PERTH & KINROSS COUNCIL

Renewable and Low Carbon Energy

DRAFT Supplementary Guidance 2019

ABBREVIATIONS

AD	Anaerobic Digestion
AQA	Air Quality Assessment
AQMA	Air Quality Management Area
CAA	Civil Aviation Authority
CEMP	Construction Environmental Management Plan
CHP	Combined Heat and Power
CMS	Construction Method Statement
CRS	Carbon Rich Soils
CTMP	Construction Traffic Management Plan
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GDL	Garden and Designed Landscape
GHG	Greenhouse Gas(es)
GW	Gigawatt
GWDTE	Groundwater Dependent Terrestrial Ecosystem
hbt	Height to blade tip
HES	Historic Environment Scotland
INNS	Invasive Non-Native Species
kW	Kilowatt
kWe	Kilowatt of electricity
kWth	Kilowatt of heat
LDP2	Perth & Kinross Local Development Plan 2
LNR	Local Nature Reserve
LVIA	Landscape and Visual Impact Assessment
MOD	Ministry of Defence
MW	Megawatt
NATS	National Air Traffic Services
NIA	Noise Impact Assessment
NNR	National Nature Reserve
NP	National Park
NPA	National Park Authority
NPF	National Planning Framework 3
NSA	National Scenic Area
NVC	National Vegetation Classification
PKC	Perth & Kinross Council
PPC	Pollution Prevention and Control
PV	Photovoltaic
SAC	Special Area of Conservation
SEPA	Scottish Environment Protection Agency
SG	Supplementary Guidance
SHP	(Ground/Air/Water) Source Heat Pump
LLA	Local Landscape Area
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SPP	Scottish Planning Policy
SSSI	Site of Special Scientific Interest
SUDS	Sustainable Drainage Systems
TBP	Tayside Biodiversity Partnership
ZTV	Zone of Theoretical Visibility

ACKNOWLEDGEMENTS

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CONTENTS

1 INTRODUCTION

VISION FOR RENEWABLES

Climate change is a real and serious threat to the environment, the economy and society as a whole. The effects are already being felt with warmer, wetter weather. Winter storms and summer drought are predicted to increase into the future in Perth and Kinross with impacts on homes, infrastructure, agriculture and biodiversity. The need to act now is recognised in the Scottish Government's declaration of a climate emergency and the amended Climate Change Act 2009 requiring Scotland to have net-zero carbon emissions by 2045. Part of the solution is through the deployment of renewable and low carbon energy options such as wind, solar, hydro, low carbon heating technologies and energy storage. The natural resources of Perth and Kinross provide an opportunity for locally produced clean energy that addresses the energy needs of the wider economy and communities and provides economic benefits including employment and the reduction of fuel poverty, while protecting the unique and valued attributes of the area.

POLICY CONTEXT

By supporting the Perth & Kinross Local Development Plan to be adopted in 2019 (the LDP2), the Renewable and Low Carbon Energy Supplementary Guidance (the Guidance) helps to deliver:

- The Paris Climate Change Agreement
- The Scottish Government Climate Change Plan (2018-2032)
- The Climate Change Act 2009 (as amended)
- Scottish Planning Policy (SPP) which requires the planning system to support the development of a diverse range of electricity generation from renewable and low carbon energy technologies.
- LDP2 Policy 1 Placemaking which refers to sustainable construction, which includes provision of energy through renewable technologies.
- LDP2 Policy 32 Embedding Low and Zero Carbon Generating Technology in New Development which requires developments for new buildings to demonstrate how carbon emission reductions will be met by renewable and low carbon energy. Submissions will be required to demonstrate how the proportion of carbon reduction emissions is delivered through renewable and low carbon technology.
- LDP2 Policy 33 Renewable and Low Carbon Energy which sets out criteria for renewable and low carbon energy generation applications.

2 PURPOSE AND USE OF GUIDANCE

2.1 PURPOSE OF THE GUIDANCE

Policy 33 of LDP2 sets out how proposals for Renewable and Low Carbon Energy installations will be assessed. This guidance contains detailed advice on how applicants should address the criteria of Policy 33 when preparing and submitting applications for a range of renewable and low carbon electricity and heat generation technologies. The Guidance is intended to provide certainty for applicants on where proposals will be most appropriate and how each of the criteria set out in Policy 33 can be best addressed in submissions. The Guidance will be a material consideration in the determination of planning applications..

The Guidance contains:

1. This introduction and guidance to preparing submissions
2. An introduction and locational guidance for each technology, including a Spatial Framework for Wind, and Strategic Environmental Sensitivity maps for Wind, Hydropower and Solar PV.
3. Written guidance on how to address the criteria of LDP2 Policy 33 and the sensitivities identified in the Strategic Environmental Sensitivity maps.

2.2 PREPARING SUBMISSIONS

Applicants should refer to the Council's website for information on the application process, fees and submission requirements. A pre-application enquiry will help ensure submissions include appropriate and proportionate information to streamline the application process. Specific requirements will depend on the nature of the application as set out below.

See: Application Checklists (PKC)
Pre Application Services
Appendix 2: Environmental Assessments and Licences

- *Micro Renewables and Permitted Development Rights*

Micro renewables, up to 50kW for electricity (kWe) and 45kW for heat (kWth) may not require planning permission. Permitted Development Rights (PDR) cover many microgeneration technologies but are subject to restrictions such as non-domestic use or to protect built and natural heritage interests. PDR does not apply for EIA developments or where the development is likely to have a significant effect on a Natura site. Even if covered by PDR, proposals may need a prior notification and approval, building warrants or listed building consents.

See: What Needs Planning Permission (PKC)
Circular 1/2012 Guidance on Householder PDR
Planning Circular 2/2011 on Non-Domestic Microgeneration

- *Major Applications*

Major developments are subject to additional requirements including Pre-Application Consultation with relevant communities and affected parties. Major applications include all developments in Schedule 1 of the EIA (Scotland) Regulations 2017, and all electricity generating developments over 20MW, or extensions resulting in a development over 20MW.

See: Major Planning Applications (PKC)

- *EIA Developments*

Environmental Impact Assessment (EIA) is a process which identifies and helps address significant environmental effects. Many renewable developments will be EIA developments. Applicants are encouraged to request a screening opinion for relevant proposals to ascertain if an EIA will be required. Where an EIA is required, a scoping opinion is also recommended.

See: EIA Guidance (PKC)
EIA Guidance (Scottish Government)
Circular 1/2017 EIA Regulations (Scottish Government)
Environmental Impact Assessment Handbook (SNH, 2018)

- *Energy Consent Applications*

Applications for new energy developments, and extensions resulting in a development, over 50MW are made to the Scottish Government Energy Consents Unit. This guidance and LDP2 will still be relevant as Perth & Kinross Council is a statutory consultee.

See: Energy Consents Guidance (Scottish Government)

- *Additional Requirements*

Further permissions including building warrants, listed building consents or environmental licences as summarised in Appendix 2: Environmental Assessments and Licences. Information to inform a Habitat Regulations Appraisal may be required for any application that is capable of affecting a Natura site.

2.3 ADDRESSING POLICY 33 CRITERIA

The Guidance addresses each of the criteria in LDP2 Policy 33 in turn which should be considered and where relevant addressed in submissions. Each section contains information relevant to all technologies, followed by additional advice specific to each technology. Applicants should read and apply both the general and technology specific advice. For each criteria the most relevant LDP2 policies and guidance documents are provided, which submissions should be consistent with. The applicability of policies and guidance will be relative to the scale, location and nature of the proposal.

Applications will also be assessed against other material considerations including the relevant policies in LDP2, Tayplan, and national policies including Scottish Planning Policy and National Planning Framework 3.

2.4 SPATIAL GUIDANCE

Spatial Framework for Wind

The Spatial Framework for Wind is specified in in Policy 33D and explained in detail in section 3.1 Wind. The Spatial Framework is national policy set out in Scottish Planning Policy (SPP) and should be considered at site selection and design. Submissions for large Wind turbines and Wind Farms should identify which group the proposal is located and how the subsequent tests in SPP Table 1 are met.

Strategic Environmental Sensitivity Maps

To help identify the most appropriate areas for renewable and low carbon technologies, the Council and the James Hutton Institute, undertook an assessment of environmental sensitivity including landscape, ecosystem services and other environmental factors shown on the following page. The resulting output is shown in the maps for Wind Strategic Environmental Sensitivities (large wind turbines and wind farms), Hydropower Strategic Sensitivities(all) and Solar Strategic Environmental Sensitivities(large solar farms) in section 3 Technologies.

These maps are outputs of the assessment of environmental sensitivity criteria which relate to many of the LDP Policy 33 criteria. The maps will help guide development to the least sensitive areas but as they are at a strategic scale do not replace the need for a case by case, site assessment basis, of all relevant factors.

An interactive web map will be published alongside the adopted Guidance. The searchable map will be able to be used to view the Perth and Kinross Renewables and Low Carbon Guidance 2019. Mapping available will include policy guidance, the spatial framework for Wind as well as the spatial strategies for the wind, hydro and solar technologies.

References within the text of the Guidance in green will link back to the web map to allow users a view of the sensitivity referred to.

Development management will also use these maps to help identify environmental considerations that may need to be addressed. Submissions may be able to demonstrate that a proposal in a chosen location can avoid or mitigate potential impacts on the identified sensitivities.

Opportunity maps for Wind, Hydro and Solar are also provided. These are for information only and will not be used in the determination of planning applications.

Further information on the technology specific maps is provided in 3 Technologies. Detailed information on the strategic assessment is available in the Environmental Report and a description of each of the sensitivies is available in the Environmental Assessment Technical Paper.

Wind Spatial Framework (SF) and Strategic Environmental Sensitivities	WIND	HYDRO	SOLAR
Cumulative Impact of Installations	X	X	X
RAMSAR | Natura Sites (SPA, SAC)	SF	X	
SSSIs | National Nature Reserves	SF	X	
Fish Ecology | Fish Barriers		X	
Land Capable of Timber Production	X		X
Existing and Consented Cumulative Installations	X	X	X
Landscape Study: - Land Form Scale | Land Form Complexity - Land Cover Complexity - High Sensitivity to Wind[1] - Naturalness	 X X X X	 X	 X X X
Wild Land Areas	SF	X	
Local Landscape Areas	X	X	
Gardens and Designed Landscapes	SF	X	
National Scenic Areas	SF	X	
Community Separation for consideration of visual impact	SF		
Visual Amenity	X	X	X
Geological Conservation Review		X	
Accessible Historic & Cultural Experience	X	X	X
Battlefields	SF		
Wetlands	X		X
Natural Flood Management	X	X	X

Wind Spatial Framework (SF) and Strategic Environmental Sensitivities	WIND	HYDRO	SOLAR
Surface River Quality: - Ecological Status - Morphology Status - Water Abstraction - Overall Hydrology		 X X X X X	
Groundwater Quality Water Abstraction Status (Agriculture)		X X	
Drinking Water Supply	X	X	X
Flood Risk	X	X	X
Aerodrome 3km buffer			X
Erosion	X		X
Food Provision	X	X	X
Carbon Rich Soils, Deep Peat, Priority Peatland	SF		
Carbon Sequestration	X	X	X
Accessible Recreation	X	X	X

1 Sensitive Landscape Character Areas as defined in David Tyldesley and Associates (2010) Landscape Study to Inform Planning for Wind Energy

2.5 SUBMITTING APPLICATIONS

Submissions should address:

- The Wind Spatial Framework if relevant
- The written advice in this Guidance, informed by the Strategic Environmental Sensitivity maps where relevant.
- The policies and advice in Local Development Plan 2 and Supplementary Guidance.
- The additional relevant assessments and surveys indicated throughout the Guidance.
- Relevant information from assessments or licence applications required by external bodies (see Appendix 2: Environmental Assessments and Licences

All submissions should provide:

- Capacity of renewable energy in kW / MW
- Number, design, specifications and description of renewable energy technology and expected operational lifespan.
- Site photos and/or visual representation of the installation
- Red line of the site including all areas of the development

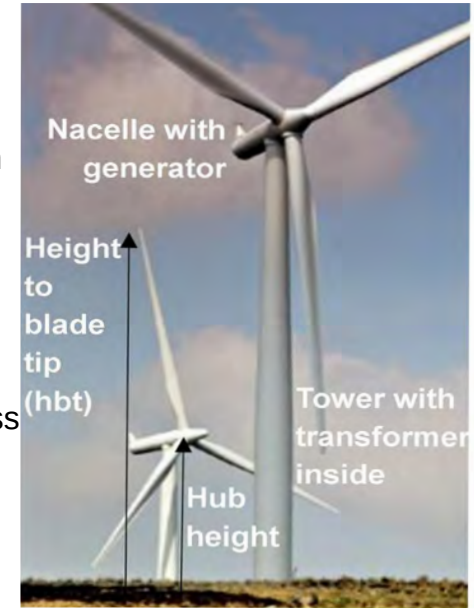
Submissions for applications > 45kwe or >50kwth should provide a plan of the site, and surrounding area showing where relevant:

- Proposed permanent and temporary infrastructure including all plant and buildings, cable and pipeline routes, tracks, compounds, excavations and abstractions.
- Grid connection location and route; or route of heat network
- Nearest receptors including buildings, dwellings, roads, and recreation areas and routes
- Onsite, adjacent and connected environmental sensitivities including watercourses, waterbodies, water supplies and abstractions, peat and carbon rich soils, habitats, trees, woodlands and natural heritage designations; and potentially affected historic environment assets.

3 TECHNOLOGIES

3.1 WIND

Wind power plays a significant role in producing clean energy with further potential contribution through the siting and repowering of the right turbines in the right place. Height of turbines is measured by height to blade tip (hbt) or to hub. Different scales of wind power can charge batteries, support households, small business and communities through to commercial scale production.



An EIA may be required for any turbine over 15m (hub height), more than two turbines of any height, or in a sensitive area

- **Fixed Micro Turbines** fixed on buildings (up to around 5kw). These will not be efficient, or suitable, in all locations. Planning permission will be required.

Photo: Andol (CC BY-SA 4.0)

- **Free Standing MicroTurbines** up to 15m hbt and <50kW are suitable for rural domestic/ agricultural use and are potentially covered by Permitted Development Rights (PDR) for domestic use. PDR is limited and subject to prior notification and approval.

- **Small Turbines** 15m-30m hbt will require planning permission if over 50kW. Foundations and underground cabling may be required.
- **Medium Turbines** 30m-50m hbt can have significant impacts if poorly sited and will require planning permission.
- **Large Turbines** >50m hbt. Large turbines require deep foundations, turbine delivery, crane pad construction and electricity infrastructure including transformers. The Spatial Framework applies.
- **Wind Farms** More than 1 turbine over 30m. Greater land take and infrastructure including substations and grid connections. The Spatial Framework applies.

CARES Renewables Energy Tool-kit
SEPA Renewables advice webpage
SNH Onshore Wind Energy advice webpage

The Strategic Environmental Sensitivity webmap will include the Spatial Framework, as set out on the following pages, and additional relevant sensitivities which formed part of the environmental assessment for this guidance to help inform submissions as set out in 2.4 Spatial Guidance. The Wind Strategic Environmental Sensitivities map contained in this guidance shows the output of the assessment. This addresses Group 3 areas of the Spatial Framework. Local Landscape Areas are particularly relevant to Wind and are clearly marked as are areas of high Cumulative Visual Impact.

A Windspeed Opportunity Map is also provided for information only.

Policy 33D: Spatial Framework for Wind Energy

The spatial framework set out below will apply to all onshore wind energy proposals in Perth and Kinross that meet one of the following criteria:

- *Individual turbines with a height of 50 metres and above to blade tip.*
- *Developments with more than one turbine with a height of 30 metres and above to blade tip.*

The above thresholds are considered to be of a size and scale suitable for inclusion within the spatial framework and include proposals for repowering and/or geographical extension where the above thresholds are met. Table 1 (Spatial Frameworks) of SPP requires the Spatial Framework to identify areas into various categories.

Proposals are required to take in to account the Spatial Framework and all other relevant LDP policies and material considerations. The Spatial Framework identifies those areas that are likely to be most appropriate for onshore wind farms as a guide for developers and communities, following the approach set out in Table 1 of SPP.

Proposals will be assessed against all other relevant LDP policies and material considerations.

Development proposals should not result in adverse effects, either individually or in combination, on the integrity of a European designated site(s).

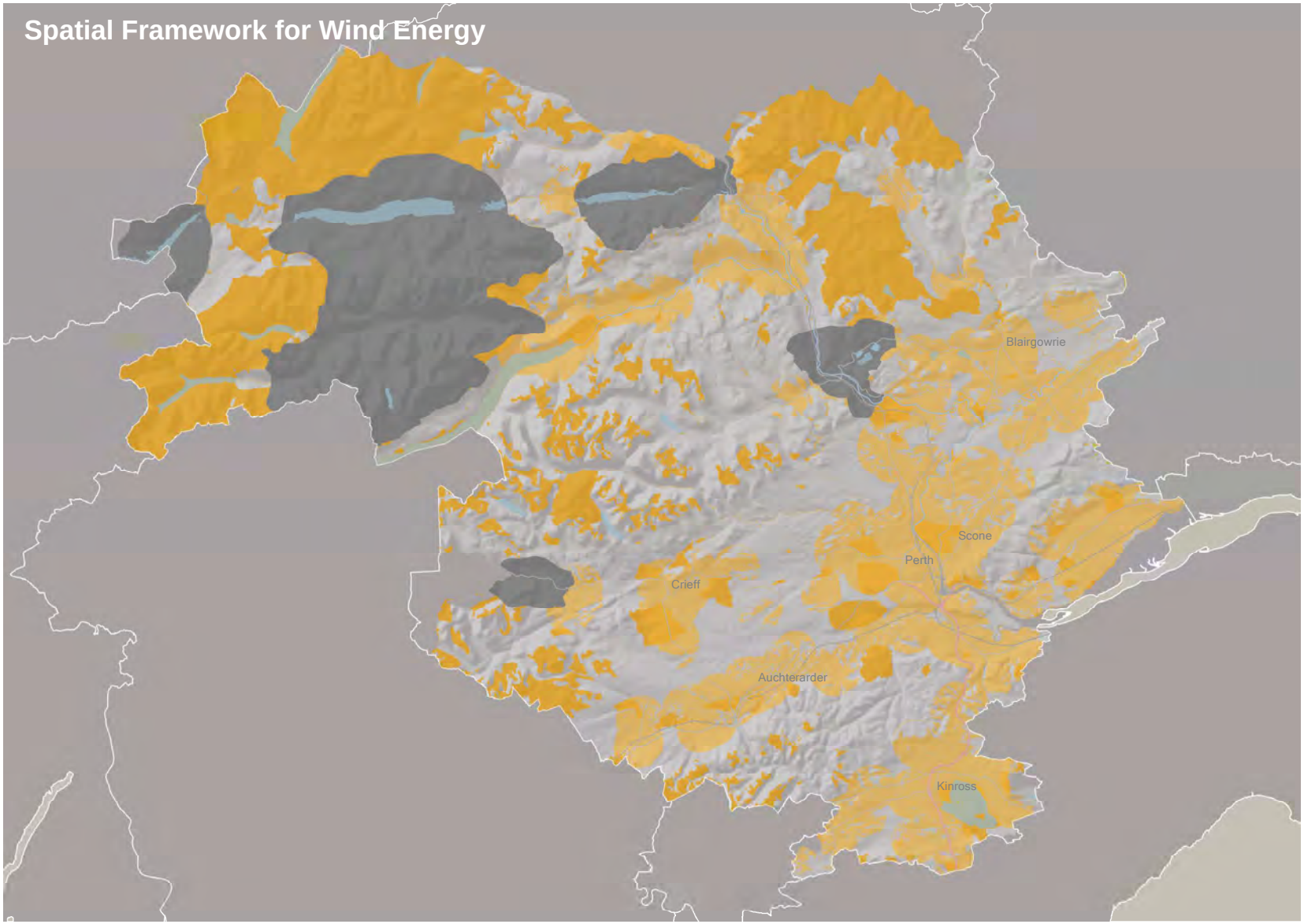
SPP Table 1

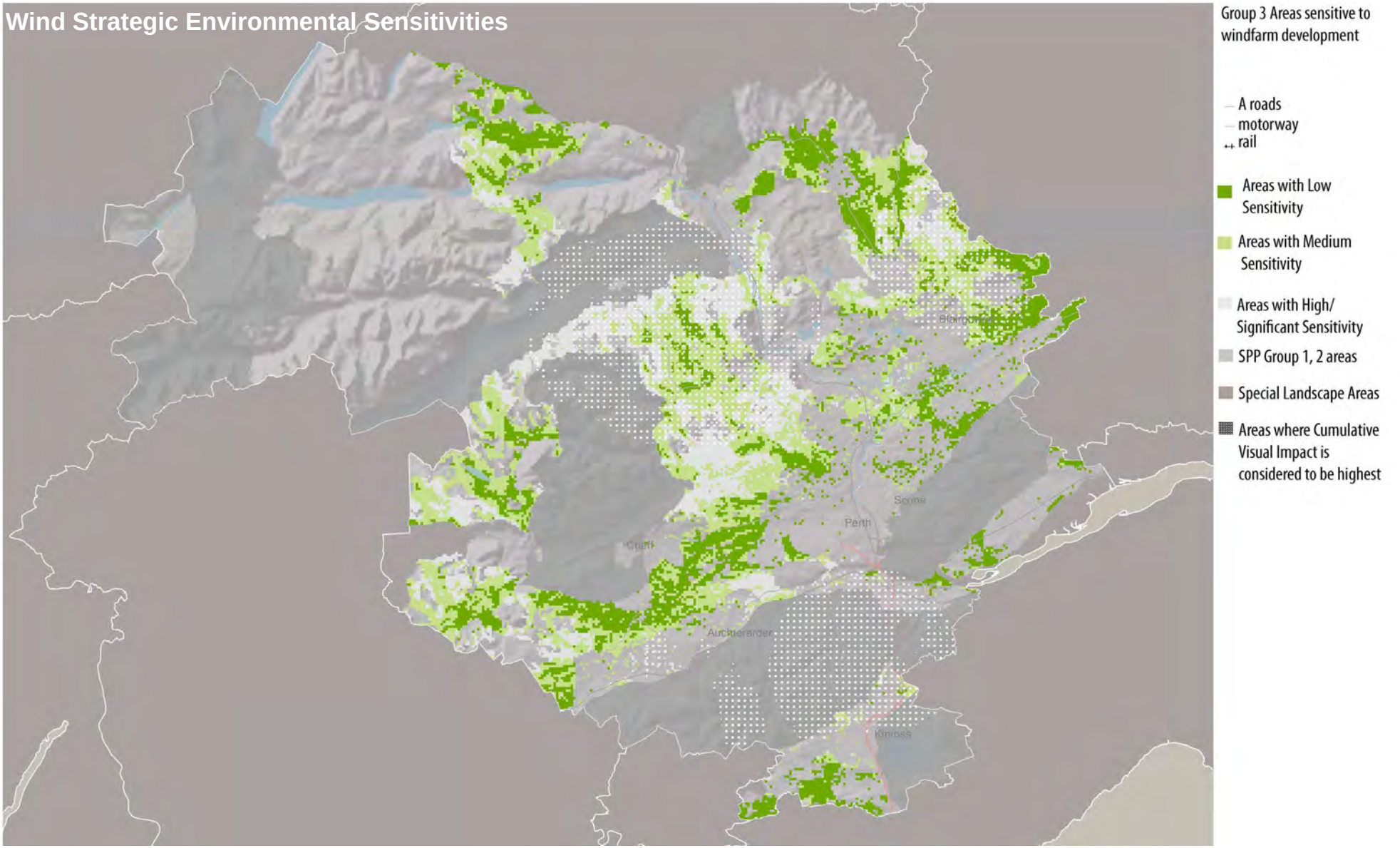
Group 1: Areas where wind farms will not be acceptable: National Parks and National Scenic Areas.

Group 2: Areas of significant protection: Recognising the need for significant protection, in these areas large turbines and wind farms may be appropriate in some circumstances. Further consideration will be required to demonstrate that any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation.

National and International designations • World Heritage Sites • Special Areas of Conservation (SAC) • Special Protection Areas (SPA) and Ramsar sites • Sites of Special Scientific Interest (SSSI) • National Nature Reserves (NNR) • Sites identified in the Inventory of Gardens and Designed Landscapes • Sites identified in the Inventory of Historic Battlefields	Other nationally important mapped environmental interests: • Areas of wild land as shown on the SNH map of wild land areas; • Carbon rich soils; deep peat and priority peatland habitat.	Community Separation for consideration of visual impact: • An area not exceeding 2km around cities, towns and villages identified on the local development plan with an identified settlement envelope or edge. The extent of the area will be determined by the planning authority based on landform and other features which restrict views out from the settlement.

Group 3: Areas with potential for wind farm development. Beyond groups 1 and 2 wind farms are likely to be acceptable, subject to detailed consideration against identified policy criteria.

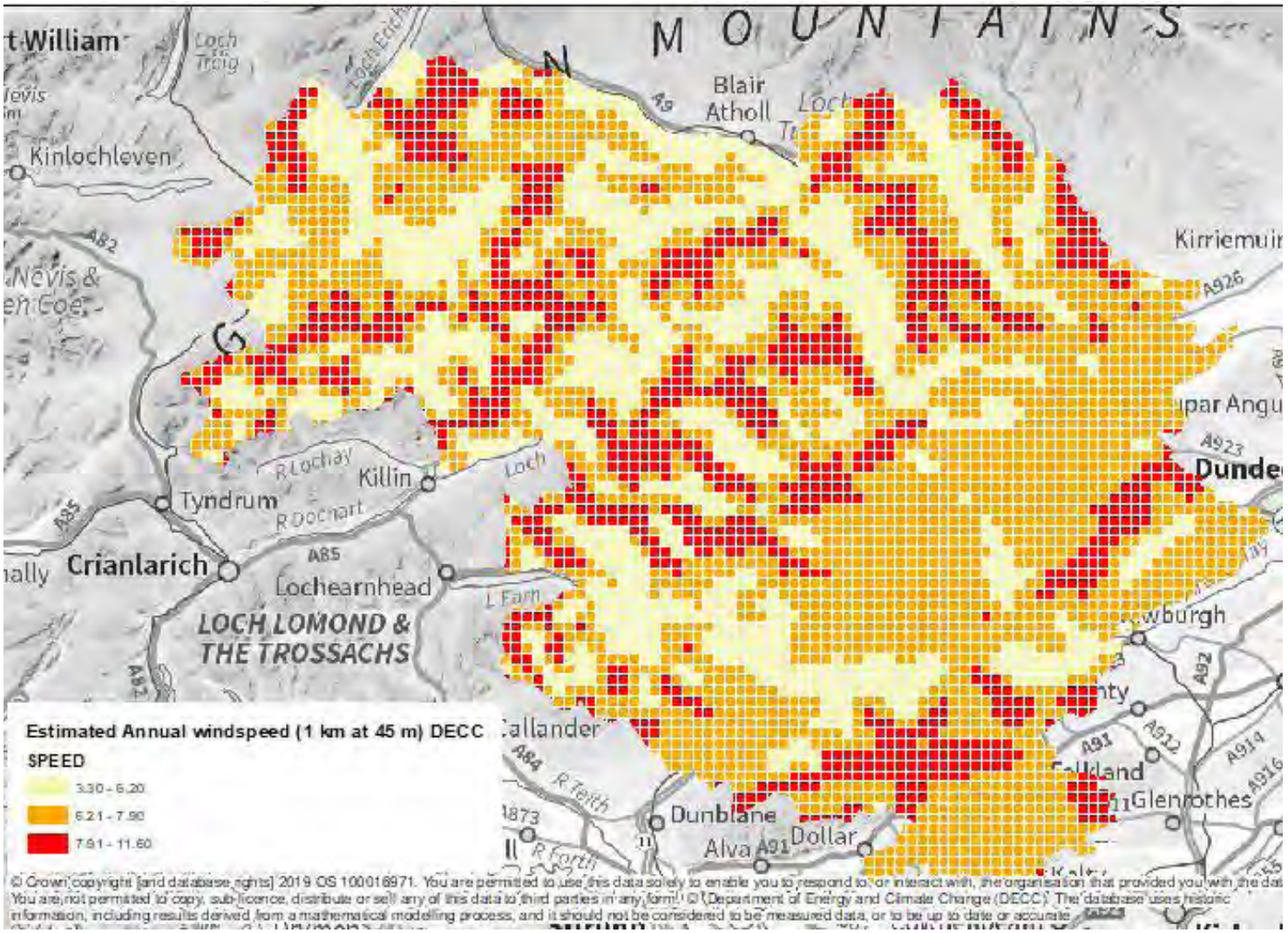




Windspeed Opportunity Map

"The windspeed database gives estimates of the annual mean wind speed throughout the UK. It uses an air flow model to estimate the effect of topography on wind speed, and makes no allowance for the effect of local winds such as sea, mountain or valley breezes. It does not take account of topography on a small scale, or local surface roughness (such as tall crops, stone walls or trees, or the built environment),which may have a considerable effect on the wind speed The database uses the Ordnance Survey grid system for Great Britain and the grid system of the Ordnance Survey of Northern Ireland. The model uses a 1 kilometre square resolution.

Any results derived from this database should be treated as an approximate and high-level guide only and should be always followed by on-site measurements to ensure a proper assessment " (DECC).



https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/38721/1402-windspeed-database-information-sheet.pdf

3.2 HYDROPOWER

The use of water to generate electricity has benefits of a high level of efficiency and predictability and small scale hydropower can therefore provide a reliable source of electricity to support rural communities and businesses.

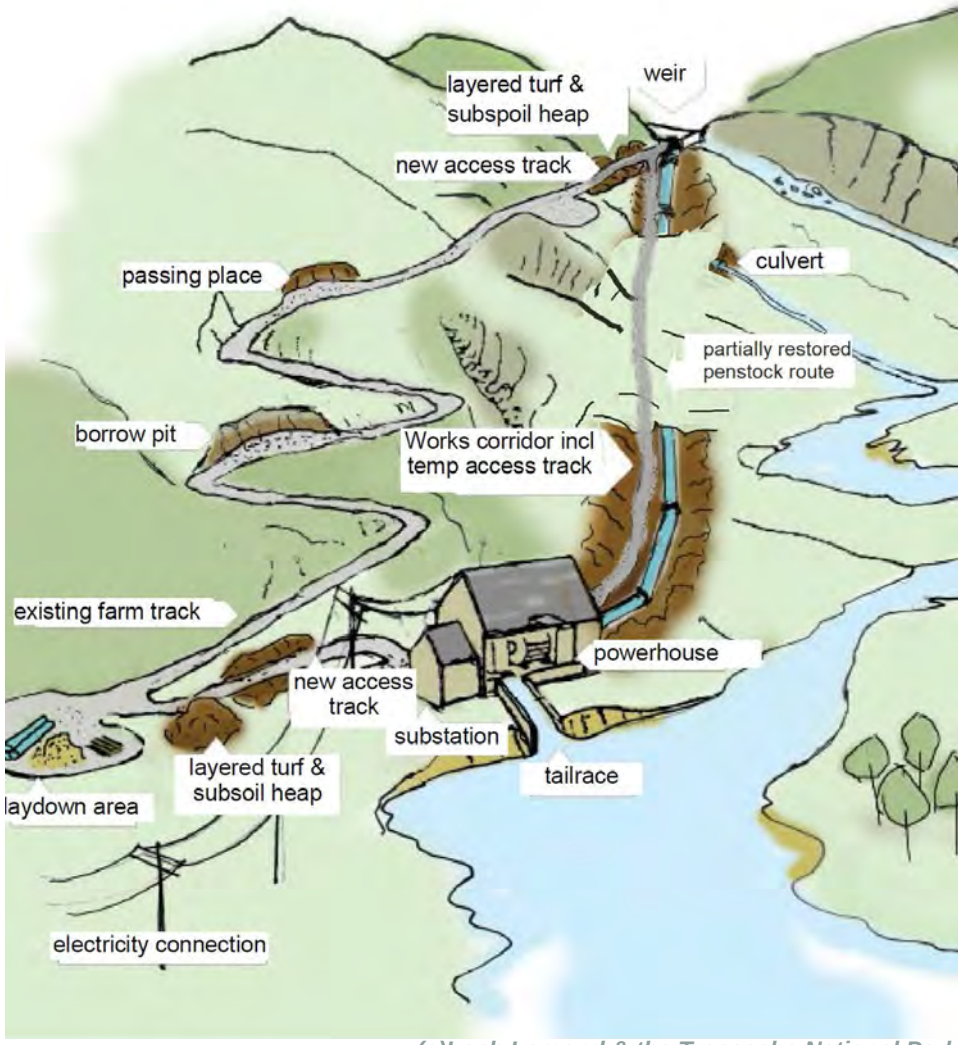
Hydropower installations in Perth and Kinross range from large impoundment schemes installed during the 20th Century to more recent smaller scale run of river schemes. A 2011 study identified over 300 sites with potential for hydropower in the area.

Hydropower installations covered in this Guidance are:

- **Impoundment:** A dam holding back a large head of water allowing water flow, and energy production, to be regulated. There is little opportunity for new large impoundment dams in Perth and Kinross.

- **Pumped Storage Hydroelectric (PSH):** Where water can be pumped back up to an impoundment dam for energy storage. These can be on an open waterway or in a closed loop of artificial storage ponds.
- **Run of River:** A proportion of water flow is diverted via a weir to pass through a penstock to a powerhouse, and discharged back into the watercourse. The components of an installation will vary depending on location and vertical drop (head) and may require penstocks, lades, weirs, and water drawn from multiple sources.

Components of Run of River Hydropower Under Construction



(c)Loch Lomond & the Trossachs National Park

An EIA may be required for applications over 500kW or in sensitive areas, and will be required for all Energy Consent applications (see 2.2 Preparing Submissions.

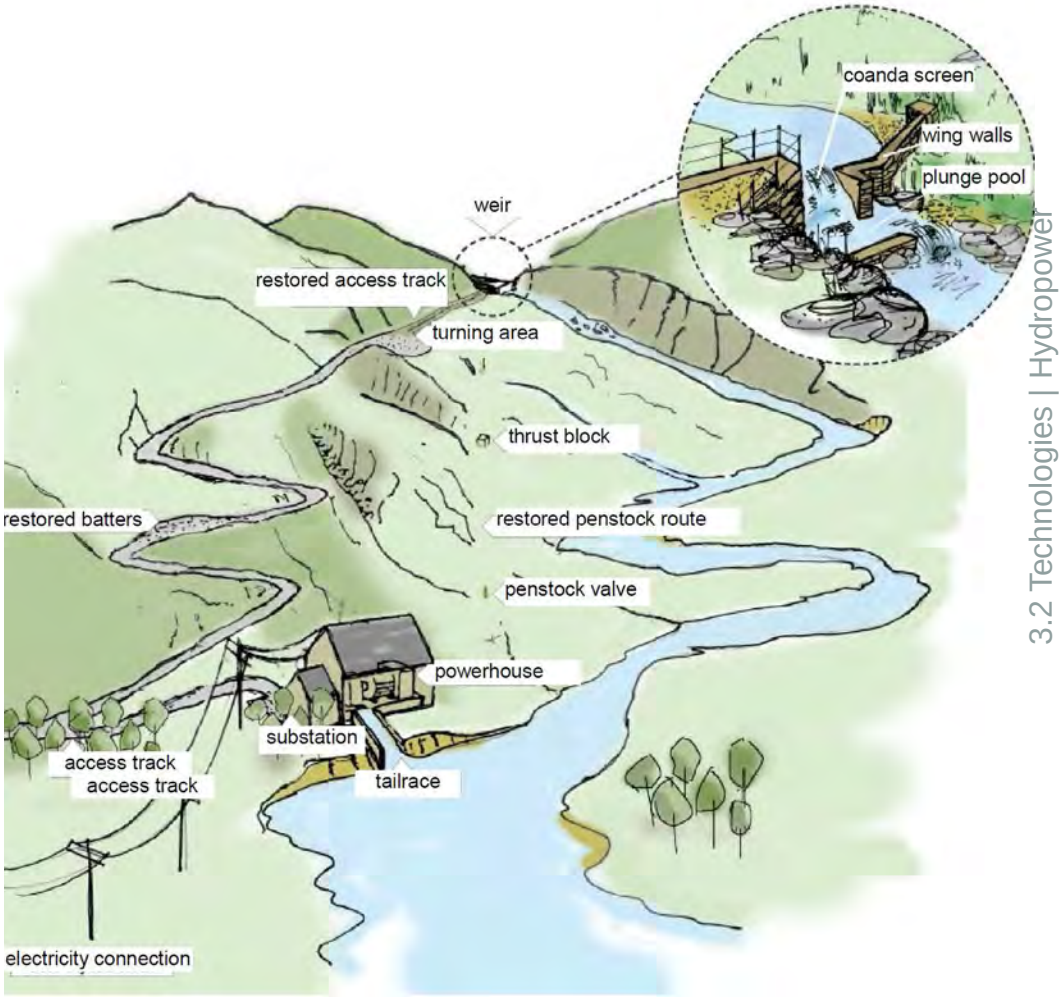
A water use (CAR) licence under the Water Environment (Controlled Activities) Regulations 2005 will be required for all applications. Engineering works including where penstock routes or tracks cross water courses will also require SEPA authorisation. Applicants should contact SEPA at an early stage to discuss requirements, check whether the scheme is licensable, and progress both applications concurrently. Proposals will need to meet SEPA criteria to be provisionally acceptable to SEPA.

- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 A Practical Guide (SEPA, 2016)
- SEPA Renewables advice webpage
- Guidance for developers of run-of-river hydropower schemes (SEPA, 2015)
- Planning Guidance on Hydropower Developments LUPS 18 (SEPA, 2013)
- Guide to Hydropower Construction Best Practice (SEPA, 2015)
- Engineering in the Water Environment Guidance (SEPA)
- SNH Hydroelectric Power webpage
- Hydro-electric schemes and the Natural Heritage (SNH, 2015)
- CARES Renewables Energy Tool-kit

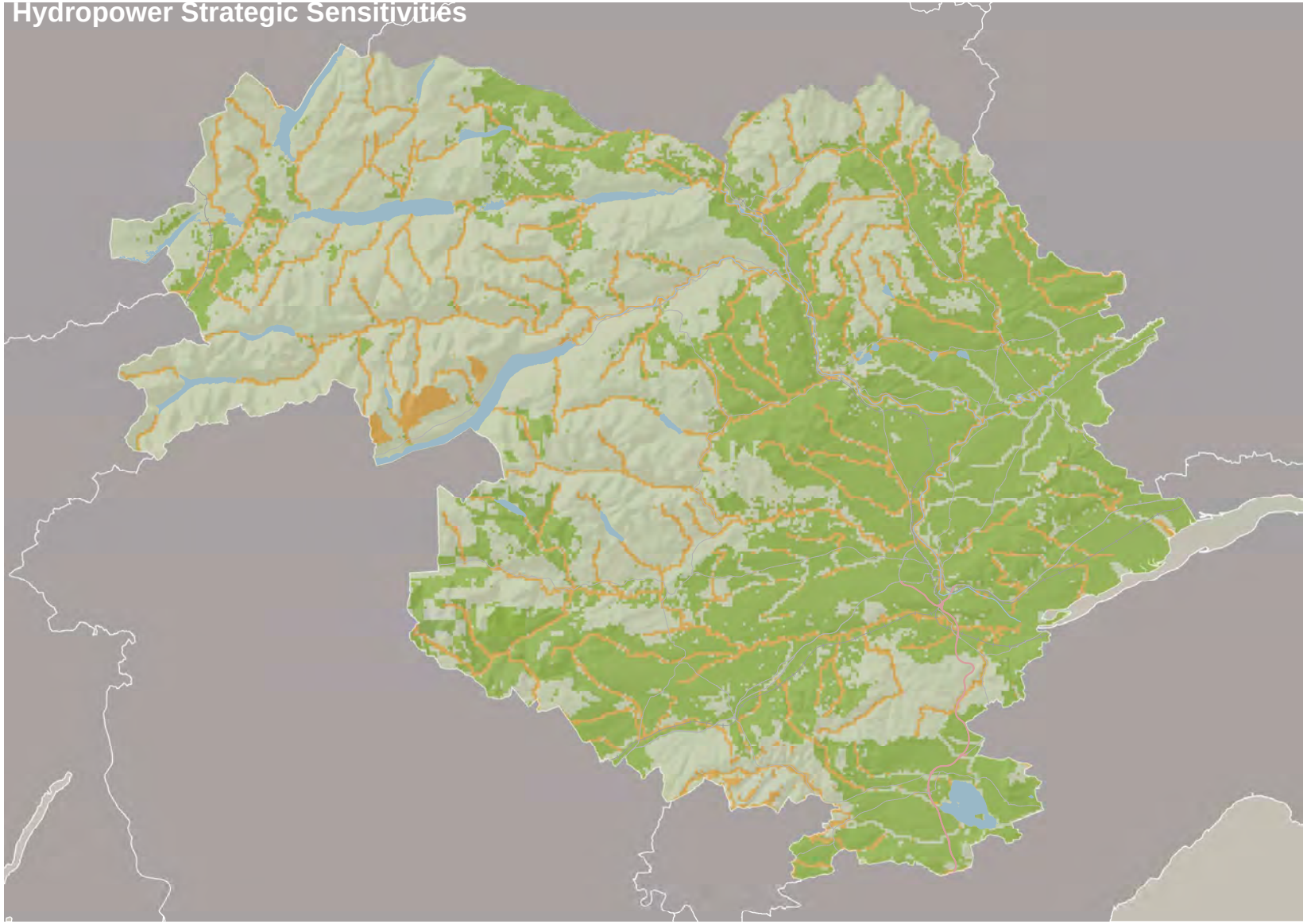
The Hydropower Strategic Environmental Sensitivities webmap will set out relevant individual and cumulative sensitivities to help inform submissions as set out in 2.4 Spatial Guidance. The map overleaf shows the output of the assessment.

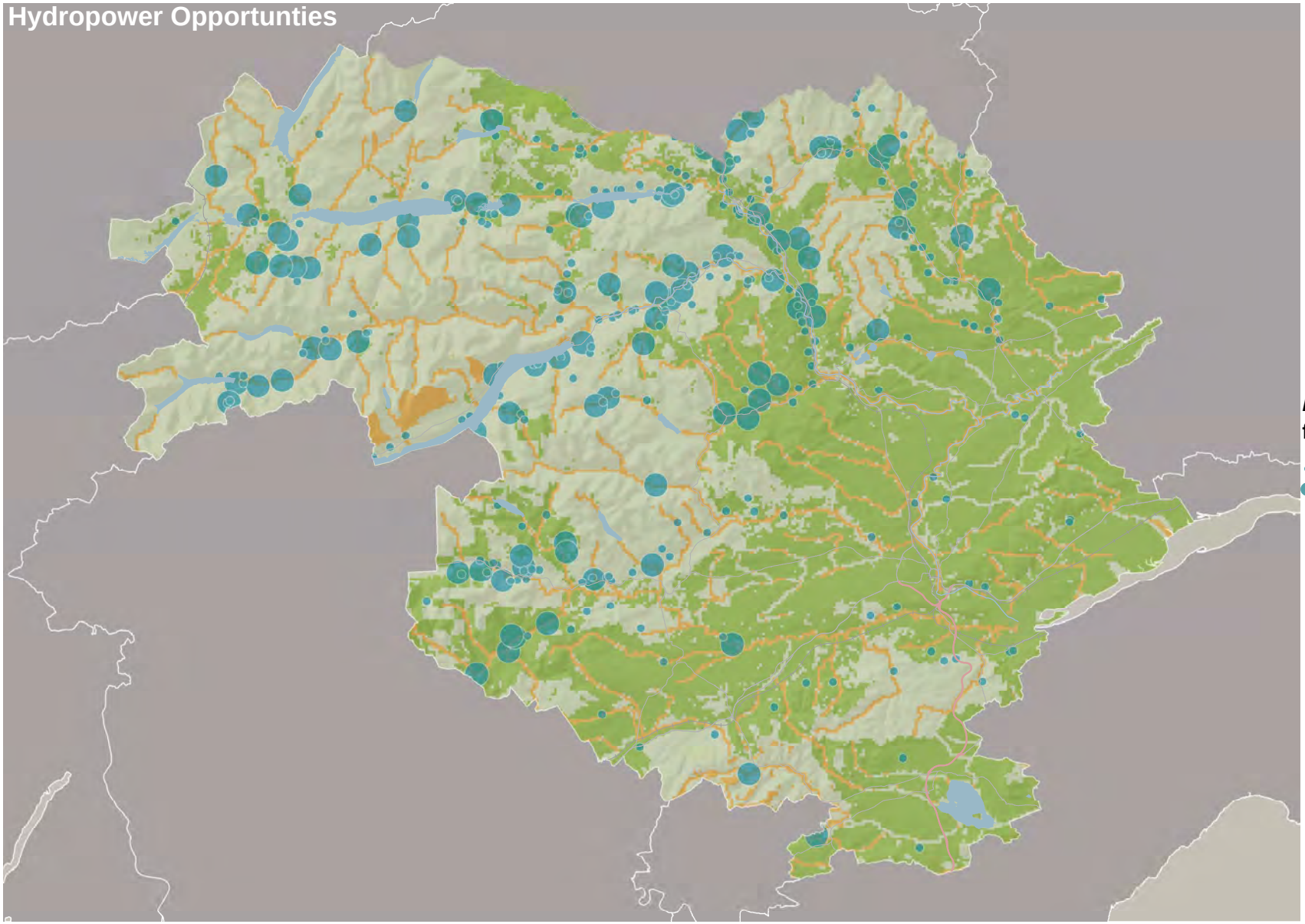
An opportunity map is also provided for information, showing the results of a 2011 study which identified sites with technically available potential for hydropower. Note that the study does not consider cumulative impacts, cumulative grid constraints, or changes in the financial environment since the date of the report.

Components of Run of River Hydropower Post Construction



(c) Loch Lomond & the Trossachs National Park





3.3 SOLAR PV & THERMAL

Electricity from solar photovoltaic panels (Solar PV) or hot water from solar heat collectors (Solar Thermal) provide or supplement energy needs with low visual and environmental impacts and can utilise unused or underused roofspace or land. Solar PV and thermal used across Perth & Kinross range from rooftop installations to large solar farms.

Solar Thermal: usually roof mounted, utilises heat from the sun through a heat exchanger to supplement hot water or central heating.

Solar PV: produces electricity from photovoltaic panels and is useful for supporting domestic use, supporting or supplementing other low carbon technology such as heat pumps, and providing energy to grid. Forms include:

- **Roof mounted PV:** Solar panels, PV roof tiles, flexible panels and wall mounted PV. Permitted development rights (PDR) exist for domestic and non-domestic microgeneration under 50kW (electric) or 45kW (thermal) but restrictions apply.
- **Ground mounted PV** range from domestic scale to large solar farms and involve PV panels, mounting structures, fencing, lighting and CCTV, inverters, cabling, and transformers, and can take up a large amount of land.

  Microgeneration <50kW arrays are useful for domestic or agricultural use with limited infrastructure. Limited PDR.

  Solar Farms >50kW will require planning permission and can have a greater impact from land take and use of infrastructure including transformers, inverters and fencing.

  Large Solar Farms over 0.5ha or in a sensitive area may require an EIA.

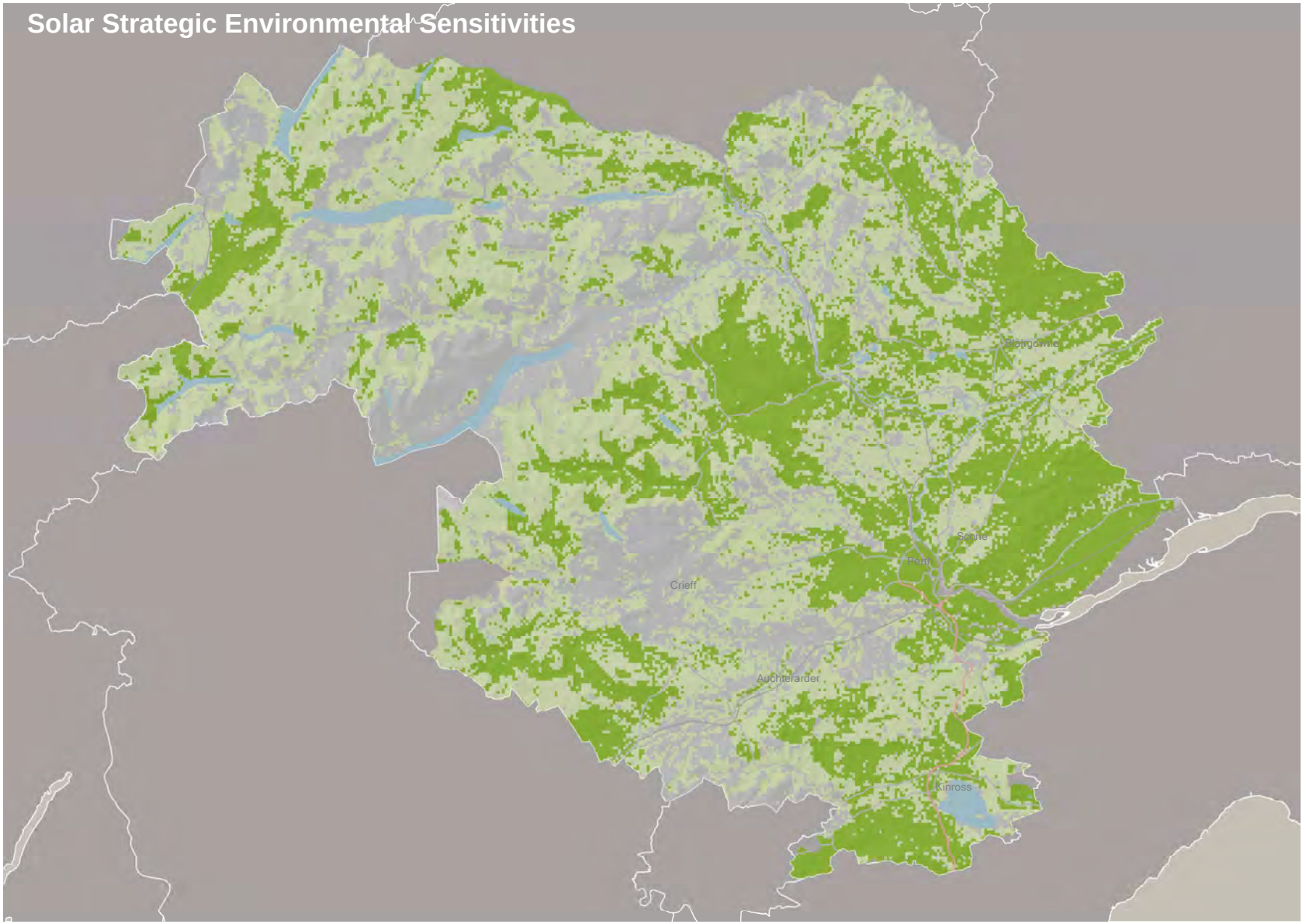
Lrge Solar Farm (c)Elgin Energy

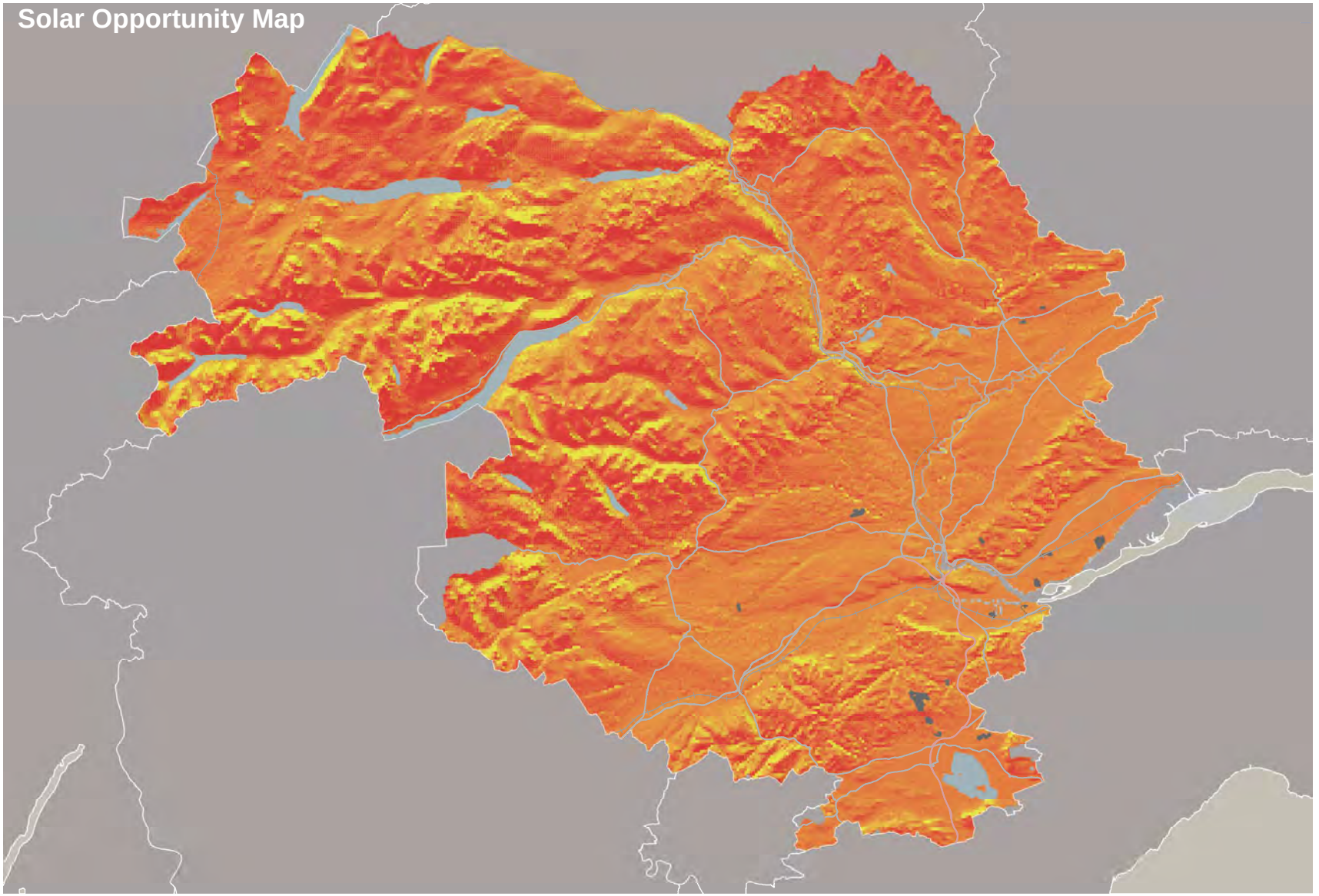
- **Floating Solar PV** involves PV panels floating on artificial reservoirs anchored by weights with the electricity infrastructure such as informers and inverters on nearby land. A CAR licence from SEPA will be required.

Circular 1/2012 Guidance on Householder PDR
Do I Need Planning Permission to Install Solar Panels?
Planning Guidance for the Development of Large Scale Ground Mounted Solar PV Systems (BRE, 2012)
SEPA Renewables advice webpage

The Solar Strategic Environmental Sensitivities webmap will set out relevant individual and cumulative sensitivities to help inform submissions as set out in 2.4 Spatial Guidance. The map overleaf shows the output of the assessment.

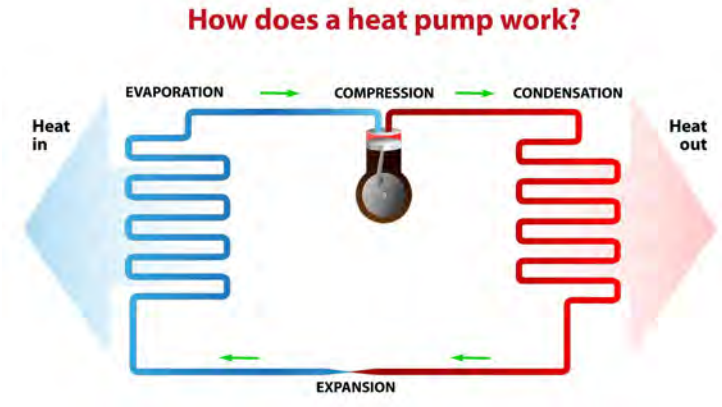
An opportunity map follows which shows annual irradiation as well as existing large solar farms for cumulative assessments and opportunity.





3.4 HEAT PUMPS

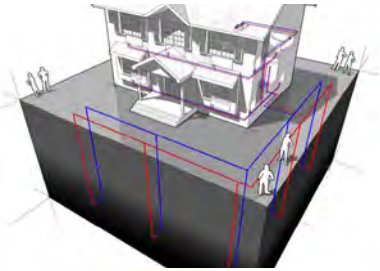
Heat pumps provide a low carbon alternative to fossil fuel heating with potential for minimal environmental impacts. Where powered by renewable electricity heat pumps can increase their contribution to renewable energy targets. Some heat pumps will also provide cooling although this may result in increased electricity usage. Heat provision should be located close to the end use and connect to heat networks where feasible.

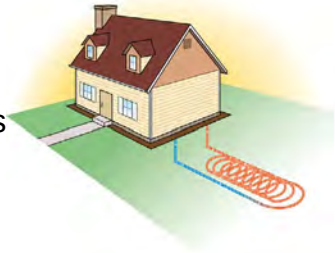


- **Air Source Heat Pumps** (Air SHP):

Air SHP are usually stand-alone units located on the outside of, or near, buildings taking heat from the outside air. Air SHP are most suitable in association with existing buildings, subject to concerns of visual and residential amenity. Permitted Development Rights are available for **single domestic units** (<45kW) with restrictions.

- **Ground Source Heat Pumps** (Ground SHP): Consist of an underground closed loop, installed vertically in a borehole or horizontally in a trench to capture solar heat stored in the ground. These have greater temperature stability than Air SHP. Ground SHP require fluid filled pipes leading into the heated building, a heat exchanger and pump. Permitted Development Rights exist for small domestic Ground SHP (<45kW) with restrictions. Limited PDR also exists for domestic and non-domestic pipework connected with Ground SHPs.

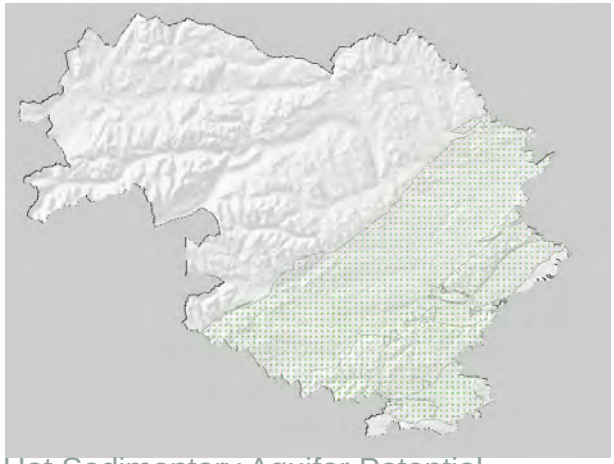




- **Water Source Heat Pumps** (Water SHP): Consist of a closed loop installed in a water body or an open loop which extracts and returns water during heat extraction. Water SHP benefits from stable temperatures relative to the size of the waterbody. Pipework, pumps and heat exchangers are necessary along with filtration and maintenance systems for open loop systems. In lochs and rivers installations will need to be at a suitable depth where current will not affect operation and natural heritage and water environment considerations can be addressed. Limited Permitted Development Rights are available for small domestic Water SHP (<45kW) and associated pipework.

- **Deep Geothermal:**

A heat pump reaching up to 4km in depth where temperatures can reach up to 80°C. Potential has been identified in the northern part of the Midland Valley which is likely to require exploratory work. Hot sedimentary aquifers here would be accessed via a closed or open loop system. A drilling rig and storage tanks may be required during construction.



Hot Sedimentary Aquifer Potential

An EIA Report may be frequired forgeothermal drilling, or for installations over 0.5ha or in a sensitive area.

Water SHP, vertical Ground SHP and Deep Geothermal may require SEPA authorisation for water use or abstradction. A CAR licence is required for all boreholes >=200m deep.

Do I Need Planning Permission for the Installation, Alteration or Replacement of an Air Source Heat Pump? (PKC, 2016)

Environmental good practice guide for ground source heating and cooling (EA, 2011)

CP2 Surface Water Source Heat Pumps (CIBSE, 2016)

Fluorinated Gases webpage (NetRegs)

CAR Licences for Deep Boreholes (SEPA, 2017)

CARES Renewables Energy Tool-kit

SEPA Renewables advice webpage

3.5 BIOMASS

Woody biomass produces heat, and potentially Combined Heat and Power, by burning logs, processed wood chips or pellets, woody forestry residue, energy crops or dry vegetable residue from agricultural or industrial processes such as distilleries.

Biomass can provide an alternative to oil for off-grid homes and businesses such as hotels and horticulture, provided any air quality concerns are addressed. Several small estate and community scale heat networks using biomass already exist in Perth & Kinross. Biomass installations range from small units housed in existing garages or new outbuildings to large, stand-alone, industrial installations.

Applicants proposing biomass installations using treated or contaminated products should refer to the Energy from Waste section.

Biomass installations may consist of use of existing or new buildings, combustion unit(s), pipework and flue, heat storage tank, facilities for delivering, storing, and/or drying fuel, hard standing areas, security fencing, and lighting

- **Micro Biomass** (<45kW): Best located in existing buildings, subject to impacts on built heritage. Restricted Permitted Development Rights are available for domestic and non-domestic use but do not apply in Air Quality Management Areas.

- **Medium Biomass** (45kW – 300kW) May require new outbuildings including for fuel storage, which are best sited near existing outbuildings, particularly in an agricultural and industrial context.

- **Large Biomass** (>300kW) are likely to require large buildings for biomass boilers, backup gas boilers; fuel storage and delivery mechanisms, heat delivery infrastructure and control building. Sites are best located in industrial or where the impacts of fuel delivery and noise can be accommodated. Consideration should also be given to the present and future heat needs of the surrounding area.

An EIA may be required for large installations or those affecting sensitive areas. Installations > 1MW or using waste wood will need a permit from SEPA.

All biomass applications should include:

- details of the size, model and specifications of boiler, flue and infrastructure
- the location and height of nearby buildings including the location of windows in relation to the proposed flue.
- proposed maintenance, fuel source, fuel storage and delivery
- details of any external pipework including underground works

Biomass Guidance (Carbon Trust)

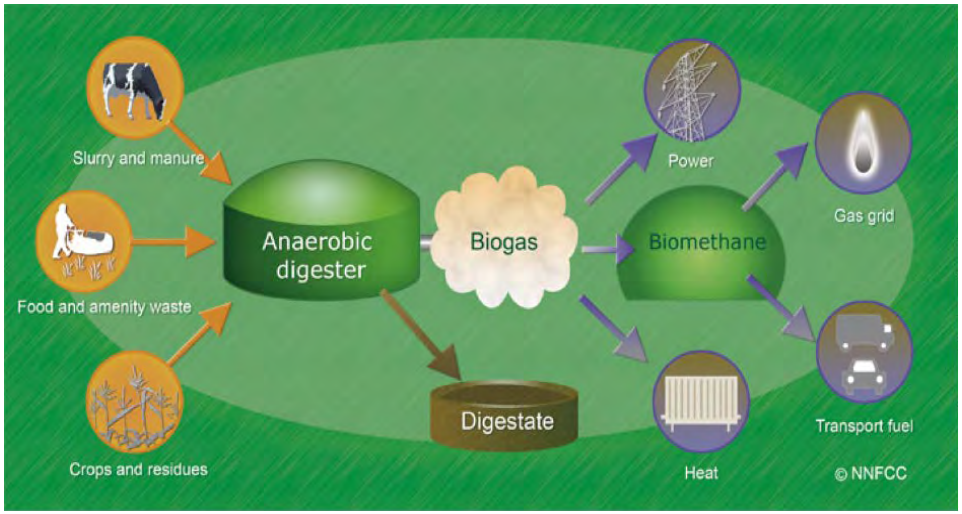
Do I Need Planning Permission to Install a Flue for a Biomass Heating System? (PKC)

Permitting Guidance for Biomass Combustion (SEPA, 2014)

SEPA Renewables advice webpage

3.6 ANAEROBIC DIGESTION

Anaerobic digestion (AD) produces biogas from waste such as agriculture slurry, poultry litter, energy crops or agricultural, domestic and distillery waste. The biogas can then provide electricity and heat, be used in the gas grid or processed astransport fuel. AD helps reduce greenhouse gas emissions from waste and energy production while reducing inputs to landfill, and controlling pathogens and odours. The residual digestate can also be used as fertiliser.



AD infrrastructure can include new structures for the digestor, and new or existing buildings for feedstock and digestate storage and the boiler or CHP unit. Ancillary infrastructure includes pipework, flue and flare stack, abatement plant, hardstanding and access roads and potential electricity, heat or gas connection.

- **Micro AD** (<45kWth, <50kWe) are usually self-contained installations in portakabins or shipping containers that can provide on-site waste treatment. They are best located on industrial estates or farms, away from dwellings. Limited permitted development rights are available on agricultural or forestry land and are subject to design, historic interests and Air Quality Management Areas and require prior notification and approval.


Micro AD (c) Qube Renewables

- **Large AD** (>45kWth, >50kWe) comprise considerably more infrastructure. They are best located on or near farms, industrial estates, food processing and waste water treatment facilities.

All AD plants are best located close to their fuel source, away from sensitive habitats, landscapes and visual receptors and a minimum of 250m away from dwellings or other sensitive receptors unless impacts can be mitigated to acceptable levels.

Large AD plants may need an EIA and Licences from SEPA relating to waste management and the water environment are also likely to be required.

Licensing of Anaerobic Digestion Plants (SEPA, 2017)
PPC Technical Guidance Note 38: Anaerobic Digestion (SEPA, 2015)
SEPA Low-carbon and resource recovery webpage

3.7 WASTE SOURCES

Waste organic matter that is in, or would otherwise go, to landfill can be utilised to produce a a low carbon source of heat or electricity offsetting additional fossil fuels. Efforts to prevent waste, reuse and recycle take priority over energy recovery. This guidance does not provide specific guidance on waste sources, but Policy 33 and the guidance for all technologies should be followed.

Landfill Gas

Organic matter in landfill produces gases including methane which need mitigation. Methane is combusted to generate heat and energy while reducing health and environmental impacts; and the CO^2 produced has a lower greenhouse gas impact than the methane source. A landfill gas operation already operates at Binn Farm.

Elements to consider include extraction and generation plant, air safety lighting, pipework, flue and flare stack, fencing and security lighting.

Landfill gas operations will necessarily be located on and adjacent to landfill sites, but additional adverse impacts will occur from the infrastructure and taking into account the site edge location which may be closer to trees, habitats and other buildings.

A PPC permit will be required for both gas installation and landfill so SEPA should be involved at an early stage to inform design and location.

SEPA Guidance on Landfill
SEPA advice on low carbon generation and resource recovery

Energy From Waste

Energy can be produced from waste either by anaerobic digestion of organic matter (see 3.6 Anaerobic Digestion) or thermal treatment by combustion, pyrolysis or gasification and for the purposes of this Guidance includes biomass facilities using non-woody or treated wood products as fuel.

Carefully designed and controlled facilities have potential to contribute to renewable energy and heat targets as well as minimising waste to landfill. The carbon offset of Energy from Waste plants will depend largely on the fuel source. Energy from waste should only be used for materials that cannot be reused or recycled or used in anaerobic digestion. Combustion of petrochemical based waste is not classed as renewable or low carbon.

Facilities should be located close to waste streams and heat demand with particular consideration for landscape, air quality and transport impacts. The Council can help identify demand opportunities and the Council's Environment Service can help identify and co-ordinate potential waste streams.

The nature of EfW requires that full consultation is carried out with SEPA, the Environmental Health team and local communities. As both emissions and waste are regulated by SEPA, including air pollution control and disposal of associated residues, a PPC Permit to operate an EFW will apply along with other regulatory requirements, and SEPA guidance should be adhered to. An EIA Report may also be required. Impacts will be considered on a case by case basis and should be discussed with the Planning Authority.

Energy from Waste Guidance (SEPA)

4 NEW SITES

Policy 33A: NEW PROPOSALS FOR RENEWABLE AND LOW CARBON ENERGY

Proposals for the utilisation, distribution and development of renewable and low-carbon sources of energy will be supported subject to the following factors being taken into account:

a) The individual or **cumulative** effects of developments and associated transport/**electricity** infrastructure…

This section sets out how the criteria in Policy 33A should be addressed. The criteria that need to be addressed will depend on the scale and nature of the technology, the associated infrastructure, and the environmental sensitivity of the site, location and receptors. Both the construction and operational stages of development should be fully addressed.

Construction

Construction best practice should be followed and consideration should be given to all temporary and permanent infrastructure including hill tracks and borrow pits, staff and storage compounds, crane pads, weirs, penstock and cable/pipework routes, excavations and bunding.

Gabions and matting to protect soil during powerhouse construction

A draft Construction Method Statement (CMS) (see Appendix 3: CMS and CTMP Guidance) will be required as part of a submission or an EIA Report:

- Where there is potential for impacts on the water environment, valuable soils, natural heritage, archaeology
- Where there is potential for impacts on a site designated for its natural heritage such as SSSIs, SPAs and SACs.
- For all large turbines and wind farms
- For all hydropower

A draft Construction Environmental Management Plan (CEMP) may also be requested to inform proposals for large turbines and wind farms, hydropower, solar farms and geothermal applications in sensitive environments. Conditions on approved applications will then require a full CEMP before construction, and the advice of an independent Ecological Clerk of Works (ECOW) as agreed by the Council, in consultation with SNH and SEPA where relevant.

SNH (2018) Good practice image guide for contractors
Good Practice During Windfarm Construction (SNH, 2019)
Guide to Hydropower Construction Best Practice (SEPA, 2015)

Cumulative Effects

The impact of a technology may be exacerbated by existing or proposed installations in the area with a similar effect. An assessment of the cumulative effects may be required for large applications and even small applications in sensitive locations. Assessments should include installations and applications within other planning authorities' boundaries where there is a significant potential landscape, visual or ecological impact. Further detail is provided in each section.

Electricity Connection and Transmission

The availability of grid capacity for renewable energy proposals is not a material consideration for planning application assessment however applicants connecting to the grid should discuss connection with the relevant distribution network operator at an early stage (SSE or Scottish Power).

Grid connections may have adverse impacts such as habitat loss and fragmentation, impacts on the water environment, bird collision risk and significant visual impacts; but may also provide positive socio-economic benefits. Visual and natural heritage impacts should be mitigated by undergrounding of cables where possible subject to detrimental impacts on archaeology and the natural environment.

To enable the full implications of a renewable energy application to be understood, applicants should indicate the route and location of infrastructure to be used to connect to the grid, including transformers, substations and associated fencing and access. The Council will need to agree the connection point and method of connecting to the grid before commencement.

Generation Connection Guidance (SSE)
Generation Availability Map (SSE)
Distributed Generation Heat Map (Scottish Power)

4A.1 BIODIVERSITY & NATURAL HERITAGE

Policy 33A: New Proposals for Renewable & Low Carbon Energy

a) The individual or cumulative effects of developments and associated transport/electricity infrastructure on…

- Biodiversity and Natural Heritage

LDP Policy 38 Nature and Conservation
LDP Policy 41 Biodiversity
LDP Policy 42 Green Infrastructure
LDP Policy 45 Lunan Lochs Catchment Area

All Technologies

All proposals should show how impacts on natural heritage has been assessed, avoided and mitigated in line with the above policies and associated guidance.

Surveys will be relative to the size, location and sensitivity of the site and surrounding habitat and can be identified during pre-application of EIA scoping discussions. Surveys should be appropriate for the habitat type, extend outside the site boundary and be undertaken in the correct season. Further guidance will be set out in forthcoming Planning for Nature guidance.

For relevant habitat and species records:

Scottish Biodiversity List
Tayside Local Biodiversity Action Plan (2016)
SCFC Fish Habitat Survey Resources
NBN Atlas
Scottish Badgers

Biodiversity and green infrastructure protection and enhancement should be implemented throughout the design of the project from initial design to construction, compensation, restoration, operation and decommissioning.

All developments should be able to demonstrate they have avoided loss or impacts on protected plants and sensitive habitats. Any unavoidable loss must be compensated.

Direct loss and fragmentation of habitats, woodland and green infrastructure can be avoided through carefully sited infrastructure and access tracks. Indirect damage to plants and habitats from changes to soils and hydrology should also be addressed.


(c) SNH/Lorne Gill

Infrastructure may also disrupt or displace wildlife from their foraging, breeding and commuting habitats. This may include displacement of birds, badgers, reptiles and amphibians from breeding and foraging/ hunting grounds; disruption to bat roosts in woodland, or disturbance/fragmentation of bat foraging habitats in and near woodland, woodland edges, watercourses, lochs and hedgerows. Even small domestic installations should address bat roosts and hibernacula and breeding birds in buildings and trees. Suitable assessment, demonstrated avoidance, good practice construction, and buffers will help avoid such issues.

Best practice construction includes working in the correct season for relevant species, and providing a safe site for widlife particulalry where there are open trenches or pipework. Measures must be taken on site to minimise risks of transfer of invasive species.

Restoration, compensation, landscaping or enhancement should be as early as possible and promote biodiversity, climate resilience, flood protection, and recreation in line with the Council's Forest and Woodland Strategy, LBAP and Green Infrastructure guidance.

A landscape plan or habitat management plan should detail mitigation, restoration and enhancement and a Site Biodiversity Action Plan together with a monitoring scheme can demonstrate that risks to habitats and wildlife are understood and managed.

Protected Sites

Any proposal within or adversely affecting RAMSAR, Natura sites (SPAs, SACs) or UK designated biodiversity sites (SSSI, NNRs), or local conservation or geodiversity sites will only be permitted in accordance with LDP Policy 38. Effects may be indirect or at a distance from the site; connected through hydrology or species moving outside protected areas. Any proposal capable of affecting a Natura site will need to provide information to allow a Habitat Regulations Appraisal to be carried out.


River Tay SAC

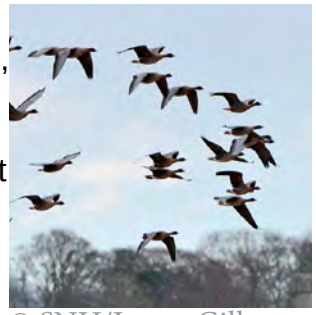
Submissions for Large Wind and Wind Farms, Large Solar Farms and Floating Solar should address potential impacts on qualifying bird species of protected SPAs.

Submissions for Hydro and Water SHP, and all construction with ecological connection to SACs and SPAs should address potential impacts on the sites and qualifying species.

- Assessing Connectivity with SPAs (SNH, 2016)
- Protected Areas and Species Advice (Hydro) (SEPA)
- SNH Sitelink for Protected Areas
- Guidance on Perth and Kinross SACs and SPAs
- Habitats Regulations guidance (SNH)

All wind turbines larger than micro turbines can provide a collision risk to birds' commuting, hunting or migration flight paths as well as loss or displacement of birds from breeding, foraging and hunting habitat. Turbines also pose a collision and Barotrauma risk to bats.

Additional surveys required include detailed surveys and collision risk modelling of raptors, bats and wintering, breeding, foraging and migrating birds for all EIA developments. For non-EIA development the level of assessment will be relative to the risk and connectivity to sensitive areas.


© SNH/Lorne Gill

Cumulative impact assessments on birds and bat populations will be required for EIA developments in line with SNH guidance.

Site location, layout and choice of turbines should be shown to avoid adverse impacts. Additional mitigation expected will include a suitable buffer between turbines and woodland edges. A monitoring and shut down plan will provide further precautionary mitigation.

Wind farms should also aim to enhance habitat during operation and decommissioning restoration particularly in association with peatland and should reflect local biodiversity priorities.

- Spatial Planning for Onshore Wind Turbines – natural heritage (SNH, 2015)
- Good Practice During Windfarm Construction (SNH, 2019)
- Wind Farm Impacts on Birds Guidance (SNH)
- Assessing the Impact of small-scale wind energy proposals on the natural heritage (SNH, 2016)
- Assessing cumulative impact of onshore wind farms on birds (SNH, 2018)
- RSPB Wind Energy Mapping and Locational Guidance

Hydropower development can have significant impacts through the installation of tracks and penstocks, but alos operational impacts on the water environment.

Changes to water quality, quantity, flow, depth, sediment and temperature can affect the habitat, food availability, spawning and migration of a wide range of species.


© SNH/Lorne Gill

Information on the impacts of hydrological changes on relevant species should be provided. Species include fish surveys as required by SEPA, aquatic invertebrates, aquatic birds, otters, beavers and bryophytes.

Impacts on species throughout their lifecycle including migration should be considered and addressed in site selection and design. Negative impacts can be avoided or miitgated by using degraded watercourses with poor ecological status, sites upstream of existing fish barriers, avoiding sites with poor hydology, and ensuring the design and location of intakes and tailraces does not detrimentally affect habitat through changes to morphology and hydrology.

Cumulative impacts on protected species should be addressed where there are other installations in the local catchment or where identified to have a cumulative sensitivity in the webmap.

Weir location and design should demonstrate that they do not prevent fish and eel access to feeding, breeding and spawning areas. Fish and mammals can be injured by poorly designed or inadequately screened intake structures, weirs, tailraces, outfalls and fish passes. Intakes and outfalls must be screened to protect wildlife.

Use of existing weirs will prevent new fish barriers, or can restore fish passage where SNH advise this is appropriate.

Other positive opportunities are encouraged to enhance aquatic and riparian habitats both up and down stream, and for flood and erosion control.

Hydro construction on existing weir

Guidance for developers of run-of-river hydropower schemes (SEPA 2015)

Hydro-electric schemes and the Natural Heritage (SNH, 2015)

Fish and Fish Habitat Information (SEPA)

SOLAR

Roof mounted PV or solar thermal should not disturb or block access to bat roosts and bird nests in or on roofs.

Solar farms have potential to displace breeding and wintering birds, mammals, amphibians and reptiles from foraging and breeding areas. Surveys should assess the existing resource and consider the location and design of the site and fencing. Siting the solar farm on land with low biodiversity value with a view to enhancement is encouraged with a substantive buffer between the site and existing trees or waterbodies.

(c)Elgin Energy

The remaining habitat can continue to have value with wildflower meadows or grasslands under arrays that can support pollinators and ground-nesting birds. Vegetation should be managed with low intensity grazing rather than herbicides.

Hedges around the site rather than fences can provide security, screening and habitat. Where fences are used badger gates and low level gaps for wildlife will allow continued use of the site, while passive infrared lighting will reduce impacts on birds and bats.

Floating solar arrays should only be on waterbodies with low ecological value, as the site may displace aquatic birds and have an effect on aquatic vegetation through light and temperature differences. Surveys of aquatic birds, fish and vegetation will help demonstrate the existing value and any impact.

Natural Heritage Considerations for Solar Photovoltaic installations (SNH, 2017)

Biodiversity Guidance for Solar Developments (BRE, 2014)

HEAT PUMPS

All heat pumps other than domestic air SHP can lead to loss or fragmentation of habitats from pipework, particulary horizontal ground SHP. The location of pipework and timing and restoration of trenches for Ground SHP should be carefully considered, with impacts on amphibians and breeding birds assessed.

GSHP trenches (c) Glendevon Energy

Construction of Water SHP and operation of open loop systems can impact on aquatic habitats and wildlife. Site selection and design should be informed by amphibian, fish and aquatic invertebrate surveys. Any changes to water temperature, particularly in relation to SPAs, SACs and SSSIs should be assessed for their impact. Design and site selection should be shown to minimise temperature differences. A monitoring and maintenance plan must be in place.

All biomass installations may have impacts on birds and bats from flue installation and emissions. Submissions for large biomass installations should demonstrate that impacts of odour/air quality impacts on nearby habitats have been avoided, and that fencing and lighting does not disrupt bird and bat commuting and foraging.

Where new energy crops are proposed negative impacts on habitats should be avoided with positive impacts from planting explored.

Anaerobic Digestion installations have potential to contaminate habitats and the water environment so buffers and hard landscaping should be use to safeguard against spillages.

Feedstock use may have indirect impacts on habitats where unsustainably sourced. Submissions should demonstrate sustainable feedstock sourcing and disposal of digestate.

4A.2 WOODLAND AND FORESTRY

Policy 33A: New Proposals for Renewable & Low Carbon Energy

a) The individual or cumulative effects of developments and associated transport/electricity infrastructure on…

- Woodland and Forestry

LDP Policy 40 Forestry Woodland and Trees & Guidance
LDP Policy 42 Green Infrastructure & Guidance.

Tree surveys are required for all developments where there are trees on site, along with additional surveys where identified through Preliminary Ecological Appraisal such as for ancient woodland. Proposals can then demonstrate how construction of installations and tracks will avoid fragmentation and loss of forestry, woodland and trees. Proposals should also seek to expand and enhance connectivity between areas of natural and ancient woodland.

Any unavoidable temporary loss should be rectified through timely and appropriate habitat and woodland restoration. Any further unavoidable loss must be compensated on or close to the site and accord with our Forest and Woodland Strategy.

In forestry, restructuring for wind optimisation may be supported if SEPA guidelines are followed and impacts on soil, biodiversity and timber production are acceptable. Keyholing of plantation is preferred, except on peat where clear felling and peat restoration is preferred. Impacts on land capable for timber production should be minimised.

Particular care should be taken with hydro schemes to avoid loss of, and to enhance, riparian woodland. Impacts on land capable for timber production should be minimised.

Sites for solar farms are expected to avoid woodland, and an appropriate buffer should be applied between site fencing and surrounding woodland to protect roots and provide a maintenance corridor.

Unsustainable biomass fuel can impact GHG emission savings and habitats. Sustainable choices include minimising fuel transport requirements, using untreated crop or woodland waste, sourcing from sustainable fuel suppliers, or planting and managing crops or woodland for fuel and biodiversity. Fuel sustainability can be demonstrated by providing a management plan, long term forestry plan, or meeting Ofgem sustainability criteria.

Proposals affecting forestry should adhere to SEPA and Forestry Commission Scotland's standards and guidance, and the Council's Forest and Woodland Strategy.

Refer to the following sources and guidance:

- Management of Forestry Waste (SEPA, 2017)
- Policy on Control of Woodland Removal (FCS, 2009)
- Biomass Suppliers List
- Woodfuel Advice Note (Ofgem, 2017)
- Forest Plan Guidance (Scottish Forestry)
- Renewables Obligation: Sustainability Criteria

4A.3 LANDSCAPE AND VISUAL AMENITY

Policy 33A: New Proposals for Renewable & Low Carbon Energy

a) The individual or cumulative effects of developments and associated transport/electricity infrastructure on…

- landscape character, Local Landscape Areas, Wild Land Areas and National Scenic Areas
- visual amenity;

LDP Policy 1: Placemaking | Guidance
LDP Policy 39: Landscape | Guidance

Renewable energy installations can impact on the character of the landscape as a result of the design, size,and layout of the installation, and associated infrastructure against the landscape.

Visual impacts also arise from people's perception of installations as seen from homes and public locations (referred to as receptors).

All submissions should consider whether the proposal will affect:

- The landscape character taking into account scenic value, and areas sensitive due to historic and cultural or recreational value.
- Views from and to locally important viewpoints and Iconic Viewpoints
- Impacts on the landscape of, and views from Local Landscape Areas, National Parks, National Scenic Areas, Wild Land Areas
- Views to iconic and locally important landmarks including the Highland Boundary Fault, monuments and natural features;
- Views from neighbouring receptors including dwellings, core paths, Principal Tourist and Amenity Routes and recreation areas

Submissions should also address any cumulative impact on the issues above. Renewable energy proposals and applications are available on the PKC Renewable Energy Proposals Location Map.

Landscape and Visual Impact Assessments (LVIA)

The assessment required of the landscape and visual impact of the proposal will be proportional to the scale and nature of the development and the sensitivity of the location ranging from simple site photographs and design drawings, through landscape and visual appraisals (LVI appraisal). For EIA developments an LVIA will be required where scoped in. The Planning Authority will help identify the extent of assessment required, the zone of theoretical visibility (ZTV) and relevant viewpoints and receptors.

All appraisals and assessments must folllow:
Guidelines for Landscape and Visual Impact Assessment (3rd ed) (The Landscape Institute, 2015)

Small and medium wind turbines submissions should refer to:
Assessment of The Impact of Small Scale Wind Energy Proposals on the Natural Heritage (SNH, 2016)

Large Turbines and Wind Farm submissions must adhere to:
Visual Representation of Wind Farms (SNH, 2017)

The Landscape character of Perth and Kinross is described in Landscape Study to Inform Planning for Wind Energy (DTA, 2010) and Landscape Character Type Descriptions (SNH, 2019). These are material considerations where a landscape appraisal or assessment is required. All assessments should take into account any changes in landscape capacity since the publication of these studies using professional judgement.

Assessment information required

Micro Wind & Small Turbines	Site photographs from agreed locations up to 1km away. Basic ZTV studies, photomontages may be required in sensitive locations
Medium Turbines	Detailed design and location information, site photos and visualisations. An LVI appraisal including studies of visual impacts upon receptors up to 15km may be required
Large Turbines & Wind Farms	LVIA with a ZTV to a minimum of 20km
Roof top & Micro PV	Site photographs, plans. Visualisations for installations affecting landscape designations.
Hydro	Site photographs of watercourses and affected construction areas. LVI appraisal or LVIA if affecting designated landscapes
Solar Farms	Site photographs, and visualisations LVI appraisal if affecting a heritage interest or landscape designation; LVIA if scoped in in EIA
Heat pumps	Site photos and plans including nearby visible heatpumps. Visualisations for large structures. LVIA for Deep Geothermal
Biomass	Site photos and plans. Visualisations or LVI appraisal for large new structures affecting heritage or landscape designation
AD	Site photos and plans Visualisations or LVI appraisal for large AD
EfW and Landfill Gas	Site photos, plans and visualisations LVI appraisal for EfW or in sensitive areas

All proposals can mitigate landscape and visual impacts through:

- Careful selection of site and route of tracks at design stage
- Considering the siting and design of infrastructure at an early stage in consultation with communities and stakeholders.
- Using design, materials, and colour that best fit with the built, historic and natural environments
- Using scale appropriate to nearby buildings, trees, pylons and landforms
- Siting infrastructure near existing structures
- Siting all turbines and large installations to avoid significant adverse visual and landscape impacts as seen from Principal Tourist and Amenity Routes.
- Using existing topography, landscaping and natural screening to minimise impacts
- Undergrounding of pipework, penstock and cabling where possible; and the use of landscaping and natural screening where undergrounding is not possible
- Timely restoration of tracks, trenches, construction compounds, laydown areas and borrow pits to match the surrounding environment
- Demonstration of effective mitigation through a Habitat Management Plan or Landscape Management Strategy.

Iconic Viewpoints and the Highland Boundary Fault

Wind farm, large turbine or solar farm proposals visible from important viewpoints including munros and scenic viewpoints should assess impacts on those views. Visualisations will be required where proposals may affect views from Iconic Viewpoints (see map on page 37).

The Highland Boundary Fault (see map on page 37) is a distinctive, topographical, cultural and geological feature running through Perth and Kinross which is sensitive to wind turbines on its top or, as seen from the Lowlands side, in front of or on the fault slope itself. Visual impact assessments will be required for large turbines and wind farm proposals within 2km of the northern edge, and 5km of the southern edge of this feature to demonstrate that views of the skyline or natural beauty of this feature are not significantly adversely affected.

Local Landscape Areas

Perth and Kinross Local Landscape Areas (LLAs) are also highly sensitive and wind proposals, solar farms, hydro and large biomass or large AD, will need to demonstrate that any significant adverse impacts on the special qualities of the relevant LLA can be overcome.

Landscape Supplementary Guidance (PKC, 2019)

National Scenic Areas and National Parks

Large turbines and wind farms proposed in National Scenic Areas (NSAs) will not be acceptable. Any turbine >12 m in a NSA needs planning permission and consultation with SNH.

Most turbines, hydro installations and hill tracks, and other large installations can have adverse landscape and visual impacts at a distance including across boundaries to both NSAs and National Parks. Where in or visible from NSAs and National Parks submissions should show they do not have a significant adverse impact on the special landscape qualities of national parks or their gateways with reference to the relevant guidance.

The Special Landscape Qualities of LL&TNP (SNH, 2010)
The Special Landscape Qualities of Cairngorms National Park (SNH, 2010)
The Special Qualities of National Scenic Areas (SNH, 2010)

Wild Land Areas

The Wild Land Areas of Perth and Kinross in group 2 of the Spatial Framework are very sensitive with little or no capacity to for development. All wind , hydro and all other large scale installations within or partly within WLAs are highly likely to require a Wild Land Assessment. Early discussion with the Planning Authority and SNH will help determine if there is a likely significant effect on WLA qualities requiring a Wild Land Assessment. Assessments should adhere to SNH Guidance: Assessing Impacts on Wild Land (SNH, 2017)

The siting and design of micro wind turbines should use scale design, materials and colour that best fit with the surrounding environment and any other turbines. Microwind is best sited in association with existing buildings or structures and can be located carefully or screened to avoid visual impacts.

Wind farms and large turbines should address the Policy 33D: Spatial Framework for Wind Energy when selecting a site and avoid impacts on areas of naturalness, landscapes of high sensitivity to Wind, and Local Landscape Areas. For the siting and design of all wind turbines above 15m in height and associated ancillary infrastructure, applicants should comply with, and will be assessed against SNH Guidelines: Siting & Designing Wind Farms in the Landscape (SNH, 2017). This will help submissions to address:

- The fit of turbines within the landscape depending on the number, scale, pattern and colour of turbines against the scale, form, complexity and cover of the landscape
- The prominence of turbines including on ridge lines, on loch and river shores and in areas of wildness, remoteness or tranquillity
- The siting of turbines on the site in relation to each other, other structures and site topography, as viewed from different receptors
- The location and fit within the pattern of existing turbine(s)
- The relation of turbine(s) in size, character and location in the context of nearby dwellings and other buildings, monuments, conservation interests and locally important natural features
- The cumulative impact of all sizes of turbines with existing and proposed turbines and other infrastructure including pylons
- The landscape and visual impact of foundations, transformers, cranes, crane pads, tracks, construction compounds, borrow pits, and grid connection infrastructure
- The impacts of safety lighting on the night sky in rural areas.

Cumulative impacts from new turbines risk coalescence between existing wind farms or turbine clusters leading to a wind farm landscape. Repowering applications may provide an opportunity to reduce existing cumulative impacts by removing or redesigning elements in the landscape.

Micro, small and medium turbines should consider other existing turbines in the immediate area to ensure cumulative impacts are minimised. Siting and design choice will help avoid creating confusion or clutter through different designs or heights.

A Cumulative Landscape and Visual Impact Assessment (CLVIA) will be required for large turbines and wind farms in areas identified on the Wind Strategic Environmental Sensitivities map as cumulative or where there are existing, or proposed turbines within a cumulative zone agreed with the Planning Authority. CLVIAs should adhere to SNH guidance Assessing the Cumulative Impact of Onshore Wind Energy Developments (SNH, 2012) and should address:

- All existing, consented or submitted wind applications
- Other large or tall industrial features including pylons
- Structures outside the Council area, including for sequential impacts
- Effects on landscape character; and the qualities of landscape designations including Local Landscape Areas and Wild Land
- Combined and successive cumulative impacts
- Sequential impacts on amenity, tourist and recreational routes
- Impacts of infrastructure such as tracks, crane pads and borrow pits.

HYDRO

Impacts will depend on the sensitivity of the location and the extent of infrastructure. Sensitive locations including NSAs, LLAs, WLAs and naturalness should be avoided if impacts cannot be mitigated.

The contrast of hill tracks and penstock routes with the existing landscape during and post construction should be minimised through siting, such as using natural features like narrow valleys to reduce the extent of construction required and using existing tracks or alternative delivery methods.

Concrete and steel can contrast with a semi-natural or rural environment. Minimise impacts on the surrounding environment by ensuring a low profile of in-river structures, and choosing materials and finishes of buildings, railings, fencing and pipework that blend with or suit the environment. Reusing or restoring historic weirs will enhance the landscape.

Any visible pipework including pressure release valves can be aligned wth land use patterns and vegetation, and transformers and associated fencing can be screened. Place powerhouses underground, in existing buildings, or in new buildings in keeping with local character.

Cumulative impact assessments may be required in cumulative areas or where the proposal is affecting a landscape designation and other hydro installations or proposals are in the ZTV.

Hydroelectric Schemes and the Natural Heritage (SNH, 2015)
Good practice image guide for contractors (SNH, 2018)

SOLAR

Small installations solar will have minimal impacts unless affecting heritage features where panels should be located discretely.

PV on a roof in a conservation area

Solar farm impacts may include the visual impacts of the panels and frames themselves although due to the sunlight absorbing nature of panels and their low profile, from a distance they can seem like water or a ploughed field. Any contrast betwen the size and layout of the solar farm against the background landscape can be reduced by being sited in areas with a variety of cropping activity, and by following the contours and enclosure patterns of the landscape created by field patterns, woodland, walls and hedges. Landscaping can help reinforce the field boundaries.

Residual impacts including that of inverters and transformers, other electricity infrastructure, and security fencing can be softened by use of topography or planting as screening, and housing inverters in existing buildings where possible. Except on brownfield land, grass or wildlflowers should be kept or sown under and around panels, where hardstanding is not appropriate.

Submissions should refer to:

Natural Heritage Considerations for Solar Photovoltaic installations (SNH, 2017)

Impacts from most heat pumps will be limited and can be addressed through locating external infrastructure discretely or through the use of screening.

Plant rooms and visible pipework for water SHP or large ground SHP, should fit with the surrounding environment.

The temporary visual impacts of drilling rigs should be addressed.

Impacts from most installations will be limited to the flue but will be largely dependent on size. Existing buildings should be used where possible and locate new facilities close to existing structures.

The use of shipping containers and portakabins are only appropriate as temporary solutions and must be screened or located discretely.

Facilities should be designed as long term features appropriate to the setting taking into account additional infrastructure such as hardstandings, pipework, tanks, fencing and lighting.

Impacts of all AD applications will include the visual impacts of flues even if housed in existing buildings. Self-contained micro AD containers will need to be located and designed discretely for their location through the use of colour, screening or cladding.

Large AD can have major impacts through both the structures, storage and associated pipework and flare stacks and are best located in agricultural or industrial landscapes. Flare stacks should be shielded.

Highland Boundary Fault
Iconic Viewpoints

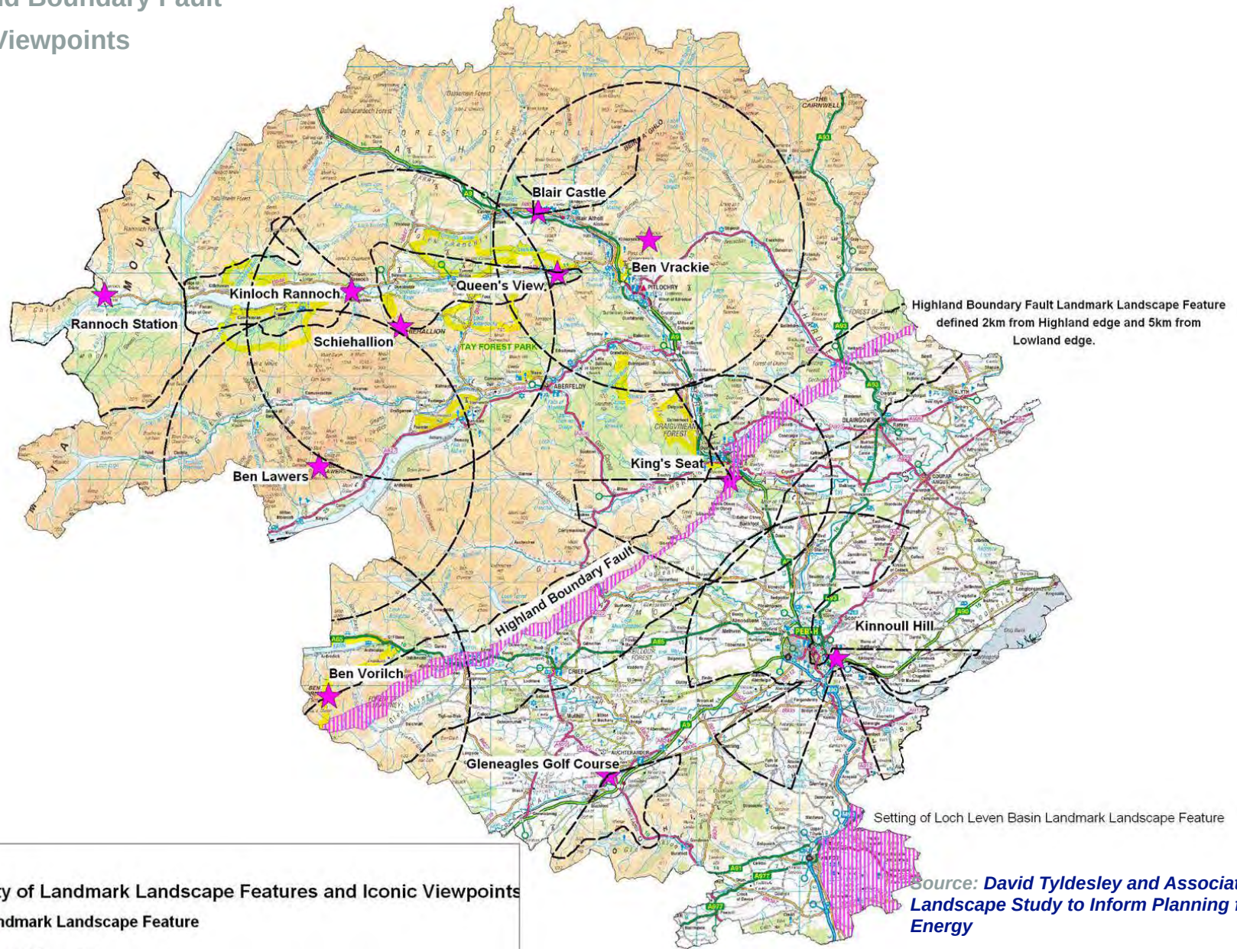
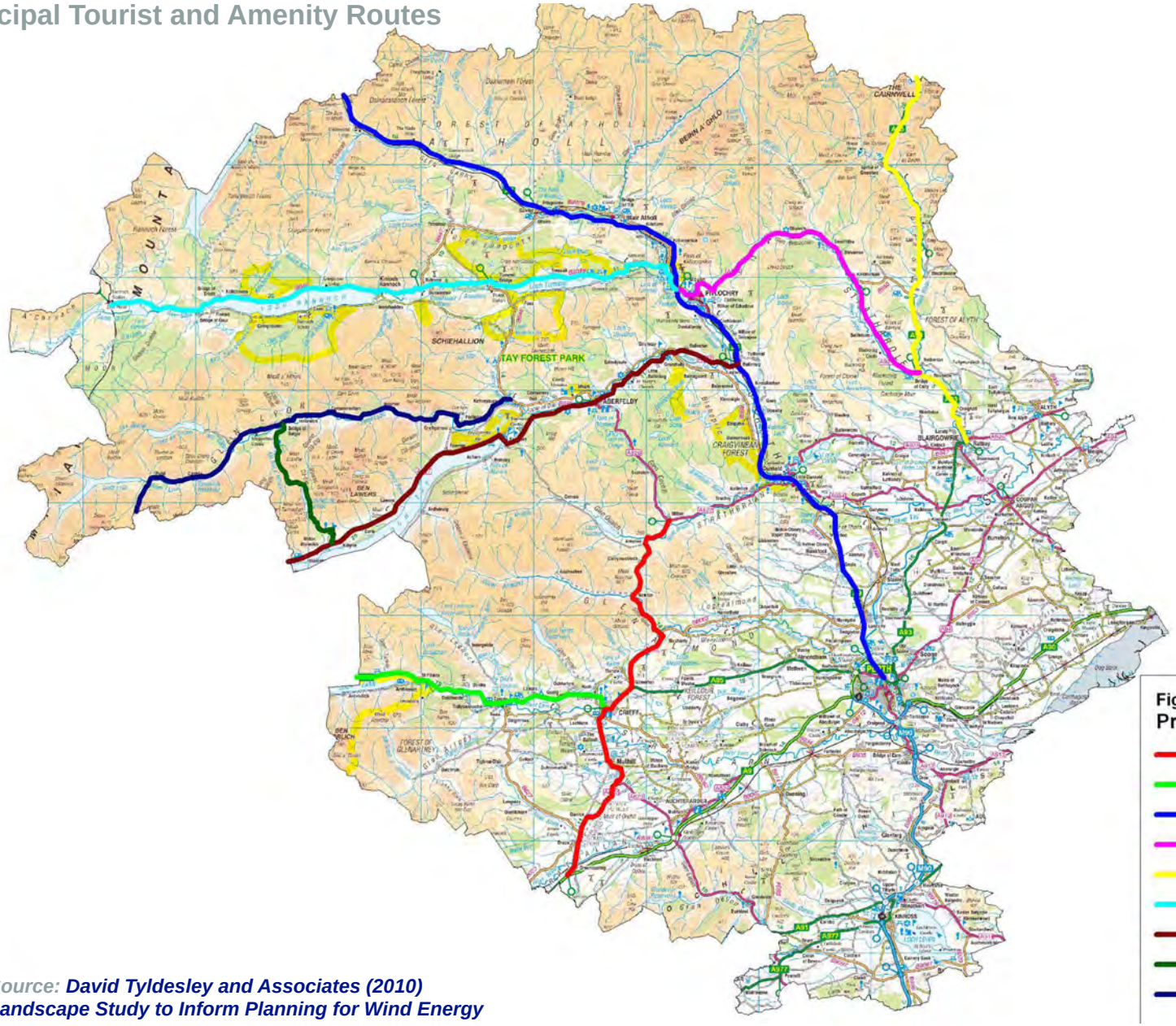


Figure 4.
Sensitivity of Landmark Landscape Features and Iconic Viewpoints
Landmark Landscape Feature

Source: ***David Tyldesley and Associates (2010) Landscape Study to Inform Planning for Wind Energy***

Principal Tourist and Amenity Routes



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Source: ***David Tyldesley and Associates (2010) Landscape Study to Inform Planning for Wind Energy***

Figure 5.
Principal Tourist and Amenity Routes

- A822 Greenloaning to Milton
- A85 Crieff to Lochearnhead
- A9 Perth to Drumochter
- A924 Bridge of Cally to Pitlochry
- A93 Blairgowrie to Devil's Elbow
- B8019/B846 Killiecrankie to Tummel
- A827 Ballaguig to Killin
- Minor Road Bridge of Balgie to A827
- Minor Road Glen Lyon to Loch Lyon

4A.4 HISTORIC ENVIRONMENT AND CULTURAL HERITAGE

Policy 33A: New Proposals for Renewable & Low Carbon Energy

a) The individual or cumulative effects of developments and associated transport/electricity infrastructure on…

- the historic environment and cultural heritage

Policy 27: Scheduled Monuments and Non-Designated Archaeology
Policy 27: Listed Buildings
Policy 28: Conservation Areas
Policy 29: Gardens and Designed Landscapes
Policy 30: Protection, Promotion & Interpretation of Historic Battlefields
Policy 31: Other Historic Environment Assets

Installation of proposals can affect the fabric of historic interests and underlying archaeology. Energy efficiency should be addressed before considering installations that may impact on the historic environment. The visual impact on Heritage Interests including historic battlefieds, gardens and designed landscapes listed buildings and conservation areas and other accessible historic and cultural experiences, and their settings is important.

Roof mounted technology and flues, and their installation, may impact on the fabric of historic buildings and the appearace and setting of listed buildings and conservation areas. These should be carefully installed and discretely sited to not detract from the historic character or settings.

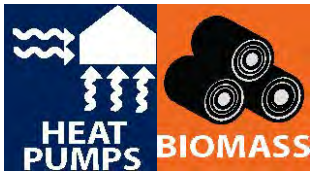
All large installations may affect the setting of or views from Heritage Interests and will not be appropriate where they have significant adverse effects. Landscape and visual appraisals should address this and any mitigation through design and screening to respect the character and setting.

All installations requiring ground disturbance should identify known archaeology across construction sites and the potential for archaeology through discussions with the Perth and Kinross Heritage Trust (PKHT). Where known or potential archaeological resources may be affected, a mitigation plan should be developed in association with PKHT. Mitigation may include recording finds or providing enhancement for acceptable proposals such as interpretative signage.

Proposals with significant transport requirements for construction or ongoing fuel delivery should also ensure historic interests are protected from vibration or ground disturbance.

Managing Change: Setting (HES, 2016)
Managing Change: Micro Renewables (HES, 2016)
Planning Advice Note 2/2011 Planning and Archaeology
Conservation Areas Advice and Heritage Conservation Map (PKC)
Listed Building Consent and Conservation Area Checklists

Heritage interests can be promoted through careful restoration of historic weirs, waterwheels and mill lades where the aquatic environment can be protected.



Vibration and ground disturbance from Geothermal and Ground SHP drilling may damage historic interests and should be assessed and avoided. The use of existing buildings for heat pump plant rooms and biomass is encouraged to protect historic settings provided pipework and vibrations do not damage historic fabric.

4A.5 HYDROLOGY, WATER ENVIRONMENT & FLOOD RISK

Policy 33A: New Proposals for Renewable & Low Carbon Energy

a) The individual or cumulative effects of developments and associated transport/electricity infrastructure on…

- hydrology, the water environment and flood risk;

Policy 45: Lunan Lochs Catchment Area
Policy 47: River Tay Catchment Area
Policy 52: New Development and Flooding & Guidance
Policy 53: Water Environment and Drainage

Hydrology and the Water Environment

All construction activities affecting the water environment may require a CAR licence from SEPA including in river engineering work; this includes all hydropower applications, floating solar, and water source heat pumps and may be required for any application requiring abstraction of water for construction or to dewater excavations. The planning team will consult closely with SEPA to assess applications, identify conditions and co-ordinate with CAR applications. SEPA guidance contains checklists to assess whether proposals will be able to obtain a water use licence.

See CAR A Practical Guide (SEPA, 2017)

Any large installation or excavation works may impact on the water environment through changes to hydrology, water supplies and water quality through construction excavation and dewatering while compacted areas, tracks and hardstandings may lead to increased runoff. These changes may lead to impacts on private water supplies and sensitive habitats including Ground Water Dependent Terrestrial Ecosystems (GWDTEs).

Assessments and Evidence Required

- Where required (see chapter 4 New Sites) CMS should map construction areas and storage compounds and identify all onsite, and connected, watercourses, lochs, water supplies, and wetlands; and appropriate buffers

For all Large turbines, Wind Farms, Hydropower, Large Solar Farms, Geothermal and others as required:

- A CEMP as set out in chapter 4
- Identify all private and public water supplies in the site catchment, assess impacts and identify mitigation for water supplies
- Consult Scottish Water for advice on precautions where development may affect a Protected Water Area
- Surveys should extend beyond the site boundary to recommended distances taking micro-siting into account
- A Phase 1 habitat survey using SNIFFER guidance can identify wetlands. A National Vegetation Classification (NVC) of each wetland will identify GWDTEs.
- Identify and avoid impacts on groundwater abstractions and GWDTEs within a minimum of 100m of excavations < 1m e.g. tracks and trenches; and 250m from excavations >1m e.g. borrow pits and foundations.
- A Drainage Impact Assessment may be required where there are significant areas of tracks or hardstandings.
- A Flood Risk Assessment will be required where required by Policy 52.

Impacts are best managed by adherence to best practice construction per SNH and SEPA Guidance.

Early consideration of site and route selection is the best way to avoid sensitive habitats including wetlands and water supplies including abstractions and drinking water supply. CMS should show that buffers are applied between construction, infrastructure and storage areas; and water bodies, abstractions and GWDTEs following SEPA guidelines. Route and site roads, tracks and trenches (excavations <1m depth) 100m from abstractions and GWDTES; and excavations and buildings (>1m) 250m away. A site specific assessment will be required if these buffers cannot be achieved. Any affects on GWDTEs should be assessed, avoided and mitigated in line with SEPA guidelines.

Water crossings should be avoided where possible and where unavoidable meet SEPA and PKC guidance and accommodate 0.5% Annual Exceedance Probability flows.Measures to protect watercourses at these points are essential.

Minimising vegetation removal and quick post construction remediation can reduce sedimentation. SUDS are required for construction and operation to treat and control run-off. Drainage to SUDS must be in place before any excavation with construction drainage and SUDS separated from clean water flows.

Natural waterflows should be maintained across habitats. This can be helped by minimising the use of impermeable surfaces, and using permeable access tracks. Drainage must be designed in line with PKC and SEPA Guidance.

Installations should not be at risk from flooding. Place all infrastructure (except for hydro and Water SHP) including generation and access infrastructure away from flood risk areas or natural flood management areas. Tracks should also avoid flood prone areas but if unavoidable must not result in an elevation of land within the flood plain. SEPA Guidance on flood risk and Policy 52 including on Flood Risk Assessment must be adhered to.

Drainage management of the site should avoid any increase in flooding downstream, particularly on Potentially Vulnerable Areas identified in Local Flood Risk Management Plans. Weirs, tracks and river crossings can pose a flood risk. If the proposal could lead to an increase in people or buildings at risk of flooding a flood risk assessment will be required in line with LDP Policy 52 and PKC Guidance. Natural flood management areas should be protected and present an opportunity for enhancement.

The following guidance should be referred to:

- Planning advice on SUDS (SEPA, 2010)
- Groundwater Abstractions and GWDTEs (SEPA, 2014)
- Abstractions Guidance (SEPA)
- WFD95: A Functional Wetland Typology for Scotland (SNIFFER, 2009)
- Flood Risk and Flood Risk Assessment SG (PKC, 2014)
- CIRIA SUDS manual C753
- Engineering in the Water Environment Guidance (SEPA)
- Good Practice Guide: River Crossings (SEPA, 2010)

Large Turbines and Wind Farms are most likely to have significant impacts particularly due to construction dewatering, excavations, tracks and crane pads.

Following careful site selection, siting of turbines and design of tracks and hardstandings should take into account existing ground cover, waterlogging and slope, the proximity and connection of the water environment.

Submissions should show how potential run-off and pollution are addressed through SUDS and drainage and a drainage impacdt assessment is likely to be required. Drainage should be designed to require minimum maintenance.

Mitigation as recommended by Ecological Clerk of Works must be followed and further measures may be required including:

- a water quality management plan to ensure water protection measures are monitored and maintained
- Monitoring of identified water sensitivities and GWDTEs; with plans for remedial action.

Good Practice During Windfarm Construction (SNH, 2019)

Given the in-stream nature of hydro construction and operation particular care must be taken for both site selection, construction and operation.

Water quality and hydrology can be affected by construction run off and scouring, sedimentation, and submerged vegetation. Hydro schemes under 100kW must be shown to not have an adverse impact on the water environment. Areas sensitive to changes in hydrology and morphology should be avoided. Submissions should address how water quality, hydrology and morphology of both construction and operation will be mitigated with best practice construction shown through the CMS and CEMP. A water quality management plan may be required to ensure water protection measrues are monitored and maintained.

Minimising vegetation loss can help protect water quality. Any watercourses on 1:50,000 map that cross the penstock route should be restored to their natural state - engineering works here may require SEPA authorisation.

Changes to water flow from flow diversion, transfers from other catchments, engineering works, weirs, intakes and outfalls may also change morphology and hydrology with impacts on fish passage, recreation and tourism and water supplies. Inflow and outflow should be carefully designed and sited and transfers between otherwise unconnected watercourses avoided.Impacts on areas sensitive due to water abstraction, and agricultural abstraction and groundwater quality should be avoided or impacts mitigated. Information on flow including compensation flow, should be provided along with an assessment of downstream effects.

Penstock route *Restored 1 year*

All weirs will give rise to some degree of water level change and potentially temperature change and should be taken into account in assessing aquatic ecology. An impoundment licence may be required for weirs and PSH.

A cumulative impact assessment may be required where there are existing hydropower structures or proposals on the tributary particularly where there are agricultural abstractions or good groundwater quality.

Hydropower Guidance (SEPA)

Guide to Hydropower Construction:Best Practice (SNH, 2015)

Guidance for developers of run-of-river hydropower schemes (SEPA, 2015)

Impoundment Guidance (SEPA)

SNH (2018) Good practice image guide for contractors

In-river engineering and installations that return water into the original watercourse should not pose a flood risk. However submissions should demonstrate that watercourse crossings and in-river engineering can cope with extreme rainfall, and powerhouses and other dry land infrastructure is designed and sited to minimise risk.

For solar farms the impact on the water environment from surface run-off from panels, non-permeable foundations, compaction and tracks should be considered. These may have impacts on GWDTEs and other habitats. Retaining vegetation around and under arrays maintained by grazing and permeable access tracks can help along with localised SUDS for any run-off. A drainage impact assessment may be required where impermeable surfaces are proposed. In addition to good construction and SUDS, using driven, screw or floating mounts can help minimise soil disturbance.

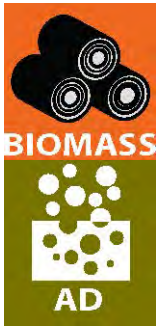
Site selection should take into account electricity infrastructure vulnerability to flood risk, with careful siting and design of inverters and transformers to reduce flooding in line with Policy 52.

Floating solar mooring equipment should not adversely impact on water quality and benthic environment.

Ground SHP trenches and boreholes may disrupt drainage impacting on GWDTEs and private water supplies requiring best practice construction. All bores deeper than 200m will require a CAR licence. Measures to protect aquifers from the drilling impacts of boreholes, including drilling fluid loss, should be provided.

Water SHP may also impact water quality from construction and operation of open loop systems but also water temperature changes in large open loop systems or closed loop in small waterbodies. Potential temperature impacts from Water SHP should be assessed and SNH and/or SEPA may require conditions to limit changes. Water quality protection measures should be proposed and a water quality management plan may be required to make sure measures are monitored and maintained.

A low risk of contamination from heat transfer fluid should be mitigated with construction and monitoring measures described to limit potential leaks.



Construction and surface runoff from large biomass should be addressed along with acidification and sedimentation from energy crops. Good practice containment of starter or back-up fuel should be shown.

AD operation, storage of fuel and construction has potential to contaminate watercourses, lochs, groundwater, and private supplies through spillage or leakage from treatment facilities or delivery of waste;

AD submissions should detail measures to contain and manage potential contamination; and detail any water requirements and source - which should be sustainable. Any abstraction will require a SEPA licence. Design of installations should use bunds to prevent any harmful liquid reaching groundwaters. Use excavated material for bunding which may require lining.

4A.6 AIR QUALITY

Policy 33A: New Proposals for Renewable & Low Carbon Energy

a) The individual or cumulative effects of developments and associated transport/electricity infrastructure on…

- air quality, including any effects on greenhouse gas emissions and impacts from construction;

Policy 57: Air Quality + Guidance

All proposals are expected to have a beneficial effect on greenhouse gas emissions (GHG). Evidence requirements are addressed in section 4B Carbon Reduction. Measures should be taken to reduce emissions in construction, transport and operation including abatement, utilising methane, reducing transport distances, using sustainable fuel sources and adhering to the waste hierarchy.

All proposals may also impact on air quality through construction impacts including movement of construction vehicles. Minimising implications of transport vehicles is addressed in section 4D Transport Implications.

Biomass, Anaerobic Digestion, Landfill Gas and Energy from Waste plants have potential to affect air quality through direct emissions. SEPA regulates the burning of waste, and fuels above thresholds under PPC and waste regulations, and will be consulted where required. Below those thresholds the Planning Authority regulates the installation through the Clean Air Act. Early consultation with Environmental Health or SEPA as appropriate, and potentially affected neighbours is essential. An air quality monitoring scheme may be required.

All biomass installations can impact on neighbours from smoke or odour particularly where the flue is below neighbouring windows or through cumulative effects. For applications over 50kW, or 20kW in the Perth or Crieff AQMAs, an Air Quality Assessment (AQA) may be required. Applications in all areas should include:

- boiler size (kW)
- manufacturer's brochure.

For AQAs the following should also be provided:

- height and diameter of stack (m)
- dimensions of buildings within 5 times the stack height including the boiler building
- maximum emission rates of NO2 and PM10 (g/s)

When choosing a location for Biomass and EFW, neighbouring properties, relative heights, window locations, topography and dispersion effects should be taken into account. Dispersion modelling may need to be mapped for large installations. Manufacturer's recommendations must be adhered to with regards the fuel type and moisture content and covered fuel storage. Large boilers may and EfW will need to have technical abatement measures.

Gases produced and CHP combustion can impact on air quality. Most proposals will need an AQA and to demonstrate exhaust emissions and flare operations adhere to SEPA Waste Guidance. AD plants should re-use their own low grade waste heat.

Permitting Guidance for Biomass Combustion (SEPA, 2012)
Air Quality and Planning Supplementary Guidance (PKC)

4A.7 AVIATION AND DEFENCE

Policy 33A: New Proposals for Renewable & Low Carbon Energy

a) The individual or cumulative effects of developments and associated transport/electricity infrastructure on…

- aviation, defence and seismological recording

Policy 61: Airfield Safeguarding

All Technologies

All tall structures, including construction cranes and flues and flarestacks, can present a hazard to air navigation. Consultation is required for applications within the safeguarding zone of Perth, Fife and Dundee airports, or any Perth and Kinross airfield as shown on the Aviation and Defence Safeguarding Map overleaf. Any proposed technical mitigation measures will need to be agreed by the relevant authorities.

Airfield Safeguarding SG (PKC)

Wind turbines can disrupt communication and navigation, and along with cranes and anemometers can interfere directly with aviation. Applicants are encouraged to engage with the planning team or relevant aviation bodies before committing to a site or design.

Applicants should consult the airport or airfield operator where wind proposals are located within the safeguarding zones of airfields and Perth, Fife, Dundee or Edinburgh airports shown on the Aviation and Defence Safeguarding Map. CAA and NATS will be consulted for all turbines.

The Ministry of Defence (MOD) will also be consulted on all applications over 11m or with a rotor diameter of 2m and all wind applications within the Munduff Hill weather radar safeguarding zone. Mitigation measures such as lighting, siting and technical features will need to be agreed by the relevant authorities and included in visual impact assessments.

Wind Farms Advice (CAA)

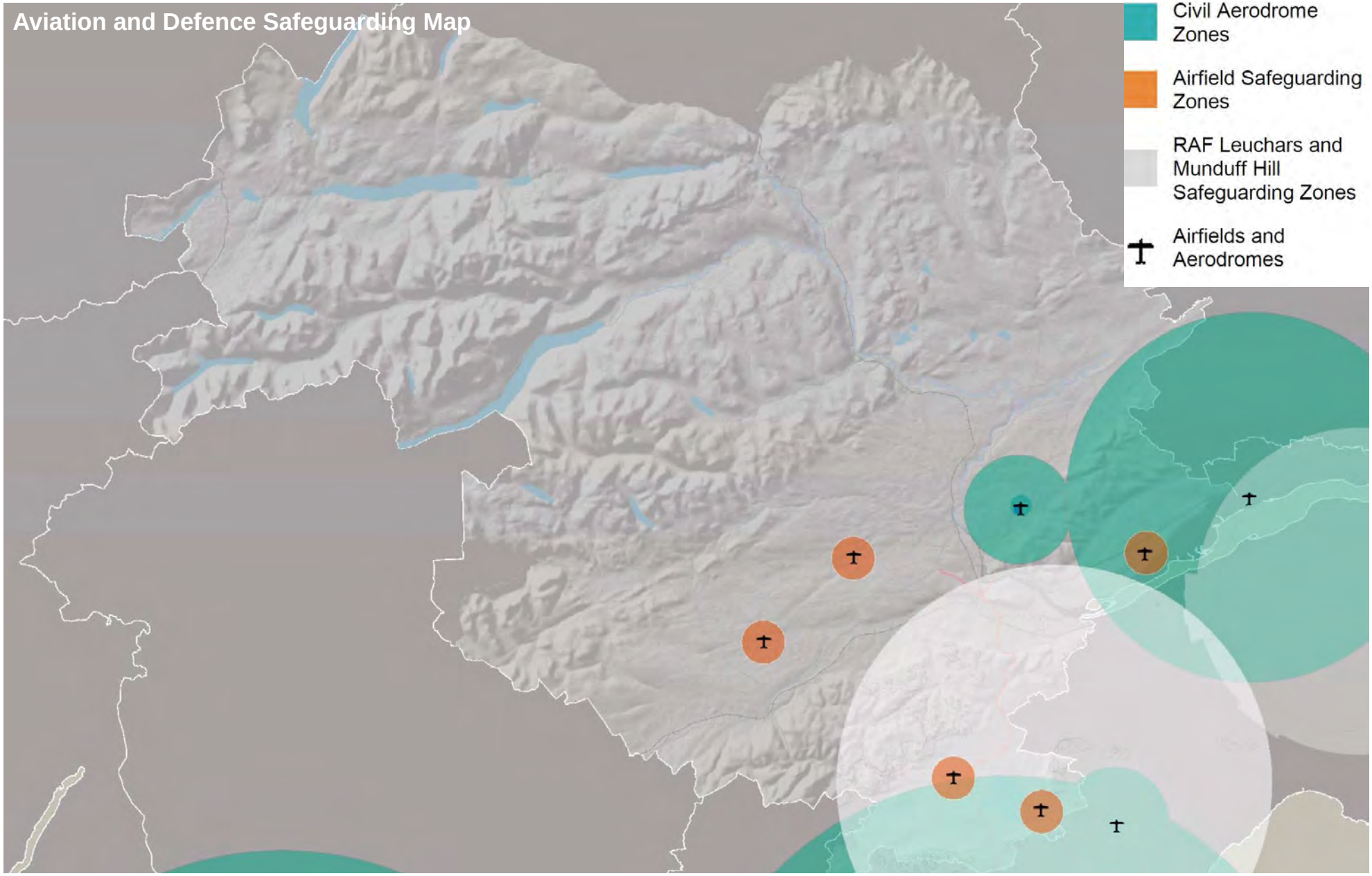
Wind Farms: MOD Safeguarding (MOD)

Large arrays have limited potential for impacts on navigation from reflection, glare and security lighting. The relevant aerodrome or airfield operator should be contacted for any ground mounted Solar PV application within the airfield safeguarding zones shown overleaf.

Applications proposing solar tracking systems will also require consultation with Ministry of Defence (MOD), Civil Aviation Authority (CAA) and National Air Traffic Services (NATS).

AD may also attract birds which may present a hazard to aircraft, which should also be factored into consultation and location.

The CAA should also be consulted where an installation will involve flaring of biogas.


Aviation and Defence Safeguarding Map
Civil Aerodrome Zones
Airfield Safeguarding Zones
RAF Leuchars and Munduff Hill Safeguarding Zones
Airfields and Aerodromes

4A.8 TELECOMMUNICATIONS AND BROADCASTING

Policy 33A: New Proposals for Renewable & Low Carbon Energy

a) The individual or cumulative effects of developments and associated transport/electricity infrastructure on…

- telecommunications and broadcasting infrastructure

Interference with radio communication and local television and radio reception should be assessed prior to development. Ofcom can provide advice on relevant operators and the Joint Radio Company can undertake screening for telemetry used by energy utilities.

Developers will be expected to resolve any potential issue with the relevant operators or, in the case of interference with TV and radio signals, with individual occupiers.

4A.9 RESIDENTIAL AMENITY

Policy 33A: New Proposals for Renewable & Low Carbon Energy

a) The individual or cumulative effects of developments and associated transport/electricity infrastructure on…

- residential amenity of the surrounding area (including noise and shadow flicker)...

Policy 55: Nuisance from Artificial Light and Light Pollution
Policy 56: Noise Pollution

The operation and construction of most proposals can impact on amenity through dust, odour, lighting, and vibration, and should be addressed in addition to the main issues below.All Technologies should address the impacts of noise generating equipment early during site selection and siting, design and technical controls. Construction should be timed to limit impacts.

All noise generating housing and equipment should be acoustically insulated where there is potential to impact on neighbours.

Where construction or security lighting is required, shielding and passive infrared technology should be used to minimise impacts on residents and wildlife.

Shadow flicker and strobe effects from moving blades can create distraction and have potential health effects on some individuals. Shadow flicker refers to an effect under certain combinations of geographical position, time of day and time of year, when the sun may pass behind the rotor and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off.

Impacts should be avoided primarily through site selection, siting and separation distances, and design with residual impacts mitigated through technical controls.

Applicants for large turbines and wind farms should identify dwellings that may be significantly affected. This includes dwellings within 10 rotor diameters distance and within 130º either side of North but should take into account that turbine height, topography and latitude may result in a greater or lesser effect on dwellings in a specific location.Submissions should demonstrate that impacts on affected dwellings are for no more than 30minutes per day or 30 hours per year at any dwelling.

Noise impact will depend on distance, turbine design, topography, prevailing wind direction and speed, and siting. Turbines may also have temporary impacts from amplitude modulation: a 'thump caused by the movement of the blades through the air.

All submissions should demonstrate that nearby residents' enjoyment of their dwellings or gardens is not adversely affected. Assessments should also be carried out for construction noise including blasting for foundations and borrow pits where relevant.

A Noise Impact Assessment (NIA) for receptors within a 35db contour of turbines may be required and should be updated following any material change in the proposed design. The Environmental Health team will help identify requirements and the appropriate receptors. Submissions for medium turbines and above should show that noise will not exceed 35dB at noise sensitive premises (LA90, 10min of 35dB, <=10m/s wind speed, at 10m height) – with a 5dB penalty for any tonal noise generated. Assessments should be undertaken in accordance standard ETSU-R-97 and guidance.

A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (Institute of Acoustics, 2013).

Large wind farms and complex cumulative impacts will be considered by the Council's noise consultant who will also advise on amplitude modulation. A cumulative assessment should demonstrate increases in both noise levels and duration, are acceptable. These will be required for large turbines, wind farms, and for small turbines where there are other wind installations within 2km.

Noise may be an issue from powerhouses. Providing the powerhouse location and manufacturer's data will allow the Environmental Health team to advise potential impacts, noise limits and any Noise Impact Assessment (NIA) requirement.

Vibration from powerhouse operation may also affect nearby dwellings. The design, construction and maintenance of powerhouses should ensure standards are not exceeded (see Table 1 of BS 6472-1:2008)

Noise may arise from poorly maintained tracking mechanisms and construction particularly from pile driven foundations, and potential operational noise from inverters, transformers. Proposals should ensure nearby dwellings are not adversely affected. An assessment and mitigation, such as limiting construction times, acoustic housing of transformers and maintenance plans may be required.

Glint and Glare is a limited issue with modern PV panels, but submissions for solar farms should show no adverse impacts on sensitive receptors taking into account tracking movements and seasonal adjustments.

Where an installation is proposed near existing dwellings or roads, applicants should provide manufacturer's information to allow the Environmental Health team to advise on Glint and Glare Assessments. Glint and glare can be mitigated through siting, screening and limiting the angle of panels. The visual impact of security lighting should also be minimised through passive infra-red technology and shielding.

Noise can be generated by all heat pump technology using heat exchangers although this is likely to be minimal. Air SHPs are typically located close to buildings and submissions should demonstrate no adverse impacts on neighbouring properties taking into account cumulative effects. Ground and Water SHP will also require a pump, which may generate further noise day and night. While drilling for vertical Ground SHP and Geothermal has potential for significant impacts. The Environmental Health team can advise on the relevant noise limits for the location and whether a Noise Impact Assessment (NIA) is required.

Vibration from drilling for geothermal and vertical Ground SHP should not impact on nearby dwellings.

Noise can occur from construction, plant operations and fuel deliveries for EfW and biomass. Submissions should demonstrate that nearby dwellings are not adversely affected. The Environmental Health team can advise on the noise limits for the location and Noise Impact Assessment requirements. Mitigation includes acoustically enclosing buildings and equipment, considerate timing of deliveries, and conducting activities off-site or in closed buildings.

Dust may also impact on nearby residents or road users depending on the fuel used. Submissions for large biomass applications should demonstrate dust will not be released from transport, delivery or storage facilities.

Noise from the 24/7 operation of CHP, flare stack, and vehicle movements should not adversely affect nearby dwellings. The Environmental Health team can advise on the relevant noise limits for the location and Noise Impact Assessment (NIA) requirements. Expected mitigation includes considerate siting of CHP, timing of deliveries, sound proofing and acoustic barriers

Odour issues can be caused by AD operation, storage and transport, depending on the feedstock used. Proposals should have no significant impacts on sensitive receptors. Details of emissions, from each source and cumulatively, should be quantified. Expected mitigation includes waste (feedstock) validation procedures, ventilation and odour abatement measures such as negative pressurisation. An Odour Management Plan may be required.

Dust levels from stored materials and vehicle movements should be minimised, assessed and proposed mitigation included in submissions.

Pests may create a nuisance depending on feedstock. Solutions such as containment and pest proofing should be described in submissions to prevent nuisance from flies, rodents and birds.

4A.10 HAZARDOUS INSTALLATIONS

Policy 33A: New Proposals for Renewable & Low Carbon Energy

a) The individual or cumulative effects of developments and associated transport/electricity infrastructure on…

- hazardous installations (including pipelines)...

Policy 54: Health and Safety Consutlation Zones

Siting of all large proposals and proposals that require excavation may impact on gas pipelines and other hazardous installations. Within Health and Safety Executive Pipeline Consultation Zones the Planning Authority will consult with HSE to identify if a proposal is acceptable.

Requirements for the Siting and Installation of Wind Turbines Installations in the Vicinity of Buried Pipelines (UKOPA, 2017)

4B CARBON REDUCTION

Policy 33A: New Proposals for Renewable & Low Carbon Energy

b) The contribution of the proposed development towards meeting carbon reduction and renewable energy generation targets

Renewable energy is encouraged in order to reduce greenhouse gas (GHG) emissions from heat and electricity generation and meet Scottish Government targets for renewable energy. Renewable energy applications over 45kWth (heat) or 50kWe (electric) capacity, can demonstrate their contribution to targets and emissions reduction by providing the following information:

- Electrical or Heat Generation capacity (in kW/MW)
- Expected annual generation (kWh/MWh)
- Equivalent number of homes powered or heated
- Fuel used and source (where relevant)
- Fuel and/or generation technology being replaced or displaced

Development on peat and carbon rich soils can negate GHG savings. Submissions for Wind Farms and all turbines on peat should use the Scottish Government's Carbon Calculator.

Heat Pumps may include fluorinated gases which are greenhouse gases if they leak or are not disposed of safely. Submissions for large SHP must provide a maintenance plan. See NetRegs F-gases webpage.

Biomass and AD GHG savings will depend on the fuel used and transport emissions. Fuel should be sourced from the Biomass Suppliers List, sustainably managed crops, or waste derived feedstock. Iinstallations >1MW should provide a calculation using the UK Solid and Gaseous Biomass Carbon Calculator

4C NET ECONOMIC IMPACT

Policy 33A: New Proposals for Renewable & Low Carbon Energy

b) The net economic impact of the proposal, including local and community socio-economic benefits such as employment and supply chain opportunities...

Note: Ownership of renewable energy proposals is not a material consideration, but proposals with local, community or shared ownership may be able to demonstrate certainty that net economic benefit will be delivered…..

Net Economic Impact

Applicants can demonstrate the effects of a proposal on the local or wider Perth and Kinross economy by demonstrating net economic benefit such as through local job creation, tourism, or use of local suppliers. Renewables can also provide economic benefit through providing off-grid or cheaper, sustainable, heat and energy, alleviating fuel poverty, or creating socio-economic benefits as a result of community or shared ownership.

All large wind and wind farm applications and all hydropower applications should consider their land use impacts on other commercial users. For example, wind farms can disrupt airflow on neighbouring wind farms, and even small hydropower developments may affect flows for other hydropower, agricultural or recreational business uses.

Invest inPerth

Biomass Suppliers List

Net economic benefit and planning (Scottish Gov, 2016)

Local, Community and Shared Ownership

The benefit of local and community ownership of renewables is recognised as nationally significant. Benefits include community sustainability, energy security, and alleviating fuel poverty. Applications which explore local ownership may also be better placed to understand and address local issues. The Scottish Government has an ambition of 1GW of renewables in local or community ownership by 2020, 2GW by 2030, with an expectation that by 2020, 50% of all new renewable applications will have a shared ownership element. Applications are encouraged which demonstrate a commitment to shared or community ownership. However neither ownership nor income are material considerations and proposals must be able to achieve planning permission without the benefits accruing from shared ownership. Shared ownership will not be used to justify environmentally damaging proposals contrary to policy.

Rumbling Bridge Hydro (c) Teresa Geisler

Local Energy Scotland

Good Practice Principles for Shared Ownership of Onshore Renewable Energy Developments (Scottish Gov, 2019)

Community Benefits

Community benefits are voluntary monetary payments unrelated to the impacts of the project, provided by the developer. These offer opportunities to support community action plans but are not a material consideration in the planning process. Support and guidance is available.

Community Benefits Advice (Forestry and Land Scotland)

Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments (Scottish Gov, 2019)

4D TRANSPORT IMPLICATIONS

Policy 33A: New Proposals for Renewable & Low Carbon Energy

(d) The transport implications, and in particular the scale and nature of traffic likely to be generated, and its implications for site access, road capacity, road safety, and the environment generally. (Applications with impacts on the Strategic Trunk Road Network will be subject to discussion and agreement with Transport Scotland).

Policy 60: Transport Standards and Accessibility Requirements

Construction vehicles, delivery of infrastructure and materials, and ongoing fuel deliveries can cause significant disruption to transport routes, rural roads, and safety, amenity and air quality in towns and villages. Road alignment or widening, and physical impacts on the road surface condition will also need to be addressed. In consultation with the relevant road authorities, a Transport Assessment, covering impacts on the road network, and a Construction Traffic Management Plan (CTMP), are likely to be required for large installations.

Transport assessments and associated CTMP should show adverse impacts are avoided, mitigated or minimised including:

- Routes, timing, and number of vehicles for construction and ongoing fuel, feedstock or digestate movements are designed to minimise disruption
- Consideration of the cumulative impacts of fuel delivery where routes are affected by existing HGV deliveries
- Sites are designed for safe access and operation
- Works and final installation are designed, sited and screened to prevent distraction to passing drivers.

4E TRACKS AND BORROW PITS

Policy 33A: New Proposals for Renewable & Low Carbon Energy

(e) Construction and service tracks and borrow pits associated with any development.

Policy 39: Landscape
Policy 49: Minerals and Other Extractive Activities – Supply
Policy 51: Soils
Policy 53: Water Environment and Drainage

Tracks and borrow pits are common to many large renewable installations and can have significant impacts on landscape, archaeology, soils (including peat and carbon rich soils) and the water environment #9including groundwater abstractions and ground water dependent terrestrial ecosystems - GWDTEs).

- The guidance given for tracks is equally applicable to pipeline and cable routes
- The guidance given for borrow pits (other than economic considerations) apply equally to turbine foundations and other large excavations such as subsurface tanks for anaerobic digestion.

Mapping of sensitivities and early consideration of site selection, routes, layout, and materials to avoid disturbance and minimise impacts can be both environmentally beneficial and avoid delay and expense through mitigation and monitoring requirements.

Construction and Service Tracks

Tracks in the rural environment and the hills can have a significant and lasting impact on the landscape, as can cabling, pipeline and penstock routes if construction and restoration is not carefully managed.

Submissions should demonstrate:

- the best routes and construction methods have been used for hill tracks, commensurate with SNH Guidance
- the best routes and construction methods have been used for other linear elements commensurate with relevant SNH and SEPA Guidance.
- avoidance and management of erosion and run off on steep ground
- avoidance, minimisation and repair of adverse landscape and visual impacts, and impacts on the natural environment
- water crossings are avoided as far as possible, following SEPA guidelines where unavoidable.
- Pipeline routes and cabling routes are underground where possible and timely, appropriate restoration applied.
- Impacts on abstractions within 100m of roads, tracks and trenches are identified and avoided.

Borrow Pits

Sourcing aggregate from local quarries is preferred to borrow pits where this benefits the local economy and environment. Material should be shown to be suitable through ground investigations.

Excavations for borrow pits, turbine bases and subsurface tanks can have landscape and visual impacts as well as blasting noise, vibration and dust, and habitat, geological and archaeological impacts, and the water environment – including on existing abstractions, GWDTEs and flood risk.

Where borrow pits are required, submissions should provide details of the location, extent, and proposed depth of borrow pits in relation to the water table, GWDTEs and abstractions (see 4A.5 Hydrology, Water Environment & Flood Risk for assessments mitigation), along with materials sourced, timing of works and restoration plan. Any dewatering will require further information and authorisation from SEPA.

Avoid, minimise and mitigate impacts as set out in 4A.3 Landscape and Visual Amenity, 4A.5 Hydrology, Water Environment & Flood Risk and 4F Soils. In addition:

- Avoid impacts through site and route selection at design stage
- Carefully consider choice of track and trench routes to avoid adverse impacts on sensitive soils, habitats and water courses.
- Use or upgrade existing tracks or use temporary surfaces
- Where possible use alternative means of transport to avoid creating new tracks
- Tracks should follow the line of landform and landscape edges
- Take advantage of existing landforms to help reduce visual impact
- Keep tracks and penstock routes to a minimum width unless this requires slope cutting
- Minimise slope cutting and survey to ensure slope stability
- Use geotechnical surveys to ensure slopes are stable enough
- Restore all earthworks, including tracks, as soon as possible after required use ceases, and soften impacts of ongoing requirements through part reinstatement.
- Restoration should enhance the landscape, landform, habitat value and connectivity; and be informed by professional appraisals.
- A habitat management plan and/or landscape plan may be required
- Refer to national gudiance on best practice construction:
  - Good Practice Guide to River Crossings (SEPA, 2010)
  - SEPA Renewables advice webpage
  - SEPA Water regulations advice
  - Constructed Tracks in the Scottish Uplands (SNH, 2015)
  - Good Practice During Windfarm Construction (SNH, 2019)
  - Guide to Hydropower Construction Best Practice (SEPA, 2015)

4F SOILS

Policy 33A: New Proposals for Renewable & Low Carbon Energy

(f) Effects on soils including:

• carbon rich soils, deep peat and priority peatland habitats; or

• prime agricultural land;...

Note: *Proposals should avoid any disturbance of carbon rich soils, deep peat and priority peatland habitat; where this is not possible effects should be minimised through appropriate mitigation measures, in agreement with the Council and SNH.*

Policy 50: Prime Agricultural Lands
Policy 51: Soils

General Soils

Soils provide a wide range of services from carbon storage to food growing. Erosion, compaction, disturbance and loss can impact habitats and waterways and negate Greenhouse Gas (GHG) reductions. Many of these effects can be avoided, minimised and mitigated through good practice construction and management as described under 4 New Sites: Construction and 4A.5 Hydrology, Water Environment & Flood Risk.

Soils stripped onsite should be minimised and stored for post-construction restoration which should be appropriate to the surrounding environment. Restoration should take place as soon as tracks or areas are completed or no longer required and aim to enhance soils and vegetation and prevent further erosion.

Construction of tracks, cable and pipeline routes particularly on the steep ground typical of hydropower, can lead to erosion. In areas likely to be prone to erosion, applications should avoid disturbance of trees and vegetation. Where unavoidable, measures to safeguard soils during construction, and planting of natural protection during restoration should be provided.

Solar applications can minimise erosion through careful site selection, avoiding steep slopes and maintaining vegetation. Using driven, screw or floating mounts can minimise soil impacts.

Ash residue or digestate is encouraged to be used as fertiliser, ideally returned to the source energy crop. Any use of ash will have to comply with PPC and waste regulations, as applicable.

(c) RG Contracting

Use of digestate as fertliser will be subject to conformity with SEPA's Position Statement on AD.

Waste Classification: Guidance (WM3) (SEPA, 2015)
Regulation of Outputs from AD Processes (SEPA, 2017)
Food Waste Management in Scotland (SEPA, 2017)

Carbon Rich Soils, Deep Peat and Priority Peatland

Impacts on carbon rich soils, peat, and peatlands should be avoided. If unavoidable development will only be permitted in line with Policy 51. Nationally important carbon rich soils, deep peat and priority peatland (classes 1 & 2) are identified in the Wind Spatial Framework. Further carbon rich soils that are addressed by Policy 51 include classes 1,2,3 and 5.

All tracks, hardstandings and excavations and boreholes have potential to disturb, excavate or drain carbon-rich soils (CRS) and peatland leading to the loss of rare habitat loss and any Greenhouse Gas (GHG) emission savings. Under Policy 51 it must be shown there is no alternative and due to the loss of GHG savings any detrimental effect on the environment must be minimal.

Where peat is present and will be impacted by the development, information must be provided, and surveys and assessment carried out, in accordance with SEPA and SNH guidance. Guidance must also be followed on minimisation of impacts, management and restoration of peat and minimisation and use of waste. A Peat Management Plan will be required where peat is present and detailed information required if waste peat is generated.

Avoidance and minimisation of impacts should be demonstrated through considered site selection, route and design with buffers betwen infrastructure and CRS and peat.

Where unavoidable, peat and CRS disturbance and loss must be minimised. Mitigation includes minimising the footprint of compounds and tracks and using floating roads or alternative delivery mechanisms.

Any disturbed peatland must be restored, and opportunities for peatland restoration in the wider area explored for compensation of unavoidable impacts or enhancement.

- Carbon and Peatland Map (SNH, 2016)
- Guidance On The Assessment Of Peat Volumes, Reuse Of Excavated Peat And The Minimisation Of Waste (SEPA, 2014)
- Developments on Peat and Off-Site uses of Waste Peat (SEPA, 2017)
- Floating Roads on Peat (SNH, 2010)
- Regulatory Position on Development on Peat (SEPA, 2010)
- Peat Hazard and Risk Assessment Guide (SGov, 2007)

Turbine foundation excavations and the large footprint of wind fars can impact across a large area of peatland and carbon rich soils through impacts on drainage and water flows. Information required for developments on peat is included in SEPA windfarm guidance.

Changes to water flows and drainage, and construction of track and penstock routes, can disturb or drain carbon rich soils and peatland, leading to impacts on the water environment, the loss of rare habitats and any GHG emission savings. Submissions should ensure changes to watercourses do not impact on peatland viability.

Solar farms may impact on peat and carbon rich soils through changes to water flow from panels, trenches, drainage and tracks and should be avoided through site selection unless impacts can be avoided through design.

Ground SHP and deep geothermal installations are likely to have significant effect on CRS and peat through ground disturbance and should avoid such soils.

Applicants proposing short term coppice or energy crops are expected to identify and avoid peat and carbon rich soils in management plans.

Prime Agricultural Land

Large renewable installations can take up land best suited for land production. Small scale installations may be suitable if in accordance with LDP Policy 50. Impacts on other good quality agricultural soils should also be minimised and mitigated in line with LDP policy 51. Submissions should include a restoration timetable.

Single turbines on agricultural land which support rural businesses while allowing agriculture use to continue are encouraged. Proposals for wind farms should minimise loss of prime agricultural land, and show that appropriate restoration will be implemented when the use ceases.

Large solar farms can require a large land area; and will be preferred on sub-prime soils and brownfield land, rather than taking land out of food production. Proposals on prime agricultural land should address LDP Policy 50 taking into account cumulative loss in the local area. Where land is proposed to be taken out of food production on poor soils continued light agricultural use under arrays such as poultry or sheep is encouraged to rest and restore soils and promote biodiversity.

On Prime Agricultural Land, trenches or Ground SHP should be at a sufficient depth and fully restored to avoid any long term impacts.

On Prime Agricultural Land, biomass facilities with a minimal footprint may be appropriate but trenches for pipework should be at a sufficient depth and restored to avoid any long term impacts. Energy crops should use sub-prime land and address any impacts on prime agricultural land and food production.

On Prime Agricultural Land, AD with a minimal footprint linked to agricultural business may be appropriate under Policy 50. Soil should be protected from contamination by bunding, preferably using soil removed during construction.

Energy from Waste plants are likely to be a large permanent feature and are not suitable for prime agricultural land.

4G PUBLIC ACCESS, RECREATION & TOURISM

Policy 33A: New Proposals for Renewable & Low Carbon Energy

(g) The effects on public access, recreation and tourism interests including core paths, scenic corridors (the A9 trunk road as identified in NPF3) and other established routes for public walking, riding or cycling.

Policy 15: Public Access
Policy 40 Green Infrastructure & Guidance
Policy 60: Transport Standards and Accessibility Requirements

Public Access and Recreation

Large scale applications can impact on recreation through land take and applicants should engage with recreational organisations to help identify users and evaluate recreational value.

Recreation routes or acces to recreational activities should be identified to minimise disruption with reasonable access or alternative routes provided. An access management plan will help ensure safety.

With routes and views identified infrastructure should be sited and designed to minimise impacts on views from accessible recreation. Enhancement to recreational access or facilities should be considered.

Wind farms can have substantial visual impacts on recreational and tourism use. Proposals should avoid having significant visual impacts on views from the A9 corridor and iconic viewpoints. Submissions should address impacts on views to National Park gateways, the Highland Boundary Fault and local landmarks. See 4A.3 Landscape and Visual Amenity for more information.

Hydropower can impact through visual impacts and access restrictions during construction. Site and design weirs to address impacts on, or enhance, recreational experience and consider enhancements such as public access across weirs. Changes in water flow may also affect water based tourism and recreation. Submissions should rovide a notification plan for water releases affecting users.

Large solar farms may impact recreation through land take and disruption to recreation routes. In addition to access considerations, submissions should address views of and from local tourist landmarks and principal tourist routes: see 4A.3 Landscape and Visual Amenity.

Open loop Water SHP may have impacts on the water environment and fishing while closed loop systems may present a snagging hazard to water users. Proposals should engage with user organisations to help identify and address concerns through siting and design.

Tourism

Where a proposal is likely to impact on a significant tourism asset a Tourism Impact Statement may be required to address impacts and benefits, taking into account:

- The number of tourists travelling through, staying or partaking in outdoor activities in the area of the development.
- Impacts on tourism interests such as views from tourist accommodation and impacts from changes in water levels
- The relative scale of tourism impact i.e. local to national
- Proposed mitigation such as screening or enhancement.

Wind farms can have potential for a limited influence over tourists' decision of where to visit and stay, while also having potential for positive effects through wind farm tourism or enhancement such as to recreational access or information provision. Where tourism impacts are identified as a concern submissions should:

- Engage with local tourist businesses and agencies to identify concerns
- Ensure views from key tourist routes, tourist accommodation and views of tourist landmarks or features are addressed in landscape and visual assessments.

Most run of river hydro should have limited impact on flows. Where an impact is identified submissions should:

- Identify potentially affected tourist assets such as waterfalls and fishing and recreational rivers
- Engage with local tourist operators, fisheries trust, canoe and rafting associations to identify concerns and design mitigation.
- Provide a tourism impact assessment where significant impacts are identified.

4H DECOMMISSIONING

Policy 33A: New Proposals for Renewable & Low Carbon Energy

(h) Decommissioning including any conditions/bonds considered necessary for site restoration.

Decommissioning should be considered when designing and choosing components of all renewable developments. Large projects with technology with limited life will have the permission period limited and require decommissioning by condition. See chapter 6 Decommissioning for more details.

4I ENERGY STORAGE

Policy 33A: New Proposals for Renewable & Low Carbon Energy

(i) Opportunities for energy storage

Energy storage is a key element to increasing the flexibility of the energy system to promote decarbonisation. Linking storage to renewable energy sources is encouraged to help promote local use, address grid capacity issues and balance supply and demand. Wind farms and solar farms should aim to provide or connect to energy storage facilities and this may influence the choice of location. Submissions for all electricity generation should state whether any energy storage is proposed.

Proposals for energy storage should address the factors in Policy 31 and also provide the storage capacity in MWh.

Thermal Storage

Thermal storage should be integral to large heat installations to allow for efficient operation during changes in demand, and to minimise fossil fuel use during maintenance. Storage tanks should be housed inside facility buildings or screened where this is not possible.

Battery Storage

Off grid battery storage and grid balancing at small and large scales is increasingly efficient. Domestic solutions are unlikely to require planning permission but listed building consent and building regulations may apply.

Large proposals should address landscape and visual impacts of batteries, any new buildings, fencing and grid infrastructure including transformers. Proposals should demonstrate avoidance of flood risk and should provide a commitment to surface water drainage arrangements to the minimum standard of industrial site requirements in CIRIA SUDS manual C753.

Hydrogen Production and Storage

Hydrogen production and storage allows for conversion of energy into hydrogen to be reconverted back into electricity, and used in fuel cells or hydrogen boilers. Production facilities involve high pressures and low temperatures and the best locations are likely to be brownfield or industrial locations close to high energy use or transport facilities. SEPA guidance and requirements of the Pollution Prevention and Control (Scotland) Regulations 2012 (PPC 2012) should be referred to.

Pumped Storage Hydroelectric (PSH)

PSH uses two connected reservoirs in an open watercourse where water is returned to the head pond as required, or in a closed loop with two connected reservoirs separated from natural watercourses. Closed Loop PSH is a net consumer of electricity but can be a commercially viable way to provide energy storage.

Open PSH will be subject to the same considerations as other hydro with additional consideration of the lower tailpond and potential excavation requirements for the powerhouse. As with other impoundment schemes there is unlikely to be capacity for large scale PSH in Perth and Kinross.

Closed PSH may have fewer impacts on natural watercourses once constructed, but can involve significant construction and excavation works, with waste and water environment implications. Submissions should address impacts on ground and surface water, implications of water abstraction and the risk of flooding or discharge of contaminated water. Closed PSH can be a good option for disused mine or quarry workings with restoration benefiting landscape, natural heritage and recreation.

4J CROSS BOUNDARY IMPACTS

Policy 33A: New Proposals for Renewable & Low Carbon Energy

(i) Cross-boundary impacts including any impacts on the qualities of the Cairngorms and Loch Lomond & The Trossachs National Parks

Policy 38B: National Designations

Cross Boundary and Regionally Significant Applications

Proposals may have effects across neighbouring planning authority boundaries particularly with regards to 4D Transport Implications, 4A.3 Landscape and Visual Amenity and 4A.1 Biodiversity & Natural Heritage. Applicants should consider the plans and policies of these authorities and they will be consulted where there may be an effect. Tayplan Strategic Development Planning Authority will also be consulted on relevant strategically significant and cross boundary proposals. Cumulative assessments should include applications and installations within other planning authorities' boundaries where there is a visual or ecological connection.

National Parks

Part of Perth and Kinross is in Loch Lomond & The Trossachs National Park. Proposals here are made to the National Park Authority (NPA) in line with their LDP. In the Cairngorms National Park, proposals are made in line with the Cairngorms LDP but submitted to Perth & Kinross Council. The Cairngorms NPA may then opt to determine the application.

http://www.lochlomond-trossachs.org/planning/
Planning Guidance: Renewable Energy (LL&TNP, 2017)
http://cairngorms.co.uk/park-authority/planning/
Cairngorms National Park Partnership Plan 2017-2022
Planning in National Parks Guidance (PKC)

5 REPOWERING AND EXTENDING

Policy 33B: Repowering and Extending Existing Facilities

As a result of the potential to make the best use of existing sites and through the continued use of established infrastructure such as grid connections, proposals for the repowering (including life extensions) of existing renewable and low-carbon energy facilities will be encouraged, subject to detailed assessment against the same factors and material considerations as apply to proposals for new facilities. The current use of the site will be a material consideration in any such proposals.

Geographical extension of existing facilities will also be assessed against criteria (a) to (j) above and any other material considerations, with particular emphasis on any potential cumulative impacts arising as a result of the proposed development. Further guidance on the key considerations when dealing with proposals for repowering and extending existing facilities will be provided in Supplementary Guidance to this Policy.

5.1 LIFE EXTENSIONS AND REPOWERING

Both upgrading existing technology (repowering) and extending the life of an existing installation planning permission (life extension) can maximise resource availability. Applications in suitable sites where impacts have been shown to be capable of mitigation and which accord with the LDP and this guidance will be encouraged, where submitted well before the existing permission expires. The impacts of the existing installation will be a material consideration including environmental or operational issues, and results of monitoring. Applicants are encouraged to improve upon the existing site environment and explore shared ownership with communities

Life Extensions will be supported where the existing installation satisfies LDP policy 33A . Monitoring results may be used to evidence the impacts of the existing site although new studies may be required to address changes to the cumulative environment.

Repowering can involve full or partial replacement of turbines at any time during the life of the installation, and may involve fewer, larger turbines on a larger footprint with potential for a significant change to landscape, visual and other impacts. A new planning application will be required to evidence adherence to policy 33. Additional considerations include:

- Changes to renewable target contribution and GHG payback
- Changes to and history of community support
- Effects on soils and the water environment through revised height, footprint and layout
- Revised landscape and visual impacts due to changes in height, rotor size and layout.
- Revised cumulative impacts
- Impacts on natural heritage and biodiversity including on successful restoration and changes to habitats and wildlife
- Impacts from changes to, retention of or decommissioning of infrastructure including tracks, crane pads and foundations
- Innovation that provides future flexibility, reuse and recycling
- Reuse of materials, tracks and cables
- Recycling of materials that cannot be reused
- Changes to restoration plans
- Application of SEPA's hierarchy of environmental impact

Life Extension and Decommissioning of Onshore Wind Farms (SEPA, 2016)

Hydropower permissions will not normally be time limited, but upgrading of existing installations will be encouraged where they accord with the LDP and this Guidance and make the most of the available resource. Any material alteration to hydropower installations is likely to require a fresh application for planning permission particularly if an increase of the size or height of the weir or dam is proposed. The existing installation will be a material consideration in the assessment and applications are encouraged to improve upon the existing site environment, and explore shared ownership with communities. Alterations to a hydro scheme are also likely to require authorisation under CAR so applicants should contact SEPA at an early stage.

Solar farms will be time limited relative to the technology used but extending the permission period of an existing solar farm (life extension) or upgrading the technology (repowering) can maximise resource availability. Proposals for repowering – involving development such as larger panels, trenching or cabling - will require a fresh application. New permissions may include an option for life extension, subject to approval and identified limitations including the availability of prime agricultural land.

Any upgrade to heat pumps which involve engineering works, or material change to the specification of equipment are likely to require a fresh application for planning permission, to address potential changes to impacts including residential amenity and the water environment.

Material alterations to biomass, AD or EfW installations, including material changes to the specification of equipment, or adding new AD infrastructure, will require a fresh planning application, particularly with regard to residential amenity.

5.2 GEOGRAPHICAL EXTENSIONS

Adding additional turbines to existing wind farms will be treated as new applications taking into account the existing wind farm and cumulative environment. Extensions should fit naturally with existing turbines and layout. If the proposed extension is intended to outlast the existing turbines, additional visualisations and impact assessments will be required to address the impact of the extension on its own.

Adding additional panels to an existing solar installation may make the best use of the available resource. Geographical extensions will be treated as new applications taking into account the existing installation and cumulative environment particularly with regard to land or water take and landscape and visual effects. Extensions should aim to fit with, or improve on, the existing panels and layout, and use as much of the existing infrastructure as possible

6 DECOMMISSIONING

Policy 33C: Decommissioning and Restoration of Existing Facilities

In cases where the permission expires or the project ceases to operate for a specific period, the removal of the development and associated equipment and the restoration of the site will be required to a standard agreed with the Council. Appropriate financial bonds or other financial mechanism(s) for site restoration may be required.

Decommissioning should be considered when designing and choosing components of all renewable developments. Large projects with technology with limited life will have the permission period limited and require decommissioning by condition.

Decommissioning will be required at the end of the permission period or where operation ceases and should be considered at design stage. Removal of all infrastructure will be required unless, such as with turbine bases below ground, the adverse impacts of removal are shown to outweigh the benefits. Submissions for large turbine and wind farm applications should include a draft Decommissioning and Restoration Plan (DRP). A full updated DRP will need to be agreed with the Planning Authority and consultees prior to decommissioning. A draft DRP should contain:

- Proposed timing, options, associated impacts and mitigation particularly regarding impacts on habitats, peat, the water environment and transport
- Reuse and recycling options
- Proposals for restoration of borrow pits and tracks
- Proposals for habitat, agricultural land peatland and/or recreation enhancement
- A realistic cost estimate of decommissioning and restoration

Decommission and Restoration Plans for Wind Farms (SNH, 2016)

Hydropower schemes will need to be decommissioned once they are deemed to have ceased operation. Decommissioning of above ground and in-water infrastructure and associated restoration should be considered at design stage. Prior to decommissioning a Decommissioning Method Statement (DMS) will need to be agreed with the Planning Authority and consultees.

Decommissioning will be required as a condition for all installations at the end of the permission period, based on the expected life of the technology, or once operation has ceased. Removal of all infrastructure will be required unless outweighed by adverse impacts.

The design of roof mounted and small ground-mounted installations should ensure decommissioning can be carried out with minimal impacts particularly in historic environments.

For large solar farms, or solar farms in sensitive areas or affecting the water environment, a Decommissioning Method Statement (DMS) will need to be agreed with the Planning Authority prior to decommissioning.

Decommissioning Method Statement

A DMS demonstrates how decomissioning will take place while protecting the environment and should include:

- Proposed timing, options, associated impacts and mitigation associated with removal of in-ground and in-water infrastructure.
- How materials will be reused or recycled in compliance with the waste regulatory framework
- How potential contaminants will be safely disposed of including heat pump units and heat transfer fluid, AD waste
- Measures to ensure no contamination of soils or the water environment
- Timing and method of restoration and enhancement, particularly of habitat and agricultural land, waterways and riparian habitat.
- Proposed restoration monitoring and aftercare

Heat pump applications are not normally time limited but decommissioning will be required where operation ceases. Removal of all infrastructure will be required unless the adverse impacts outweigh the benefits. For large Ground and Water SHP, and Deep Geothermal applications a Decommissioning Method Statement (DMS) will need to be agreed with the Planning Authority and SEPA prior to decommissioning.

Good Practice Guidance for Decommissioning of Redundant Boreholes and Wells (SEPA, 2010)

Biomass applications will not normally be time limited. However decommissioning will be required where operation ceases. Removal of all above ground infrastructure will be required except for any structures being repurposed.

AD and EfW applications will not be time limited. However due to the potential for contamination, decommissioning will be required where operation ceases. Removal of all infrastructure will be required unless being repurposed or adverse impacts outweigh the benefits. A Decommissioning Method Statement (DMS) will be need to be agreed with the Planning Authority and SEPA prior to decommissioning.

7 APPENDICES

APPENDIX 1: GLOSSARY

Barotrauma

Damage and fatality caused to bats by changes in air pressure from wind turbine operation

Ecosystem services

Services provided by the natural environment that benefit people including food, fibre and fuel provision and cultural services such as recreation, regulation of the climate, purification of air and water, flood protection, soil formation and nutrient cycling.

GWDTEs

Ground Water Dependent Terrestrial Ecosystems; specifically protected wetlands which critically depend on groundwater flows and/or chemistries.

Heritage Interests

Conservation Areas, Listed Buildings, Gardens and Designed Landscapes, Historic Battlefields and Scheduled Monuments

Historic Interests (PDR)

These vary between technologies and Scottish Government guidance on PDR should be referred to.

Hibernacula

Places where animals such as bats hibernate over winter.

Landscape Designations

National Parks, National Scenic Areas, Special Landscape Areas

Low Carbon Energy

Energy installations which produce lower carbon emissions than fossil fuel equivalents but require energy input which is not zero emission such as heat pumps.

Natural Heritage Designations

Natura (SPAs, SACs, Ramsar); national biodiversity designations (Sites of Special Scientific Interest, National Nature Reserves); local conservation or geodiversity sites.

PPC

Pollution Prevention and Control (Scotland) Regulations 2012 (PPC 2012) governing emissions to water, air and land administered by SEPA.

Prime Agricultural Land

Soil Classification Classes 1,2 and 3.1 . See Scotland's Soils map.

Sensitive areas (EIA)

Sites of Special Scientific Interest, Land subject to Nature Conservation Orders, European Sites (Natura), National Scenic Areas, World Heritage Sites, Scheduled Monuments, National Parks, Marine Protected Areas.

Sensitive Habitats

Protected habitats including GWDTEs and habitats identified in the Scottish Biodiversity List and Tayside Local Biodiversity Action Plan. Further guidance on habitat surveys will be available in forthcoming guidance on Planning for Nature.

APPENDIX 2: ENVIRONMENTAL ASSESSMENTS AND LICENCES

Natura: Habitat Regulations Appraisal

Natura sites - Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) - are internationally important nature conservation sites. Proposals which are capable of affecting a Natura site, regardless of distance, will be subject to the Habitat Regulations Appraisal process. For projects likely to have a significant effect on a site, an appropriate assessment must be carried out and the Council as competent authority can request information to do this. Proposals will only be permitted in line with LDP Policy 38.

Habitats Regulations guidance (SNH)
SNH Guidance on Protected Areas
Loch Leven SPA, the Dunkeld-Blairgowrie Lochs SAC and the River Tay SAC Guidance (PKC)
SEPA Guidance on Protected Areas and Species

Sites of Special Scientific Interest (SSSIs)

Consent may be required from SNH to carry out operations within a Site of Special Scientific Interest (SSSI).

SNH Guidance on SSSIs

Protected Species Licences

Construction or operation of renewable energy has potential to affect European and national protected species which may be an offence. Licences may be available to carry out activities in mitigation where avoidance is not possible and are administered by SNH.

SNH Guidance on Protected Species
SEPA Guidance on Protected Areas and Species

Tree Felling

Full planning permission for a development that expressly specifies tree felling in the permission and identifies the affected trees on a plan will not require a licence. Other operations not directly related to the development such as felling for biomass fuel may require a licence from Forestry Commission Scotland. Felling or planting may require a separate environmental impact assessment.

FCS Guidance on Felling and Environmental Impact Assessment

SEPA: Emissions, Waste and Water

SEPA holds responsibility for regulation of emissions to air, water and land under the Pollution Prevention and Control (Scotland) Regulations 2012. This will be particularly relevant to hydropower, heat technologies and activities using or disturbing forest or peat. Many of these activities require a permit.

SEPA Guidance on Pollution Prevention and Control

Proposals which produce or utilise waste, including biomass, AD and Energy from Waste, may require a permit from SEPA under the Waste Management Licensing (Scotland) Regulations 2011.

SEPA Guidance on Biomass
SEPA Guidance on Anaerobic Digestion
SEPA Guidance on Energy from Waste

Any activity that may impact on the water environment must abide by regulations and if necessary obtain an authorisation from SEPA to proceed under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) ("CAR"). This can affect any site but will be required for hydropower, water source heat pumps, and discharges, abstractions, and groundworks that have potential to affect water bodies, groundwater supplies or Ground Water Dependent Terrestrial Ecosystems.

SEPA Guidance on Water
CAR A Practical Guide (SEPA, 2017)

APPENDIX 3: CMS AND CTMP GUIDANCE

Construction Method Statement (CMS)

- *Introduction*

For the purposes of this guidance document we have utilised as an example a run of river hydro scheme. This tends to be the most sensitive and onerous CMS that could be provided and therefore as a guidance document provides for all concerns which should be addressed within a competent CMS in relation to any development proposal. To deliver a competent CMS, your document must be site specific and include drawings which describe methodology. Drawings are more user friendly than extensive text and the users are not likely to be inclined to spend considerable lengths of time reading.

Some CMS's, certainly in relation to hydro development, are also required in relation to The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR). This guidance document borrows guidance issued by SEPA for this purpose and builds upon it to ensure a CMS which is fit for both CAR and Planning as one document submitted to satisfy both is less likely to have contradictory or competing mitigation.

Specialist guidance from a Clerk of Works may be conditioned as a requirement of your planning permission either in relation to preparation of documents such as this which may be required by suspensive condition or possibly for monitoring, auditing and/or reporting. This is likely to be in relation to Ecology but could also be Landscape, Geology, Hydrology, Archaeology among others.

- *What we should expect from a CMS*

Broadly speaking, there are five questions which should be answered by any contractor in a CMS:

1. What are the environmental/ecological risks and where are they?

   The clearest and most straightforward way to do this would be to identify areas of risk (water crossings, pipeline routes, intake, outfall locations, trees, ecological habitat, archaeology, fuel and chemical stores, concrete batching and wash out areas, wheel washes and risings from these activities) and highlight these on a site plan. This is not an exhaustive list but some common examples to make the operator think on a site-specific basis.

2. Who is aware of these risks?

   All staff, from site manager to digger driver, should be aware of the risks to the environment and ecology from construction, each must be made aware of these. What we would like to see here is a note that staff are properly inducted and that monitoring (and importantly that results of monitoring) are implemented. A site diary of routine checks and inductions is a useful tool to demonstrate appropriate maintenance of mitigation.

3. What will be done to prevent pollution/harm?

   This is a key question. We do not need a step by step guide to construction, nor do we need anything relating to health and safety. A CMS in this context is simply an indication that environmental and ecological risks have been identified and will be mitigated. Staff should know how to monitor and maintain mitigation and when and how to react to changing circumstances.

The following presents a hierarchy for reducing the likelihood for pollution:

i. Minimisation – Reducing the amount of water which comes into contact with materials which will cause siltation. Keep clean water clean.

ii. Filtration – Filtration of water control ditches as a precaution i.e. straw bales, gravels or baffles or silt fences nd effective maintenance.

iii. Settlement – Use of sumps and lagoons.

iv. Mechanical intervention – silt separators.

v. Percolation – Removing the particles by discharge over adjacent grasslands. An Ecological Clerk of Works could identify areas for this use in early course of the construction activity but as stated this should be a last resort.

Note: flocculants should only be used with prior specific SEPA approval.

Define Construction Exclusion Zones (CEZ's) relating to trees, sensitive habitats and/or archaeology.

4. What will you do if the mitigation fails?

Spill kits, replacement silt fences, sedimats, straw bales, oil booms etc. should be on hand, particularly at sensitive locations. Contact details for specialist guidance relating to hydrology, ecology, archaeology or arboricultural should it be required.

5. Who will you contact if the mitigation fails?

The relevant stakeholder, this could be SEPA in relation to the water environment, SNH relating to wildlife and ecology or regarding the built environment, the LPA for potential consultation with Historic Environment Scotland or Perth and Kinross Heritage Trust. In all instances you should notify the Local Planning Authority as soon as reasonable practicable. Affected local users should be contacted in emergency especially in relation to pollution where that could affect private water supplies, this should be known before the development commences. This question is included as a prompt.

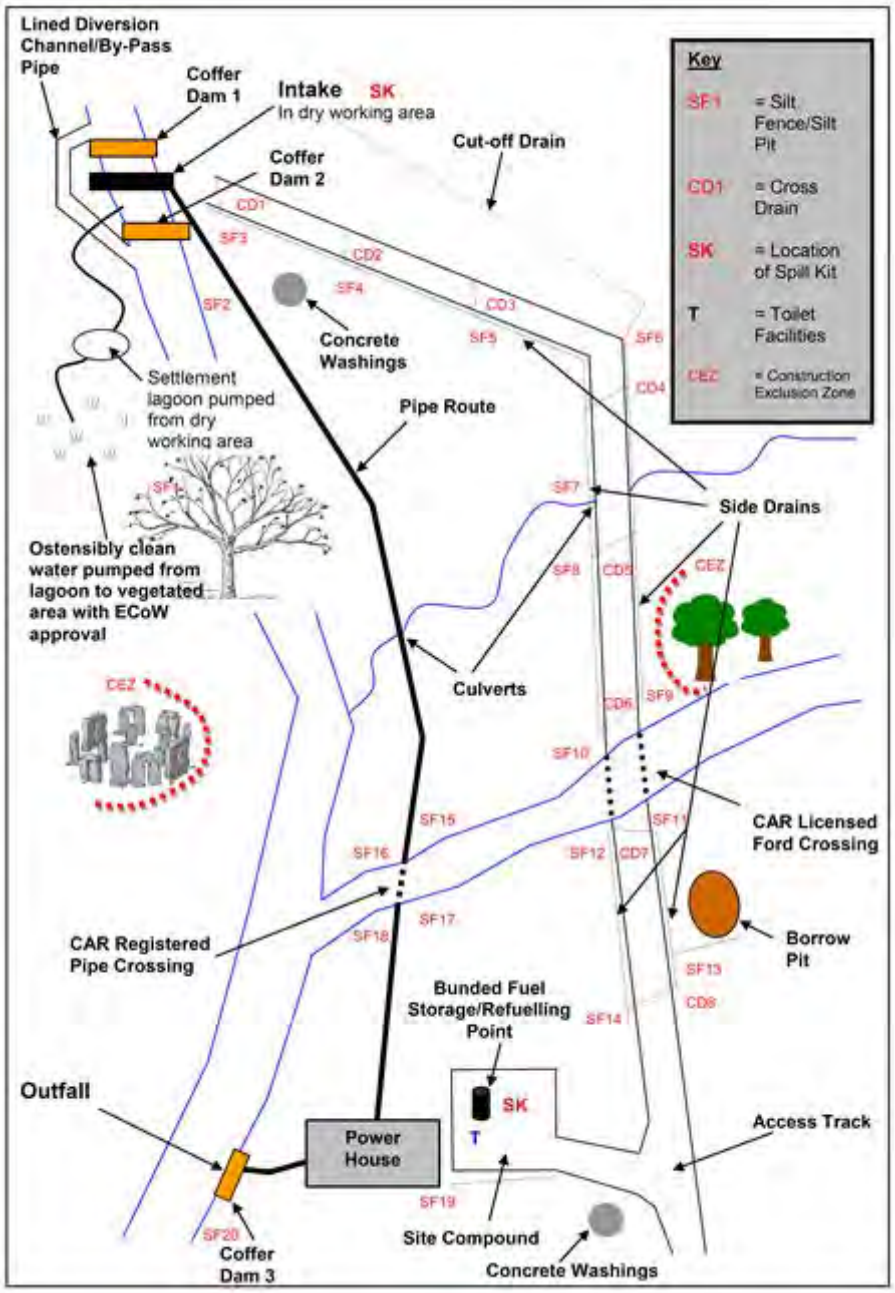
Checklist for reviewer

- Has the operator clearly considered the areas where there could be a risk of water pollution?
- Is it clear that on-site staff have been made aware?
- Are the suggested mitigation measures acceptable?
- Have emergency procedures been indicated?
- Is the operator aware who should be contacted in the case of incident/query?
- Do CMS timings match 'work on the ground' timings?
- Will the CMS clearly be displayed on site?

- *CMS Template*

A CMS template has been devised overleaf, with questions for the operator to answer, and these answers should not be easily copy/ pasted from other CMS's. What we are trying to do with these is ensure that the individual site has been considered in some detail. We are also trying to minimise the volume of work which can be produced, to save operator and reviewer time. In effect, we need these to be as short as possible but bespoke.

Construction Method Statement Template
What are the environmental/ecological risks and where are they?
All areas of risk to ecology, the water and built environment must be considered. • Provide a plan of the site, clearly showing the areas of potential pollution. These should be highlighted and numbered, with a simple key. An example of this is provided, for guidance. • All sensitive habitat should be considered and mitigated.
Who is aware of these risks?
All on-site staff must be made aware that pollution has to be prevented and ecological impact mitigated. • Indicate how everyone is made aware of this requirement e.g. in induction, clearly displayed CMS, as part of daily monitoring checks, signed information sheet and site diary.
What can be done to prevent pollution/harm?
Mitigation measures appropriate to prevent pollution have to be considered, and must be routinely monitored land replaced where required. • Using individual numbers from the site map above, indicate exactly what mitigation measures will be used to prevent siltation, run-off and oil spills etc. • Clearly defined, robust Construction Exclusion Zones.
What will you do if the mitigation fails?
There will be circumstances where mitigation measures e.g. overloaded silt curtains are in need of repair and replacement. A thorough monitoring regime and adequate replacement kits must be in place. • Detail what spill kits etc. will be available and where these will be located. These should be marked on the map.
Who will you contact?
The appropriate authorities and water users will have to be made aware of environmental incidents as they occur. • List the names and contact numbers of the interested parties who you will contact in the case of emergency.



Construction Traffic Management Plan (CTMP)

CTMPs will be required by condition. The information required will be advised by the Council as Roads Authority and/or Transport Scotland and will be relative to size, location and construction transport requirements. This may include:

a. Detail of consultations with the Council Roads Department, Transport Scotland and affected communities; any permits or notifications required, and arrangements for ongoing communication of transport events;

b. Restriction of construction traffic to approved routes: Routes and timing to minimise disruption to school traffic, commuting and council services, and limit the risk of vehicle conflict between outgoing and returning HGVs;

c. Details of traffic volumes throughout the construction programme; and measures taken to reduce impacts such as using fewer larger vehicles;

d. A code of conduct for HGV drivers to ensure good practice including allowing queuing traffic to pass;

e. Arrangements for ensuring road suitability for HGV and abnormal loads including road survey results, modifications to roads and street furniture; proposed new and upgraded passing places;

f. A delivery plan for abnormal loads including proposed holding/ parking areas, pre-arranged stops, contingency measures, and escorts. Abnormal loads notifications should be carried out in accordance with the procedures laid down under regulations on our Abnormal Loads advice page: http://www.pkc.gov.uk/ article/17632/Abnormal-loads-procedure;

g. Emergency arrangements detailing communication and contingency arrangements in the event of vehicle breakdown;

h. Arrangements for cleaning of wheels, and cleaning of roads affected by material deposited from the construction site;

i. Arrangements to provide safe site access; including enabling entry and exit in forward gear and signage at site accesses and crossovers, and on roads in order to provide safe access for pedestrians, cyclists and equestrians;

j. Arrangements to ensure that access for emergency service vehicles is not impeded;

k. Co-ordination with other major commercial users known to use roads affected by construction traffic including other renewable installations;

l. Arrangements for monitoring, reporting and implementation; and

m. Arrangements for dealing with non-compliance

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You can also send us a text message on 07824 498145.

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