagement, project promoters are invited to seek pre-application advice from the Council.

Examples of arrangements for local community buy in and or benefit may include:

- Opportunities for local people to take a financial stake in the project, for example by share issue or by local or community ownership of panels.
- The establishment of an annual payment based on electricity generated (as adopted by the Wind Industry protocol: A Community Commitment – The benefits of onshore wind[5] in their community benefits protocol) to a local environmental or community Trust or other agreed recipient/s of funding.
- Local projects that could be funded including environmental projects, community facilities, improving energy efficiency of local housing, installing renewable energy installation for community facilities.
- Community Enterprise schemes such as the Bath and West Community Energy Industrial and Provident Society which has invested in solar energy generation including on local school buildings. This Community Benefit Society offers individuals a financial stake and dividend as well as financing a Community Fund[6] that supports local projects that demonstrate community benefit, environmental sustainability, low or zero carbon use of energy.

Projects where there is clear evidence of community leadership and which can demonstrate significant levels of local community support are particularly encouraged. However it should be noted that the Council will also need to assess and give due weight to the legitimate planning concerns of those who may oppose any such scheme.

Although attracting significant weight in planning decisions, demonstration of effective local community engagement, buy in and/ or community benefit is of course just one of a number of factors that must be considered. Other factors include landscape, visual, heritage and / or other considerations that are material to the merits of the application. Figure 2 sets out those factors that are considered likely to be significant for each type of renewable energy project.

[4] http://www.southglos.gov.uk/environment-and-planning/planning/planning-policy
[5] http://www.renewableuk.com/en/renewable-energy/communities-and-energy/community-benefits-protocol/index.cfm
[6] http://www.bwce.coop/

8. Technology specific guidance

The following pages provide technology specific information and guidance covering:

- The nature of the technologies covered by this SPD,
- Potential opportunities and constraints,
- Examples of consented schemes implemented elsewhere,
- A checklist of the likely significant factors that need to be considered when planning, designing and submitting an application for proposed development and the methodologies by which they should be assessed,
- Planning and design guidance that seeks to secure delivery on relevant policy as set out the in Core Strategy and Local Plan.

In accordance with paragraph 10 of DCLG's Planning Practice Guidance for Renewable and Low Carbon Energy, this guidance also gives examples of how 'planning conditions or planning obligations can mitigate the impacts' of each of the technologies covered by this SPD[7], including that:

- Scheme design should seek to design out all impacts on communities, the economy and the environment and to design in benefits where possible.
- Planning conditions where appropriate would be the first resort to mitigate residual impacts of the development.
- Section 106 agreements may however be necessary for some technologies that have wider effects.

Likely key factors for consideration

The following table sets out those factors that in the experience of the Council are most likely to be significant issues in relation to the planning, design and impact assessment for each renewables technology. This matrix is for initial guidance only and cannot replace an appropriate assessment of the particular circumstances of each technology in the context of a specific locality.

[7] http://planningguidance.planningportal.gov.uk/blog/guidance/renewable-and-low-carbon-energy/

Figure 2: Factors that are considered likely to be significant for each type of renewable energy project

Technology	Potential Impact																					Comments
	Agricultural Grade and soils	Air Quality	Aviation	Biodiversity	Contamination	Decommissioning	Electromagnetic	Flicker/ Reflection/Glare	Flood / Drainage	Green Belt	Heritage	Landscape & Visual	Minerals	Noise	Odour	Proximity to nuclear installation	PROW	Rural Economy	Safety	Shadow flicker	Transport	Cumulative Impact	
Anaerobic Digester		✓		✓	✓	✓			✓	✓	✓	✓	✓	✓	✓		✓	✓			✓	✓	Range of applications from farm to industrial scale
Biomass	✓	✓		✓					✓		✓		✓	✓	✓			✓			✓	✓	Domestic/ commercial
Heat Pump											✓		✓	✓							✓	✓	Note*
Hydro Power				✓		✓			✓		✓	✓		✓					✓		✓	✓	Note*
Landfill Gas		✓				✓								✓					✓			✓	Note*
Solar Park	✓			✓		✓		✓	✓	✓	✓	✓	✓	✓			✓	✓			✓	✓	Note*
Solar Roof				✓		✓		✓			✓	✓										✓	
Wind	✓		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	Note*

Note Transport impacts possible during construction and decommissioning. Unlikely during operation.*

8.1 Anaerobic digester

Introduction

Anaerobic digestion (AD) is a natural process that converts organic matter such as agricultural manure and slurry, food waste and sewerage sludge into energy. This produces biogas, which is rich in methane and can be used to generate electricity or heat, or it can be upgraded by removing the carbon dioxide to produce bio-methane – which is effectively a renewable natural gas that can be put into the National Grid or compressed for use as a renewable road fuel. This process also produces 'digestate' that can be applied to farmland as a fertilizer and soil conditioner.

A typical AD scheme comprises infrastructure that is of an industrial nature, and includes:

- Storage for incoming materials
- The anaerobic digestion plant
- Electrical generation plant room
- Storage for digestate.

They may be developed at a range of scales and in a variety of locations, including for example at waste water treatment works, food processing facilities, on industrial estates and also in association with farms. Such facilities typically operate 24 hours per day.

Example of consented scheme elsewhere

Copys Green Farm, Norfolk

Digester and gas storage tank, Copys Green Farm. Courtesy of Farming Futures

- 130 kW installation
- 500 acre farm, with 100 cows, arable, and cheese making enterprise
- Aerobic digester facility integrated with building group to reduce impact on the wider landscape
- Digestate used as a free fertiliser replacement
- Much-reduced cost of disposing manure, silage and whey
- Generates electricity to run farm operations and export to the grid, as well as methane to provide heat for domestic and commercial operations

Potential opportunities for/constraints to development

AD facilities are likely to be most readily absorbed into the local environment where co-located with existing industrial buildings. Depending on the sensitivity of the

local environment, the introduction of AD facilities within rural landscapes is likely to be more challenging, due to the urbanising impact that the structures may have on the local and/or wider environment, including landscape and scenic quality, and the setting of heritage assets. However, AD facilities can offer significant benefits to farm operations by providing on-site treatment of farm waste with useable outputs in the form of energy and digestate. If sited, designed and landscaped sensitively it may be possible to reduce impact within rural landscapes to an acceptable level.

Access for transporting materials and grid connections can also be considerations that may provide opportunities and or constraints to development.

Proximity to settlement may also raise concerns regarding the potential for odour problems.

Checklist of factors for consideration: Anaerobic Digester

The following issues are considered likely to be of local concern and/or potential significance when assessing the impact of Anaerobic Digester proposals. Web links are provided to relevant assessment methodologies.

It should be noted that the Environment Agency controls the operation of anaerobic digesters under exemptions or permits, depending on whether they are used for agriculture or not, and the scale of the operation. Permits generally require a separation distance of at least 200m to the nearest sensitive receptor (typically a dwelling or work place) for certain stack heights. They also limit location with respect to groundwater protection zones, water courses, European Designated or Sites of Special Scientific Interest. They also require a written management system and baseline information regarding matters such as soil and groundwater contamination. For further information please contact the Environment Agency.

Figure 3: Anaerobic Digester-Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Air Quality	Air Quality Impact Assessment (Defra Technical Guidance (LAQM.TG(09), EPUK/ IAQM Guidance, Environment Agency H1 Guidance Annex F)	Emissions from engines, dust and bioaerosols from waste materials	http://laqm.defra.gov.uk/supporting-guidance.html http://iaqm.co.uk/guidance/ https://www.gov.uk/environmental-management/environmental-permits	EA permit (larger plant only)
Biodiversity	Extended Phase 1 habitat and protected species surveys included within applications – assessed on site by site basis	To ensure development accords with wildlife legislation, NPPF and national (Gov) and local Policies	https://www.gov.uk/government/publications/national-planning-policy-framework--2 https://www.gov.uk/government/publications/biodiversity-and-geological-conservation-circular-06-2005 http://www.legislation.gov.uk/uksi/2010/490/contents/made	

Figure 3: Anaerobic Digester-Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Contam-ination	Environment Agency technical guidance. Registered exemption/ standard rules/ environmental permit (depending on size and nature of facility)	Accidental releases/ unauthorised discharges to land or water		Environment Agency Permits
Decom-missioning	EA Technical guidance. Permit requirement for site to returned to original condition on surrender of permit (larger plant only)	Deterioration of land quality over the lifetime of the facility (larger plant only)		Environment Agency Permits
Flooding & drainage	Flood Risk Assessment Proposals for managing drainage and run off	Avoidance of impact on flood capacity and pollution risk	http://planningguidance.planningportal.gov.uk/ https://www.gov.uk/planning-applications-assessing-flood-risk https://www.gov.uk/environmental-permit-check-if-you-need-one	
Green Belt	Landscape and visual impact assessment in line with Guidelines on Landscape and Visual Impact Assessment 3RD edition 2013	Assess degree of impact on Openness of the green belt	Guidelines for Landscape and Visual Impact Assessment: IEMA Routledge Press http://www.landscapeinstitute.org/knowledge/GLVIA.php	Decision will need to compare benefits against harm to the purposes of the green belt
Heritage	Institute for Field Archaeology standards; EH methodology for assessment of setting	Potential impact on setting or significance of heritage assets and/or archaeological deposits through ground disturbance	http://www.archaeologists.net/codes/ifa http://www.helm.org.uk/guidance-library/setting-heritage-assets/	
Landscape and visual	Landscape and visual impact assessment in line with GLVIA third edition if in open countryside or sensitive location	To assess potential impact of buildings of industrial character on the character, appearance and amenity of the host landscape.	Guidelines for Landscape and Visual Impact Assessment: IEMA Routledge Press http://www.landscapeinstitute.org/knowledge/GLVIA.php	
Minerals	Assess potential impact on minerals resources.	Protect minerals resource areas from sterilisation	Links to the S Glos Core Strategy and Minerals and Waste local plan http://www.southglos.gov.uk/environment-and-planning/planning/planning-local-plans/	Likely to be relevant to larger scale schemes only
Noise	British Standard 4142:1997 Method for rating industrial noise	To assess acceptability of impact on sensitive receptors	http://shop.bsigroup.com/ProductDetail/?pid=000000000001154363	
Odour	Odour assessment Environment Agency registered exemption/ standard rules environmental permit (depending on size and nature of facility)	Odour from stored materials, process activities or products/ bi-products of the process (incl air handling treatment		
Public Rights Of Way (PROW)	No standard methodology	Impact on PROW routes and amenity (including odour) during construction and operation		
Rural Economy	No standard methodology	Assess any impact on nearby businesses that depend on their rural/ undisturbed setting		

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Transport	Department for Transport Guidance on Transport Assessment. Transport statement, including a schedule of vehicle movements off and on site over a typical 24 hour period	Assess impacts of any abnormal indivisible loads during construction, plus operational waste imports and sludge exports	http://planningguidance.planningportal.gov.uk	Potential impacts to be assessed during construction and operation
Cumulative impact	Standard EIA type assessment in combination with existing and proposed development	In line with established EIA methodologies	http://www.legislation.gov.uk/uksi/2011/1824/made http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/	

Notes: Slower low temperature AD requires longer storage and therefore larger buildings

In addition to planning permission, it is likely that an anaerobic digestion plant will require Environmental Permits from the Environment Agency before the plant could be brought into operation.[8]

Planning and Design Guidance

Design Guidelines

Adherence to the following guidelines will help to ensure that a development proposal complies with the strategic policies as set out in the Core Strategy and the saved policies of the Local Plan.

- Seek sites that are already set within an industrial context, close to grid connections, and avoid open undisturbed rural and historic landscapes and the settings to heritage assets or sensitive ecological habitats.
- The design of structures and buildings should be sensitive to context. Within an industrial landscape a more iconic approach to building design may be appropriate.
- For farm scale installations seek to co locate with existing structures with a more industrial character, and or to reuse redundant structures, as well as avoiding the use of higher grade agricultural land.
- Seek to ensure that the scale of buildings is in keeping with the surroundings. It may be appropriate to reduce the height of structures possibly by excavation to prevent visual dominance.
- Carefully consider built form, massing, colour and texture to complement existing buildings and maximise integration with the landscape.
- Carefully design the profiling of reused excavated material to create natural flowing land forms wherever possible instead of intrusive and alien bunds.
- A robust landscape scheme that is commensurate with the scale of the AD development should form a part of every application and should provide a level of screening that will ensure integration with its surroundings.

[8] http://www.environment-agency.gov.uk/business/sectors/32601.aspx

- Ensure that planting within the countryside is of native species that are appropriate to the locality and of biodiversity value.
- Fencing and/or boundary walls should be constructed of quality, minimum maintenance materials that are appropriate to the locality.
- Security and surveillance features, and/or facilities including lighting should be as unobtrusive as possible and avoid light pollution.
- Access arrangements should be designed to minimise impact on local landscape character and features, particularly in rural areas.
- Access routes and hours for deliveries and operation should avoid disturbance to local communities, and site layout should ensure there is no queuing or turning on the highway.
- The scale and appearance of signage should be appropriate to the character of the locality.
- Onsite facilities must be incorporated to ensure adequate pest (including insects, vermin and birds), dust control and to ensure that wheels are washed free of debris and mud.
- Noise reduction measures must be designed into the scheme so that there is no disturbance to local communities or sensitive receptors such as schools.
- Grid connections should be sensitively designed and planned as an integral part of the scheme design, and undergrounded where necessary to protect the character and visual amenity of the locality.

Requirements and obligations

These would be assessed on a case by case basis depending on the characteristics of the site and the proposal, in the first instance requiring planning conditions. In some cases the proposal could result in the requirement to enter into a Section 106 Agreement, for example in respect of transport issues.

Planning Conditions, Compliance and enforcement

In addition to the normal pre-commencement conditions, including to protect heritage and ecological assets, to address transport issues, and control details of the layout, design, landscaping, lighting, service runs etc, the following matters are likely to be controlled by the implementation of planning conditions requiring:

- Control of the timings of construction work and vehicular movements - to determine the appropriateness of routings and timings for delivery to prevent disturbance to residents and/or other sensitive receptors.
- The implementation of wheel washing - to protect the condition and safety of the highway network.
- The implementation and monitoring of measures to control and monitor odour, dust, litter and pests – to protect the amenity of residents and other sensitive receptors.
- The minimisation of light pollution - to ensure protection of amenity and biodiversity.
- Noise controls setting limits and times of operation as applicable.
- Requirement to remove all buildings, facilities and equipment and site restoration within 6 months (or other period as agreed) of the cessation of operation of the AD facility – to protect the character and amenity of the locality. This would apply to temporary permissions.

8.2 Biomass

Introduction

Biomass is a generic term for any organic material that can be used to produce heat, electricity or fuel for transport, and includes woody energy crops and thinnings, other energy crops including oilseed rape, sugar beet, wheat and maize, agricultural residues such as straw and manure as well as , the biomass content of municipal solid waste, waste wood, poultry litter, abattoir waste and waste vegetable oils.

It is recognised that there are concerns however about the sustainability of some biomass sources, in terms of their impact on the environment and also diversion of land, (including higher grade agricultural land), and crops away from food production. However, most aspects of the production of biomass are beyond the control of planning.

While accepting that the source of biomass cannot generally be controlled through planning, this Council encourages the use of biomass from locally sourced and sustainable sources.

The aspect of energy from biomass that comes within planning control relates to facilities to store the materials and the combustion installations / boilers, and for smaller schemes their most significant feature may be their chimney. Biomass combustion installations can vary from small and domestic in scale, through to large commercial facilities including those that provide a heat grid to other development, through to large scale stand alone power generation facilities.

Proposals for intermediate scale facilities will often form part of a larger planning application, for example for large business or other institution, or a housing scheme; and the guidance set out in this SPD may be relevant to that aspect of the proposal. The Environment Agency deals with permits for combustion installations over 50 MW or over 3MW if using waste as a fuel. Larger stand alone biomass facilities may operate 24/7 and require regular deliveries of materials.

Permitted Development:

The growing of biomass crops is an agricultural or forestry operation that falls outside planning control.

Examples of consented schemes elsewhere

Wadswick Country Store, Wiltshire

Harvesting of Miscanthus as an energy crop. Courtesy of Enagri Limited

- Farm business grows Miscanthus.
- Used to heat farm shop, staff accommodation and farmhouse.
- Biomass boiler uses 1 bale miscanthus per day.
- Flexible, secure fuel source.

Sheffield City Council, Carwood Close

Boiler room at Carwood Close. 320kW biomass boiler. Courtesy of Econergy

- Swapping aged gas boilers for woodchip to heat social housing.
- 100 two-storey homes supplied with heat and hot water.
- 320kW woodchip boiler installed in specially-designed boiler house.
- Fed by auger from underground fuel bunker.
- Locally sourced woodchip used.

Potential opportunities for / constraints to development

Well designed proposals for smaller biomass combustion installations are likely to be acceptable across the Council area. The main constraints are likely to relate to the settings to any historic buildings or proposals in particularly sensitive landscapes. For larger schemes, their more industrial nature, their need for regular deliveries of biomass materials, and the potential for odours from the storage of biomass and dust are likely to limit locations to industrial areas and/or sites that are sufficiently distant to residential properties.

Proposed biomass facilities within Air Quality Management Areas would require particular consideration to ensure that they do not add to existing problems.

Checklist of factors for consideration: Biomass

The following issues are considered likely to be of local concern and/or potential significance when assessing the impact of Biomass proposals. Web links are provided to relevant assessment methodologies.

Figure 4: Biomass-Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Agricultural Grade and Soils	Assess impact on grade of agricultural land as per DEFRA land classification. Where information is not available, a land survey will be needed to demonstrate agricultural grade	to ensure compliance with national policy to avoid higher quality agricultural land.	http://publications.naturalengland.org.uk/publication/35012?category=23033	Growing biomass not controllable through the planning process
Air Quality	Biomass and Air Quality by EPUK Development Control: Planning For Air Quality (EPUK)	for developers to consider impact of Biomass on local air quality	http://iaqm.co.uk/guidance	
Biodiversity	Extended Phase 1 habitat and protected species surveys included within applications – assessed on site by site basis	To ensure development accords with wildlife legislation, NPPF and national (Gov) and local Policies	http://publications.naturalengland.org.uk/publication/35012?category=23033	Applications affecting European Protected Species will be subject to test under the Habitat Regulations 2010
Flooding & drainage	Flood Risk Assessment proposals for managing drainage and run off	Avoidance of impact on flood capacity and pollution risk	http://planningguidance.planningportal.gov.uk/ https://www.gov.uk/planning-applications-assessing-flood-risk https://www.gov.uk/environmental-permit-check-if-you-need-one	
Heritage	Institute for Field Archaeology standards; EH methodology for assessment of setting	Biomass facilities/ buildings should also have regard to protecting the setting and significance of heritage assets and avoiding damage to archaeological deposits through construction and pipe runs	http://www.helm.org.uk/guidance-library/biomass-energy-historic-environment http://www.helm.org.uk/guidance-library/setting-heritage-assets http://www.archaeologists.net/codes/ifa	
Minerals	Assess potential impact on minerals resources	Protect minerals resource areas from sterilisation	Links to the S Glos Core Strategy and Minerals and Waste local plan http://www.southglos.gov.uk/environment-and-planning/planning/planning-local-plans/	Likely to be relevant to larger scale schemes only
Noise	British Standard 4142:1997 Method for rating industrial noise.	To assess acceptability of impact on sensitive receptors	http://shop.bsigroup.com/ProductDetail/?pid=000000000001154363	
Odour	Odour Impact Assessment H4 Odour Management (Environment Agency) Odour Guidance for Local Authorities (DEFRA)	Odour impact assessment to assess impact of potential odours on local receptors	https://www.gov.uk/government/publications/environmental-permitting-h4-odour-management https://www.gov.uk/government/publications/odour-guidance-for-local-authorities	
Rural Economy	No standard methodology	Assess any impact on nearby businesses that depend on their rural/ undisturbed setting		

Transport	Department for Transport Guidance on Transport Assessment. Transport statement, including a schedule of vehicle movements off and on site over a typical 24 hour period	Assessment of the suitability of the site and the highway network to safely accommodate vehicle movements.	http://planningguidance.planningportal.gov.uk	Potential impacts to be assessed during construction and operation
Cumulative impact	Standard EIA assessment in combination with existing and proposed development	In line with established EIA methodologies	http://www.legislation.gov.uk/uksi/2011/1824/made http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/	

Planning & Design Guidance

Design Guidelines

For all biomass facilities:

- Integrate biomass boilers with the built form of the host building, wider development and/or building.
- Ensure that site planning, and the design and finishes of the facilities are carefully considered so that they make a positive contribution to the landscape and urban fabric of the locality.
- Avoid harm to the fabric of or setting to heritage assets, landmarks, key view points or urbanisation of undisturbed rural landscapes.
- Consider carefully the design and location of the chimney to ensure that this enhances built form and composition.

For larger biomass facilities:

- Sites that are naturally screened from wider view are preferred.
- Regrading of the land should form gentle slopes and flowing curves rather than bunds.
- A landscape scheme is likely to be essential to provide a high quality setting, screening from or integration with the wider landscape or urban setting, as well as locally appropriate biodiversity habitat.
- Fencing and/or boundary walls should be constructed of quality, minimum maintenance materials that are appropriate to the locality.
- Security and surveillance features, and/or facilities including lighting should be as unobtrusive as possible and avoid light pollution.
- Access arrangements should be designed to minimise impact on local landscape character and feature, particularly in rural areas.
- Access routes should avoid disturbance to local communities, and site layout should ensure there is no queuing or turning on the highway.
- The scale and appearance of signage should be appropriate to the character of the locality.
- Onsite facilities must be incorporated to ensure adequate pest (including insects, vermin and birds), dust control and to ensure that wheels are washed free of debris and mud.

For larger biomass facilities (continued):

- Noise reduction measures must be designed into the scheme so that there is no disturbance to local communities or sensitive receptors such as schools.
- Grid connections should be sensitively designed and planned as an integral part of the scheme design, and undergrounded where necessary to protect the character and visual amenity of the locality.

Requirements and obligations:

These would be assessed on a case by case basis depending on the characteristics of the site and the proposal, in the first instance requiring planning conditions and in some cases the proposal could result in the requirement to enter into a Section 106 Agreement. For example, due to traffic generation to service larger biomass facilities, there may be transportation impacts that need to be controlled through a Section 106 Agreement.

Planning conditions, compliance and enforcement

In addition to the normal pre-commencement conditions, including to protect heritage and ecological assets, to address transport issues, control details of the layout, design, landscaping, lighting, service runs etc, the following matters are likely to be controlled by the implementation of planning conditions requiring:

- Control of the timings of construction work and vehicular movements - to determine the appropriateness of routings and timings for delivery to prevent disturbance to residents and/or other sensitive receptors.
- For larger facilities and/or those in sensitive locations, a Construction Method Statement will be required to detail how the development would be constructed – to ensure protection of environmental assets and avoidance of disturbance to communities and/or sensitive uses.
- The implementation and monitoring of measures to control and monitor noise, odour, dust, litter and pests – to protect the amenity of residents and other sensitive receptors.
- The implementation of wheel washing - to protect the condition and safety of the highway network.
- The minimisation of light pollution - to ensure protection of amenity and biodiversity.
- Requirement to remove all buildings, facilities and equipment and site restoration within 6 months of the cessation of operation of the facility – to prevent dereliction and protect the character and amenity of the locality.
- Hours of operation and/or transport movements to and from site.
- In addition for large scale infrastructure a mechanism for liaison with the local community should be established as appropriate to the construction, operational and decommissioning phases - to ensure that local communities concerns are highlighted to the developer and appropriately addressed.

8.3 Heat pumps and deep geothermal energy

Introduction

Heat pumps use heat that is stored in relatively shallow ground, air or water to heat and cool buildings. Their output of energy is significantly greater than that required to run the system, however they produce low temperature heat and are therefore usually connected to a low heat system such as under-floor heating.

Air sourced heat pumps comprise a unit similar in appearance to an air conditioning unit that sits outside the building. Water sourced heat pumps will normally be located within the building, with the pipework being submerged within a water body which can include for example a river, pond or lake.

Ground source heat pumps can be of two types, either open or closed loop. For closed systems an electrical unit pumps a mixture of water and antifreeze around underground pipes running either through a trench or borehole, which then circulates back to a ground mounted unit generally housed within the building

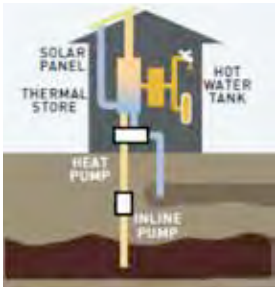
Deep Geothermal energy is considered to be that from a heat source below 100m in depth, including harvesting from aquifers and rocks as well as mine water. Depending on their scale and the source of heat being harvested, facilities range in scale, and are likely to involve preliminary test drilling and or abstraction to establish the viability of any proposal.

There are a significant number of old mine shafts in South Gloucestershire and investigation of their potential as a renewable source of energy is encouraged.

Please note: This SPD does not consider Engineered Geothermal Systems requiring the fracturing or 'fracking' of rock to enhance the permeability of rock at the heat source. Planning policy guidance on this matter can be found in the Council's Policies, Sites and Places Development Plan Document (DPD).

Examples of consented schemes elsewhere

Glenalmond Street Housing, Shettelston, Glasgow



- Geothermal energy for 16 flats and houses.
- Water taken from disused coal mine 100 metres under the site at 12°C, then passed through a heat pump to the thermal storage tank.
- Solar Thermal panels installed to provide further heat.
- Network of pipes distribute heat to each property.
- Study currently underway to investigate city-wide potential.

Geothermal energy schematic. Courtesy of John Gilbert Architects

Southampton District Energy Scheme

Southampton District Energy Scheme - Heat Station. Courtesy of COFLEY District Energy

- City wide District Energy scheme extracting geothermal energy from underlying aquifers.
- Heating, cooling and CHP.
- 800 residential customers, 45 commercial.
- 14km of buried pipework.
- Heat room (right) constructed in middle of retail development containing buildings of similar age and design.

Potential opportunities for / constraints to development

The Environment Agency hosts a link to a map based screening tool to show which areas of England may be suitable for an open loop source pump.[9]

Constraints are likely to relate to proposals that result in physical alterations to listed buildings, visual impact including on heritage or ecological assets, local landscape and/or amenity issues. Biodiversity values may constrain the implementation of water source heat pumps due to the potential for impact on sensitive habitats or species.

Open loop ground source heat pumps are subject to Environment Agency (EA) permits because they abstract and discharge water. For closed loop systems the EA can place controls on the use of hazardous substances (the antifreeze in the pipework) in sensitive locations such as in a groundwater protection zone, proximity to a watercourse or designated wetland site, or near a septic tank.

Noise from any external fan may cause disturbance to neighbours and will also be a relevant consideration in the interests of protecting amenity. For deep geothermal noise impacts on neighbours and wildlife from test drilling as well as ongoing operation of the infrastructure may constrain development.

An abstraction license and environmental permit from the Environment Agency would be required for deep geothermal proposals.[10] If mine water is proposed to be used, a licence will be required from the relevant body, for example the Coal Authority.

[9] https://www.gov.uk/government/collections/ground-source-heating-and-cooling-forms-and-guidance-notes
[10] https://www.gov.uk/deep-geothermal-energy-regulation

Checklist of factors for consideration for each technology

The following issues are considered likely to be of local concern and/or potential significance when assessing the impact of heat pump proposals. Web links are provided to relevant assessment methodologies.

Figure 5: Heat Pumps-Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Heritage	English Heritage Guidance on Heat Pumps Institute for Field Archaeology standards; EH methodology for assessment of setting	To determine likely impact on the significance and setting of heritage assets. Ground source heat pumps have the potential for damage to archaeological deposits	http://www.helm.org.uk/guidance-library/eetb-heat-pumps http://www.english-heritage.org.uk/publications/eetb-heat-pumps/heat-pumps-traditional-buildings.pdf http://www.archaeologists.net/codes/ifa	
Minerals	In the case of potential use of coal mine water there is need for liaison with the Coal Board	Coal Board licence required		
Noise	British Standard 4142:1997 for rating industrial noise	To assess acceptability of impact on sensitive receptors	http://shop.bsigroup.com/ProductDetail/?pid=000000000001154363	Potential change to permitted development with 42dBA
	MCS Planning Standards for permitted development installations of wind turbines and air source hear pumps on domestic premises	Sets out planning standard which must be complied with for domestics installations of air source heat pumps to be permitted development	http://www.microgenerationcertification.org/mcs-standards/installer-standards	
Transport	Department for Transport Guidance on Transport Assessment. Likely to only be relevant to larger scale installations and deep geothermal where there may be test rigging, boring equipment and large indivisible loads	Assessment of the suitability of the site and highway network to accommodate the vehicle movements.	http://planningguidance.planningportal.gov.uk	
Cumulative impact	Standard EIA assessment in combination with existing and proposed development	In line with established EIA methodologies	http://www.legislation.gov.uk/uksi/2011/1824/made http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/	

Planning & Design Guidance

Design Guidelines

For all heat pump and geothermal facilities:

- Avoid harm to the fabric of or setting to heritage assets, landmarks, key view points or urbanisation of undisturbed rural landscapes.
- Pumps should be located within existing buildings wherever possible, or for new build schemes should be designed in to form an integral part of the building/ building group.
- Piping, cabling or drilling should avoid impact on heritage assets including buried archaeology. A borehole beneath the proposed building may be appropriate in more sensitive locations.
- Infrastructure whatever its scale should be carefully designed in terms of location, size, massing, colour, materials and (for small scale installations) mountings to ensure minimisation of visual impact.
- Topsoil and subsoil should be separately and carefully stripped and appropriately stored to maintain its structure, and then reused when restoring the site following installation.
- Electricity and/ or grid connections should be sensitively designed and planned as an integral part of the scheme design, and undergrounded where necessary to protect the character and visual amenity of the locality.

For deep geothermal proposals the guidelines are as for larger scale biomass facilities (see page 24).

8.3.7 Requirements and obligations:

The necessity would be assessed on a case by case basis depending on the characteristics of the site and the proposal, in the first instance requiring planning conditions and in some cases the proposal could result in the requirement to enter into a Section 106 Agreement.

8.3.8 Planning conditions, compliance and enforcement

In addition to the normal pre-commencement conditions, including to protect heritage and ecological assets, to address transport issues and control details of the layout, design, landscaping, lighting, service runs etc, the following matters are likely to be controlled by the implementation of planning conditions requiring:

- Control of the timings of construction work and vehicular movements - to prevent disturbance to residents and/or other sensitive receptors.
- The implementation and monitoring of measures to control and monitor noise – to protect the amenity of residents and other sensitive receptors. If this can not be adequately mitigated on site, an hours of operation condition may be necessary.

- The implementation of wheel washing during exploratory investigations and construction - to protect the condition and safety of the highway network.
- For larger facilities, the minimisation of light pollution - to ensure protection of amenity and biodiversity.
- Requirement to remove all buildings, facilities and equipment and to restore site within 12 months of the cessation of operation of the facility – to prevent dereliction and protect the character and amenity of the locality.
- For larger facilities and/or those in sensitive locations, a Construction Method Statement will be required to detail how the development would be constructed.
- In addition for large scale infrastructure a mechanism for liaison with the local community should be established as appropriate to the construction, operational and decommissioning phases. To ensure that local communities concerns are highlighted to the developer and appropriately addressed.

8.4 Hydropower

Introduction

Due to the physical geography of the area, the opportunities for implementing hydro power in South Gloucestershire are generally limited to 'run of river' schemes that use the natural flow of a river, usually at a weir, diverting some of the water through a turbine to generate electricity. There may also, subject to the constraints of the international designations on the estuary and the agreement of the nuclear companies, be the possibility to investigate the potential for incorporation of hydropower equipment into for example the walls of the lagoon associated with the Oldbury power station.

Run of river schemes will usually involve a channel and/or spillway or pipeline that diverts some of the water to the turbine, with a screen that prevents fish or debris entering the turbine, a turbine house, a tailrace to return the water to the river and a grid connection.

Example/s of consented schemes elsewhere

Marsden, Gloucestershire

Mill race, with generating equipment in historic building. Courtesy of Western Renewable Energy

- Low head, low flow.
- 6kW Archimedes screw system chosen.
- Screw housed as far as possible in existing building to retain historical use.
- The site had historical flooding problems.

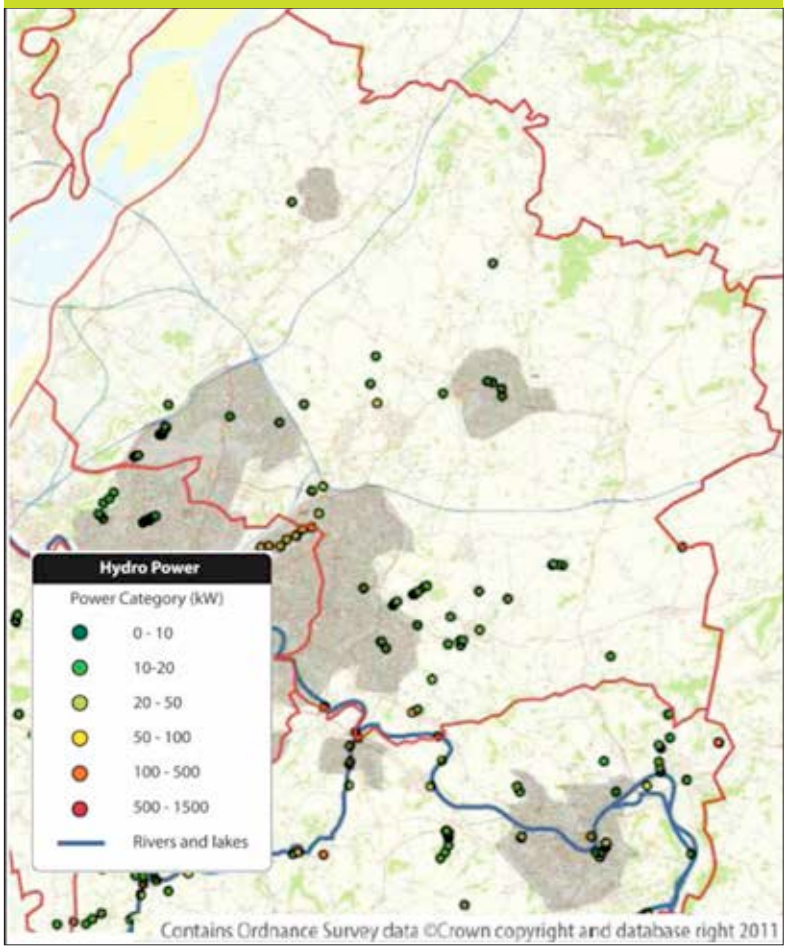
Alhampton Mill, Somerset

Archimedes screw and generator housing. Courtesy of Potenergy

- Low head, medium flow.
- 12kW Archimedes screw.
- Minimum maintenance requirement.
- "Fish friendly" system.
- Provides power to private house and exports surplus to the grid.

Potential opportunities for / constraints to development

Figure 6: Locations in South Gloucestershire where the water flow appears to have potential for the implementation of hydro schemes (Buro Happold, 2012, based on Environment Agency datasets)



A number of factors may constrain the implementation of hydro schemes, including for example where flood risk would be increased or migratory fish harmed, and to ensure the control of any pollution risk, particularly during construction. These factors are controlled through Environmental Permits issued by the Environment Agency.

Other constraining factors may include for example where a weir is a significant heritage asset or a historic mill is present. The site may be located in sensitive landscapes or the water course may contain important habitats or species that could be adversely affected. There may be variability of ecological sensitivity of the site across the seasons, and this would have implications for both the timing and methods of construction.

Checklist of factors for consideration

The following issues are considered likely to be of local concern and/or potential significance when assessing the impact of hydro power proposals. Web links are provided to relevant assessment methodologies.

Figure 7: Hydro power-Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Biodiversity	Potential barrier to fish migration routes; and impacts on estuarine waterfowl. European Sites (SAC/SPA/ Ramsar) subject to Habitat Regulations Assessment process Extended Phase 1 habitat and protected species surveys included within applications – assessed on site by site basis Environment Agency permit controls impact on fish	Statutory duty. Any development (plan or project) likely to have a significant effect on the conservation objectives of a European Site must be subject to assessment under the Habitat Regulations 2010. To ensure development accords with wildlife legislation, NPPF and national (Gov) and local Policies	https://www.gov.uk/government/collections/hydropower-schemes-guidelines-and-applying-for-permission https://www.gov.uk/government/publications/national-planning-policy-framework--2 https://www.gov.uk/government/publications/biodiversity-and-geological-conservation-circular-06-2005 http://www.legislation.gov.uk/uksi/2010/490/contents/made	
Decom-missioning	Proposals for the decommissioning and removal following cessation of use	to avoid dereliction and long term impact on river		
Flooding / drainage	Environment Agency permit	Avoidance of impact on flood risk, including impeding water flow	http://planningguidance.planningportal.gov.uk/ https://www.gov.uk/government/collections/hydropower-schemes-guidelines-and-applying-for-permission	
Heritage	Institute for Field Archaeology standards; EH methodology for assessment of setting	Potential effects on heritage assets and archaeological deposits through ground disturbance. E.g. Many 'mill' buildings may be listed nationally and consent would be required for installations	http://www.helm.org.uk/guidance-library/setting-heritage-assets http://www.archaeologists.net/codes/ifa	EH Guidance to be published
Landscape and visual	Landscape and visual impact assessment in line with GLVIA third edition where the scale of the development or the sensitivity of the receiving landscape indicate	To determine the level and acceptability of impact on landscape character and visual amenity	Guidelines for Landscape and Visual Impact Assessment: IEMA Routledge Press http://www.landscapeinstitute.org/knowledge/GLVIA.php	

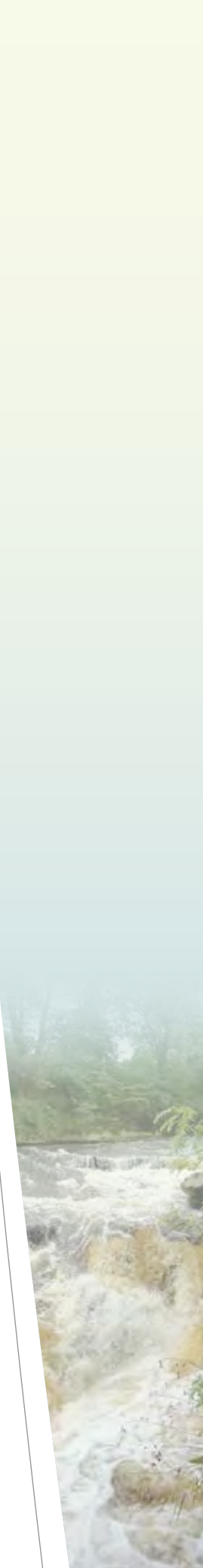


Figure 7: Hydro power-Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Noise	Manufacturer's noise data for the make & model of turbine proposed. British Standard 4142:1997 method for rating industrial noise	To assess acceptability of impact on sensitive receptors, including residents / amenity / wildlife	http://shop.bsigroup.com/ProductDetail/?pid=000000000001154363	Depending on location it is likely that the noise levels from the water would be higher than screws To be submitted with planning application
Safety	Possible river safety issues	To ensure public safety		
Transport	Department for Transport Guidance on Transport Assessment, to include proposals for routing of any abnormal indivisible loads	Assessment of suitability of the site and the highway network to safely accommodate the vehicle movements	http://planningguidance.planningportal.gov.uk	Impact potentially during construction as a result of bringing in large parts / equipment
Cumulative impact	Standard EIA assessment in combination with existing and proposed development	In line with established EIA methodologies	http://www.legislation.gov.uk/uksi/2011/1824/made http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/	

Note: Low output small scale mill systems on rivers at existing weirs most likely to be proposed in South Gloucestershire

Planning & Design Guidance

Design Guidelines

It is anticipated that any hydro schemes in South Gloucestershire will be modest in scale and the guidelines set out below have been drafted accordingly:

- Plant should be housed within an existing building or structure where possible and where these structures are historic they should be sympathetically repaired.
- The repair or restoration, as appropriate, of mill buildings, water wheels and other heritage features is secured as part of a hydro scheme relating to a statutory listed mill.
- Ensure that the planning of the construction phase and working methods as well as the design of hydro scheme itself not only avoid impact on but also enhance the biodiversity of the locality.
- The safe passage of fish and other freshwater animals must be facilitated.
- Any new building or structure should be of a form that compliments the local vernacular and of materials that blend with the surroundings.
- The turbine housing should be designed to ensure that it contains significant noise.

- Topsoil should be stripped and appropriately stored, or ground protection used during construction to enable restoration of the local landscape after construction.
- Any fencing or railings must be designed in terms of both materials and colour to blend into the landscape.
- Grid connections should be sensitively designed and planned as an integral part of the scheme design, and undergrounded where necessary to protect the character and visual amenity of the locality.

Requirements and obligations:

These would be assessed on a case by case basis depending on the characteristics of the site and the proposal, in the first instance requiring planning conditions and in some cases the proposal could result in the requirement to enter into a Section 106 Agreement.

Examples of issues that could require mitigation through a Section 106 Agreement, include measures required to facilitate the delivery of abnormal loads, flood capacity compensation, habitat creation or interpretation off site.

Planning Conditions, Compliance and enforcement

In addition to the normal pre-commencement conditions, including to protect heritage and ecological assets, to address transport issues and control details of the layout, design, landscaping, lighting, service runs etc, the following matters are likely to be controlled by the implementation of planning conditions requiring:

- Control of the timings of construction work, commissioning and vehicular movements - to prevent disturbance to biodiversity or residents.
- The implementation of wheel washing during exploratory investigations and construction- to protect the condition and safety of the highway network.
- For facilities in ecologically or heritage sensitive locations, a Construction Method Statement will be required to detail how the development would be constructed.
- A maintenance plan to ensure monitoring and cleaning of the intake screen – to monitor impacts on biodiversity and ensure optimal energy generation.
- Noise controls. If noise cannot be successfully mitigated on site, controls over hours of operation.

8.5 Landfill gas

Introduction

Although generated from land fill which is not a renewable resource, and it is this Council's policy to minimise waste to landfill, where such facilities do exist the harvesting of gas from landfill is encouraged. This has the additional benefit of reducing emissions of methane, which is a potent greenhouse gas. Burning of methane to generate energy from landfill gas produces CO2, but the latter has a much weaker global warming effect.

Examples of consented schemes elsewhere

Auchencarroch Landfill Site

Electricity generating infrastructure at Auchencarroch
Courtesy of Barr Environmental Ltd

- 4MW generation capacity, supplying 1,300 homes.
- Landfill gas collected through network of pipes.
- Containerised internal combustion engines.
- Any gas surplus to requirements undergoes complete combustion within a flare system.

Blaydon Landfill Gas Project, Newcastle upon Tyne

Electricity generating infrastructure at Blayden
Courtesy of ENER-G

- 2.2MW capacity, commissioned 2013.
- Landfill gas engines use up to 1600 m3/hr.
- Odours from the site are significantly reduced.

Potential constraints to opportunities for development

At date of publication of this SPD landfill gas was a diminishing resource in South Gloucestershire.

The Environment Agency is responsible for permitting and also has guidance in relation to landfill gas.[11]

Checklist of factors for consideration

The following issues are considered likely to be of local concern and/or potential significance when assessing the impact of landfill gas proposals. Web links are provided to relevant assessment methodologies.

Figure 8: Landfill Gas - Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Air Quality	The EA have a number of technical guidance notes for landfill gas	To consider impact on local air quality	http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/geho0311btop-e-e.pdf	
Decom-missioning	Proposals for decommissioning and removal of equipment following cessation of use	To avoid long term dereliction		
Noise	Engines would be expected to be contained within an acoustic enclosure. Standby flare could generate low frequency noise. British Standard 4142:1997. Minerals Policy Statement 2: Annex 2	To assess acceptability of impact on sensitive receptors	http://shop.bsigroup.com/ProductDetail/?pid=000000000001154363 http://www.planningportal.gov.uk/planning/planningpolicyandlegislation/previousenglishpolicy/mmgmpsmmg/mps2	
Safety	DSEAR	To assess risk of fire & explosion	http://www.hse.gov.uk/fireandexplosion/dsear.htm	
Cumulative impact	Standard EIA assessment in combination with existing and proposed development. ESA guidance – Landfill Gas: Industry Code of Practise	In line with established EIA methodologies	http://www.esauk.org/reports_press_releases/esa_reports/LandfillgasICoP2012web.pdf http://www.legislation.gov.uk/uksi/2011/1824/made http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/	

Notes:
Given that there would have to be an existing consented landfill site for there to be harnessing of gas, many of the issues of concern would be likely to have been dealt with as a result of a pre-existing landfill consent.

Engines rated above 3MW will be subject to a permit, smaller facilities will normally be included within the existing landfill permit.

[11] http://www.environment-agency.gov.uk/business/sectors/108918.aspx#landfillgas

Planning & Design Guidance

Design Guidelines

Since facilities to harvest landfill gas will be located within a landfill site, which is an already disturbed and / or urbanised landscape, guidelines seek to ensure that new facilities do not compound existing impacts and that they do not compromise restoration objectives.

- To minimise impact on the local/wider landscape, compounds, buildings, chimney and flare, and structures should be grouped with existing buildings and share access.
- Fencing and security should be designed to blend with the surrounding natural landscape and lighting that would urbanise the area or disrupt wildlife should be avoided.
- Facilities should be designed so that they do not compromise the timetable for or objectives of the restoration of the landfill site.
- Grid connections should be sensitively designed and planned as an integral part of the scheme design, and undergrounded where necessary to protect the character and visual amenity of the locality.

Requirements and obligations

These would be assessed on a case by case basis depending on the characteristics of the site and the proposal, in the first instance requiring planning conditions and in some cases the proposal could result in the requirement to enter into a Section 106 Agreement. Monitoring of air quality may be such an obligation.

Planning Conditions, compliance and enforcement

In addition to the normal pre-commencement conditions, including to protect heritage and ecological assets, control details of the layout, design, landscaping, lighting, service runs etc, the following matters are likely to be controlled by the implementation of planning conditions requiring:

- The implementation and monitoring of measures to control and monitor noise and odour – to protect the amenity of residents and other sensitive receptors.
- The implementation of wheel washing during exploratory investigations and construction – to protect the condition and safety of the highway network.
- The minimisation of light pollution - to ensure protection of amenity and biodiversity.
- Noise control during operation. If this cannot be adequately mitigated on site then control of hours of operation may be necessary – to protect amenity.
- A requirement to remove all buildings, facilities and equipment and restore the site within 12 months of the cessation of operation of the facility – to protect the character and amenity of the locality.

8.6 Solar – Ground mounted

Introduction

Ground mounted solar projects can vary in scale from a few panels up to many hectares, however many of the issues in terms of siting and design are similar albeit at differing scales.

Medium to large scale solar parks are likely to require buildings for switch gear and inverters etc, grid connections, access tracks security fencing and CCTV. Cumulatively this can have a significant impact on the character of the locality and the below ground archaeological resource, therefore sensitive siting and design is required to ensure that the impacts are reduced to an acceptable level. Where located on derelict or previously intensively managed ground, solar parks have the potential to improve biodiversity value. Solar parks are generally considered to be 'temporary' features in the landscape, generally planning for 25 to 30 years duration.

Examples of consented schemes elsewhere

Bradford on Avon solar park 12.5ha

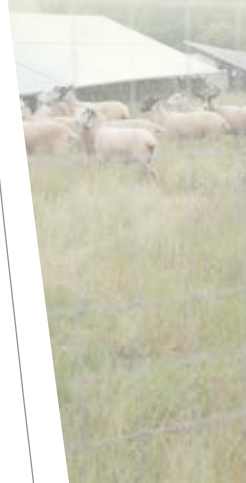
Sheep grazing below solar panels.
Courtesy of the land owner.

- Sensitive location on the edge of a historic town.
- Strong hedgerow network retained.
- New planting to supplement.
- Sheep grazing to maintain sward.
- Few public views in immediate vicinity.

Westmill Solar Park, Swindon

Aerial photo of Westmill Solar Park
Courtesy of Westmill Solar Coop

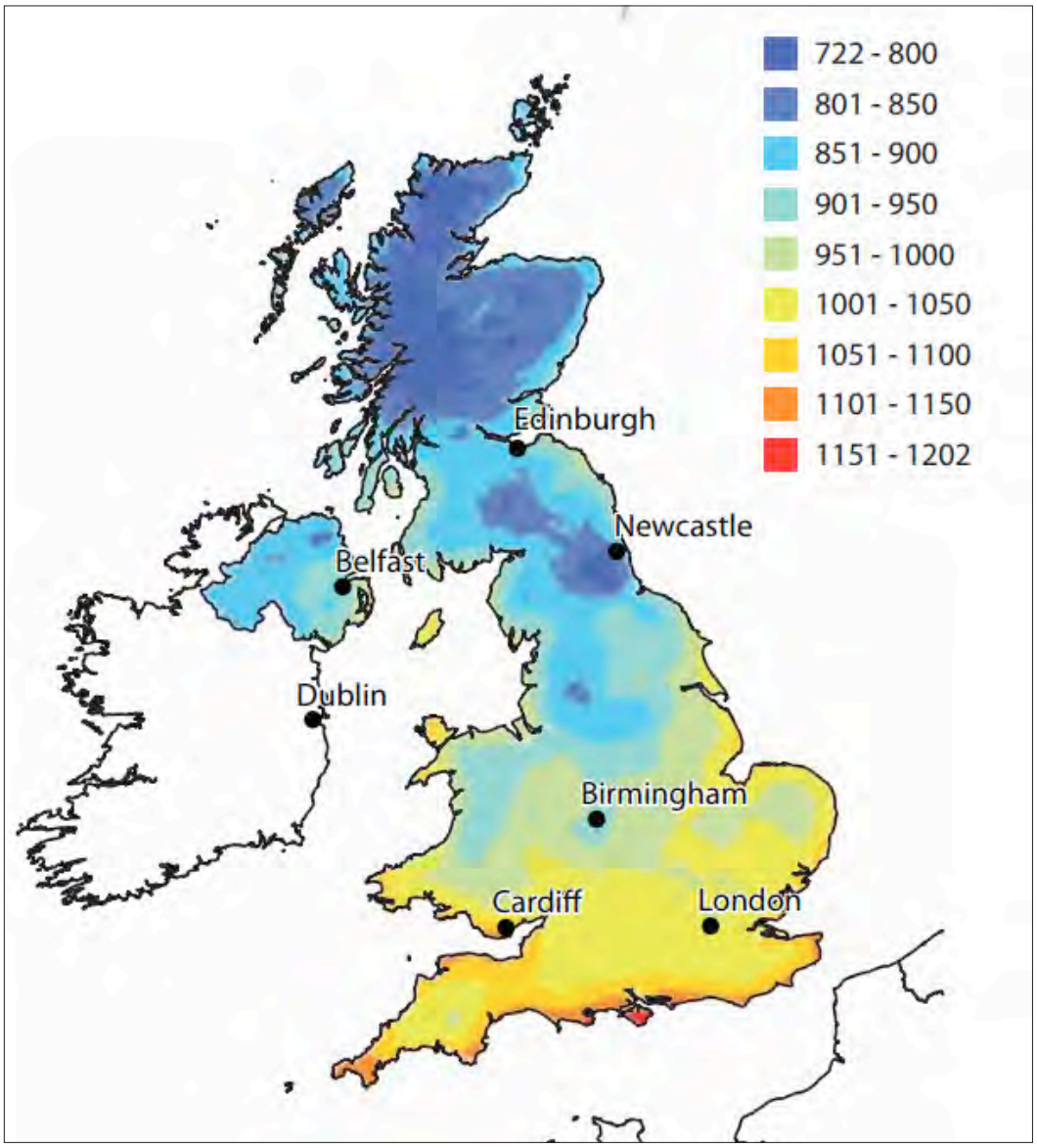
- Community-led development.
- Former airfield site with wind turbines.
- Hedgerows provide some reduction in visibility in local views.
- Co-located with nearby pre-existing wind turbines enables sharing of existing grid connection.



Potential opportunities for / constraints to development

South Gloucestershire is located within an area with relatively good solar irradiation levels compared with much of the UK; hence the interest from solar scheme promoters in locating projects here.

Figure 9: Solar radiation levels across the UK



Gently rolling or flatter landscapes with strong hedgerow frameworks and which are not significantly overlooked in public views or which do not form part of visually prominent land forms may have the potential to accommodate solar parks. They may however be constrained by the presence of landscape designations, and / or features or areas of heritage and or biodiversity value, and / or the presence of other solar parks or forms of development that together lead to cumulative impact.

map in preperation

The Council maintains a map that aims to show planning consents and refusals for larger solar farms in South Gloucestershire (link to be inserted). This will help with the assessment of site potential and cumulative impact, although it may also be relevant to consider consented and implemented schemes in adjacent Council areas. Developers are advised however to undertake a check of planning decisions held on Council's web sites in order to undertake their assessment of cumulative impact.

Access to the 33kV electricity network is the main option for solar installations greater than 5MW. These are limited in coverage however the network provider can offer connections in other locations, but this may have a cost implication which may affect the viability of some schemes and may potentially limit opportunities. Western Power Distribution covers the distribution networks in South Gloucestershire and they are able to offer further help and advice in this regard.[12]

In the interests of certainty of delivery, applicants should demonstrate that a suitable grid connection is in place for their proposed development or alternatively, proposals for grid connections should be submitted with the application to enable cumulative impacts to be assessed.

Planning consents are considered to be temporary for a period up of 25 - 30 years (the design life of most solar panels), after which time it can be expected that the solar panels would be removed and the site fully restored. A fresh planning application would be required for proposals beyond this period.

Checklist of factors for consideration for ground mounted solar

The following issues are considered likely to be of local concern and/or potential significance when assessing the impact of solar park proposals. Web links are provided to relevant assessment methodologies.

Figure 11: Ground Mounted Solar and Solar Parks: Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Agricultural grade and soils	Assess impact on grade of agricultural land as per DEFRA land classification. Where information is not available, a land survey will be needed to demonstrate agricultural grade. Compliance with DEFRA Construction Code of Practice for soils on construction sites	Potential for impact on high grade agricultural land. To ensure compliance with national policy to avoid higher quality agricultural land. Ensure conservation of soil resource and protection of agricultural value	http://publications.naturalengland.org.uk/publication/35012?category=23033 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69308/pb13298-code-of-practice-090910.pdf	

[12] Western Power Distribution - http://www.westernpower.co.uk/Contact-Us

Figure 11: Ground Mounted Solar and Solar Parks: Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Biodiversity	Any proposed solar park in the floodplain of the Severn Estuary European Site (SAC/SPA/ Ramsar) will be subject to assessment under the Habitat Regulations 2010. Elsewhere development should be supported by relevant surveys and assessments. Extended Phase 1 habitat and protected species surveys included within applications – assessed on site by site basis	Statutory duty. Any development likely to have a significant effect on the conservation objectives of a European Site must be subject to assessment under the Habitat Regulations 2010. To ensure development accords with wildlife legislation, NPPF and national (Gov) and local policies	http://www.naturalengland.org.uk http://www.legislation.gov.uk/uksi/2010/490/contents/made https://www.gov.uk/government/publications/national-planning-policy-framework--2 https://www.gov.uk/government/publications/biodiversity-and-geological-conservation-circular-06-2005	Loss of great crested newt habitat subject to European protected species licensing provisions.
Decom-missioning	Commitment to removal following ceasing generation / expiration of proposed operational phase	To secure viable future of agricultural land and avoidance of dereliction		protecting character & appearance of locality by ensuring removal when no longer in use
Flooding & Drainage	Flood Risk Assessment for proposals within flood zones. Environment Agency requires 8m easement to main rivers.	To avoid impact on flood storage capacity and obstruction to flood water flow	http://planningguidance.planningportal.gov.uk/ https://www.gov.uk/planning-applications-assessing-flood-risk	Development potential may be constrained in flood zones 2 & 3.
Glare/ Reflection	A Glint and Glare assessment. Building Research Establishment methodology: Site Layout Planning for Daylight and Sunlight – a guide to good practice	Measurement and assessment of the occurrence and duration of reflected disability glare. Consider the likely reflective capacity of materials with particular reference to the face of the solar PV panel, and the likely lines of reflection relative to the suns trajectory	http://www.brebookshop.com/details.jsp?id=326792	Consultation with Network Rail is advisable in the vicinity of railway infrastructure.
Green Belt: Openess Setting to Historic Towns	Landscape and visual assessment in line with GLVIA third edition to establish scale of impact	Assessment allows weighing of predicted impacts on the openness, purposes and functions of the green belt	Guidelines for Landscape and Visual Impact Assessment: IEMA Routledge Press http://www.landscapeinstitute.org/knowledge/GLVIA.php	NPPF paragraph 91: When located in the Green Belt, developers will need to demonstrate very special circumstances if projects are to proceed. This may include the wider environmental benefits from increased production of energy from renewable sources

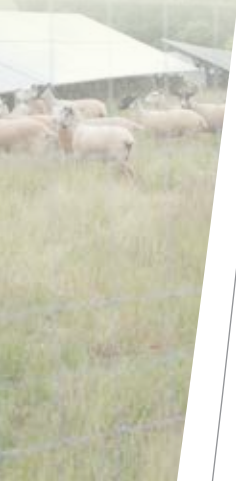


Figure 11: Ground Mounted Solar and Solar Parks: Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Heritage	Institute for Field Archaeology standards; EH methodology for assessment of setting	Assessment of impact on the setting and significance of heritage assets and archaeological impact through ground disturbance associated with supporting infrastructure, access tracks, cabling etc	http://www.english-heritage.org.uk/publications/setting-heritage-assets http://www.english-heritage.org.uk/publications/seeing-history-view http://www.archaeologists.net/codes/ifa	EH currently updating guidance on renewables to include large scale ground solar
Landscape and Visual	Impact Assessment in line with GLVIA 3rd edition where the scale of the proposed development or the sensitivity of the receiving landscape indicate this is necessary	Assessment of impact on landscape character and features, plus visual impact on public views and sensitive receptors	Guidelines for Landscape and Visual Impact Assessment: IEMA Routledge Press http://www.landscapeinstitute.org/knowledge/GLVIA.php	This issue to include assessment of impact on the openness and amenity of any Green Belt in accordance with the NPPF
Minerals Safeguarded areas	Does the proposal sterilise protected Minerals resources?	Ensure protection of minerals deposits that may become of economic importance in the foreseeable future	Links to the S Glos Core Strategy and Minerals and Waste local plan http://www.southglos.gov.uk/environment-and-planning/planning/planning-local-plans/	
Noise from electrical equipment such as inverters etc	British Standard 4142:1997 Method for assessing noise affecting residential areas.	To assess acceptability of impact on sensitive receptors	http://planningguidance.planningportal.gov.uk/	
Public Rights of Way	No standard methodology	To assess impact on route of public right of way and impact on amenity		
Rural economy		Consider potential for impact on a business that relies on an undisturbed rural setting alongside potential benefits to the rural economy e.g. through local ownership or a community benefit fund		The majority of the appeal decisions discuss socio-economic effects, including tourism - only one seen to date specifically discusses the effect on the rural economy
Transport	Department of Transport Guidance on Transport Assessment	Assessment of suitability of the site and highway network to safely accommodate construction vehicle movements	http://planningguidance.planningportal.gov.uk	Consultation with Network Rail recommended where development adjoins or may impact on a railway (Asset Project Engineers)

Figure 11: Ground Mounted Solar and Solar Parks: Checklist of Factors for Consideration				
Issue	**Methodology/ standards**	**Purpose of assessment**	**Web link**	**Comments**
Cumulative impacts	EIA guidance	standard EIA guidance	http://www.legislation.gov.uk/uksi/2011/1824/made http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/	
	Mapping to be made available on S Glos web site showing planning decisions in relevant areas adjacent to South Gloucestershire	To enable and appropriate assessment of cumulative impact, and due consideration of any constraints outside the S Glos boundary		Applicants are advised to agree in advance with the Council the appropriate area for consideration of cumulative impact

Planning & Design Guidance

Design Guidelines

- Select a site with close proximity to a grid connection, and utilise underground connections where possible, carefully planning the route to avoid damage to heritage, landscape or wildlife features.
- Seek to utilise previously developed land where available.
- Seek sites with less visibility in public views.
- Ensure that proposals do not compromise the objectives and settings of sites and areas that are designated for their natural beauty, heritage value or biodiversity.
- Avoid higher grade agricultural land, i.e. that defined as best and most versatile (grades 1, 2 and 3a).
- Avoid sites where levelling works will be required.
- Site planning and design should ensure that there is no disturbance to local communities and sensitive receptors.
- Retain, protect, actively manage & enhance hedgerow network and tree cover to help absorb solar park and maintain and enhance biodiversity. Laid hedges can be stock proof and improve the security of the site.
- Seek to manage ground vegetation by sheep grazing, as this allows the panels to be kept relatively low to the ground. Grazing by larger animals should be avoided as this requires the panels to be raised up, increasing their visibility and disruptiveness in the landscape.
- Encourage floriferous native ground flora to enhance biodiversity for bees/ insects.
- Ensure that the project is constructed to be reversible so that there is no permanent degradation of the landscape. For example, ensure that installations (e.g pile or screw foundations that are capable of easy removal) and access tracks are 'reversible' at the end of their life, so that the land can be returned to its original form and condition.

- Locate access tracks connecting to the installation to run alongside linear features such as hedges or stone walls, but
- Allow for at least 5+m buffers to existing hedgerows to conserve ground flora, allow for the movement of wildlife and to prevent shading.
- Locate and design any buildings or structures, including transformer boxes to avoid intrusive locations such as open or high ground, take advantage of the screening effect of landscape features such as trees or hedgerows, and to blend with the landscape and to reflect local building form and materials.
- Ensure the conservation of top soil, by stripping in advance of construction, handling and storing in accordance with best practice, and reinstating once the scheme is installed. Similar procedures should be followed at decommissioning.
- Where security fencing is necessary utilise a design that is not intrusive (such as weld mesh in a dark colour), that it does not form a barrier to wildlife movement and use existing hedges to screen.
- Minimise security lighting and use passive infra-red (PIR) to minimise glare, light pollution and impacts on biodiversity.
- If CCTV is required this must be carefully located and integrated with the landscape scheme to minimise visual and landscape impact.
- Ensure that drainage is designed to avoid concentration of run off and the formation of gulleys.
- Ensure that there is a mechanism for community liaison prior to and during development, operation and decommissioning.
- Grid connections should be sensitively designed and planned as an integral part of the scheme design, and undergrounded where necessary to protect the character and visual amenity of the locality.

Requirements and obligations

These would be assessed on a case by case basis depending on the characteristics of the site and the proposal, in the first instance requiring planning conditions and in some cases the proposal could result in the requirement to enter into a Section 106 Agreement for issues such as off site planting or habitat creation.

Planning conditions, compliance and enforcement

- In addition to the normal pre-commencement conditions, including to protect heritage, landscape and ecological assets, to address transport issues, control details of the layout to secure the retention and protection of landscape features and habitats, and control panel design/materials, landscaping, lighting, service runs etc, the following matters are likely to be controlled by the implementation of planning conditions.

- Planning permissions will normally be for a period of 25 - 30 years from the date of commissioning, after which removal will be required.

- Consents will generally need to be commenced within 3 years and a timeframe for the completion of construction and the commissioning of the development will be set – to provide certainty and avoid difficulties in assessing cumulative impact where development is commenced but not completed.

- Noise controls and limits and a requirement for monitoring as appropriate to the locality - to prevent unacceptable impacts on local communities.
- A Landscape and Ecological Management Plan – to protect and enhance biodiversity, landscape character and visual amenity in the long term.
- Top soil conservation – to protect soil quality and ensure establishment of planting and or seeding.
- Undergrounding of cabling – to protect the natural environment and visual amenity.
- Control of the timings of construction deliveries and work – to prevent disturbance to residents and/or other sensitive receptors.
- Construction Traffic Management Plan including wheel cleaning – in the interests of highway safety.
- Removal of any temporary works and reinstatement within 6 months of construction – to prevent unacceptable landscape and visual impacts.
- Limits to levels of light pollution – to ensure protection of amenity and biodiversity.
- Requirement to remove all buildings, facilities and equipment and site to restore within 6 months of the cessation of operation of the solar facility – to prevent dereliction and protect the character and amenity of the locality.
- Provision of electricity generation data upon request from the local planning authority – to enable monitoring against the Climate change Strategy.
- If there is a suitable publicly accessible location, an interpretation panel to be maintained for the life of the project - to advise re the nature of the project and raise awareness of renewable energy generation.

Community Benefit[13]

In line with the Core Strategy Policy CS3 point 2:

> Where a proposed development will have significant effects in the locality, and in recognition of the role that local communities play in hosting solar parks, it is expected that community benefit will be provided that is equivalent to the current, benchmark figure of £1000 per MW, or in line with a future, solar wide protocol should one be implemented.

This could be delivered through a Unilateral Undertaking, or where mitigating or offsetting planning related impact through a Section 106 or other legal agreement. For example: At Says Court Farm Solar Project, Westerleigh, the developer has committed to an annual payment to the Parish Council of £1000 per MW installed capacity to cooperate with the the local wildlife trust to delivery habitats adjacent to the solar park, and other works to benefit local ecology or energy efficiency.

[13] http://www.renewableuk.com/en/renewable-energy/communities-and-energy/community-benefits-protocol/index.cfm

8.7 Solar – roof mounted

Introduction

Solar panels include both photovoltaic and solar thermal or thermodynamic panels. While most schemes are currently retrofitted, in future it is anticipated that more new build projects will incorporate solar power generation surfaces into the fabric of the building.

Since many of the principles are the same, this guidance is intended to be applied to all scales of installation, including on domestic, farm and industrial buildings.

The installation of solar panels on roofs is encouraged providing they do not have an adverse impact on the heritage value, character, appearance or amenity of the building or locality.

Permitted Development:

The current situation with respect to permitted development should be checked. At the time of writing the installation of solar PV currently on buildings benefited from Permitted Development (PD) Rights, as specified in Parts 40 and 43 of the GPDO[13a]. However, it is a condition of permitted development, including for all domestic solar panels, that the solar panel is installed 'so far as practicable' to minimise its effect on the external appearance of the building'. It is therefore recommended that proposals for all roof mounted solar permitted installations follow the guidance set out in this SPD.

The above is subject to strict conditions, for example if the building is a Listed Building or where located in a Conservation Area, then PD rights may not apply. The installation of solar panels on the roof of a listed building will also require Listed Building Consent.

Examples of consented schemes elsewhere,

The Mead Community Primary school, Trowbridge, Wiltshire

Arial photo of solar on school roof.
Courtesy of Mead Community School

- 50kW installation on primary school roof under a community energy scheme.
- Solar panels are sympathetic character of the modern school building.
- Solar panels match the colour of the existing roofing.
- Education opportunity.

[13a]http://www.planningportal.gov.uk/permission/responsibilities/planningpermission/permitted

The Greener Group barn conversion, Chester

Building Integrated PV on roof of listed building. Courtesy of Solar Century

- Listed building requiring planning consent.
- Roof-mounted solar had previously been rejected.
- Building Integrated PV used instead of panels, to blend with slate roof and flex with the movement of the beams.

Potential opportunities for / constraints to development

Opportunities exist for the installation of solar panels on commercial and many residential buildings across much of South Gloucestershire. The primary requirements for maximum efficiency are a southerly aspect, lack of shading, a roof slope that is ideally 30-35 degrees and a structure that is capable of bearing the panels.

New development provides the opportunity for layouts to be planned to maximise active and passive solar gain, and for solar power panels to be designed into new buildings. This often results in higher quality design than retrofitting at a later date.

Solar panels can be incorporated into the overall roof plain of the building when re-roofing, giving a cleaner, neater appearance.

A location within the AONB, presence of a listed building, scheduled ancient monument or Conservation Area may form a constraint to the implementation of solar panels on roofs where these would impact on landscape or heritage values or the setting of designated assets. For example, the presence of a bat roost may affect the detailed design of a project. In such cases, applicants are advised to seek advice from the Council, or obtain independent, specialist advice.

Checklist of factors for consideration for each technology

The following issues are considered likely to be of local concern and/or potential significance when assessing the impact of roof mounted solar proposals. Web links are provided to relevant assessment methodologies.

Figure 12: Roof Mounted Solar: Checklist of Factors for Consideration				
Issue	**Methodology/ standards**	**Purpose of assessment**	**Web link**	**Comments**
Biodiversity	Fitting should be preceded by protected species surveys (bats, birds) – assessed on site by site basis	To ensure development accords with wildlife legislation, NPPF and national (Gov) and local Policies		https://www.gov.uk/government/publications/national-planning-policy-framework--2 https://www.gov.uk/government/publications/biodiversity-and-geological-conservation-circular-06-2005 http://www.legislation.gov.uk/uksi/2010/490/contents/made
Decom-missioning	Commitment to removal following ceasing generation / expiration of proposed operational phase	to protect the character and appearance of the locality		
Reflection/ Glare	A Glint and Glare assessment. Building Research Establishment methodology: Site Layout Planning for Daylight and Sunlight – a guide to good practice	To assess the occurrence and duration of reflected disability glare, including the likely reflective capacity of all of the materials with particular reference to the face of the solar PV panel, and the likely lines of reflection relative to the suns trajectory	http://www.brebookshop.com/details.jsp?id=326792	The BRE is the only guidance available.; There are no standards got glare
Heritage	Assessment of impact on the fabric and or setting of a listed building, or a Conservation Area including consideration of glare	Applications should be accompanied by an assessment which investigates the potential impact of the installation on the significance and setting of the heritage assets	http://www.helm.org.uk/guidance-library/small-scale-solar-thermal-energy-and-traditional-buildings http://www.helm.org.uk/guidance-library/small-scale-solar-electric-photovoltaics-energy http://www.helm.org.uk/guidance-library/setting-heritage-assets http://www.helm.org.uk/guidance-library/setting-heritage-assets	
Visual	Submit full details of the panels, including a scale drawing of their proposed location, plus specification for the colour, finish (including reflectivity), framing and mounting	To enable assessment of the impact of the panels on the host building and on the character and amenity of the locality		
Cumulative impact	Consider the cumulative impact along with other solar panels consented or implemented in the locality	To enable assessment of the impact on the locality bearing in mind others already installed/ consented	http://www.legislation.gov.uk/uksi/2011/1824/made http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/	

Planning & Design Guidance

Design Guidelines

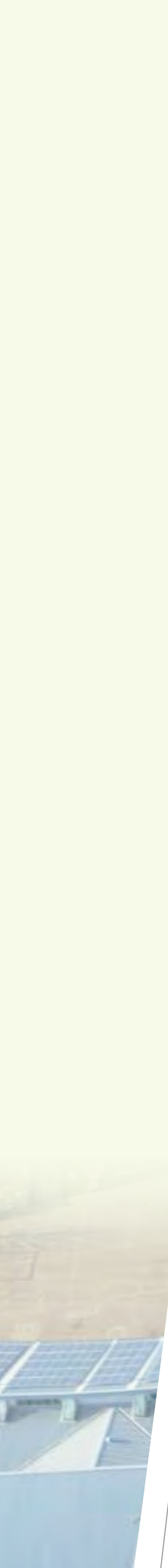
- Wherever possible solar panels should be incorporated into the design of the building rather than bolting on as a retrofit.
- Position panels to compliment the form of the existing building, or consider the use of outbuildings, valley roofs or extensions or ground mounted panels where this would reduce impact on the main building, and would not compromise the character and appearance of its setting.
- On sloped roofs, the panels should project no more above the roof than a typical roof light (up to 20cm).
- The highest part of the panels should be kept below the height of a sloped roof, including the ridge or apex of the roof in all viewpoints.
- Design the layout, colour, framing and mounting of solar panels to relate well to existing features and windows or roof lights to maintain or enhance the proportion of both the host and neighbouring buildings.
- Select a non shiny, anti glare finish and frames of a colour that blends in with the roof material of the host building.
- Electricity and/ or grid connections should be sensitively designed and planned as an integral part of the scheme design, and housed within the building or undergrounded where necessary to protect the character and visual amenity of the locality.

Planning conditions, compliance and enforcement

These would be assessed on a case by case basis depending on the characteristics of the site and the proposal.

In addition to the normal pre-commencement conditions, including to protect heritage and ecological assets and control details of the layout, design, landscaping, service runs etc, the following matters are likely to be controlled by the implementation of planning conditions requiring:

- Requirement to remove all equipment and mountings within 6 months of the cessation of operation of the solar panels – to protect the character and amenity of the locality.

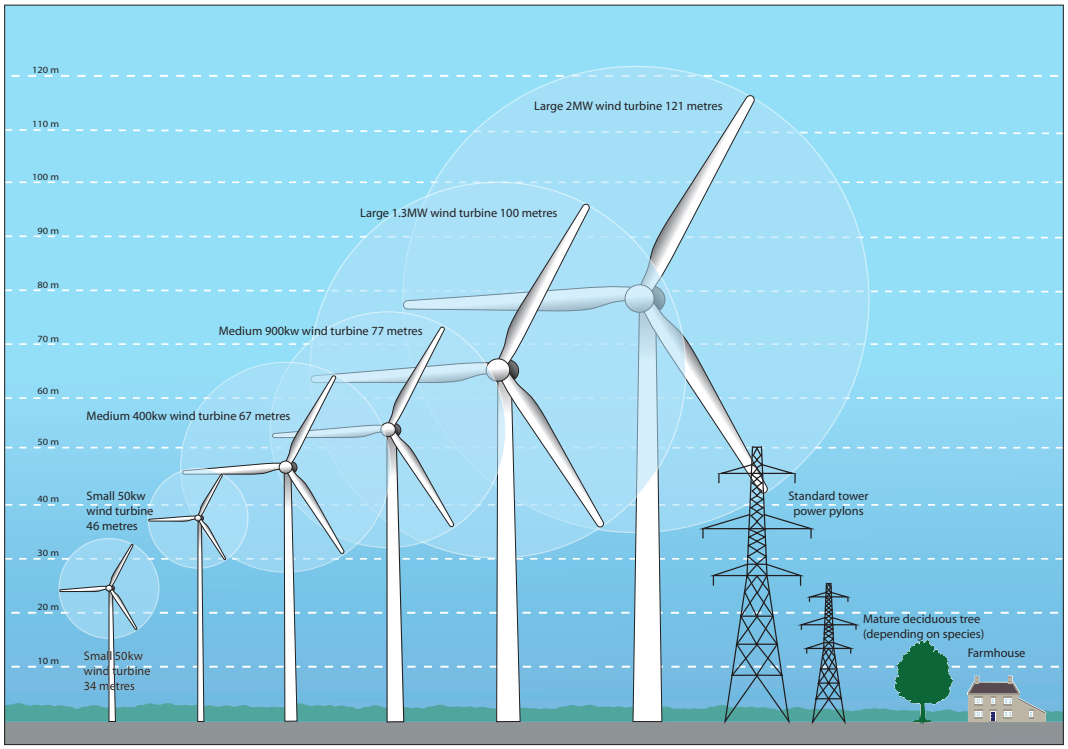


8.8 Wind

Introduction

This guidance applies to all scales of wind turbine since many of the principles will be the same, however depending on the scale, it is the extent of impact that is likely to vary.

Figure 13: Comparative scale of wind turbines



For the purposes of this SPD, wind turbines have been divided into broad categories as illustrated on this diagram. The heights are to the maximum height from existing ground level to the tip of blade. Large turbines could also include 130 metre high turbines or above.

It is notable that a single large 100 – 121m or 2.3MW turbine produces a similar amount of electricity to 46 smaller 34- 46m high turbines, therefore many more small turbines are needed to produce the energy output of a large one.

Wind turbine installations require site access for construction (both on the site and access for large vehicles and parts along existing roads) and maintenance, grid connections and potentially a substation. The planning, design and impact assessment of these elements should be considered alongside that of the turbines themselves.

Examples of consented schemes from elsewhere:

Swindon Westmill wind farm and solar park

Five 600kW turbines at Westmill Wind Co-op. Courtesy of Westmill Wind Co-op

- Fairly open flat landscape.
- Former airfield site.
- Few nearby dwellings.
- 100% community ownership and profit share.

Bristol Port

Turbines in the industrial landscape of Bristol Port. Courtesy of Ecotricity

- Set within an already industrial landscape on estuary edge.
- Promoted by the business hosting the turbines.
- Reduces cost by providing electricity supply for the port.

Shooters Bottom Farm, Chewton Mendip

Single 2 MW turbine at Shooters Bottom Farm. Courtesy of Ecotricity

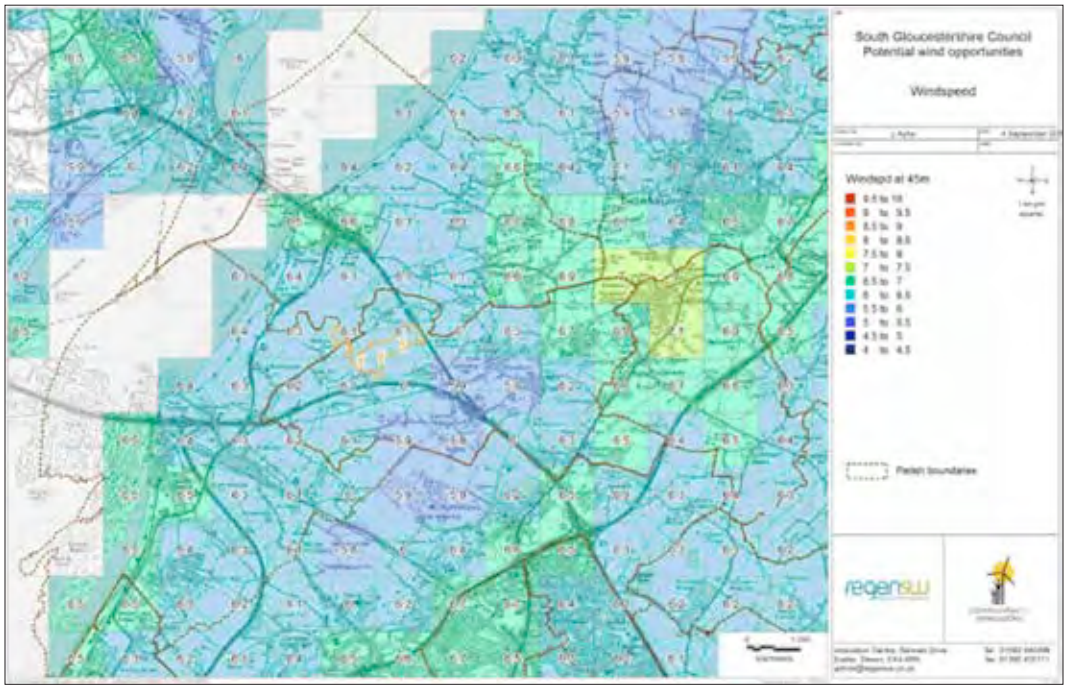
- Located in an undulating rural landscape.
- Single turbine comprises feature in landscape.
- Close to but outside designated area of AONB.

Potential opportunities & constraints

South Gloucestershire has extensive areas with wind speeds that indicate suitability for power generation. Figure 14 gives an indication of useable resource in South Gloucestershire.

As indicated on Figures 1 and 14, despite having significant areas of windspeeds that are suitable for the generation of electricity; the implementation of wind turbines in South Gloucestershire is constrained by a range of factors including its settlement pattern that comprises scattered dwellings as well as villages across much of the rural area.

Figure 14: South Gloucestershire Council Potential wind opportunities (RegenSW)



There are a wide range of environmental constraints, including a range of sites of national and international importance for nature conservation as shown on Figure 1 of the SPD. The Severn Estuary in particular is subject to a series of these designations. It is known as a European or Natura 2000 (N2K) Site, being designated as a Special Protection Area (SPA) under EC Directive 79/409 on the Conservation of Wild Birds ('the Birds Directive') and a Special Area of Conservation (SAC) under European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora ('the Habitats Directive 1992'), implemented in Britain by the Conservation (Natural Habitats & c) Regulations 2010 ('the Habitat Regulations').

The Severn Estuary is also a Ramsar site under the Ramsar Convention on the Conservation of Wetlands of Importance and is notified as a Site of Special Scientific Interest (SSSI) under the Wildlife & Countryside Act 1981 (as amended). It is not only the internationally designated site itself that provides a constraint. The waterfowl for which the Estuary is designated as a European Site also use fields and water bodies within the coastal floodplain (Lower Severn Vale Levels) during their overwintering and passage periods and these areas are subject to the same statutory processes and provisions as the SPA/Ramsar site itself.

South Gloucestershire also has a wide variety and distribution of heritage assets whose fabric and setting require protection.

This includes the eastern part of the District which forms part of the Cotswolds Area of Outstanding Natural Beauty, and therefore there is a requirement to conserve and enhance its natural beauty and also protect its setting.

In addition, the landscape character of South Gloucestershire varies considerably across the Council area. It is a fine grain landscape as reflected in the 21 Character Areas defined in the Adopted Landscape Character Assessment. These vary considerably from urban to rural, estuarine to Cotswolds, from undisturbed and tranquil rural landscapes to those that are the subject of significant and large scale commercial development. It is clear from planning appeal decisions and the recently published planning practice guidance that landscape character is a key factor in determining the suitability of an area to host wind turbines.

Wind turbines above the very small scale have the potential to result in significant changes to the character and appearance of a local and/or wider area. This is due not only to their scale relative to the surrounding landscape but also because of the movement of the blades in contrast to pylons and other stationary structures

Planning decisions in South Gloucestershire

It is observed that in South Gloucestershire, appeal decisions have dismissed proposals in an undisturbed rural landscape, while allowing those in locations where there are pre-existing features that already disturb, disrupt or intrude into the landscape.

map in preparation

The Council maintains a map that aims to show planning consents and refusals for non domestic small, medium and large wind turbines in South Gloucestershire (link to be inserted). This may provide a starting point for assessing cumulative impacts in combination with other wind turbines in South Gloucestershire, although it will be important to consider consented or implemented schemes in adjacent Council Areas. Developers are advised however to undertake a check of planning decisions held on Council's web sites in order to undertake their assessment of cumulative impact.

In accordance with the NPPF, the Council will follow the approach to impact assessment taken by the National Policy Statement EN-3 Renewable Energy as well as considering compliance with local plan policy.

Checklist of factors for consideration

The following issues are considered likely to be of local concern and/or potential significance when assessing the impact of wind turbine proposals. Web links are provided to relevant assessment methodologies.

Figure 16: Wind Turbines - Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Agricultural Grade	Assess impact on grade of agricultural land as per DEFRA land classification. Where information is not available, a land survey will be needed to demonstrate agricultural grade Compliance with DEFRA Construction Code of Practice for soils on construction sites	To ensure compliance with national policy to avoid higher quality agricultural land. Ensure conservation of soil resource and protection of agricultural value	http://publications.naturalengland.org.uk/publication/35012?category=23033 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69308/pb13298-code-of-practice-090910.pdf	
Aviation	Safeguarding Aerodromes Advice Note 7: Wind Turbines and Aviation CAA policy and guidelines on wind turbines	Provides information on aviation including heliports. Note: Air ambulance based at Filton	http://www.caa.co.uk/cap764	Note: National Police Air Service and Great Western Air Ambulance Service based at Filton
Biodiversity	Extended phase 1 habitat and relevant protected species surveys to inform development particularly for European protected species (EPS) such as bats, dormouse and great crested newts. Applications affecting (EPS) subject to test under the Habitat Regulations 2010. Natural England recommends a 50m stand off distance from outer swept path of blade tip to nearest hedgerow or tree line. This is to protect bats and birds from displacement and collision mortality	Statutory requirement/duty. Natural England guidance on Setting and RSBP guidance on assessment of affects on wildlife Particular focus on bat activity and hedgerow corridors	http://www.legislation.gov.uk/uksi/2010/490/contents/made https://www.gov.uk/government/publications/biodiversity-and-geological-conservation-circular-06-2005 https://www.gov.uk/government/publications/national-planning-policy-framework--2 re bats: http://publications.naturalengland.org.uk/publication/35010 http://www.rspb.org.uk/ourwork/policy/windfarms/index.aspx	

Figure 16: Wind Turbines - Checklist of Factors for Consideration				
Issue	**Methodology/ standards**	**Purpose of assessment**	**Web link**	**Comments**
	Proposals for turbines adjacent to the foreshore or within floodplain of the Severn Estuary SPA/Ramsar will be subject to assessment and the statutory provisions of the Habitat Regulations 2010 and necessitate wintering wildfowl surveys	To assess impacts of turbines on birds through mortality or displacement	http://planningguidance.planningportal.gov.uk/blog/guidance/natural-environment/biodiversity-ecosystems-and-green-infrastructure/	Statutory duty. Any development likely to have a significant effect on the conservation objectives of a European Site must be subject to assessment under the Habitat Regulations 2010
Decom-missioning	Submission of proposals for decommissioning following cessation of generation, or malfunction of one or more turbines	To protect character and appearance of locality, ensure removal when no longer in use		
Electro-magnetic interference	Tall Structures and their impact on broadcast and other wireless services	OFCOM Guidance	http://licensing.ofcom.org.uk/radiocommunication-licences/fixed-terrestrial-links/guidance-for-licensees/wind-farms/tall_structures/	
		BBC Assessment Tool	http://www.bbc.co.uk/reception/info/windfarm_tool.html	
Flooding & Drainage	Flood Risk Assessment for proposals within flood zones. Environment Agency requires 8m easement to main rivers	To avoid impact on flood storage capacity and obstruction to flood water flow	http://planningguidance.planningportal.gov.uk/ https://www.gov.uk/planning-applications-assessing-flood-risk	
	Extended Phase 1 habitat and protected species surveys included within applications – assessed on site by site basis	Particular focus on bat and bird activity and hedgerow corridors		
Green belt	Landscape and Visual impact assessment following GLVIA third edition	Identify scale of impact on the openness, purposes and functions of the green belt	Guidelines for Landscape and Visual Impact Assessment: IEMA Routledge Press http://www.landscapeinstitute.org/knowledge/GLVIA.php	Issues include openness and preserving the setting and special character of historic towns
Heritage	Assessment of impact on fabric of and settings to designated heritage assets. In areas of archaeological potential investigations and assessment of interest may be required	Potential implications in respect of the setting and significance of heritage assets and impact on archaeological deposits through ground disturbance.	http://www.english-heritage.org.uk/publications/setting-heritage-assets/ http://www.english-heritage.org.uk/publications/wind-energy-and-the-historic-environment http://www.english-heritage.org.uk/publications/seeing-history-view	Assessment of views to be factored into Landscape and Visual Impact assessment. Viewpoints should be agreed in advance with LPA

Figure 16: Wind Turbines - Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Heritage	Assessment of impact on fabric of and settings to designated heritage assets. In areas of archaeological potential investigations and assessment of interest may be required	Potential implications in respect of the setting and significance of heritage assets and impact on archaeological deposits through ground disturbance.	http://www.english-heritage.org.uk/publications/setting-heritage-assets/ http://www.english-heritage.org.uk/publications/wind-energy-and-the-historic-environment http://www.english-heritage.org.uk/publications/seeing-history-view	Assessment of views to be factored into Landscape and Visual Impact assessment. Viewpoints should be agreed in advance with LPA
Landscape and Visual	Guidelines for Landscape and Visual Assessment third edition	Assessment of impact on landscape character and features, plus visual impact on public views and sensitive receptors	Guidelines for Landscape and Visual Impact Assessment: IEMA Routledge Press http://www.landscapeinstitute.org/knowledge/GLVIA.php	Animated images may be required to illustrate impacts on sequential vi ews/
Minerals Safeguarded areas	Does the proposal sterilise protected Minerals resources?	To ensure the protection of minerals deposits that may become of economic importance in the foreseeable future	Links to the S Glos Core Strategy and Minerals and Waste local plan http://www.southglos.gov.uk/environment-and-planning/planning/planning-local-plans/	
Noise	For medium and large turbines: The Assessment and Rating of Noise from Wind Farms ETSU 1997, along with the Institute of Accoustics (IoA) bulletin methodology	Assessment of the potential impact of noise from a wind farm on nearby residents or other noise sensitive receptors	http://planningguidance.planningportal.gov.uk/ http://www.ioa.org.uk/ http://www.ioa.org.uk/sites/default/files/IOA%20Good%20Practice%20Guide%20on%20Wind%20Turbine%20Noise%20-%20May%202013.pdf	National Policy Statement for Renewable Energy Infrastructure (EN-3) states to use ETSU taking into account latest industry good practice. Planning Inspectors are having regard to ETSU and the IOA bulletin methodology
Noise: For smaller turbines (less than 16m diameter)	British Wind Energy Association Standards	To assess impact on nearby residents or other noise sensitive receptors	http://www.renewableuk.com/en/publications/guides.cfm	Small turbines tend to have different noise characteristics to larger turbines. Therefore it is generally agreed that the BWEA standards are more appropriate as the takes more account of the fluctuations in noise associated with smaller turbines

Figure 16: Wind Turbines - Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Public Rights of Way/ Bridleways	British Horse Society Advisory Statement on wind farms	Advice on the implications of wind turbines on horses & riders. Includes recommended separation distances	www.bhs.org.uk/~/media/BHS/Files/PDF Documents/Access leaflets/Wind Farms Leaflet.ashx	
Rural economy	No standard methodology	Assess potential for impact on businesses that rely on an undisturbed rural setting		
Safety considerat-ions	The Strategic Road Network and the Delivery of Sustainable Development 2013	HA recommend separation distance from roads: turbine height plus 50m or 1.5x height (whichever is lower)	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/237412/dft-circular-strategic-road.pdf	Standard includes consideration of structural failure, icing, distraction and dazzle
	National Grid: Electricity Transmission Lines – Guidance	Recommended separation distance between a turbine and overhead line is no less than 3 times the diameter of the turbine blade	http://www2.nationalgrid.com/UK/Safety/Library/	
	Buildings	A separation distance of height to tip of blade plus 10% is often used as a safe separation distance to buildings	http://planningguidance.planningportal.gov.uk	Note: This is often less that the distance required on the basis of noise levels and visual impact
(for information only)	BS 61400-1:2004 Wind Turbine generator systems (safety requirements) and BS 61400-2:1996 Safety of Small Wind Turbines	The developer is required to comply with these British Standards. HSE has the regulatory role	http://www.hse.gov.uk/consult/condocs/energyreview/energyreport.pdf	For information only this document is for reference only - it sets out the HSE's role
(for information only)	BWEA Guidance on Health & Safety in the wind energy industry		http://www.renewableuk.com/en/publications/index.cfm/guidelines-for-onshore-and-offshore-wind-farms	This is the industry guidance for small scale single turbines
Shadow Flicker	Assessment of impact on properties within 130 degrees either side of north, and proposals for control and mitigation should be submitted	Assessment of impact on residential amenity or other sensitive receptor	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/225689/Planning_Practice_Guidance_for_Renewable_and_Low_Carbon_Energy.pdf	This is an impact that can be mitigated through control of wind turbines to switch off when certain light conditions occur

Figure 16: Wind Turbines - Checklist of Factors for Consideration

Issue	Methodology/ standards	Purpose of assessment	Web link	Comments
Transport impacts	Department for Transport Guidance on Transport Assessment. Transport Statement or Traffic Impact Assessment	Assessment of the suitability of the site and highway network to safely accommodate the vehicle movements, including particularly potential impact during construction and maintenance, including impact on the environment by abnormal loads	https://www.gov.uk/government/publications/guidance-on-transport-assessment	Consultation with Network Rail recommended where development adjoining or close to railway (Asset Project Engineers)
Cumulative impacts	Standard EIA guidance, but depending on the local context and given the height of some turbines and the extent of their zones of visual influence, cumulative impact may be relevant over significant distances	Cumulative impact assessment should take account of operational and approved developments in the wider area, along with any proposed extensions and any proposals that are being advanced through the planning system	http://www.legislation.gov.uk/uksi/2011/1824/made http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/	
			http://www.snh.org.uk/pdfs/strategy/cumulativeeffectsonwindfarms.pdf	IEMA recommend use of Scottish Natural Heritage guidance on cumulative impacts
	Mapping to be made available on S Glos web site showing planning decisions in relevant areas adjacent to South Gloucestershire	To enable and appropriate assessment of cumulative impact, and due consideration of any constraints outside the S Glos boundary		Applicants are advised to agree in advance with the Council the appropriate area for consideration of cumulative impact

Notes:

Amplitude Modulation (AM):

A review of planning appeal decisions indicates that this is not an issue that is to date considered by the Planning Inspectorate. There is currently no generally accepted standard or methodology for assessing AM.

Planning & Design Guidance

Design Guidance

Separation Distances

The National Policy Statement on Renewable Energy accepts that '… commercial wind farms are large structures and there will always be significant landscape and visual effects from their construction and operation for a number of kilometres around the site'. It further states that 'the two main issues that determine the acceptable separation distances are visual amenity and noise.'

DCLG National Planning Practice Guidance for renewable and low carbon energy states that 'local planning authorities should not rule out otherwise acceptable renewable energy developments through inflexible rules on buffer zones or separation distances', and that while the consideration of distance plays its part, 'other than when dealing with set back distances for safety, distance does not itself determine whether the impact of a proposal is unacceptable'.[14]

Given that there is no right in law to a private view, planning decisions will consider whether a turbine is unacceptably dominant or overbearing as a material consideration, however each case is considered on its own merits and distance is but one criterion. In considering the acceptability of proposals for wind turbines, in terms of visual impact and impact on residential amenity, it is proposed that each scheme should be the subject of an assessment of its own particular context, and due to the variability of landscape character across South Gloucestershire blanket distance thresholds are not considered appropriate.

For certain features however, some organisation's recommend separation distances for safety reasons. It is considered that if these distances are set for strategic networks, it is appropriate to apply them also to the local network and if a distance is set for one transport mode it should also be applied to another. Therefore if a setback is recommended for roads, this should also be applied to railways. Following separation distances are therefore proposed for safety reasons:

***Figure 17**: Recommended separation distances*

Feature	Recommended distance	Recommendation by:
Buildings	Height to tip of blade plus 10%	Government National Planning Practice Guidance refers
Hedgerows and treelines	50m	Natural England
Roads and railways	Turbine height plus 50m or 1.5 times height whichever is lower	Highways Agency recommendation to be applied to S Glos road network. Consultation with Network Rail also recommended.
Strategic electricity network All other lines	3x turbine blade diameter Height to tip of blade plus 10%	National Grid Western Power Distribution
Nuclear facility	Safety consideration regarding potential for e.g. fire or blade throw	Consult with nuclear operator and HSE

[14] paragraph 8 Renewable and Low Carbon Energy, NPPG

In addition, it is generally accepted in respect of noise that for larger turbines noise can become a significant issue within distances of approximately 350m. (See House of Commons Library Note[15])

In terms of visual impact, the point at which a turbine becomes dominant and/ or overbearing in a public view varies with the landscape of the locality in which it is proposed, depending on for example, the topography, level of tree cover and/ or settlement pattern. For example, in a flat open landscape, a proposed wind turbine may become dominant at a longer distance, whereas in a more enclosed landscape a turbine may be screened at a shorter distance. Given the variability of the landscapes within South Gloucestershire, it is again considered that, blanket separation distances are not appropriate for South Gloucestershire.

All applications for wind turbines will be assessed in terms of their impact on landscape and visual amenity, impact on heritage assets and their settings, impact on residential amenity and businesses, taking into account the particular character, appearance, features and amenity of the surrounding area. Similarly noise assessments will take into account the particular circumstances and baseline conditions in the locality.

There are many other factors that also determine the suitability of a locality for the hosting of wind turbines, and the following guidance applies:

- Consider locations in association with existing large scale development, including for example, commercial building complexes and areas already impacted by extensive wirescapes; however this must be set against the consideration of cumulative impact.
- Given the relationship of the Severn Levels to the internationally designated species and habitats of the estuary, and the presence of significant bat populations and commuting routes across S Glos schemes must be planned and designed to avoid harm to any important bird or bat populations.
- Within the Cotswolds AONB or its setting, careful consideration must be given to context, scale and potential cumulative impact to ensure that the objectives of designation are not compromised.
- Siting and design should have special regard to preserving the setting and significance of designated heritage assets and should not dominate, overwhelm or prevent the appreciation or understanding of South Gloucestershire's distinctive land forms, historic landscapes or historic buildings, in particular landmark buildings including for example, hilltop forts, battlefields, parklands, monuments, church towers and spires.
- The disturbance of archaeological deposits, historic landscapes and their features such as earthworks and ridge and furrow should be avoided, or mitigated.
- Avoid selecting sites in undisturbed rural, coastal or historic landscapes including those that form part of distinctive skylines or publicly accessible views.

[15] www.parliament.uk/briefing-papers/sn05221.pdf

- Avoid overbearing or overwhelming visual impacts on residential properties or settlements.
- The large areas of semi natural habitats, ancient and other broadleaf woodland plus the extensive hedgerow network across a large part of the district and other characteristic features of the landscape should be protected.
- In flood prone landscapes, ensure no loss of flood capacity.
- Design access routes and plan deliveries to prevent damage to the character of rural lanes, avoiding or mitigating impact on characteristic hedgerows and boundary features or other features that contribute to the character of the area.
- Locate wind turbines on the most level part of the site to avoid a confusing variation of turbine heights.
- Wherever possible transformers should be housed within the turbine tower to reduce visual impact, and cables and grid connections should be underground.
- Align access routes and locate any substation or control buildings to integrate with and take advantage of the screening potential of (but with an adequate buffer to) hedgerows or tree cover. Integrate with the local vernacular including the use of locally occurring materials for cladding.
- Soil disturbance should be minimised. For any disturbed areas topsoil and subsoil should be separated and appropriately stored. Once construction is complete, the site should be restored, soil and ground flora should be reinstated.
- Ensure that the surfacing of any tracks that are to remain blends in with the surrounding landscape.
- For medium and larger turbines, simple pale grey colours will often reduce contrast with the sky and match others; however for very small turbines darker colours may help to blend with the landscape.
- If lighting of tips is required for aviation purposes, infra-red should be used to minimise impact at night.
- Any shadow flicker impacts should be mitigated through shut down at times when residential properties would be affected.
- Agree schedules for the delivery of Abnormal Indivisible Loads to minimise disruption to traffic flows.
- Ensure that there is a mechanism for community liaison during development, operation and decommissioning.
- Grid connections should be sensitively designed and planned as an integral part of the scheme design, and undergrounded where necessary to protect the character and visual amenity of the locality.

Given the relatively small scale and pattern of many of South Gloucestershire's landscapes, to ensure the protection of environmentally significant features, and to provide certainty as to impacts, it is likely that standard tolerances of 30-50m to allow for flexibility in locating wind turbines (as set out in EN-3[16](paragraph 2.7.24) will not be acceptable. This is because such flexibility could result in impacts on landscape features, habitats, heritage assets, buildings, roads etc.

[16] https://whitehall-admin.production.alphagov.co.uk/government/uploads/system/uploads/attachment_data/file/37048/1940-nps-renewable-energy-en3.pdf

In order to protect landscape features, habitats and other elements in the surrounding area, applications should tightly define the exact proposed locations of wind turbines, and minimise any limits of deviation.

Requirements and obligations:

These would be assessed on a case by case basis depending on the characteristics of the site and the proposal, in the first instance requiring planning conditions and in some cases the proposal could result in the requirement to enter into a Section 106 Agreement. Issues could include monitoring of bat and bird fatalities, habitat creation or enhancement of off site landscape mitigation works.

Planning Conditions, Compliance and enforcement

In addition to the normal pre-commencement conditions, for example to protect landscape features, heritage and ecological assets and control details of the layout, design, landscaping, lighting, access tracks, service runs etc, the following matters have potential to be controlled by the implementation of planning conditions requiring:

- Commencement, completion and commissioning development within a set time period – to provide certainty, prevent accumulation of unimplemented consents and enable assessment of cumulative impact.
- A limit to the duration of the consent, de-commissioning and requirement for removal of all structures, equipment and access tracks – in recognition of the expected life of turbines and to protect landscape character and visual amenity.
- Notification of the Ministry of Defence and Civil Aviation Authority – to protect the safety of air traffic.
- Limiting construction to specified times of year – to avoid impacts on breeding, passage, roosting or wintering birds.
- Removal of any temporary works and reinstatement within 6 months of construction – to prevent unacceptable landscape and visual impacts.
- Agreement of a baseline topographic survey plan and defined limits of tolerance regarding the positioning and height of of turbines – to minimise environmental impact.
- Construction Traffic Management Plan including wheel cleaning – in the interests of highway safety.
- A Landscape and Ecological Management Plan – to protect and enhance biodiversity, landscape character and visual amenity in the long term.
- Prevention of shadow flicker – to protect residential amenity and public health.

- Maximum limits for noise emissions, and any monitoring requirements – to protect the living conditions of occupiers of nearby dwellings.
- Undergrounding of cabling – to protect the natural environment and visual amenity.
- Top soil conservation – to prevent unacceptable environmental impacts.
- Implementation of a Safety Scheme including dealing with ice build up to protect the public including Public Rights of Way users.
- Detail of colour and finishes to be agreed and requirement for no graphics or logos - to protect visual amenity.
- A protocol for dealing with complaints about interference with TV and radio reception - to prevent disturbance to residents.
- Notification to the local planning authority of the cessation of generation of electricity and requirement for removal of any turbine/s that fail/s to supply electricity to the grid for a period of more than 6 months - to protect the character and amenity of the locality.
- All of the wind turbines shall rotate in the same direction – to prevent unacceptable landscape and visual impacts.
- In areas where there is the potential for bat and or bird fatalities, a programme of monitoring will be required[17]
- Provision of wind speed and electricity generation data upon request from the local planning authority - to enable monitoring against Climate Change Targets.
- An interpretation panel to be maintained for the life of the project – to advise re safety and raise awareness of renewable energy generation.

Community Benefit[18]

In line with Core Strategy policy CS3 point 2:

> In recognition of the role that local communities play in hosting wind turbines, it is expected that community benefit will be provided in accordance with the Renewables (wind industry) protocol - On Shore Wind: A Community Commitment (or a successor document[19]). http://www.renewableuk.com/en/renewable-energy/communities-and-energy/community-benefits-protocol/index.cfm

This could be delivered through a Unilateral Undertaking, or where mitigating or offsetting planning related impact through a Section 106 or other legal agreement.

[17] http://onlinelibrary.wiley.com/doi/10.1002/wsb.256/abstract

[18] http://www.renewableuk.com/en/renewable-energy/communities-and-energy/community-benefits-protocol/index.cfm

[19] DCLG Guidance on Community benefits and engagement for onshore wind issued October 2014 https://www.gov.uk/government/publications/community-benefits-and-engagement-guidance-for-onshore-wind

9 Monitoring and Review

The Climate Change Strategy renewables delivery target will be monitored bi-annually by the Planning Transportation and Strategic Environment Committee and the Local Strategic Partnership. Consideration as to progress against this target will be a material consideration in the assessment of planning applications.

The Council will maintain a map of planning applications and decisions for wind turbines and solar panels in order to inform the assessment of cumulative impact when planning applications are received.

Given the pace of change in respect of renewable energy both in terms of technologies and policy context this SPD may need to be the subject of future review to ensure that it aligns with any change in planning guidance or emergence of new or changed technologies.

If you need this information in another format or language please contact 01454 868009

SGC CREATIVE DESIGN • Printed on recycled paper 9658|12|13

www.southglos.gov.uk (access is free from your local library)

South Gloucestershire Council