Renewable and Low Carbon Energy Supplementary Guidance: Consultation Draft

July 2017

Perth & Kinross Council - The Environment Service
v1.3

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
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
kW_e	Kilowatt of electricity
kW_{th}	Kilowatt of heat
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
PV	Photovoltaic
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SG	Supplementary Guidance
SHP	(Ground/Air/Water) Source Heat Pump
SLA	Special 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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This guidance is available to download from the Council's website at www.pkc.gov.uk/renewablesguidance.

For further information please see the above website or contact the Local Development Plan Team at developmentplan@pkc.gov.uk or on 01738 475300.

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1 INTRODUCTION

1.1 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. There is a need to act now to mitigate the impacts on our natural and built environments through the reduction of greenhouse gases. 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.

1.2 Policy Context

By supporting the Perth & Kinross Local Development Plan (the LDP), the Renewable and Low Carbon Energy Supplementary Guidance (the Guidance) helps deliver international aspirations, and national policies and strategies, on renewable and low carbon energy. Scottish Planning Policy (SPP) requires the planning system to support the development of a diverse range of electricity generation from renewable and low carbon energy technologies. The LDP through Policy ER1 supports new installations of renewable and low carbon energy generation to promote a secure energy supply, and stimulate investment in new jobs and businesses, while Policy EP1 stipulates renewable energy generation as part of sustainable construction requirements for new buildings. As required by SPP, this Guidance supports these policies by guiding renewable and low carbon energy technologies to appropriate locations, and by providing detail on issues that will be taken into account when proposals are being assessed.

1.3 Consultation

Perth & Kinross Council is consulting on this draft Guidance and the accompanying Strategic Environmental Assessment (SEA). The purpose of this consultation draft is to explore relevant topics and issues and seek your views on the appropriate scope and content, to support both applicants and those who may wish to comment on renewable and low carbon energy proposals. The results of the consultation will be used to inform the final version of this Guidance.

The consultation runs for a period of 7 weeks from 13 July to 31 August 2017 and the Council welcomes comments from anyone who is interested in commenting on both the draft Guidance and the SEA. This draft Guidance, Comments Form, accompanying SEA, and further information on the consultation can be found online at: www.pkc.gov.uk/renewablesguidance . Alternatively the documents can be viewed in hard copy at the Council's Offices at Pullar House.

Data Protection

Please note that comments and any information you provide as part of your consultation response will be published online. Please be assured that personal details such as signatures, email addresses and telephone numbers will be removed prior to this. However, names and addresses will be published unless you specifically request that they are withheld. If you do not want your details to be published please notify us. Contact details can be withdrawn upon request by emailing developmentplan@pkc.gov.uk. For further information on how the Council collects and uses personal information please visit our website www.pkc.gov.uk/dataprotection, or email: dataprotection@pkc.gov.uk or by phone on 01738 477933.

2 PURPOSE AND USE OF GUIDANCE

The LDP, adopted in 2014, contains Policy ER1: Renewable and Low Carbon Energy Generation, which is applied in the assessment of development proposals for renewable and low carbon energy. This Guidance meets a commitment in the LDP to produce guidance to expand on how proposals for development can comply with the LDP and Policy ER1 in particular. It contains advice on preparing and submitting applications for a range of renewable and low carbon electricity and heat generation technologies. This Guidance replaces the 2005 guidance for wind energy proposals and will be a material consideration in the determination of planning applications for renewable and low carbon energy developments.

The Guidance contains a General Considerations section, which should be referred to in applications for all technologies, and a separate section for each technology which contains advice specific to the type of energy installation proposed. Each section contains two elements.

1. Locational guidance including a Spatial Framework for Wind, and Strategic Land Use Capacity maps for Wind, Hydropower and Solar PV. These spatial strategies illustrate the capacity of the built and natural environment to accommodate the technology.
2. Written guidance on how to address the environmental, social and economic effects of renewable energy proposals. The topics covered by the Guidance are drawn from the factors listed in LDP Policy ER1 and reflect the requirements of Scottish Planning Policy, including the factors in paragraph 169

By addressing these spatial strategies and written guidance, proposals will be best placed to demonstrate that the factors in Policy ER1 have been taken into account. Applicants are also expected to address all relevant policies in the LDP and the relevant policies in Tayplan. The Perth & Kinross Policies and Guidance most relevant to the topics covered in this Guidance are indicated in Table 1. This list is not exhaustive and applicability will depend upon location, technology and scale.

Policy ER1: Renewable and Low Carbon Energy Generation

Policy ER1A: New Proposals

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 on biodiversity, landscape character, visual integrity, the historic environment, cultural heritage, tranquil qualities, wildness qualities, water resources, aviation, telecommunications and the residential amenity of the surrounding area.

(b) The contribution of the proposed development towards meeting carbon reduction targets.

(c) The effects on the elements listed in criterion (a) of the connection to the electricity distribution or transmission system.

(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.

(e) The hill tracks and borrow pits associated with any development.

(f) The effects on carbon rich soils.

(g) Any positive or negative effects they may have on the local or Perth & Kinross economy including tourism and recreation interests either individually or cumulatively.

(h) In case of large-scale onshore wind energy developments, their fit with the spatial framework for wind energy developments.

Proposals for the development of renewable and low carbon sources of energy by a community will be supported provided it has been demonstrated that the factors (a) – (h) itemised above have been fully considered.

Policy ER1B: Extensions to Existing Facilities

Proposals for the extension of existing renewable energy facilities will be assessed against the same factors and material considerations as apply to proposals for new facilities.

In all cases the Council will require the removal of the development and associated equipment and the restoration of the site whenever the consent expires or the project ceases to operate for a specific period.

Table 1: Perth & Kinross LDP Policies and Guidance

Policies	Guidance
Landscape and Visual Impacts	
ER6: Managing future Landscape Change to conserve and Enhance the Diversity and Quality of the Area's Landscape	Landscape SG Tayside Landscape Character Assessment (LUC, 1999) Environmental Report Technical Paper
NE5: Green Belt	
PM2: Design Statements	Design and Access Statements
PM1A – Placemaking	Placemaking SG
Biodiversity, Natural Heritage and Green Infrastructure	
NE1: Environment and Conservation	SPA and SAC SG
NE3: Biodiversity	Planning and Biodiversity SG Tayside Local Biodiversity Action Plan Forest and Woodland Strategy
NE2: Forestry Woodland and Trees	Green Infrastructure SG
NE4: Green Infrastructure	
Water Environment, Hydrology and Flood Risk	
EP2: New Development and Flooding	Flood Risk and Flood Risk Assessments
EP3: Water Environment and Drainage	Local Flood Risk Management Plans River Tay SAC SG
EP6: Lunan Valley Catchment Area	Lunan Valley Area Dunkeld – Blairgowrie Lochs SAC
EP7: Loch Leven Catchment Area	Loch Leven SPA and Ramsar Site
Soils	
EP1A: Carbon rich soils ER5: Prime Agricultural Land	
Historic Environment	
HE1: Scheduled Monuments and Non-Designated Archaeology HE2: Listed Buildings HE3: Conservation Areas HE4: Gardens and Designed Landscapes HE5: Protection, Promotion and Interpretation of Historic Battlefields	Heritage Conservation Heritage Map
Recreation and Tourism	
CF2:Public Access ED3:Rural Business & Diversification	

Policies	Guidance
Residential Amenity	
PM1: Placemaking	Placemaking SG
EP8: Noise Pollution	
RD1: Residential Areas	
EP11 Air Quality Management Areas	Air Quality Guidance Perth Air Quality Action Plan
Aviation, Defence, Telecommunications and Broadcasting	
EP13: Airfield Safeguarding	Airfield Safeguarding SG
Electricity Generation and Transmission	
ER2: Electricity Transmission Infrastructure.	
Traffic and Trunk Roads	
TA1: Transport Standards and Accessibility Requirements	
Tracks and Borrow Pits	
ER4: Minerals and Other Extractive Activities	
EP1: Climate Change, Carbon Reduction and Sustainable Construction	Sustainable Design and Zero Carbon Development SG
EP10: Management of Inert Waste and Construction – Waste	
GHG Emissions and Renewables Targets	
EP1: Climate Change, Carbon Reduction and Sustainable Construction	Sustainable Design and Zero Carbon Development SG
Net Economic Impact	
ED3: Rural Business and Diversification	
PM3: Infrastructure Contributions	
Repowering and Extension	
ER1B: Extensions of Existing Facilities	
Decommissioning and Restoration	
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2.1 Preparing Applications

Before Preparing an Application

Applicants should refer to the relevant checklists and guidance on the Council's website for information on the application process, fees and application requirements including whether:

- Permitted development rights apply
- The application may be a major application
- An EIA screening opinion request is recommended

See: Application Checklists (PKC)

Pre-application Enquiries

A pre-application enquiry with the Council will help ensure submissions include appropriate and proportionate information and will also help to streamline applications. Pre-application enquiries should be in writing in the first instance and provide as much of the information suggested in the introductory section of each technology as possible. Officers will then assess whether an EIA screening request is advisable, which policies should be referred to and the information that a submission should contain. For further information see the Council website, or contact the Development Management Team. The Council requires a Planning Processing Agreements (PPA) for Major Applications, and recommends PPAs for EIA developments to ensure processes and timeframes are understood by all.

See: Pre Application Guidance Note (PKC, 2016)
Planning Processing Agreement Guidance (PKC, 2016)

Email: developmentmanagement@pkc.gov.uk

Micro Renewables and Permitted Development Rights

Micro renewables, up to 50kW for electricity (50kWe) and 45kW for heat (45kWth) have a significant role to play in reducing emissions, providing economic benefits for householders. Permitted development rights (PDR) cover many microgeneration technologies including solar PV, heat pumps, micro wind turbines and biomass boilers. These allow for micro renewables within specified parameters and are subject to exceptions including in SACs, SPAs and where an EIA is required.

Building warrants and prior notification and approval may also be required. Further detail for each technology is noted in this guidance.

See: What Needs Planning Permission (PKC)
Non-Domestic PDR Guidance (Scottish Government)
Circular 1/2012 Guidance on Permitted Development Rights

Major Applications

Many renewable developments will be classed as major developments and have specific requirements. Major developments include all developments in Schedule 1 of the EIA (Scotland) Regulations 1999, and all electricity generating developments or extensions over 20MW. On receipt of a pre-application screening notice the Council can advise whether a proposal will be a major application.

See: Major Planning Applications (PKC)

Energy Consent Applications

Applications for new and modified energy developments over 50MW (also referred to as "section 36" applications) are made to the Scottish Government Energy Consents Unit. Perth & Kinross Council is a statutory consultee and will provide a response based on an assessment of the application against the LDP and this guidance.

See: Energy Consents Guidance (Scottish Government)

EIA Developments

Environmental Impact Assessment (EIA) is a process which identifies and helps address the significant environmental effects of development. Many renewable developments will be EIA developments. Applicants are encouraged to request a screening opinion for relevant proposals to ascertain if an EIA and subsequent EIA Report 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, 2013)

Cross Boundary and Regionally Significant Applications
Proposals may have effects across neighbouring planning authority boundaries particularly on transport, landscape and natural heritage. The plans and policies of these authorities should also be considered and they will be consulted where there may be an effect.

Tayplan Strategic Development Planning Authority will also be consulted on strategically significant and cross boundary proposals within the Tayplan area.
See: Tayplan Strategic Development Plan

National Parks
Part of Perth and Kinross is in Loch Lomond & The Trossachs National Park (see figure 2.1 below). Proposals here are made to the National Park Authority (NPA) in line with their LDP. Similarly in the Cairngorms National Park, proposals are to be made in line with the Cairngorms LDP but submitted to Perth & Kinross Council. The Cairngorms NPA may then opt to determine the application.
See: http://www.lochlomond-trossachs.org/planning/
http://cairngorms.co.uk/park-authority/planning/
Planning in National Parks Guidance (PKC)

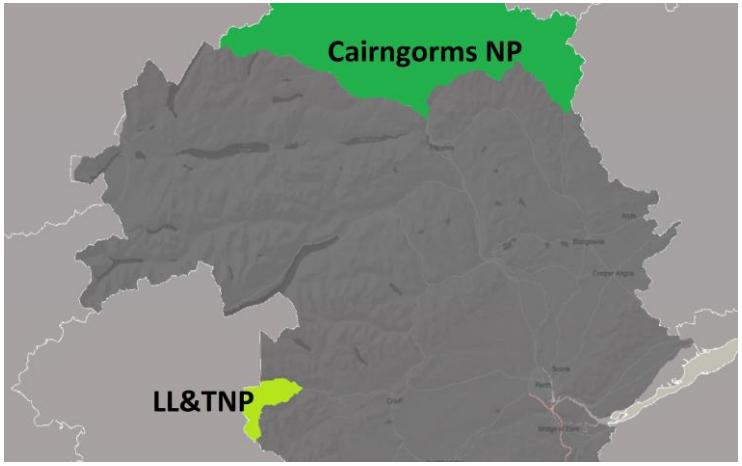

Figure 2.1. National Parks in Perth and Kinross.

2.2 Spatial Strategies

2.2.1 SPATIAL FRAMEWORK FOR WIND

Proposals for large turbines and wind farms will be assessed against the Spatial Framework for Wind which identifies areas most sensitive to large developments (Groups 1 and 2) and where proposals are likely to be acceptable subject to detailed assessment (Group 3). See Wind.

2.2.2 STRATEGIC LAND USE CAPACITY MAPS

The Council is also tasked with identifying areas capable of accommodating other renewable and low carbon technologies, as well as providing guidance on criteria that applications will be assessed against. In conjunction with the James Hutton Institute (JHI) as part of the Strategic Environmental Assessment for this guidance, we have undertaken an assessment of environmental sensitivity taking into account ecosystem services, relevant landscape criteria and additional criteria specified in Scottish Planning Policy and other Scottish Government policy and guidance documents (see Table 2 below). This has resulted in Strategic Land Use Capacity maps for Wind in Group 3 areas, Hydropower and Solar PV. The maps identify land use capacity for the potential deployment of these technologies by providing a strategic view of the range of sensitivities that proposals may need to address and to help guide developers to the least sensitive areas. Further information on the methodology used to produce the maps is available in the Environmental Assessment Technical Paper. To comment on the methodology please see the SEA Consultation.

The maps are strategic and, with the exception of Group 1 areas of the Spatial Framework for wind, do not prevent proposals being acceptable as submissions may be able to demonstrate that a proposal in a chosen location can avoid or mitigate potential impacts on the identified sensitivities. Proposals will still be considered on a case by case, site assessment basis, taking into account all features that may have a limiting or positive effect.

Consultation Question 1
Do you agree with the use of land use capacity mapping to guide development away from areas of highest sensitivity?

Table 2: Framework and data used for each technology sensitivity model

	Wind	Solar		Hydro
Ecosystem Service	**Carbon Sequestration** **Regulating and Maintaining Services** • Natural Flood Management, Erosion Protection **Provisioning Services** • Nutrition: Food Provision, Drinking Water Supply; Biotic Materials: Timber Production **Cultural Services** • Accessible Recreation, Accessible Historic, Visual Amenity	**Carbon Sequestration** **Regulating and Maintaining Services** • Natural Flood Management, Erosion Protection **Provisioning Services** • Nutrition: Food Provision, Drinking Water Supply; Biotic Materials: Timber Production **Cultural Services** • Accessible Recreation, Accessible Historic and Cultural Experience, Visual Amenity	Ecosystem Service	**Carbon Sequestration** **Regulating and Maintaining Services** • Natural Flood Management, Erosion Protection **Provisioning Services** • Nutrition: Food Provision, Drinking Water Supply **Cultural Services** • Accessible Recreation, Accessible Historic, Cultural Experience, Visual Amenity
Planning Considerations	• Groundwater Dependent Terrestrial Ecosystems (GWTES) (Wetland Inventory) • Flooding	• Aerodrome 3 km buffer • Groundwater Dependent Terrestrial Ecosystems (GWDTES) (Wetland Inventory) • Flooding Risk	Areal Criteria	• Naturalness • Protected Areas (RAMSAR, SSSIs, NNR, Gardens and Designed Landscapes, SPAs, SACs, Areas of Wild Land 2014, NSAs, SLAs, Geological Conservation Review)
Landscape	Landscape Capacity Study: • Land Cover Complexity • Landform Complexity • Landscape Complexity • Naturalness • Existing and Consented Cumulative Wind Turbine Impact • High Sensitivity to Wind LCA Areas	Landscape Capacity Study: • Landcover Complexity • Landform Complexity • Landscape Complexity • Naturalness • Existing and Consented Cumulative	Linear Criteria	Surface River Quality: • Fish Barriers Status • Overall Ecological Status • Fish Ecology Status • Morphology Status • Water Abstraction Status • Overall Hydrology Status
Other - Filter	• Group 1 (NSA/National Parks) • Group 2 (Natura 2000 and Ramsar sites, SSSIs, NNRs, Gardens and Designed Landscapes, Inventory of Historic Battlefields, Areas of Wild Land 2014, Carbon Rich Soils, Deep Peat and Priority Peatland Habitat, Community Separation for Consideration of Visual Impact, Special Landscape Areas)		Cumulative Impact Criteria	• Existing and Consented (sub-watershed) • Water Abstraction Agriculture • Groundwater Quality

(source: Environmental Assessment Technical Paper (PKC, JHI, 2017)

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2.3 Submitting Applications

By using this guidance, the LDP and pre-application advice, applicants will be best placed to include relevant and proportionate information. Submissions should address:

- How the proposal addresses the relevant Spatial Strategies
- The written advice in this Guidance
- The relevant policies of the LDP
- The advice contained in other relevant Supplementary Guidance
- The additional assessments and surveys indicated in the guidance relevant to the application (see Appendix 2)
- Relevant information from assessments or licence applications required by external stakeholders (see Appendix 3)

All submissions should as a minimum provide:

- Capacity of renewable energy in kW / MW
- Design, specifications and description of renewable energy technology used
- Site photos or visual representation of the installation – proportionate to the application scale and location sensitivity
- Red line of the site including, all areas of the development including as relevant, construction areas, tracks, and staff compounds
- Plan of site with location of project elements
- Grid connection location and route where relevant; or route of heat distribution.
- Location of nearest buildings, dwellings and other sensitive receptors such as core paths, roads and recreation areas to a distance proportionate to the scale of application
- Location of onsite and nearby waterways, trees and woodlands within a distance proportionate to the scale of application

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3 GENERAL CONSIDERATIONS

The following ER1 topics are generally relevant to most low carbon and renewable technologies.

- Net Economic Benefits and Other Users
- Traffic and Transport
- Earthworks: Hill Tracks, Borrow Pits etc
- Communities
- Traffic and Transport
- GHG Emissions and Renewables Targets
- Electricity Transmission and Grid Connection
- Energy Storage
- Heat Networks

3.1 Net Economic Benefits and Other Users

Net Economic Benefit

Applicants can demonstrate the net economic benefit of proposals by showing positive impacts on the local economy such as 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.

See: InvestinPerth
Biomass Suppliers List
Net economic benefit and planning (Scottish Gov, 2016)

Other Commercial Users

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 hydro developments may affect flows for other hydro or agricultural or recreational business uses.

3.2 Traffic and Transport

Construction vehicles, delivery of construction elements and materials, and ongoing fuel deliveries can cause significant disruption to transport routes, rural roads and safety and amenity 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
- The cumulative impacts of fuel movements where routes are affected by existing deliveries are considered
- Sites are designed for safe access and operation
- Works and final installation are designed, sited and screened to prevent distraction to passing drivers

3.3 Earthworks: Hill Tracks and Borrow Pits etc.

Linear and levelled earthworks are common to many large renewable installations and can have significant impacts on landscape, archaeology, soil and the water environment. Submission should identify all relevant elements in submissions, assess impacts and identify mitigation.

Tracks, Trenches and Pipeline Routes

Choice of materials and routes, size and construction method of linear works can have significant impacts on the landscape and natural environment. Construction and subsequent restoration of trenches and pipeline routes can also impact on soils, natural heritage and the landscape. Submissions should demonstrate:

- the best routes and construction methods have been used
- avoidance and management of erosion and run off on steep ground
- minimisation and repair of visual and landscape impacts

Construction Compounds, Crane Pads and Site Levelling

The size, materials used and location of hard standings such as crane pads and compounds for temporary storage, pipe laydown areas, and staff accommodation should be identified in submissions. Drainage, and soil impacts should be addressed with ground disturbance kept to a minimum, and the visual impacts of developments minimised particularly where located close to receptors such as roads and dwellings.

Borrow Pits

Impacts of borrow pits include blasting noise, vibration and dust, landscape and visual, habitat, water environment, geological and archaeological impacts. Where available, sourcing of aggregate from local quarries is preferred as this may have greater benefit to the local economy and less impact on the environment. 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, along with materials sourced, timing of works and restoration plan. Ground investigations should be carried out to ensure material is suitable.

Expected Mitigation and Enhancement

- Minimise 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 to minimise impacts on habitats, waterways and soils
- Tracks should follow the line of landform and landscape edges such as fields and woodland
- Keep tracks and penstock routes to a minimum width unless this requires slope cutting
- Use geotechnical surveys to ensure slopes are stable enough for construction
- Minimise cutting of slopes and soften impacts through restoration
- Ensure materials and construction method have least landscape and habitat impact, including managing the risk of invasive non-native species.
- Apply buffers between construction elements and waterways
- Take advantage of existing landforms to help reduce visual impact
- Restore tracks, trenches, pipeline routes, and compounds as soon as possible
- Minimise size of remaining tracks, compounds and crane pads soften residual impacts through restoration
- Aim restoration to restore or enhance the original landscape and function of the habitat
- A habitat management plan and/or landscape plan may be required

Refer: Good Practice Guide to River Crossings (SEPA, 2010)
Constructed Tracks in the Scottish Uplands (SNH, 2012)
Good Practice During Windfarm Construction (SNH, 2015)
Guide to Hydropower Construction Best Practice (SEPA, 2015)
Biosecurity and management of invasive non-native species for construction sites and controlled activities (SEPA, 2016)

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3.4 Communities

Communities can be both positively and adversely affected by renewable and low carbon energy technologies. Applicants should consider communities that may be at a distance affected by distant visual impacts or impacts on traffic, tourism or ecological assets.

Community Consultation

Applications can benefit from engaging with affected communities and interest groups. Major and national developments must carry out Pre-Application Consultation with relevant communities and affected parties. Beyond this, early, meaningful and effective community engagement is recommended, for all wind, hydro and solar farms and other small renewable proposals. Consultation can help ensure issues are identified, understood and addressed, and so help shape local solutions, leading to greater confidence and fewer delays in the decision-making process.

See: Pre-Application Consultation Guidance (PKC)
Guidelines for Developers & Individuals on Engagement (PKC)

Rumbling Bridge Community Hydro © Teresa Geissler

Community Benefits

Community benefits are voluntary monetary payments unrelated to the impacts of the project, provided by the developer. These offer a unique opportunity for communities but are not a material consideration in the planning process. Support and guidance is available.

See: Benefiting from Commercial Operations (LES)
Community Benefits Advice (Forestry Commission Scotland)
Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments (Scottish Gov, 2015)

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 proposed a 1GW milestone for renewables in local or community ownership by 2020 with an expectation that 50% of all new renewable applications will have a shared ownership element. Perth and Kinross currently has over 20MW of local and community ownership in renewables and applications are encouraged which demonstrate a commitment to shared or community ownership which deliver quantifiable and evidenced local socio-economic benefits.

See: Generating Your Own Electricity (LES)
Good Practice Principles for Shared Ownership of Onshore Renewable Energy Developments (Scottish Gov, 2015)

Consultation Question 2

Guidance, support and funding is available for communities and developers from Local Energy Scotland (LES) wishing to explore community or shared ownership, or engage in community benefit negotiations What support if any do you think Perth & Kinross Council should provide?

3.5 Renewables Targets and GHG Emissions

Renewable energy is encouraged in order to reduce greenhouse gas (GHG) emissions from heat and electricity generation (see LDP Policies EP1 and ER1) 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) of the new installation
- Approximate number of homes that could be powered or heated
- Fuel used and source (where relevant)
- Fuel and/or generation technology being replaced (where relevant)

Most applications by their nature will reduce greenhouse gases but development on peat can negate greenhouse gas savings, while for biomass and anaerobic digestion, GHG savings will depend on the fuel source used. Submissions can demonstrate a contribution to greenhouse gas savings by:

- For all wind farms, and all wind turbines on peat, except micro turbines, by using the Scottish Government's Carbon Calculator
- For Biomass and AD by sourcing fuel from the Biomass Suppliers List or exclusively using waste or waste derived feedstock
- For Biomass and Anaerobic Digestion installations of >1MW using the UK Solid and Gaseous Biomass Carbon Calculator

Consultation Question 3
Do you think Perth and Kinross should have a target for Renewable and Low Carbon Energy generation?

3.6 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 SSE (or in some instances Scottish Power) as distribution network operator at an early stage. Permission to connect to the National Grid will be required before construction can proceed.

Grid connections may have adverse impacts such as loss and fragmentation of habitat, impacts on waterways, bird collision risk and significant visual impacts; but may also provide positive socio-economic benefits. Applications for electricity transmission infrastructure will be subject to a separate planning application in accordance with LDP Policy ER2. However 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 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.

Visual and natural heritage impacts may be mitigated by undergrounding. On site cabling should be underground, and should be considered for grid connection where possible, subject to significant detrimental impacts on the environment. Careful attention should be paid to disturbance during construction, and vegetation restoration.

See: Generation Connection Guidance (SSE)
Generation Availability Map (SSE)
Distributed Generation Heat Map (Scottish Power)
Assessment and mitigation of impacts of power lines and guyed meteorological masts on birds (SNH, 2016)

3.7 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.

Thermal Storage

Thermal storage is likely to be integral to the design of large heat installations, to allow for efficient operation during changes in demand, and provide uninterrupted supply during maintenance. Siting storage tanks inside facility buildings will address landscape and visual impacts.

Battery Storage

Current technology allows for off grid storage and grid balancing at small and large scales using increasingly efficient battery solutions from lead acid to lithium ion, and saltwater batteries. At a domestic level off the shelf solutions are unlikely to require planning permission if housed internally but building regulations may apply. Large battery storage proposals will need to consider the landscape and visual impacts of any new storage buildings, containment of potential contaminants, flood risk and decommissioning.

Hydrogen Production and Storage

Hydrogen production and storage allows for conversion of energy into hydrogen either to be reconverted back into electricity, used in fuel cells, hydrogen boilers or used to power vehicles. Facilities involve the use of high pressures and low temperatures. Hydrogen production and use currently faces issues of expense and efficiency but Perth & Kinross Council encourages opportunities to work with developers to develop proposals and identify appropriate locations. These are likely to be brownfield or industrial locations close to high energy use or transport facilities.

Pumped Storage Hydroelectric (PSH)

PSH uses two connected reservoirs in an open waterway where water is returned to the head pond as required, or in a closed loop with two connected reservoirs separated from natural waterways. Closed Loop PSH is a net consumer of electricity but, particularly if supplemented by additional renewable energy, can be a commercially viable way to provide energy storage and manage grid loads.

Open PSH will be subject to the same considerations as other hydro schemes with additional consideration of the impacts of the lower tailpond, extra pipe work, 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 waterways 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 into the environment. Closed PSH can be an appropriate option for disused mine or quarry workings with opportunities for restoration to create benefits for landscape, natural heritage and recreation.

3.8 Heat Networks

Landowners, developers, community groups and other interested parties are encouraged to explore the feasibility of deploying heat networks, as a low carbon source of energy provision at an estate, community or district scale. Heat networks can provide benefits through carbon emission reduction, energy resilience and fuel poverty alleviation, particularly in off gas-grid areas.

The Council is currently developing a method to identify potential District Heating Network areas for both new development sites and existing built-up areas. This work will contribute to the introduction of an Energy Strategy to identify opportunities for deploying low carbon heat solutions across a variety of public, private and commercial buildings. We are also intending to introduce policy and guidance for Heat Networks in the proposed Local Development Plan and future Supplementary Guidance, in line with National Policy and Guidance, and collaborative work undertaken by the Scottish Cities Alliance.

Currently the Council will work closely with developers that may be able to develop a heat network, or connect an energy centre to an existing or potential heat network. We will provide advice on the key considerations to take into account and, where possible, help to identify significant heat loads and demands with potential to support a network. Renewable heat applications and applications for other installations producing significant amounts of excess heat are encouraged to consider:

- Creation of or connection to new and existing heat networks
- The location of installations in relation to existing or potential heat networks and significant heat users
- Future proofing of new facilities to meet potential connection needs

Consultation Question 4
What information do you think would be useful to include in further guidance to help identify opportunities for, or support the deployment of, heat networks in Perth and Kinross?

Cultybraggan Camp, Comrie, has a district heating network fuelled in part by biomass. © Mark Nesbitt

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4 WIND

Wind power in Perth and Kinross has already played a significant role in producing clean energy with potential for a continuing contribution through the siting and repowering of the right turbines in the right place. Different scales of wind power can charge batteries, support individual dwellings, small business and communities through to commercial scale production. At the time of writing there were 75 onshore wind schemes in Perth and Kinross with an installed capacity of 264MW. Applications for a further 301 turbines had been approved or were in consultation stage, providing a potential 55% increase in capacity.

In addition to 2-3 bladed large wind turbines, other technology includes micro turbines fixed on buildings (up to around 5kw) and freestanding micro turbines with a range of designs including vertical axis and multiple blades. Other infrastructure may include concrete foundations, transformers, tracks, crane pads, construction compounds and grid connection equipment.

Figure 4.1: Wind turbine components
© PKC

This Guidance and planning requirements relate to following categories.

Fixed micro turbine	Planning Permission Required
Free standing micro turbines Up to 15m hbt, <50kW	Planning permission required unless covered by Permitted Development Rights (PDR): - domestic use only - outwith historic interests and SSSIs - > 100m from curtilage of another dwelling PDR is subject to prior notification & approval
Single small turbine 15-30m hbt	Under 50kW may be permitted by PDR for domestic purposes see above Over 50kW - Planning permission required
Medium turbine 30-50m hbt	Over 50kW – Planning permission required. If under 50kW PDR potentially applies as above
Large turbine >50m hbt	Planning permission required Assessed against Spatial Framework and Strategic Land Use Capacity maps
Wind Farms More than 1 turbine >30m hbt	Planning permission required Assessed against Spatial Framework and Strategic Land Use Capacity maps

Further Requirements:

- An EIA may be required for any turbine over 15m (hub height), more than two turbines of any height, or in a sensitive area. PDR does not apply to EIA developments.
- A listed building consent and/or building warrant, and other environmental licences (see Appendix 3) may be required

See: Renewables Energy Handbook (CARES, 2013)
Circular 1/2012 Guidance on Householder PDR
Prior Notification Submission Checklist (PKC, 2016)

Consultation Question 5
Do you agree with the approach we have taken for wind power proposals in this section? If not, what could we do differently?

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4.1 Spatial Strategies

4.1.1 SPATIAL FRAMEWORK FOR WIND

The Spatial Framework (figure 4.2) identifies areas most sensitive to wind farms and where proposals are likely to be acceptable subject to detailed assessment. The Spatial Framework and associated table below (SPP para 166) apply to large turbine and wind farm proposals.

<table>
<tr><td colspan="3">Group 1: Areas where wind farms will not be acceptable:
National Parks and National Scenic Areas.</td></tr>
<tr><td colspan="3">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.</td></tr>
<tr><td>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</td><td>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.</td><td>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.</td></tr>
<tr><td colspan="3">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.</td></tr>
</table>

4.1.2 STRATEGIC LAND USE CAPACITY MAP

The Strategic Land Use Capacity map (figure 4.3) helps guide developers to the least strategically sensitive areas in the remaining Group 3 areas by providing a strategic view of a range of environmental, landscape and planning considerations that submissions for large turbine and wind farm proposals are likely to need to address. See section 2.2 for further information.

In addition to these considerations, Special Landscape Areas (SLAs), designated in 2015, are considered to require special protection and therefore have limited capacity for wind farms at a strategic level. Areas of the highest cumulative visual impact are also identified on the map. Submissions here are likely to need to address the cumulative visual impact of additional, or repowered, wind installations.

Submissions for large turbines and wind farms should take the Strategic Land Use Capacity map into account, and it will be a material consideration in the assessment of proposals. Areas with the highest capacity are those with the least sensitivity to large turbines and wind farms.

The map shows the following categories of strategic land use capacity:

Limited Capacity	Special Landscape Areas: Proposals will need to substantially overcome significant impacts on identified sensitivities.
Low Capacity:	Proposals are likely to need to address impacts on a wide range of sensitivities.
Medium Capacity:	Proposals may need to address impacts on a number of sensitivities
High Capacity	Proposals are likely to have fewer sensitivities to address.
Cumulative:	Areas considered of high cumulative visual impact

An online version of this map is available at https://arcg.is/0bODqi.

Figure 4.2: Spatial Framework for Wind

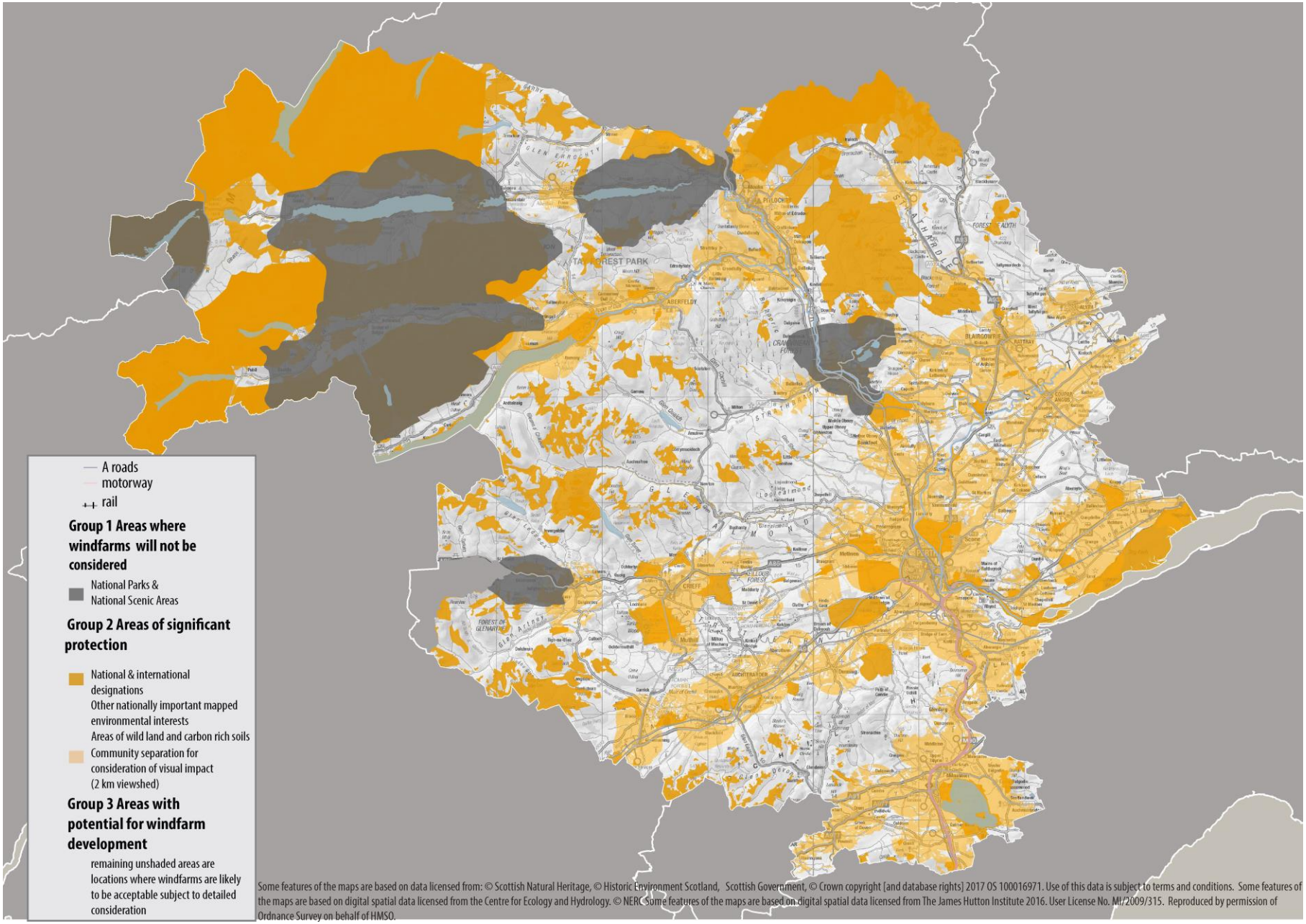

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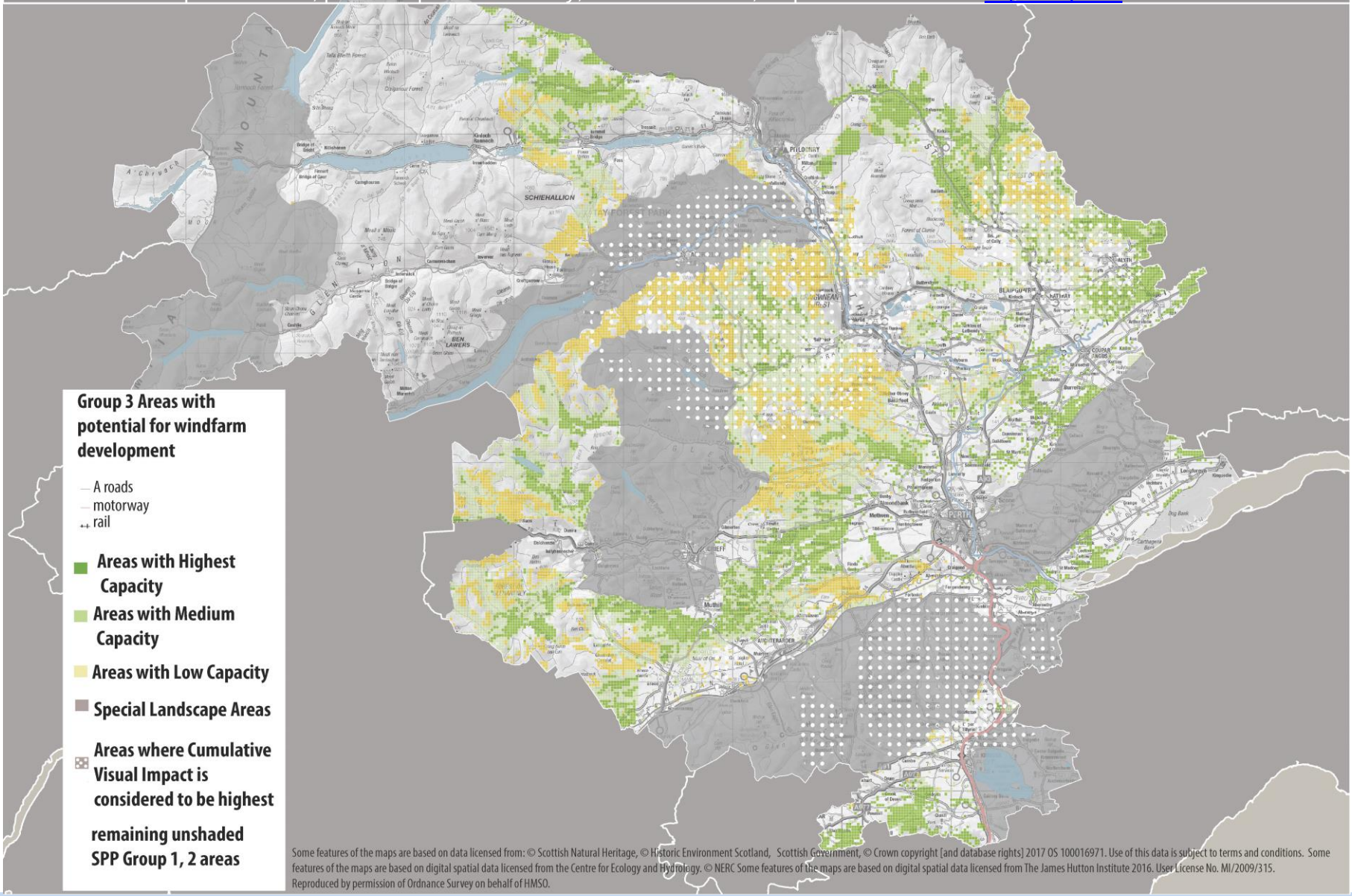
Figure 4.3 Wind Strategic Land Use Capacity Map

Consultation Question 6: Do you agree with the areas identified on the Strategic Land Use Capacity map as having high/medium capacity for further development? If not, please explain. To identify, and comment on, a specific location see http:/bit.ly/2vP



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4.2 Planning Considerations

The main planning considerations of wind applications are likely to be their fit with the scale and character of the landscape, and their effects on ecological interests, along with community, historic environment, aviation and defence interests. All proposals should also address General Considerations as relevant.

Pre application enquiries are encouraged to help ensure submissions are proportionate and complete. Please provide as much relevant information as possible, including:

- Size, number and design of technology used
- Location in relation to nearby dwellings, recreational use
- Location and basic layout of site incorporating location of turbines, tracks and construction compounds, road access
- Indication of foundation or fixing required
- Location and route of potential grid connection
- Location of sensitive features including waterways, waterbodies, peatlands, wetlands and water abstractions
- Current use of site and proposed dual use if any
- Location of trees and woodlands
- Source of materials
- Operational lifespan of power scheme
- Existing recreational access

Applications will be assessed against the Spatial Framework and Strategic Land Use Capacity map where relevant; and should include the information detailed in this guidance, an EIA Report where required, and relevant surveys, assessments and plans (see Appendix 2).

Refer: Good Practice During Wind Farm Construction (SNH, 2015)
Assessing the Impact of small-scale wind energy proposals on natural heritage (SNH, 2016)
Planning Guidance on On-shore Windfarm Developments (SEPA, 2014)

Cumulative assessments 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. Cumulative assessments may be required for the following topics:

- Landscape and Visual Impacts
- Biodiversity and Natural Heritage
- Water Environment
- Soils
- Residential Amenity

Construction best practice should be followed. Where there is potential for impacts on a water body, natural heritage or archaeological designation, or other environmentally sensitive constraint, a Construction Method Statement (CMS) will be required. A draft Construction Environmental Management Plan (CEMP) may be requested as part of an application and, where required, wind farms will need to have a CEMP in place, and follow the advice of an independent Ecological Clerk of Works (ECOW) as agreed by the Council, in consultation with SNH and SEPA.

4.2.1 LANDSCAPE AND VISUAL IMPACTS

Wind power can have a significant impact on the character of the landscape as a result of the interaction of the landscape and setting, with the design, size, siting and layout of the turbines themselves and the associated infrastructure.

Visual impacts arise from people's perception of these elements as seen from their location such as dwellings, roads and recreational paths, and recreational and tourist sites, referred to as receptors.

Submissions should address (as relevant):

- 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, local buildings, monuments, conservation interests and locally important natural features
- The cumulative impact with existing and proposed turbines and other infrastructure including pylons
- The sensitivities identified in the Spatial Framework and Strategic Land Use Capacity map
- The scenic, historic, cultural or recreational significance of the site
- Impacts on views from locally important, and iconic, viewpoints
- Impacts on views to iconic and locally important landmarks, monuments and natural features
- The landscape and visual impact of foundations, transformers, cranes, crane pads, tracks, construction compounds, borrow pits, and grid connection infrastructure both during construction and operation
- The impacts of safety lighting on the night sky in rural areas

Landscape and Visual Impact Assessments

Submissions should provide an assessment of their landscape and visual impacts as follows as a minimum:

Micro	Site photographs from agreed locations up to 1km away; and design details
Small & Medium	Detailed design and location information including studies of visual impacts upon receptors within 2km including photomontages and wire drawings. A Landscape and Visual Impact Assessment (LVIA) may be required.
Large & Wind Farms	A full LVIA including cumulative assessment.

LVIA methodology should follow Landscape Institute Guidelines and refer to the Strategic Land Use Capacity Map and the Environmental Assessment Technical Paper. All assessments should take into account any changes in landscape capacity using professional judgement.

The Planning Authority will help to identify the extent of assessment required including the zone of theoretical visibility (ZTV) and identification of viewpoints and receptors.

Refer: PKC Guidance for the Preparation and Submission of Photographs and Photomontages.
Guidelines for Landscape and Visual Impact Assessment (3rd ed) The Landscape Institute, 2015)
Spatial Framework and Strategic Land Use Capacity Map
Environmental Assessment Technical Paper (PKC, JHI, 2017)
Siting & Designing wind farms in the landscape (SNH, 2017)

Landscape Designations

Large turbines and wind farms proposed in National Scenic Areas (NSAs) will not be acceptable. Wind turbines can have adverse landscape and visual impacts at a distance including across boundaries to both NSAs and National Parks. Submissions for large turbines and wind farms should consider and address impacts on views to and from these areas where relevant.

Perth and Kinross Special Landscape Areas (SLAs) including the entire Ochils are also highly sensitive and wind farm proposals here will need to substantially overcome any adverse impacts on the special qualities of the relevant SLA. Small and medium wind turbine proposals may be suitable where they have no significant adverse impact on the SLA's special qualities.

Refer: The Special Qualities of National Scenic Areas (SNH, 2010)
Landscape Supplementary Guidance (PKC, 2015)

Wild Land Areas and Wildness

The distinctive Wild Land Areas of Perth and Kinross are very sensitive with little or no capacity to accept wind development. All applications that may have a significant effect on WLAs, including those outwith the WLA or through cumulative effects, will require a Wild Land Assessment.

Many areas of Perth and Kinross are not designated as wild land but still have a strong sense of wildness through a combination of naturalness, remoteness and tranquillity. These areas include those identified as those of the highest sensitivity (L1) in the Environmental Assessment Technical Paper. Applications in these sensitive landscapes may also require a Wild Land Assessment.

Refer: Assessing Impacts on Wild Land (SNH, 2017)

Urban and Industrial Environments

Micro turbines can be used in urban areas, where siting and design is demonstrated to be appropriate to the surrounding character, and visual, cumulative, residential amenity and heritage impacts are addressed.

A small or medium turbine of a scale appropriate to its surroundings may be suitable in industrial settings, where a visual impact assessment covering receptors within 20 times the turbine height (to blade tip) demonstrates no adverse visual effects.

Large turbines and wind farms proposed within the community separation buffer in the Spatial Framework will need to substantially overcome significant visual impacts on these areas, in addition to other impacts including residential amenity and heritage impacts.

Consultation Question 7

Do you agree with the scale and acceptability suggested for wind turbines in urban and industrial environments? If not what change would you suggest?

Iconic Viewpoints and the Highland Boundary Fault

Wind farm or large turbine proposals visible from important viewpoints including munros and scenic viewpoints should assess impacts on those views. In particular visualisations will be required where proposals may affect views from the viewpoints identified as iconic in a 2010 study[1] for Perth & Kinross Council (see Appendix 5)

The Highland Boundary Fault 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 turbine 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.

See Appendix 5: Iconic Viewpoints and Highland Boundary Fault

[1] David Tyldesley and Associates (2010) Landscape Study to Inform Planning for Wind Energy

Cumulative Landscape and Visual Impacts

Cumulative impacts will limit applications in areas of Perth and Kinross that are approaching carrying capacity, and in remote locations, cumulative thresholds are likely to be lower. Repowering applications may provide an opportunity to reduce existing cumulative impacts by removing or redesigning elements in the landscape.

A Cumulative Landscape and Visual Impact Assessment (CLVIA) will be required in areas identified on the Strategic Land Use Capacity map and where there are existing, or proposed turbines within a radius of up to 60km, relative to the proposal. CLVIAs should address:

- All existing, consented or submitted wind applications
- Other large or tall industrial features including pylons
- Combined and successive cumulative impacts from fixed viewpoints
- Sequential impacts along amenity, tourist and recreational routes
- Impacts of infrastructure such as tracks, crane pads and borrow pits

Refer: Assessing the Cumulative Impact of Onshore Wind Energy Developments (SNH, 2012)
Siting & Designing Wind Farms in the Landscape (SNH, 2017)

Expected Mitigation: Siting and Design

All proposals should consider the siting and design of turbines at an early stage of design in consultation with communities and stakeholders.

Micro wind turbines:

- Use design, materials, and colour that best fit with the built, historic and natural environments and any other turbines
- Use scale appropriate to nearby buildings, trees, pylons and landforms
- Site in association with buildings or structures
- Consider the visual effect of the rotor design and rotation speed
- Avoid creating confusion or clutter with different designs or heights
- Locate carefully or screen to avoid visual impacts

Wind turbines above 15m hbt and wind farms:

- For the siting and design of wind farms, all wind turbines above 15m in height and associated ancillary infrastructure, applicants should demonstrate compliance with SNH Guidelines:

Refer: Siting & Designing wind farms in the landscape (SNH, 2017)

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4.2.2 BIODIVERSITY AND NATURAL HERITAGE

Impacts on biodiversity and natural heritage from wind turbines can occur from direct mortality from blade collision to indirect impacts such as disruption of flight paths, displacement and loss or disruption of habitat while also providing significant opportunities for enhancement.

Refer: Micro Renewables and the Natural Heritage (SNH, 2016)
Spatial Planning for Onshore Wind Turbines – natural heritage considerations (SNH, 2015)
Good Practice During Wind Farm Construction (SNH, 2015)

Designated sites

Large turbines and wind farms within or adversely affecting EU and UK designated biodiversity sites (SPAs, SACs, SSSI, NNRs, Ramsar) or local geodiversity sites are unlikely to be appropriate. Effects may be indirect such as through hydrological connections or species moving outside protected areas. All proposals except micro turbines may need to identify and address impacts on designated sites within a distance relevant to the scale and location and address LDP Policy NE1.

See: Assessing Connectivity with SPAs (SNH, 2016)
Perth & Kinross SPA and SACs SG (PKC)

Habitats and Species

All proposals may impact on wildlife and habitats including protected species and habitats outside of, but ecologically connected to, the site. and should address LDP Policy NE3. All applications may require habitat and protected species surveys relative to the size and site location and an Ecological Impact Assessment for all but micro turbines.

Surveys should be discussed with the planning team as part of pre-application or EIA scoping discussions. Surveys should extend outside the site boundary and take into account seasonal requirements (see Appendix 8). Relevant surveys, assessment and mitigation include:

- A Phase 1 Habitat survey for large turbines and windfarms or where significant features may be affected
- A National Vegetation Classification (NVC) survey where there is potential for protected habitats to be on site
- Raptors, bats and wintering, breeding, migrating and foraging birds
- Invertebrates, reptiles and amphibians on open sites
- Badgers, wildcats, red squirrels and pine martens
- Fish, aquatic invertebrates and otters where waterways are present

Assessments should address impacts from siting and design of turbines, infrastructure and construction. These include:

- Loss or impacts on protected plants and sensitive habitats
- Disruption or fragmentation of foraging, breeding and commuting habitats of all wildlife
- Impacts on plants and habitats from changes to soils and hydrology
- Disturbance of nesting birds in roofs (roof mounted installations)
- Disturbance and displacement of birds from breeding, foraging and hunting habitat
- Disturbance of bat roosts and hibernacula in buildings and trees
- Disturbance, displacement, fragmentation or loss of bat foraging in woodland, woodland edges, waterways and hedgerows
- Collision risk to birds from turbines in commuting, hunting or migration flight paths
- Collision and barotrauma risk to bats from turbines in flyways
- Cumulative impacts on birds and bat populations
- Potential changes to raptor behaviour from site changes

Refer: Assessing the Impact of small-scale wind energy proposals on the natural heritage (SNH, 2016)
Scottish Biodiversity List
Tayside Local Biodiversity Action Plan (2016)
Wind Farm Impacts on Birds Guidance (SNH)
Assessing the cumulative impact of onshore wind farms (SNH, 2012)
RSPB Bird Map
Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed) (BCT, 2016)

Woodland, Forestry and Green Infrastructure

Submissions should include details of measures to avoid and mitigate impacts on, and enhance, woodlands and green infrastructure in line with Policies NE2 and NE4 and associated Council guidance along with Scottish Government and SEPA guidance on forestry removal and waste. In forestry, tree removal and restructuring for wind optimisation may be supported if soil, biodiversity and timber production are safeguarded, and SEPA guidelines are followed. Keyholing is preferred except for felling of plantation on peat followed by peat restoration.

Refer: Forest and Woodland Strategy (PKC)
Green Infrastructure SG (PKC)
Management of Forestry Waste (SEPA, 2013)
Guidance Note on Use of Trees Cleared to Facilitate Development on Afforested Land (SEPA, 2014)
Policy on Control of Woodland Removal (FCS, 2009)

Expected Mitigation and Enhancement

- Carefully site turbines and infrastructure to avoid impacts
- Apply buffers between woodland or sensitive habitats and turbines, tracks and infrastructure
- Follow best practice construction including a safe site for wildlife and to prevent transfer of INNS.
- Time construction to respect seasonal requirements of species
- Compensate unavoidable tree loss on site, with any offsite compensation sited in Perth and Kinross
- Carry out timely compensatory and post-construction restoration
- Aim restoration, compensation and enhancement to promote opportunities for biodiversity, climate resilience, flood protection, and recreation including the objectives of the Council's Forest and Woodland Strategy, LBAP and Green Infrastructure guidance
- Provide a landscape plan or habitat management plan for mitigation, restoration and enhancement
- Monitoring and shut down plan for bats and birds
- Provide a Site Biodiversity Action Plan or monitoring scheme to ensure risks to wildlife are understood and managed

4.2.3 WATER ENVIRONMENT

Potential impacts on the water environment include:

- Changes to water flows, supplies and quality through excavations, dewatering, compaction, and run-off from tracks and hardstandings
- Impacts on Ground Water Dependent Terrestrial Ecosystems (GWDTEs) and water supplies from changes to natural flows
- Sedimentation and pollution from construction of any scale wind

Water Quality and Quantity

Submissions and CMS should:

- Identify construction areas and storage compounds
- Identify the locations of the nearest watercourses and waterbodies, water supplies, ground water and wetlands

Siting and mitigation should:

- Address potential run-off and pollution
- Take into account existing ground cover, waterlogging and slope
- Take into account the proximity and connection to waterbodies

Applicants proposing to abstract water for construction or to dewater foundation excavations may require a licence from SEPA

Water Supplies and GWDTEs

Submissions for all large turbines and wind farm applications should:

- Identify all private and public water supplies in the site catchment
- Identify all groundwater abstractions within 100m of tracks and trenches and 250m from borrow pits and excavations
- Consult Scottish Water for advice on precautions where development may affect a Protected Water Area
- Assess impacts and identify mitigation for water supplies
- Carry out a National Vegetation Classification (NVC) of each wetland present, and assess and mitigate impacts on GWDTEs

Flood Risk

Siting of infrastructure including generation infrastructure should avoid areas at risk from flooding and natural flood management areas. Good drainage management should avoid any increase in flooding downstream, particularly on Potentially Vulnerable Areas identified in Local Flood Risk Management Plans.

Expected Mitigation

- Best practice construction (See SNH and SEPA Guidance)
- Buffers between construction, storage areas and water bodies
- Minimise vegetation removal
- Avoid water crossings where possible
- Aim to maintain natural waterflows across habitats
- Minimise impermeable surfaces, use permeable access tracks
- SUDS for construction and operation to treat and control run-off
- Separate construction drainage and SUDS from clean water flows
- Ensure drainage to SUDS is in place prior to any excavation
- Design drainage to require minimum maintenance
- A water quality management plan to ensure water protection measures are monitored and maintained
- A drainage impact assessment is likely to be required
- Mitigation as recommended by Ecological Clerk of Works
- Timely restoration post construction restoration of vegetation

Refer: Planning advice on SUDS (SEPA, 2010)
Abstractions Guidance (SEPA)
Assessing Impacts of Development Proposals on GWDTEs (SEPA, 2014)
Good Practice During Wind Farm Construction (SNH, 2015)

4.2.4 SOILS AND PEAT

Peat and Carbon Rich Soils

Construction of wind foundations, tracks and hardstandings can disturb, excavate or drain carbon-rich soils and peatland leading to the loss of rare habitat loss and any GHG emission savings. These potential impacts should be addressed in line with LDP Policy EP1A. SEPA and SNH Guidance should be adhered to for any development potentially affecting peat. Peat, vulnerable and valuable soils should be avoided.

Prime Agricultural Land[2]

Single turbines on agricultural land which support rural businesses while allowing agriculture 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.

Expected Mitigation

- Where unavoidable minimise peat disturbance and loss
- Avoid disturbance of trees and vegetation that may affect soils or increase erosion
- Use floating roads on peat and sensitive soils
- Provide buffers between infrastructure and peat
- Identify appropriate and timely post-construction restoration
- Aim for restoration that enhances soils and vegetation
- Explore opportunities for peatland restoration in the wider area
- Provide a Peat Management Plan

Refer: Carbon Calculator (Scottish Government)
Guidance On The Assessment Of Peat Volumes, Reuse Of Excavated Peat And The Minimisation Of Waste (SEPA, 2014)
Floating Roads on Peat (SNH, 2010)
Regulatory Position on Development on Peat (SEPA, 2010)
Peat Hazard and Risk Assessment Guide (SGov, 2007)
Carbon and Peatland Map (SNH, 2016)

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

4.2.5 HISTORIC ENVIRONMENT AND CULTURAL HERITAGE

Wind technology impacts will be primarily on the fabric of, setting of or views from heritage interests and can have impacts on archaeology.

- Micro turbines should be discretely sited and designed to not detract from the historic character of buildings, settings or views. Proposals should demonstrate that the weight, vibration, and installation of fixed micro turbines will not damage the fabric of historic buildings.
- Small and medium turbines within, affecting the setting of, or views from, Conservation Areas, Gardens and Designed Landscapes, Historic Battlefields and Scheduled Monuments should demonstrate compliance with LDP Historic Environment Policies and Conservation Area Appraisals.
- Large turbines and wind farms are unlikely to be appropriate where they have significant adverse effects on the setting of heritage interests.

Known archaeology across construction sites should be identified and potential for archaeology discussed with the Perth and Kinross Heritage Trust, who can also advise on mitigation, such as recording archaeology. Enhancement opportunities may exist for acceptable proposals such as interpretative signage.

Refer: Managing Change: Setting (HES, 2010)
Managing Change: Micro Renewables (HES, 2016)
Planning Advice Note 2/2011 Planning and Archaeology
Heritage Conservation Advice and Map

Clearly defined construction exclusion zone for archaeology
© PKC

4.2.6 RECREATION AND TOURISM

Wind farms can impact on recreation through land take and disruption to recreation routes and by affecting valued views and the recreational experience. Submissions should:

- Identify recreation routes or access to recreational activities
- Address impacts in line with LDP Policy CF2
- Allow reasonable access or alternative routes during construction while ensuring safety and provide an access management plan
- Consider enhancement of recreational access or facilities

Wind farms can also impact on the tourism experience and have a limited but potential influence over some tourists' decision of where to visit in Perth and Kinross. Submissions should:

- Assess impacts on views from key tourist routes and from tourist accommodation
- Assess impacts on views of tourist landmarks
- Engage with local tourist businesses
- Provide a tourism impact assessment where potential issues arise

4.2.7 RESIDENTIAL AMENITY

Operation and the lengthy construction of wind proposals can impact on amenity through dust, odour, lighting, and vibration, and should be addressed in addition to the main issues below.

Shadow Flicker

Shadow flicker and strobe effects from moving blades can in limited circumstances create distraction and have potential health effects on some individuals. Applicants for large turbines and wind farms should assess shadow flicker impacts. The assessment should:

- Address impacts on dwellings within 130° North and 10 rotor diameters distance of the nearest turbine
- Show shadow flicker impacts less than 30min/day or 30h/year

A Wind Farm Shadow Flicker Protocol may be required prior to construction.

Noise

The noise impact from turbines 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 (L_{A90}, 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.

See: 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.

Expected Mitigation

- Consider impacts early during site selection
- Address impacts through siting, design and technical controls
- Time construction to limit impacts
- Use screening to address any residual flicker impacts
- Incorporate shut-down measures in management plans

4.2.8 AVIATION, DEFENCE AND BROADCASTING

Aviation and Defence

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.

See: Safeguarding Airfields Supplementary Guidance (PKC, 2012)
Wind Farms Advice (CAA)
Wind Farms: MOD Safeguarding (MOD)

Broadcasting and Communication

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 signal, with individual occupiers.

4.2.9 EXTENSIONS AND REPOWERING

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 closely match existing turbines and layout but be able to stand on their own if proposed to outlast the existing wind farm.

Life Extensions and Repowering

Both repowering and extending the life of existing turbines can maximise resource availability. 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.

Applications which accord with the LDP and this guidance will be encouraged, where submitted well before the permission expires. The existing wind farm is a material consideration including environmental changes, operational issues, and monitoring results. Applicants are encouraged to improve the landscape through revised layout and are encouraged to explore shared ownership with communities. Additional considerations include:

- Changes to renewable target contribution and GHG payback
- Changes to and history of community support
- Effects on landscape through revised height, footprint and layout
- Revised cumulative impacts
- Impacts on natural heritage and biodiversity including on successful restoration and changes to habitats and wildlife distribution
- 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 for existing and proposed installation

Consultation Question 8

Do you agree with the Council's approach for dealing with proposals for extending and repowering existing wind projects?

4.2.10 DECOMMISSIONING AND RESTORATION

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

Draft DRPs will need to be updated every 5 years, including the cost estimate. The DRP will form the basis for conditions including securing a restoration bond or other financial mechanism, ongoing habitat management and monitoring.

Refer: Decommissioning and Restoration Plans for Wind Farms Guidance (SNH, 2016)

5 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.

There is a significant range of hydropower installations in Perth and Kinross ranging 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):** usually a form of impoundment used for energy storage See Energy Storage (section 3) for more information.
- **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 waterway. Proposals with a low vertical drop (low head) may have lesser impacts than high head schemes which may require large penstocks, lades, tracks and several water sources.

Application Requirements:

- All hydropower proposals require an application for planning permission and will be assessed against the Strategic Land Use Capacity map.
- An EIA may be required for applications over 500kW or in sensitive areas, and will be required for all Energy Consent (s 36) applications (those over 50MW, see section 2).
- A water use (CAR) licence under the Water Environment (Controlled Activities) Regulations 2005 is likely to be required for all applications. Applicants should contact SEPA at an early stage to discuss requirements and progress both applications concurrently.
- A listed building consent and/or building warrant, and other environmental licences (see Appendix 3), may be required.

Refer: The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) A Practical Guide (SEPA, 2016)

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

Renewables Energy Handbook (CARES, 2013)

Lawers impoundment dam. © PKC

Run of river installation. © PKC

Consultation Question 9
Do you agree with the approach we have suggested for hydropower proposals in this section? If not, what could we do differently?

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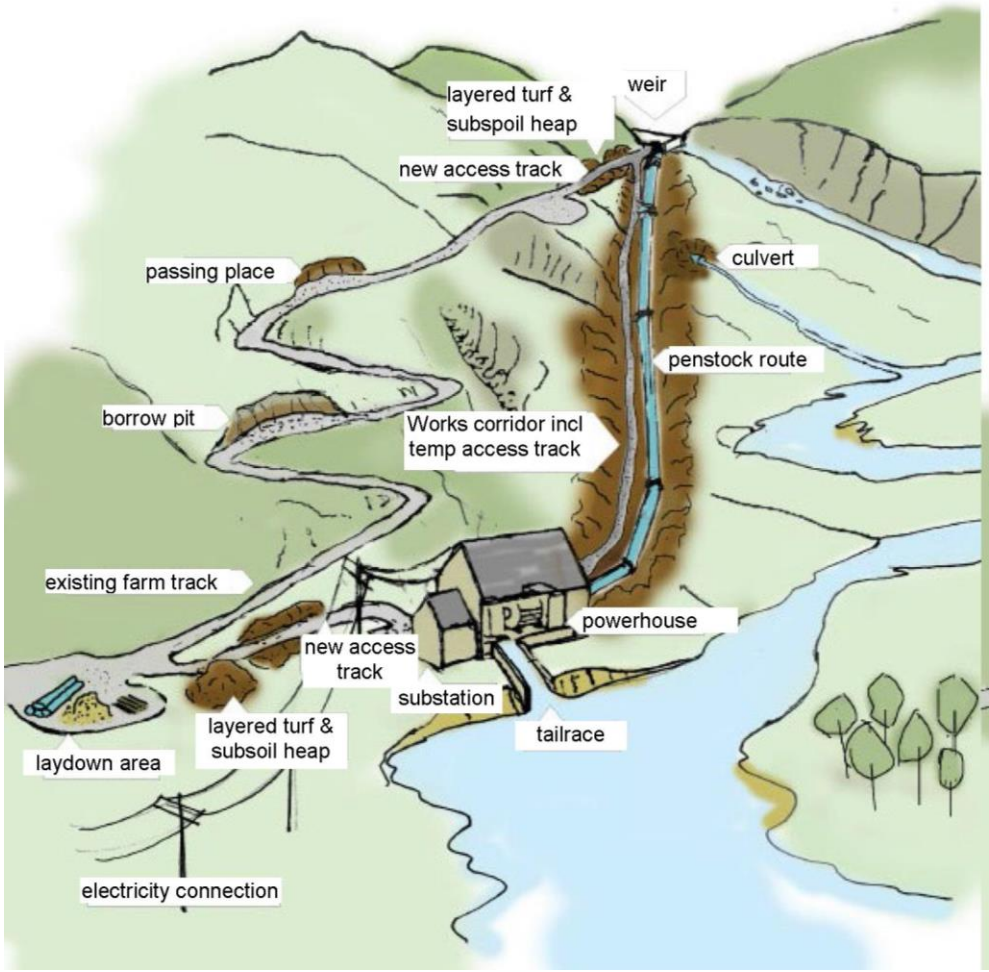
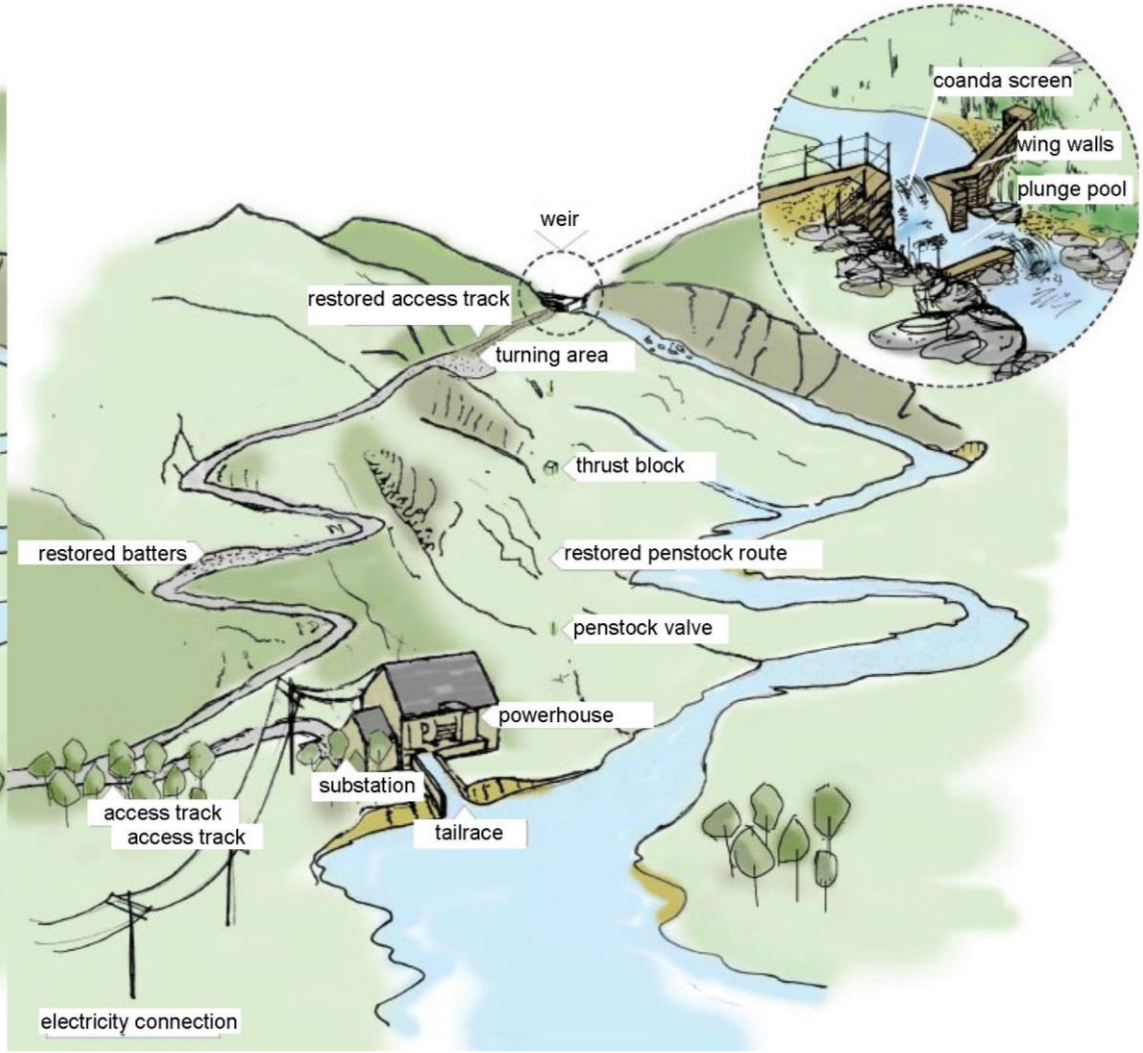
Figure 5.1: Main Components of a Run-of River Scheme – Under Construction



© Loch Lomond and the Trossachs National Park

Figure 5.2: Main Components of a Run-of River Scheme – Post Construction



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5.1 Spatial Strategy

5.1.1 STRATEGIC LAND USE CAPACITY MAP

The Strategic Land Use Capacity map for hydropower (figure 5.3 below) helps guide developers to the least strategically sensitive areas in Perth and Kinross by providing a strategic view of the range of environmental, planning, river quality and other water related considerations that affect the capacity of Perth and Kinross to accommodate hydropower development. See section 2.2 for more information.

The considerations on which the map is based are primarily water environment sensitivities but due to the presence of smaller waterways which may be suitable for micro hydro installations, and the associated construction and operational impacts of hydropower, the map covers the whole of the Perth and Kinross landscape. As many of the larger watercourses fall within the catchment of the River Tay SAC and other protected areas, they are generally categorised as sensitive, with most falling into the Limited Capacity categories. Proposals in these areas are likely to be subject to Appropriate Assessment due to their protected status (see Appendix 3 for more information).

Submissions for all hydropower installations should take the Strategic Land Use Capacity map into account, and it will be a material consideration in the assessment of proposals. Areas with the highest capacity are those with the least sensitivity to hydropower.
The map shows the following categories of strategic land use capacity:

Low Capacity:	Proposals are likely to need to address impacts on a wide range of sensitivities
Medium Capacity:	Proposals may have to address impacts on a number of sensitivities.
High Capacity:	Proposals are likely to have fewer sensitivities to address.

An online version of this map is available at https://arcg.is/Hbqyn.

5.1.2 OPPORTUNITY MAP

An opportunity map is also provided (figure 5.4 below) which is based on a study carried out in 2011[3] overlaid on the strategic land use capacity map. The 2011 study identified sites with technically available potential for hydropower. The opportunity sites are provided for information but applicants should note that they do not take into account cumulative impacts, including cumulative grid constraints, or changes in the financial environment since the date of the report. The outputs are therefore advisory only.

[3] babyHydro Ltd (2011) Hydropower Capacity Outputs and Methodology for Perth and Kinross Council

Figure 5.3. Hydro Strategic Land Use Capacity Map

Consultation Question 10: Do you agree with the areas identified on the Strategic Land Use Capacity map as having high/medium capacity for further development? If not, please explain. To identify, and comment on, a specific location see http:/bit.ly/2uIYaZo

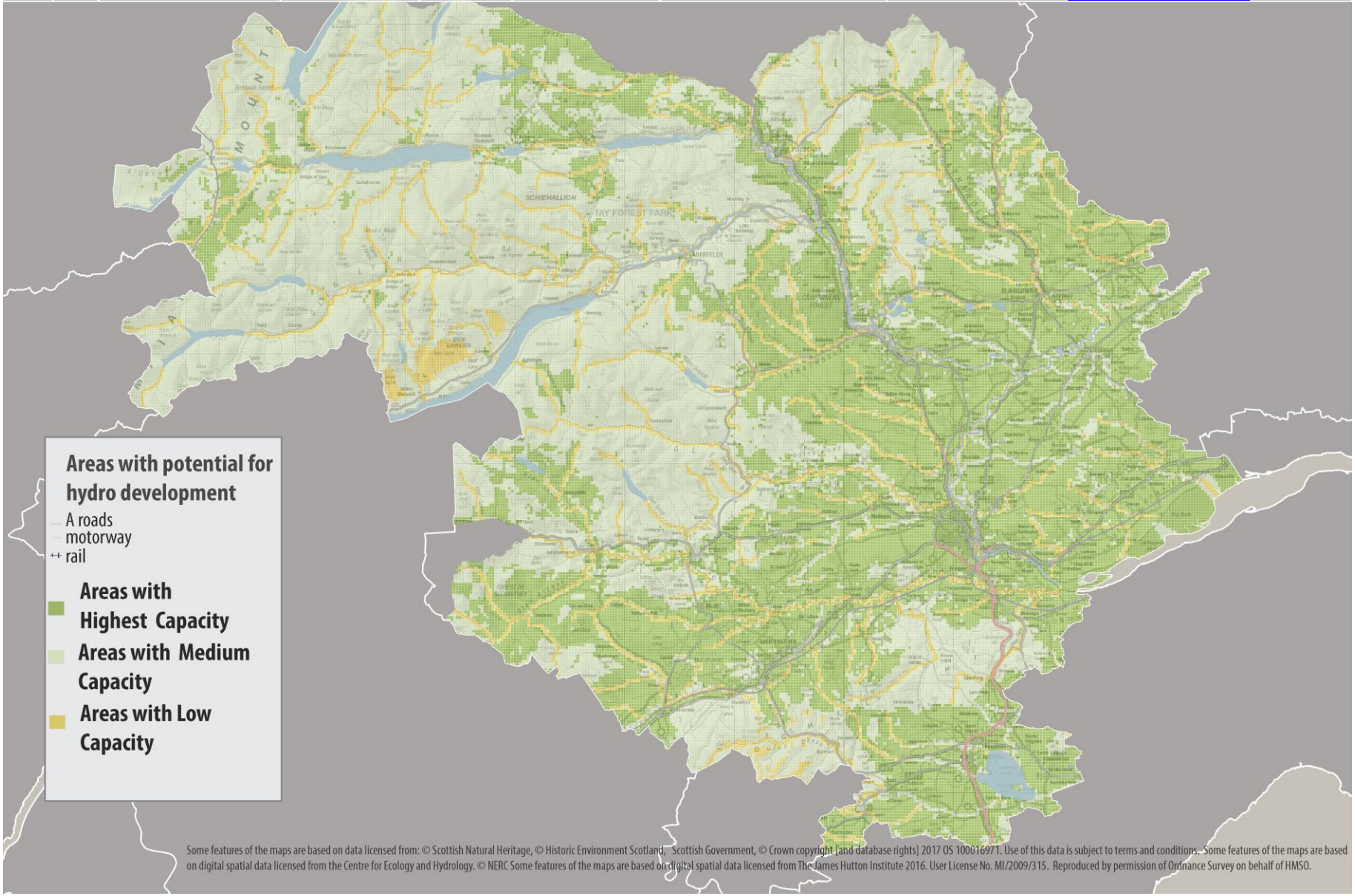

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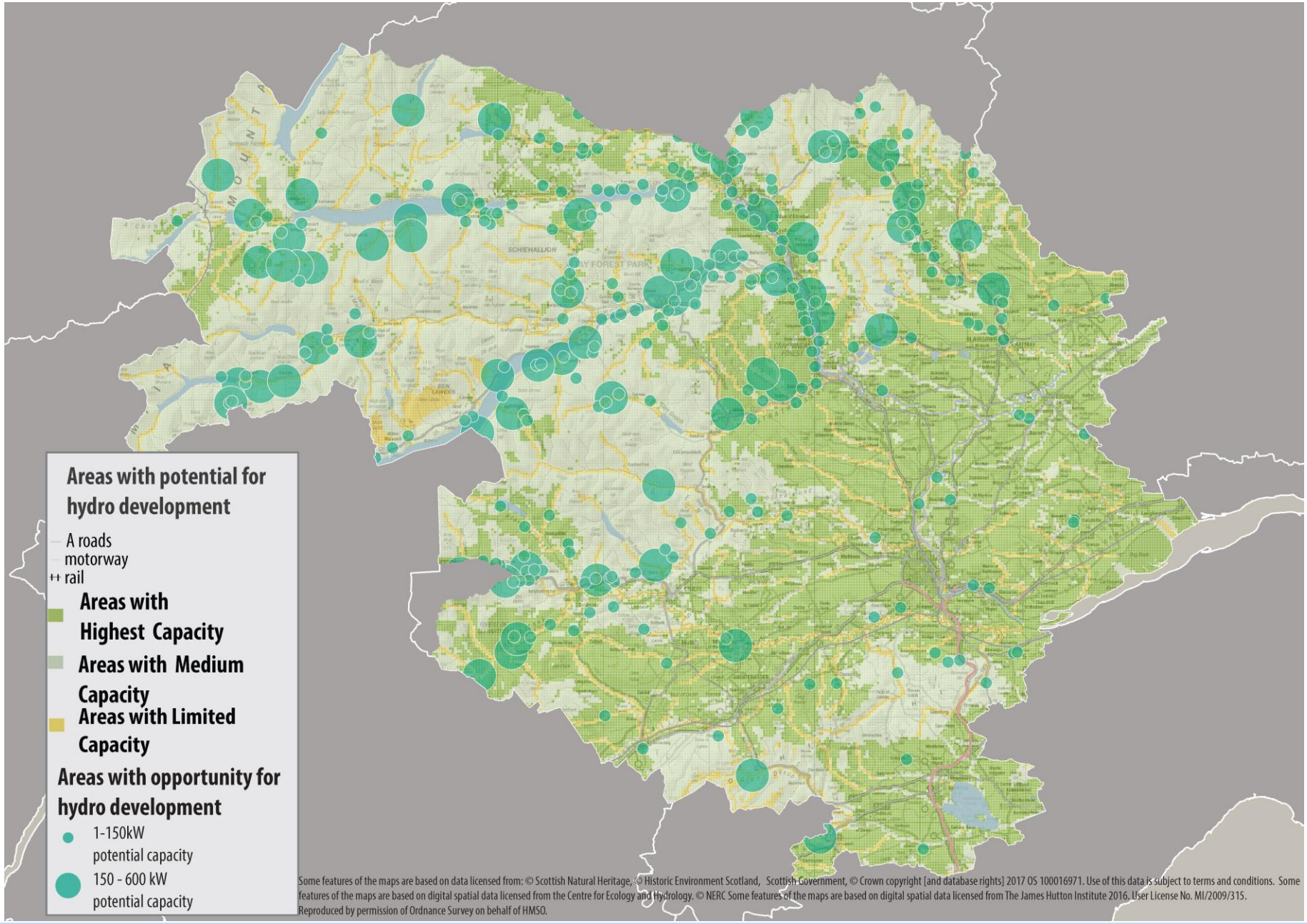
Figure 5.4. Hydropower Opportunity Map



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5.2 Planning Considerations

The main planning considerations of hydro installations include the positive impacts of reducing greenhouse gas emissions and local net economic benefits, along with operational and construction impacts on the landscape, water environment and associated habitats, wildlife, recreation and water supplies. All proposals should also address General Considerations as relevant

Pre application enquiries are encouraged to help ensure submissions are proportionate and complete. Please provide as much relevant information as possible, including:

- Size and design of technology used
- Location and basic layout of site incorporating location of pipelines, infrastructure, tracks and construction compounds, laydown areas, potential grid connection; and the location and design of weir and tailrace relative to the natural watercourse
- Location of each water body affected
- Location of sensitive features including peatlands, wetlands and water abstractions
- Location of trees and woodlands
- Source of materials
- Operational lifespan of power scheme
- Existing recreational access
- Indicative routes for construction traffic
- Information from any discussions held with SEPA or SNH

Applications will be assessed against the Strategic Land Use Capacity map; and submissions should include the information detailed in this guidance, an EIA Report where required, and relevant surveys, assessments and plans (see Appendix 2). Any further information requested by SEPA and SNH can help inform the application.

Cumulative assessments may be required for large applications and even small applications in a sensitive location and should include installations and applications within other planning authorities' boundaries where there is a visual or ecological connection. Cumulative assessments may be required for:

- Landscape and Visual Impacts
- Biodiversity and Natural Heritage
- The Water Environment

Construction best practice construction should be followed to avoid potential significant impacts on waterways and sensitive habitats. Ground investigations carried out before committing to a site can help to avoid unnecessary disturbance. A draft Construction Method Statement (CMS) will be required as a minimum for all hydropower developments as part of a submission or EIA Report. Prior to commencement, most hydro schemes will need to have a detailed Construction Environmental Management Plan (CEMP) in place, and follow the advice of an independent Ecological Clerk of Works (ECOW) as agreed by the Planning Authority, SNH and SEPA.

Refer: Guide to Hydropower Construction Best Practice (SEPA, 2015)
Engineering in the Water Environment Guidance (SEPA)
Guidance for developers of run-of-river hydropower schemes (SEPA, 2015)
Hydro-electric schemes and the Natural Heritage (SNH, 2015)
Planning Guidance on Hydropower Developments LUPS 18 (SEPA, 2013

5.2.1 LANDSCAPE AND VISUAL IMPACTS

Run of river schemes can be installed with low impacts on the landscape but this depends on the sensitivity of the location and the extent of structures, tracks, penstock and transmission infrastructure involved. Any large impoundment proposal will need to overcome significant impacts.

Visual impacts include the introduction of man-made materials such as concrete and metal into a semi-natural or rural environment.

Landscape and Visual Impact Assessments (LVIA)

Submissions should address the design, colour and materials of all installation elements along with fencing, tracks and construction compounds. The location of transformers should also be noted

- All submissions will require site photographs of waterways, and locations of construction, compounds and tracks.
- Most submissions will require a degree of visualisation proportionate to the scale and location of the application.
- EIA developments and proposals in Landscape Designations or Wild Land will require a Landscape and Visual Impact Assessment.

The Planning Authority will help to identify the extent of photos, visualisations and LVIA required including the zone of theoretical visibility (ZTV) and identification of viewpoints and receptors.

Cumulative impact assessments may be required where:

- The proposal is in or affecting a landscape designation or highly sensitive landscape; and
- There are other hydro or industrial installations within the ZTV

Refer: Guidelines for Landscape and Visual Impact Assessment (3rd ed) (The Landscape Institute, 2015)
Strategic Land Use Capacity Map
Environmental Assessment Technical Paper
Hydroelectric Schemes and the Natural Heritage (SNH, 2015)
PKC Guidance for the Preparation and Submission of Photographs and Photomontages.

Powerhouse completed with appropriate materials and well established reinstatement © PKC

Landscape Designations

Proposals in or visible from National Parks, National Scenic Areas (NSAs), and Special Landscape Areas (SLAs) should address the impacts on the designations' special qualities. Proposals visible from National Parks should consider the National Park Authority's guidance.

Refer: Landscape Supplementary Guidance (PKC, 2015)
The Special Qualities of National Scenic Areas (SNH, 2010)

Wild Land

Wild Land Areas are highly sensitive but small scale, suitably located hydro schemes may be appropriate where the key attributes and qualities of the area are not significantly affected. All proposals that may have a significant effect on WLAs will require a Wild Land Assessment. Areas not designated as wild land but with a high degree of naturalness may also have wildness qualities. Submissions for applications here may also require a wild land impact assessment.

Refer: Assessing Impacts on Wild Land (SNH, 2017)

Expected Mitigation and Enhancement

- Use natural features such as narrow valleys reduce construction
- Ensure low profile of in-river structures
- Use topography and existing or planted woodland to screen impacts
- Run penstock and cabling underground where possible
- Align visible pipework including pressure release valves with land use patterns and vegetation
- Place powerhouses underground, in existing buildings, or in new buildings in keeping with local character
- Use design, materials, and colour to minimise impacts of structures, powerhouses, railings, fencing, and pipework etc
- Use existing tracks or utilise alternative delivery means
- Screen transformers and associated fencing
- Carry out timely and appropriate restoration of tracks, trenches, construction compounds, laydown areas and borrow pits
- Restore and enhance existing disused weirs, locks and watermills

5.2.2 BIODIVERSITY AND NATURAL HERITAGE

Potential for significant impacts on aquatic biodiversity include on:

- Water quality, quantity, flow, depth, sediment and temperature
- Habitat, food availability, spawning and migration of a wide range of species from changes to the water environment
- Fish and eel access to feeding, breeding and spawning areas from barriers created by even small weirs
- Fish and mammals injured by poorly designed or inadequately screened intake structures, weirs, tailraces, outfalls and fish passes
- Positive opportunities to enhance aquatic and riparian habitats

Designated Sites

Most hydropower installations within or affecting designated biodiversity sites (SPAs, SACs, SSSI, NNRs) or local geodiversity sites are unlikely to be appropriate. Micro hydro schemes may be acceptable but should consider potential cumulative impacts. Effects may include through up and downstream connections or species moving outside protected areas. All proposals should identify ecologically connected designated sites within a distance relevant to the scale and location and address impacts in line with LDP Policy NE1.

Refer: Protected Areas and Species Advice (Hydro) (SEPA)
Assessing Connectivity with SPAs (SNH, 2016)
Perth and Kinross SPA and SACs Guidance (PKC)

Woodland and Green Infrastructure

Woodland, including ancient woodland, and green infrastructure may be at particular risk of loss and fragmentation from hydro installations and associated tracks. Submissions should address LDP Policies NE2 and NE4 and associated supplementary guidance.

Refer: Control of Woodland Removal Policy (FCS, 2009)

Habitats and Species

All proposals should address the requirements of LDP Policy NE3 and consider habitats and species found within, outside, and ecologically connected to the site.

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Survey requirements can be identified during pre-application or EIA scoping discussions. Surveys should extend across the entire site, outside the site boundary and take into account seasonal requirements (see Appendix 8). Required surveys and assessment may include:

- A Phase 1 Habitat survey, with a National Vegetation Classification (NVC) survey where protected habitats are identified
- Fish surveys as required by SEPA
- Bryophytes, water voles, otters, aquatic invertebrates and beavers
- Breeding and ground nesting birds, badgers, and amphibians
- Wildcats, red squirrels, lichens, bats, and pine martens where woodland is present

Refer: SCFC Fish Habitat Survey Resources
Scottish Biodiversity List
Tayside Local Biodiversity Action Plan (2016)

Expected Mitigation and Enhancement

- Use degraded waterways with poor quality aquatic habitat
- Use existing weirs and remove fish barriers where agreed by SEPA
- Use least impact design and siting of all in water infrastructure
- Screen intakes and outfall, addressing both fish and mammals
- Consider species throughout their lifecycle and migration
- Avoid loss of fragmentation of woodland and green infrastructure
- Implement measures to minimise risks of transfer of invasive species (INNS)
- Carry out timely and appropriate habitat and woodland restoration
- Seek benefits for biodiversity, and for flood and erosion control
- Aim to improve aquatic and riparian habitat up and down stream
- Implement a habitat management or site biodiversity action plan

Refer: Guidance for developers of run-of-river hydropower schemes (SEPA & Natural Scotland, 2015)
Hydro-electric schemes and the Natural Heritage (SNH, 2015)
Fish and Fish Habitat Information (SEPA)

5.2.3 WATER ENVIRONMENT

The planning team will consult closely with SEPA to assess applications, identify conditions and co-ordinate with CAR applications. Hydro schemes under 100kW should demonstrate no deterioration on the water environment. Impacts to address include:

- Construction run off and hydrological changes to water quality through scouring, sedimentation, and submerged vegetation
- Changes to water flow from flow diversion, transfers from other catchments, engineering works, weirs, intakes and outfalls, resulting in changes to morphology and hydrology
- Impacts of these changes on sedimentation, erosion, quantity and quality of habitat downstream
- Impacts on fish passage, recreation and tourism from flow changes
- Changes to water level and temperature from all weirs
- Impacts on water supplies and groundwater dependent terrestrial ecosystems (GWDTEs) from abstraction and construction
- Changes to water flow may impact on flood plains

Water Quality and Quantity

Submissions should:

- Identify the locations of affected watercourses and waterbodies
- Address impacts on these of both construction and operation on water quality, hydrology, and morphology
- Provide flow information including compensation flow, and an assessment of downstream effects
- Address construction impacts in a CMS (see Appendix 4)

An impoundment licence may be required for weirs and PSH. A cumulative impact assessment may be required where there are other hydropower installations or proposals on the tributary.

Flood Risk

Submissions should demonstrate that in-river engineering can cope with extreme rainfall, and powerhouses and other dry land infrastructure is designed and sited to minimise risk. A Flood Risk Assessment may be required where there is potential increased risk to dwellings or Potentially Vulnerable Areas in Local Flood Risk Management Plans.

Effective silt trap, dug in, clearly numbered for maintenance ©PKC

Splash guards at low points over river crossings or culverts ©PKC

Water Supplies and GWDTEs

All submissions should:

- Identify all private and public water supplies in the catchment.
- Consult Scottish Water for advice on precautions where development may affect a Protected Water Area.
- Identify all groundwater abstractions within 100m of penstocks, tracks and trenches, and 200m of borrow pits and excavations.
- Assess impacts and identify mitigation for water supplies.
- Carry out a National Vegetation Classification (NVC) of each wetland present, and assess and mitigate impacts on GWDTEs

Expected Mitigation and Enhancement

- Best practice construction including a CMS, CEMP and ECOW
- Buffers between waterways and construction works including tracks and penstock
- Avoid water crossings where possible
- Minimise vegetation removal and restore post construction.
- SUDS for construction and operation to treat and control run-off
- Avoid transfer between otherwise unconnected waterways
- A water quality management plan to ensure water protection measures are monitored and maintained
- Mitigation as recommended by Ecological Clerk of Works
- Minimise impacts and enhance natural flood management
- Demonstrate adherence to SEPA Guidance

Refer: Hydropower Guidance (SEPA)
Guide to Hydropower Construction:Best Practice (SNH, 2015)
Guidance for developers of run-of-river hydropower schemes (SEPA, 2015)
Assessing Impacts of Development Proposals on GWDTEs (SEPA, 2014)
Impoundment Guidance (SEPA)
Engineering in the Water Environment Guidance (SEPA)
SEPA Guidance on Abstractions

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5.2.4 SOILS AND PEAT

Peat and Carbon Rich Soil

Changes to water flows and drainage, and construction of track and penstock routes, particularly on the steep ground typical of hydro, can damage, disturb or drain carbon rich soils and peatland, leading to the loss of rare habitats and any greenhouse gas emission savings.

Carbon- rich soils and peat should be avoided and impacts addressed in line with LDP Policy EP1A. Surveys, assessment, management and restoration of peat should accord with SNH and SEPA guidance and a Peat Management Plan may be required to demonstrate avoidance of peat, minimisation of disturbance and restoration.

Erosion

Steep sided hydropower sites may be particularly susceptible to erosion, causing loss of soil and impacting waterways. In areas likely to be prone to erosion, submissions should demonstrate measures to prevent or minimise erosion.

Expected Mitigation

- Avoid areas of vulnerable and valuable soils and peatland
- Penstock and track routes should avoid carbon rich soils and peatland wherever possible, particularly on steep ground where restoration may be difficult
- Minimise loss and disturbance of peatland and carbon rich soils
- Use floating roads or other means of delivery such as helicopters
- Ensure changes to waterways do not impact on peatland viability
- Retain or plant trees and vegetation to control erosion
- Restore and enhance where disturbance is unavoidable

Refer: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste (Scottish Renewables/SEPA, 2014)
Floating Roads on Peat (SNH, 2014)
Regulatory Position on Development on Peat (SEPA, 2010)
Peat Hazard and Risk Assessment Guide (Scottish Govt, 2007)
Carbon and Peatland Map (SNH, 2016)

5.2.5 HISTORIC ENVIRONMENT AND CULTURAL HERITAGE

Hydropower can have impacts on the fabric of listed buildings or on the setting of or views from heritage interests, and construction can have impacts on archaeology. Heritage interests however can also be promoted through careful restoration of historic weirs, waterwheels and mill lades. Energy efficiency should be addressed before considering installations that may impact on the historic environment.

Micro schemes may be compatible with Conservation Areas, Gardens and Designed Landscapes, Historic Battlefields and Scheduled Monuments with siting and design that respects the character and setting. Any proposal affecting heritage interests should demonstrate compliance with LDP Historic Environment Policies including impacts on setting and views.

The archaeological value across sites for larger schemes, including tracks and penstock routes, should be identified and potential archaeological value discussed with the Perth and Kinross Heritage Trust, who can also advise on mitigation. Enhancement opportunities may exist for acceptable proposals such as interpretative signage.

Refer: Managing Change in Historic Environment: Setting (HES, 2010)
Managing Change: Micro Renewables (HES, 2016)
Conservation Areas Advice (PKC)
PKC Heritage Map
Planning Advice Note 2/2011 Planning and Archaeology

5.2.6 RECREATION AND TOURISM

Hydropower can impact on recreation through visual impacts and access restrictions during construction. Changes in water flow may affect also water based recreation and tourism. Submissions should:

- Address LDP Policy CF2 and identify important routes and locations
- Engage with recreational organisations to help identify users, evaluate recreational value
- Allow reasonable access during construction while ensuring public safety and provide an access management plan
- Provide a notification plan for water releases affecting users
- Consider enhancements such as public access across weirs
- Site and design weirs to address impacts on, or enhance, recreation
- Identify potentially affected tourist assets such as waterfalls and fishing rivers and identify associated businesses
- Provide a tourism impact assessment where impacts are identified
- Address visual impacts on tourist and recreational interests

Contacts include:
Scottish Canoe Association; Scottish Rafting Association;
Tay District Salmon Fisheries Board ; Forth District Salmon Fishery Board and River Forth Fisheries Trust.

5.2.7 RESIDENTIAL AMENITY

Noise

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. The powerhouse location should be carefully considered, and all equipment acoustically enclosed to ensure there is no significant noise impact on neighbours.

Vibration

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).

5.2.8 REPOWERING

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 are expected to explore shared ownership with communities.

5.2.9 DECOMMISSIONING AND RESTORATION

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. A DMS should contain:

- An estimate of timing, options and associated impacts
- Reuse and recycling opportunities
- Potential impacts and proposed mitigation covering the removal of infrastructure, and the restoration of tracks and natural water flows.
- Proposed restoration, monitoring and aftercare.

6 SOLAR PV & THERMAL

Electricity from solar photovoltaic panels (Solar PV) or hot water from solar thermal collectors provide or supplement energy needs with low visual and environmental impacts and able to utilise unused or underused roofspace or land. Solar PV and thermal are utilised across Perth & Kinross ranging from rooftop installations to large solar PV farms including 4 consented or operational large solar farms with an installed capacity of 42MW.

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** panels but extend to PV roof tiles, flexible panels and wall mounted PV.

Ground mounted PV can involve:

- PV panels
- mounting structures
- fencing, lighting and CCTV
- inverters, cabling, and transformers

Consultation Question 11
Do you agree with the approach we have suggested for solar PV and thermal proposals in this section? If not, what could we do differently?

Consultation Question 12
As part of LDP2 preparation we are reviewing LDP Policy NE5 which limits infrastructure in the Green Belt to essential infrastructure. Do you think that solar farm developments would be appropriate in the Perth Green Belt in some cases? Please explain your reasons and anv limitations vou think would be necessarv.

This Guidance and planning requirements relate to following categories:

Micro Roof Mounted Solar PV or Thermal <50kWe (PV) or <45kWth (thermal)	Planning permission required for domestic dwellings unless Permitted Development Rights (PDR) apply. PDR is limited by: - Physical size (1m around building) - Dwelling type (not flats) - Historic interests Non-domestic PDR exists but is limited: - Near aerodromes or technical sites - In landscape designations
Large Roof Mounted Solar PV or Thermal >50kWe or 45kWth	Planning permission required
Micro Ground Mounted Solar PV or Thermal <50kWe or <45kWth	Planning permission required unless PDR apply. PDR is limited: - In or in the curtilage of historic interests - By size, height, and location restrictions
Solar Farms Large Ground Mounted PV 50kWe to 1MW	Planning permission required
Large Solar Farms Commercial Scale Ground Mounted PV >1MWe	Planning permission required The Strategic Land Use Capacity map applies

Further requirements may include:

- An EIA for installations over 0.5ha, or in a sensitive area
- A listed building consent and/or building warrant, and environmental licences (see Appendix 3)

See: Renewables Energy Handbook (CARES, 2013)
Circular 1/2012 Guidance on Householder PDR
Do I Need Planning Permission to Install Solar Panels?
Planning Circular 2/2011 on Non-Domestic Microgeneration
Planning Guidance for the Development of Large Scale Ground Mounted Solar PV Systems (BRE, 2012)

6.1 Spatial Strategy

6.1.1 STRATEGIC LAND USE CAPACITY MAP

The Strategic Land Use Capacity map for Solar (figure 6.1) helps guide developers to the lease strategically sensitive areas in Perth and Kinross by providing a strategic view of the range of environmental, relevant landscape factors and planning considerations that affect the capacity of Perth and Kinross to accommodate large solar farms (>1MW). See section 2.2 for more information.

Submissions for large solar farms (>1MW) should take the Strategic Land Use Capacity map into account, and it will be a material consideration in the assessment of proposals. Areas with the highest capacity are those with the least sensitivity to large solar farms.

The map shows the following categories of strategic land use capacity:

Low Capacity:	Proposals are likely to need to address impacts on a wide range of sensitivities.
Medium Capacity:	Proposals may need to address impacts on a number of sensitivities.
High Capacity:	Proposals are likely to have fewer sensitivities to address.

An online version of this map is available at https://arcg.is/HnPCb.

Errol Solar Farm. © Elgin Energy. Photo by DroneScope

6.1.2 OPPORTUNITY MAP

An opportunity map is provided (figure 6.2) for information only. The map identifies levels of solar irradiation without consideration of the suitability of environment itself. The map also identifies large solar farm applications which may provide opportunities for co-location or be indicative of a potential adverse cumulative impact.

Figure 6.1. Solar PV Strategic Land Use Capacity Map

Consultation Question 13: Do you agree with the areas identified on the Strategic Land Use Capacity map as having high/medium capacity for large solar farm development? If not, please explain. To identify, and comment on, a specific location please see

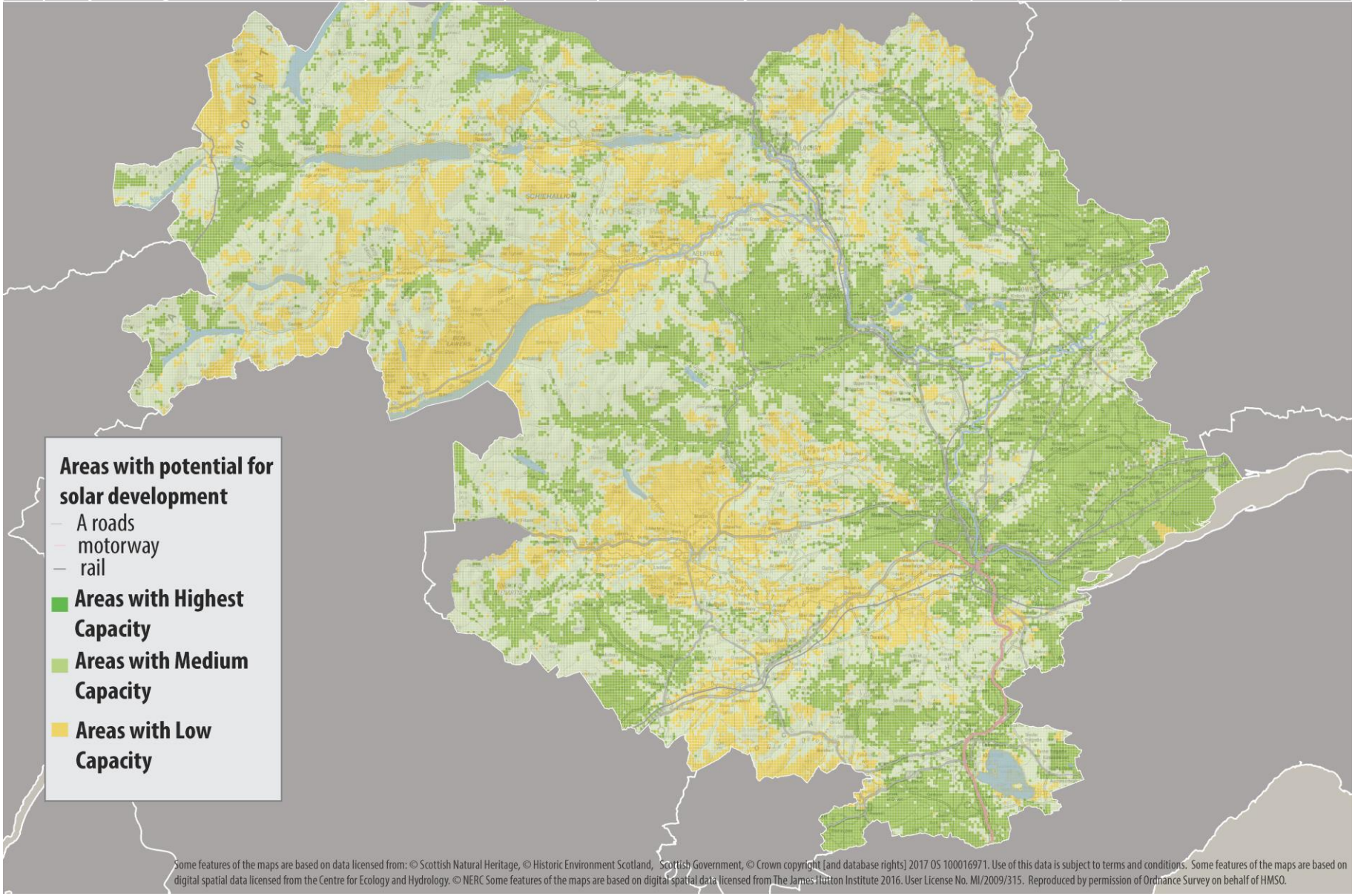

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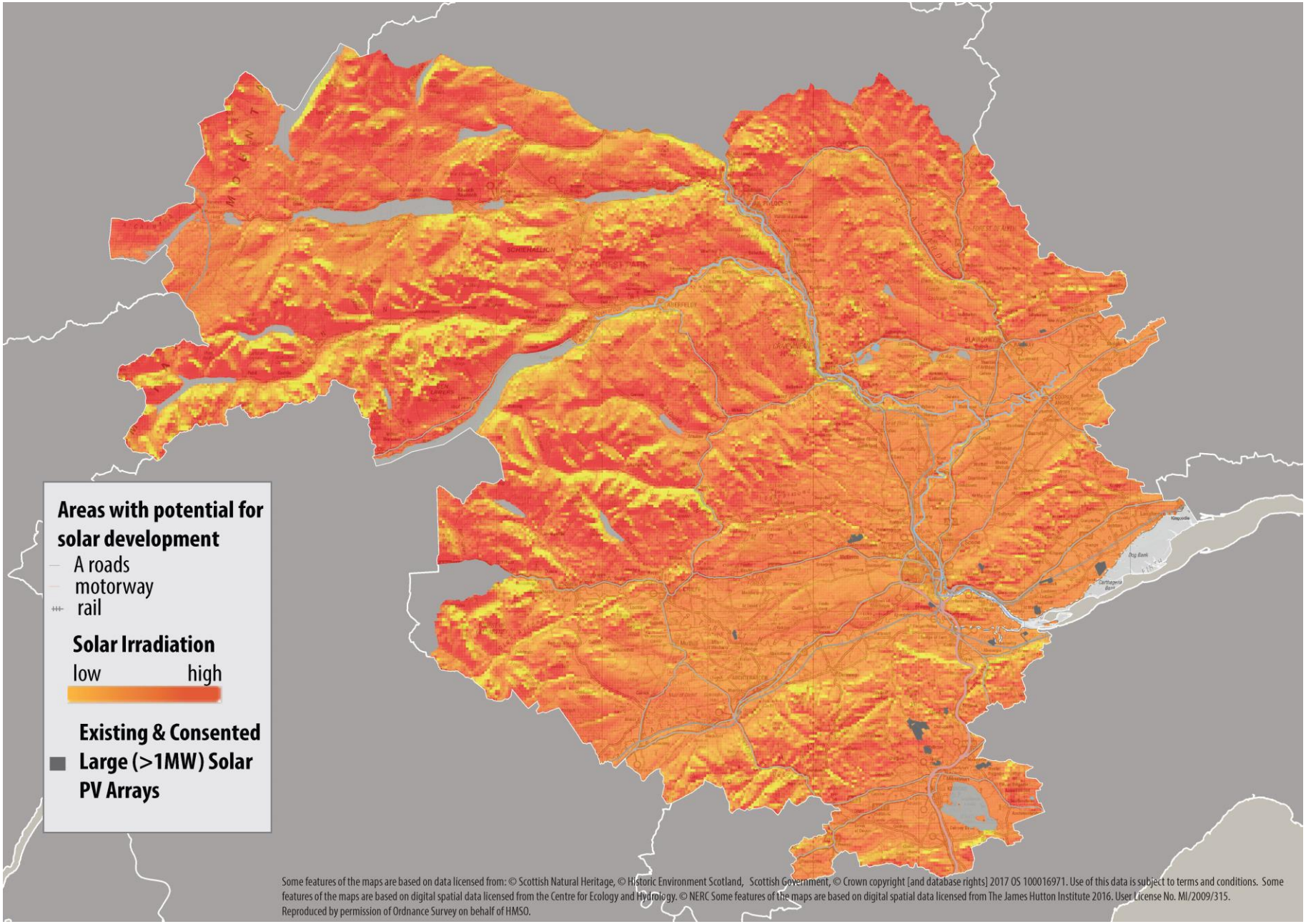
Figure 6.2. Solar PV Opportunity Map



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6.2 Planning Considerations

The main planning considerations are likely to be:

Roof Mounted PV or Thermal: Operational visual impacts and construction impacts on historic assets, birds and bats.

Ground Mounted PV: Impacts relative to the installation scale including operational impacts on landscape, agricultural soils, biodiversity and aviation. Construction impacts on soil, water and biodiversity may arise from site levelling, foundations, cabling, access and maintenance tracks, security fencing and lighting, grid equipment and grid connection.

All proposals should also address General Considerations as relevant.

Pre application enquiries are encouraged to help ensure submissions are proportionate and complete. Please provide as much relevant information as possible, including:

- Size and design of technology including number of panels
- Current use of land and land within the landscape
- Location in relation to airfields, dwellings, and recreational uses
- Location and basic layout of site including location of tracks and construction compounds, transformers and inverters
- Location and route of potential grid connection
- Proposed fencing, security and lighting
- Location of sensitive features including designated sites, waterways, peatlands, wetlands
- Details of other renewables in the area
- Location of trees and woodlands
- Expected operational lifespan of technology used
- Any proposed complementary use of the land

Cumulative assessments may be required for solar farm applications, and for roof mounted PV in conservation areas. Assessments should include applications and installations within other planning authorities' boundaries where there is a visual or ecological connection. Cumulative assessments may be required for:

- Landscape and Visual Impacts
- Biodiversity and Natural Heritage
- Prime Agricultural Land
-

Construction best practice should be followed. Where there is potential for impacts on a water body, natural heritage or archaeological designation, or other environmentally sensitive constraint a draft Construction Method Statement (CMS) may be required. A draft Construction Environmental Management Plan may also be required for large solar farms.

Applications will be assessed against the Strategic Land Use Capacity map where relevant; and submissions should include the information detailed in this guidance, an EIA Report where required, and relevant surveys, assessments and plans (see Appendix 2).

Sheep grazing under solar panels providing low impact vegetation management. © Elgin Energy

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Appendix 5: Iconic Viewpoints and Highland Boundary Fault

6.2.1 LANDSCAPE AND VISUAL IMPACTS

Small installations may have minimal landscape impacts but cumulative impacts may arise in sensitive landscapes. Solar farms use panels designed to absorb sunlight, and with a low lying nature, may therefore have limited landscape impact, appearing as water or a ploughed field. Adverse impacts may occur through contrasts between the colour, size and layout of the solar farm against the background landscape.

Visual impacts will depend on the visibility and prominence of panels, mounting frames, grid and security infrastructure, hardstandings and compounds. Subject to impacts on heritage interests installations in an urban or industrial environment are likely to be minimal.

Landscape and Visual Impact Assessments (LVIA)

Submissions should provide:

All Rooftop	Site photographs and plans
Micro Ground	Site photographs and plans Visualisations for non-domestic installations affecting heritage interests or landscape designations
Solar Farm	Site photographs, plans. Visualisations may be required. LVIA if heritage interest or landscape designation, subject to proposal size and location sensitivity
Large Farm	LVIA

The Planning Authority will help to identify the extent of photos, visualisations and LVIA required including identification of viewpoints and receptors. Views should be considered from all sides, higher ground, Perth & Kinross Iconic Viewpoints (see Appendix 5) and both recreational and road users.

Cumulative Assessments may be required for large solar farms where there are other existing or proposed large solar farms or structures such as pylons, wind turbines or permanent polytunnels within 2km.

Refer: Guidelines for Landscape and Visual Impact Assessment (3rd ed)(The Landscape Institute, 2015)
Large Scale Solar Photovoltaic Installations Considering Landscape, Visual and Ecological Impacts (SNH, 2016)

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Landscape Designations

Solar farm proposals in or visible from National Parks, National Scenic Areas (NSAs) and Special Landscape Areas (SLAs) will be approached cautiously and should demonstrate that they have no significant adverse impact on the qualities of the designation.

Refer: The Special Qualities of the National Scenic Areas (SNH, 2010)
Landscape Supplementary Guidance (PKC, 2015)

Wild Land

Wild Land Areas(WLAs) are highly sensitive. Large solar farm proposals may create a perceived human influence on the landscape but discrete smaller scale PV may be appropriate. Where in or visible from WLAs, a Wild Land Assessment will be required. Areas identified as highest sensitivity (L1) in the Environmental Assessment Technical Paper are likely to also have wildness qualities and may require a wild land assessment.

Refer: Assessing Impacts on Wild Land (SNH, 2017)

Expected Mitigation and Enhancement

- Address landscape and visual impacts at site selection stage
- Locate panels discretely where heritage assets are affected
- Use topography and planting to screen or break up visual impact
- Follow contours and enclosure patterns of landscape created by field patterns, woodland, walls and hedges
- Locate large blocks of PV in areas with a variety of cropping activity
- Take advantage of otherwise unused brownfield sites
- Use landscaping to reinstate field boundaries or connect habitats
- Manage vegetation under and around panels, preferably by grazing
- Use design, colour and materials of infrastructure and buildings to minimise impacts and integrate with existing setting
- House inverters in existing buildings where possible
- Onsite cables should be underground
- Timely and locally appropriate post construction habitat restoration
- A habitat management plan or landscape management strategy may be required

6.2.2 BIODIVERSITY AND NATURAL HERITAGE:

Impacts on biodiversity and natural heritage will vary greatly due to the size and site of the installation that should be addressed include:

- Disturbance of and blocking access to bat roosts and bird nests in or on roofs during roof mounted installation work
- Disruption and displacement of ground nesting birds
- Exclusion of wildlife from foraging, commuting and breeding areas
- Construction impacts on waterways and sensitive habitats
- Impacts on bats and nocturnal birds from security lighting
- Impacts from changes in drainage on waterways and habitats
- Enhancement opportunities of land beneath solar panels

Designated Sites

Roof mounted and micro ground mounted PV consistent with LDP Policy NE1 may be acceptable in designated sites (SPAs, SACs, SSSI, NNRs, Local Geodiversity Sites). Solar Farms are unlikely to be appropriate here and proposals should also identify, assess and address impacts on nearby or ecologically connected designated sites.

Woodland, Forestry and Green Infrastructure

Solar farms are likely to be on open land and are expected to avoid impacts on trees, woodland and green infrastructure. Submissions should address any direct loss of trees or impacts from ground disturbance in line with LDP Policies NE2 and NE4 and associated guidance.

Habitats and Species

Submissions should address impacts on habitats and species in line with LDP Policy NE3 including those outside but using, or ecologically connected to the site. An Ecological Impact Assessment (EcIA) may be required for solar farms.

Survey requirements can be identified during pre-application discussion. Surveys should follow best practice, extend outside the site boundary and take into account species and seasonal requirements (see Appendix 8). Survey and assessment requirements may include:

- Bird and bat surveys for roof mounted applications
- A Phase 1 Habitat survey for large Solar PV where significant wildlife habitats or features may be affected
- Ground nesting and wintering birds, bats, badgers, reptiles and amphibians
- Breeding and foraging areas, commuting and migration routes

Expected Mitigation and Enhancement

- Avoid sensitive habitats
- Route access tracks to avoid habitat fragmentation
- Apply buffers from protected sites, trees, and waterways
- Provide fencing with badger gates and low level gaps for wildlife
- Use shielded or passive infrared lighting
- Follow best practice construction and time to seasonal requirements
- Carry out timely post-construction restoration
- Aim to enhance biodiversity and green infrastructure when designing restoration, compensation and screening
- Plant wildflower meadows or grasslands under arrays that can support pollinators and ground-nesting birds
- Maintain vegetation with low intensity grazing
- A landscape plan, habitat management plan or site biodiversity action plan for mitigation, restoration and enhancement

Refer: Large scale solar photovoltaic installations considering landscape, visual and ecological impacts (SNH, 2016)
Biodiversity Guidance for Solar Developments (BRE, 2014)
Assessing Connectivity with SPAs (SNH, 2016)
Scottish Biodiversity List
Tayside Local Biodiversity Action Plan (2016)
Perth & Kinross SPA and SACs SG (PKC)

6.2.3 WATER ENVIRONMENT

Potential impacts to be addressed include:

- Little impact from roof mounted and small scale PV and thermal
- Disruption to natural water flows through surface runoff from panels, non-permeable foundations, compaction, tracks for larger solar
- Pollution and sedimentation from construction
- Impacts on habitats including Ground Water Dependent Terrestrial Ecosystems (GWDTEs) from the above effects
- Vulnerability of electricity infrastructure to flood risk

Expected Mitigation:

- Maintain natural flows across sites to safeguard waterways and GWDTEs
- Buffers between construction, storage areas and water bodies
- SUDS for construction and operation to treat and control run-off
- Locate site, and design inverters and other infrastructure to reduce risk from flooding. A flood risk assessment may be required
- Retain vegetation around and beneath arrays
- Use driven, screw or floating mounts to minimise soil impacts
- Use natural grazing rather than herbicide spraying to maintain vegetation
- Use permeable access tracks with associated SUDS
- A water quality management plan to ensure water protection measures are monitored and maintained

Refer: Planning advice on SUDS (SEPA, 2010)
Assessing the Impacts of Development Proposals on Groundwater Abstractions and GWDTEs (SEPA, 2014)

6.2.4 SOILS AND PEAT

Solar PV farms may have impacts on peat and carbon rich soils through changes to water flow from panels, trenches, drainage and tracks. Erosion can also occur through loss of vegetation cover during site levelling or maintenance spraying. Careful site selection and maintenance can minimise damage to or even enhance soils.

Peat, Carbon Rich Soil and Erosion

Carbon rich soils and peat should be avoided and impacts addressed in line with LDP Policy EP1A. Solar farms should demonstrate minimal disturbance of peat and all soils from all infrastructure and large solar farms should show how residual impacts will be addressed through vegetation retention, management and restoration.

Prime Agricultural Land[4]

Large solar farms can require a large land area; and will be preferred on sub-prime soils and brownfield land, rather than land in food production. Any proposals on prime agricultural land should address LDP Policy ER5 taking into account cumulative loss in the local area, and any proposed continued agricultural use under arrays or other plans to benefit the soil. A timetable for restoration should be noted in submissions.

Expected Mitigation and Enhancement

- Avoid areas of peatland, prime agricultural land or steep slopes
- Use driven, screw or floating mounts to minimise soil impacts
- Minimise the footprint and impacts of compounds and tracks
- Store stripped soil onsite for post-construction restoration
- Minimise soil and vegetation removal and restore immediately
- Consider continued use of site for food production at design stage
- Use low impact vegetation management such as sheep or poultry

Refer: Peatland Development Guidance (SEPA)
Carbon and Peatland Map (SNH, 2016)

Consultation Question 14
Do you agree with our approach to protecting agricultural land whilst encouraging solar farm development in the right locations? If not, please explain.

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

6.2.5 HISTORIC ENVIRONMENT AND CULTURAL HERITAGE

Solar PV and thermal can have impacts on the fabric and setting of, or views from, heritage interests and impacts on archaeology. Energy efficiency should be addressed before considering installation.

Roof mounted and small ground mounted PV and thermal should be carefully installed, discretely sited, and designed to not detract from the historic character of buildings, settings or views. Solar farms affecting the setting of, or visible (up to 5km) from, Conservation Areas, Gardens and Designed Landscapes, Historic Battlefields and Scheduled Monuments, should demonstrate compliance with LDP Historic Environment Policies and Conservation Area Appraisals.

Installations requiring construction activity should identify archaeological sites and discuss potential archaeological value with the Perth and Kinross Heritage Trust (PKHT) who can also advise on mitigation such as floating foundations. Enhancement opportunities may exist for acceptable proposals such as interpretative signage.

See: Managing Change in Historic Environment: Setting (HES, 2010)
Managing Change: Micro Renewables (HES, 2016)
Conservation Areas Advice (PKC) and Heritage Map (PKC)
Planning Advice Note 2/2011 Planning and Archaeology

Discrete Solar Panels on Council Offices in Perth Conservation Area

6.2.6 RECREATION AND TOURISM

Large solar farms may impact on recreation through land take and disruption to recreation routes, and detract from the recreational experience or tourist viewpoints. Submissions for large solar farm applications should:

- Identify routes, locations of and access to recreational activities
- Address impacts in line with LDP Policy CF2
- Allow reasonable access or alternative routes during construction while ensuring public safety and for large solar farms provide an access management plan
- Address views of and from local tourist landmarks and from principal tourist routes (see Appendix 6) in visual assessments

6.2.7 RESIDENTIAL AMENITY

Construction of solar installations has the potential to impact on amenity through dust and vibration, in addition to the issues covered below.

Glint, Glare and Lighting

Modern PV panels produce minimal refraction, 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

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

6.2.8 AVIATION AND DEFENCE

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 in Appendix 7. Applications proposing solar tracking systems will also require consultation with Ministry of Defence (MOD), Civil Aviation Authority (CAA) and National Air Traffic Services (NATS).

6.2.9 EXTENSIONS AND REPOWERING

Geographical Extensions

Adding additional panels to an existing solar installation may make the best use of the available land resource. Geographical extensions will be treated as new applications taking into account the existing installation and cumulative environment particularly with regard to land 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.

Life Extensions and Repowering

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 life extensions of existing installations, where no further development is required; or repowering – involving development such as larger panels, trenching or cabling - are both encouraged but will require fresh applications. New permissions may include an option for life extension, subject to approval and identified limitations including the availability of prime agricultural land.

Applications which accord with the LDP and this guidance will be encouraged, where submitted well before the permission expires. The existing installation will be a material consideration including environmental or operational issues, and results of monitoring. Applicants are expected to explore shared ownership with communities.

6.2.10 DECOMMISSIONING AND RESTORATION

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 near waterways, a Decommissioning Method Statement (DMS) will need to be agreed with the Planning Authority. A DMS should contain:

- Proposed timing, options, associated impacts and mitigation
- Disposal of panels, and reuse and recycling opportunities
- Restoration and enhancement, particularly of habitat and agricultural land, along with monitoring and aftercare proposals

7 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. Large heat pump installations could provide an energy centre for a heat network.

Air Source Heat Pumps (Air SHP); usually stand-alone units located on the outside of, or near, buildings taking heat from the outside air.

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.

Deep Geothermal is heat pump source reaching up to 4km in depth where temperatures can reach up to 80^{o}C. Perth and Kinross has potential for Deep Geothermal accessing hot water in Hot Sedimentary Aquifers via a closed loop, or directly through an open loop system. A drilling rig and storage tanks may be required during construction.

Water Source Heat Pumps (Water SHP) can consist of a closed loop installed in a water body or an open system which draws in and returns water from a loch or river extracting heat during the process. Closed loop Water SHP can also be used to extract heat from waste water. 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.

Consultation Question 16
Do you agree with the approach we have suggested for heat pump proposals in this section? If not, what could we do differently?

This Guidance and planning requirements relate to following categories:

Air SHP single unit <45kWth	May be covered by permitted development rights (PDR). Restrictions on PDR include location, size, historic interests, use and standards. Planning permission required if PDR does not apply
Small Ground & Water SHP <45kWth	May be covered by PDR for domestic properties Restrictions on PDR include historic interests Underground pipes may be covered by PDR for domestic and non-domestic properties. Restrictions include size, historic interests and ground restoration. Planning permission required if PDR does not apply
Large Ground & Water SHP Geothermal Large Air SHP >45kWth	Planning permission will be required.

Further requirements may include:

- A listed building consent and/or building warrant, and environmental licences
- An EIA Report for geothermal drilling, for installations over 0.5ha or in a sensitive area
- For Water SHP and Deep Geothermal - a water use and/or abstraction licence from SEPA

See:
- Renewables Energy Handbook (CARES, 2013)
- Do I Need Planning Permission for the Installation, Alteration or Replacement of an Air Source Heat Pump? (PKC, 2016)
- Circular 1/2012 Guidance on Householder PDR
- Planning Circular 2/2011 on Non-Domestic Microgeneration
- Environmental good practice guide for ground source heating and cooling (EA, 2011)
- CP2 Surface Water Source Heat Pumps (CIBSE, 2016)
- Fluorinated Greenhouse Gases Regulations 2009
- CAR Licences for Deep Boreholes (SEPA, 2017)

7.1 Locational Guidance

Heat provision should be located close to the end use and connect to heat networks where feasible. Heat exchangers should ideally be powered by renewable sources located close to the heat pump.

Air SHP may be suitable in all locations in association with existing buildings, subject to concerns of visual and residential amenity.

Ground SHP may be suitable in all locations at a depth where temperatures are relatively constant and landscape, soil and natural heritage considerations can be addressed.

Deep Geothermal potential has been identified in the northern part of the Midland Valley (figure 7.1) which is likely to require exploratory work. Brownfield and industrial sites may be best able to accommodate the associated infrastructure.

Water SHP will be acceptable in all lochs and rivers with suitable depth where current will not affect operation and natural heritage and water environment considerations can be addressed.

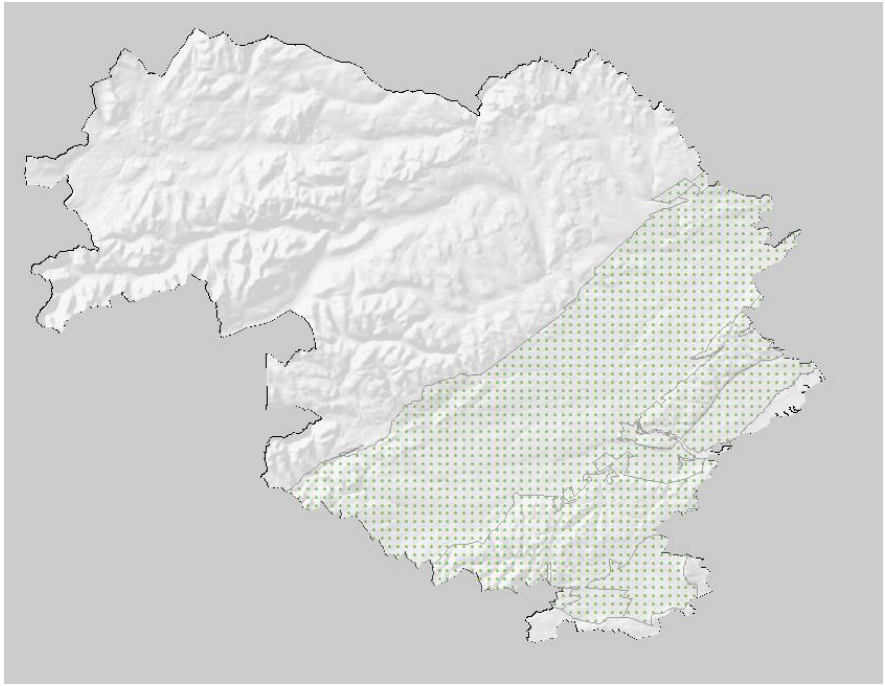

Figure 7.1 Hot Sedimentary Aquifer Potential

7.2 Planning Considerations

The main planning considerations are likely to be:

Air SHP	Visual impacts; historic environment Residential amenity (noise)
Ground SHP **Water SHP**	Visual impacts; operational and construction impacts on natural heritage, historic environment and the water environment
Geothermal	Landscape and visual impacts; impacts on the water environment; residential amenity (noise and vibration); historic environment

All proposals should also address General Considerations as relevant

Pre application enquiries are encouraged to help ensure submissions are proportionate and complete. Please provide as much relevant information as possible, including:

- Design and specifications of pump and heat exchanger
- Proposed location and location of other buildings
- Location and design of any pipework, underground or water engineering required
- Depth, location and method of any borehole drilling
- Location of trees, woodlands and waterways
- Site photos and plans

Submissions should include the information detailed in this guidance, including relevant surveys, assessments and plans (see Appendix 2), along with an EIA Report where required.

Cumulative assessments may be required for:

- Noise and visual impacts of multiple Air SHP in close proximity
- Pumphouse noise and water environment impacts of Water SHP.

Construction best practice should be followed. Where there is potential for impacts on a water body, natural heritage or archaeological designation, or other environmentally sensitive constraint a draft Construction Method Statement (CMS) may be required.

7.2.1 LANDSCAPE AND VISUAL IMPACTS

Landscape and visual impacts can include:

- Little landscape impacts from most heat pumps
- Landscape impacts of pipes and pumphouses for large Water SHP
- Visual impacts from poorly sited Air SHP
- Visual impacts of pumphouses, pipework, trenches, security fencing and lighting associated with large Ground and Water SHP
- Visual impacts of drilling rig and storage tanks for Geothermal

Large proposals should describe the design, siting, colour and materials of all elements and provide site photos and plans. Visualisations may be required if large structures or significant pipework are required, or in landscape or heritage designated areas.

Expected Mitigation and Enhancement

- Locate heat pumps to minimise visibility such as on flat roofs, to the rear of buildings or where they are otherwise screened
- Address the cumulative visual impact of multiple existing or proposed heat pumps
- Locate infrastructure close to existing buildings or structures
- Use cladding, colour and materials to integrate with setting
- Run all pipework underground and restore trenches and construction impacts with appropriate vegetation
- Use landscaping and natural screening where undergrounding is not possible such as close to waterways
- Aim to enhance landscape, biodiversity and recreation while carrying out landscaping and construction

7.2.2 BIODIVERSITY AND NATURAL HERITAGE

Impacts from heat pumps can include:

- Loss or fragmentation of habitats from pipework and cabling work
- Significant impacts on aquatic habitats and wildlife from Water SHP construction, and operation of open systems.
- Changes to water temperature from Water SHP – particularly important for the Tay and other SACs and Loch Leven SPA

Any scheme in designated biodiversity sites (SPAs, SACs, SSSI, NNRs) should identify, avoid and address adverse effects with reference to LDP Policy NE1 and provide details of proposed mitigation, enhancement and monitoring.

Habitat and protected species surveys may include:

- Ground and Air SHP: bats and breeding birds
- Water SHP: amphibians, fish and aquatic invertebrates

Expected Mitigation and Enhancement

- Avoid sensitive habitats and apply buffers to trees and waterways
- Avoid removal and fragmentation of trees and woodland
- Address seasonal requirements in surveys, mitigation and construction (see Appendix 8)
- Carry out timely restoration of trenches with like for like planting
- Aim to enhance biodiversity and natural heritage through restoration
- Site and design to minimise aquatic temperature differences
- Screen intakes and outfalls of open loop Water SHP
- Implement monitoring and maintenance regime for Water SHP
- Implement a Landscape Plan and/or Habitat Management Plan

7.2.3 WATER ENVIRONMENT

Potential impacts to address include:

- Disruption to drainage, Ground Water Dependent Terrestrial Ecosystems (GWDTEs) and private water supplies and abstractions from trenches and boreholes for Ground SHP
- Water quality disruption from Water SHP construction
- Water temperature changes from Water SHP operation particularly in large open loop systems or closed loop in small waterbodies
- Contamination from leak of closed loop Ground or Water SHP
- Contamination from open loop abstraction and return of water
- Contamination of aquifers as a result of borehole drilling

Submissions should:

- Demonstrate construction impacts are avoided or mitigated through a draft CMS for all Deep Geothermal, Water and large Ground SHP
- Comply with SEPA guidelines for Water SHP construction
- Describe construction and monitoring measures to limit potential of leaks from heat transfer fluid
- Identify any groundwater abstractions within 100m of trenches, and assess and identify mitigation
- Describe potential temperature impacts from Water SHP. SNH and/or SEPA may require conditions to limit changes
- Detail protection measures on open loop systems

Expected Mitigation and Enhancement

- Best practice construction including buffers from waterways
- SUDS to control construction run-off and sedimentation
- Minimise vegetation removal and restore immediately
- Ensure all water protection measures are monitored and maintained
- Site and design Water SHP to withstand flooding
- A water quality management plan to ensure water protection measures are monitored and maintained
- Minimise and manage drilling impacts including drilling fluid loss

Refer: Engineering in the Water Environment Guidance (SEPA)
Groundwater Abstractions and GWDTEs (SEPA, 2014)
Abstractions Guidance (SEPA)

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7.2.4 SOILS AND PEAT

Groundworks for Geothermal and Ground SHP installation and trenches for pipework for all large heat pumps should avoid areas of peat and carbon rich soils. Any proposals here should minimise and address impacts in line with LDP Policy EP1A, and propose effective management and restoration. On prime agricultural land[5], trenches or Ground SHP should be at a sufficient depth and fully restored to avoid any long term impacts.

Refer: Peatland Development Guidance (SEPA)
Carbon and Peatland Map (SNH, 2016)

7.2.5 HISTORIC ENVIRONMENT

Heat pumps can be used in the historic environment where the historic building or place can be protected from impacts on building fabric, setting or archaeology and energy efficiency measures have been addressed. Submissions should:

- Ensure heat pumps and equipment are carefully installed, discretely sited, and designed or screened to respect historic character
- Address LDP Historic Environment Policies and Conservation Area Appraisals including impacts on the setting of historic interests
- Demonstrate that ground disturbance and vibration for Geothermal or Ground SHP will not damage historic interests
- Use existing buildings or rooms for plant rooms and ensure thermal storage and pipework does not damage historic fabric
- Identify archaeology value of site where groundworks are required and discuss potential archaeological value with the Perth and Kinross Heritage Trust, who can also advise on mitigation

Refer: Managing Change: Micro Renewables (HES, 2016)
Conservation Areas Advice (PKC)
Heritage Map (PKC)
Planning Advice Note 2/2011 Planning and Archaeology

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

7.2.6 RECREATION AND TOURISM

Submissions for Water SHP should ensure water recreation interests are not adversely affected. Open loop Water SHP may have impacts on biodiversity and the water environment, closed loop systems may present a snagging hazard to water users, and both may have visual impacts. Proposals should:

- Identify important recreational routes and locations
- Engage with user organisations to help identify and address concerns through siting and design

Scottish Canoe Association; Scottish Rafting Association; Tay District Salmon Fisheries Board ; Forth District Salmon Fishery Board and River Forth Fisheries Trust.

7.2.7 RESIDENTIAL AMENITY

Operation and construction of heat pumps have the potential to impact on amenity through dust, odour, vibration and lighting, in addition to the main issues covered below.

Noise

All heat pump technology using heat exchangers will generate some noise 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. Location of pumps away from dwellings and the use of acoustically insulated facility housing can minimise noise impacts.

Vibration

Construction of Geothermal and vertical Ground SHP will involve drilling. Submissions should address impacts on nearby dwellings.

7.2.8 EXTENSIONS AND REPOWERING

Physical extensions or repowering by way upgrading technology 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. Upgrading existing installations is encouraged where this makes the most of the site and enhances, or has no significant adverse impact on, the surrounding environment. The existing installation will be a material and proposals are encouraged to improve upon the existing site as part of the new application.

7.2.9 DECOMMISSIONING AND RESTORATION

Heat pump applications will not normally be time limited. However 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. A DMS should contain:

- Proposed timing, options, associated impacts and mitigation particularly regarding removal of in ground infrastructure, and removal of closed loop Water SHP from waterways
- Reuse and recycling options, and safe disposal of heat pump units
- Assessment of options for removal of closed loop Water SHP from waterways
- Safe removal and disposal of heat transfer fluid
- Restoration and enhancement proposals particularly of riparian habitat for Water SHP

8 WOODY 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; and several small estate and community scale heat networks already exist in Perth & Kinross. Biomass installations range from woodburning stoves and small units housed in existing garages or new outbuildings to large, stand-alone, industrial installations. All proposals should also address General Considerations as relevant

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 construction of new buildings
- a combustion unit(s)
- pipework and flue (s)
- heat storage tank
- facilities for delivering, storing, and/or drying fuel
- hard standing areas, security fencing, lighting

Consultation Question 17
Do you agree with the approach we have suggested for biomass proposals in this section? If not, what could we do differently?

Planning permission will be required where there is external work, subject to exceptions, and will depend on the size of installation:

Microgeneration <45kWth, <50kWe	Planning permission may not be required due to Permitted Development Rights (PDR). PDR is subject to restrictions including Air Quality Management Areas (AQMA), historic interests, flue height and location. PDR may also apply to industrial buildings, and buildings on agricultural or forestry land.
Small biomass 45kWth – 300kWth	Planning permission required for external works including flues and new buildings for equipment and fuel storage.
Medium biomass 300kW – 1MW	Planning permission required as above
Large Biomass >1MW	Planning permission required as above Further requirements may apply as below

Further requirements may include:

- An EIA for large installations or those in sensitive areas
- A listed building consent and/or building warrant, and other environmental licences (see Appendix 3)
- A permit from SEPA for installations over 20MW or using waste wood. SEPA will be consulted on proposals of a scale that would require a permit

See: Biomass Guidance (Carbon Trust)
Renewables Energy Handbook (CARES, 2013)
Circular 1/2012 Guidance on Householder PDR
Planning Circular 2/2011 on Non-Domestic Microgeneration
Do I Need Planning Permission to Install a Flue for a Biomass Heating System? (PKC)
Permitting Guidance for Biomass Combustion (SEPA, 2014)

8.1 Locational Guidance

Micro and small biomass: Best located in existing buildings. Any new buildings including for fuel storage, are best sited in relation to existing buildings, particularly in an agricultural and industrial context. Consider the scale of buildings, fuel transport and air quality considerations.

Medium and large biomass should consider the distance from fuel production, and whether the site supports serves the creation of, or connection to, existing or potential heat networks. Consider a flexible site that allows for increased demand and connection to heat networks.

Biomass fuel delivery to Pitlochry High. Fuel store and boiler housed in existing buildings © PKC

8.2 Planning Considerations

The main planning considerations for medium and large biomass are:

- Residential amenity: air quality and noise
- Landscape and visual impacts of new buildings
- Traffic and transport including the transport of fuel
- Construction impacts on natural heritage and the water environment

Pre application enquiries are encouraged. Please provide as much relevant information as possible, including:

- Size (kW), model and specifications of installation, flue and infrastructure
- Location in relation to other buildings
- Site photos and plans
- Information on buildings for boiler and fuel storage
- Proposed maintenance, fuel source, fuel storage and delivery
- Details of any related external pipework including underground works

Submissions should include the information detailed in this guidance, an EIA Report where required, and relevant surveys, assessments and plans (see Appendix 2)

Cumulative assessments may be required for biomass over 20kW in the Perth or Crieff AQMAs or for large installations in rural areas. The most relevant topics are:

- Air Quality
- Prime Agricultural Land
- Traffic and Transport

Construction best practice should be followed. Where there is potential for impacts on a water body, natural heritage or archaeological designation, or other environmentally sensitive constraint a Construction Method Statement (CMS) may be required.

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APPENDIX

8.2.1 LANDSCAPE AND VISUAL IMPACTS

The landscape and visual impacts of a biomass installation will depend largely on size and the sensitivity of its location along with the amount of new external facilities. Impacts to be addressed may include:

- Inappropriate use of shipping containers and portakabins
- Landscape impacts of large biomass facilities including size and materials of large biomass facilities and infrastructure including concrete hardstandings and tracks
- Visual impacts of pipework, storage tanks, fencing and lighting

Landscape and Visual Impact Assessments (LVIA)

Submissions should address the design, colour, material and visibility of all new or altered infrastructure elements

- All submissions should include site photos and plans
- Visualisations, proportionate to the installation scale, may be required for new medium and large biomass infrastructure in areas designated for landscape, wild land or historic values; or close to sensitive receptors such as roads, dwellings and affecting tourist routes
- Submissions for large biomass proposals in sensitive areas may also need an LVIA

The Planning Authority will help to identify the extent of the LVIA, viewpoints, receptors, and the zone of theoretical visibility (ZTV).

Refer: Guidelines for Landscape and Visual Impact Assessment (3rd ed) (The Landscape Institute, 2015)

Landscape Designations and Wild Land

Biomass proposals in National Scenic Areas, Special Landscape Areas and where visible from National Parks, may be appropriate where associated with agricultural buildings of similar scale or well screened. However in Wild Land Areas large biomass may introduce an unacceptable human influence on the landscape. Submissions should address the special qualities of these areas.

Refer: The Special Qualities of the National Scenic Areas (SNH, 2010)
Landscape Supplementary Guidance (PKC, 2015)
Assessing Impacts on Wild Land (SNH, 2017)

Expected Mitigation and Enhancement

- Design facilities as long term features appropriate to the setting
- Relate new facilities by scale, character and materials with existing buildings and character of the neighbourhood
- Use micro biomass in shipping containers and portakabins as temporary solutions only and in appropriate areas
- Use existing buildings or site new facilities close to existing buildings where possible
- Work with existing topography when siting to minimise visual impacts
- Use cladding, screening and colour to minimise impact
- Use landscaping to reduce impacts and aim to provide enhancement to habitats, green infrastructure and recreation
- Identify and commit to timely post-construction restoration
- A habitat management plan and/or landscape plan may be required

8.2.2 BIODIVERSITY AND NATURAL HERITAGE

The most likely potential impacts to address include:

- Ongoing impacts on habitats from tracks, fuel source and delivery
- Impacts on birds and bats from flue installation.
- Loss and fragmentation of commuting, roosting, breeding and foraging habitat from both the site and energy crop planting
- Displacement of species including breeding birds from the site
- Disruption to commuting and navigation from lighting and fencing

Designated Sites

Small and medium biomass consistent with LDP Policy NE1 may be appropriate in designated biodiversity sites (SPAs, SACs, SSSI, NNRs). Large biomass construction is unlikely to be appropriate and these proposals should also identify and address impacts on ecologically connected or nearby designated sites.

Habitats and Species

Submissions should address impacts of both the site and energy crops on habitats and species in line with LDP Policy NE3. Survey and mitigation requirements will depend largely on the site location and infrastructure requirements.

Woodland, Forestry and Green Infrastructure

Construction for biomass installations and energy crops should avoid and mitigate impacts on, and enhance, woodlands and green infrastructure in line with Policies NE2 and NE4 and guidance.

Sustainable fuel use is encouraged. This can 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.

Mitigation and Enhancement

- Use best practice construction including buffers and exclusion
- Locate away from sensitive habitats and consider biodiversity requirements in energy crop planning
- Use buffers to protect habitats, trees and waterways
- Carry out timely restoration, screening and compensation planting
- Aim to enhance biodiversity, amenity, recreation and flood control
- Implement landscape, habitat management and/or site biodiversity action plans for mitigation, restoration and enhancement

Refer: Biomass Suppliers List
Guidance on Development on Forested Land (SEPA)
Policy on Control of Woodland Removal (FCS, 2009)
Forest Plan Guidance (Forestry Commission Scotland)
Renewables Obligation: Sustainability Criteria (Ofgem, 2016)
Woodfuel Advice Note (Ofgem, 2014)
Forest and Woodland Strategy (PKC)

Consultation Question 18
Should local fuel supplies (e.g. from within a defined distance of the biomass installation) be preferred?

8.2.3 WATER ENVIRONMENT

New facilities and hard standings for large biomass may have adverse impacts from construction and surface runoff along with acidification and sedimentation from energy crops. Installations should avoid areas of high flood risk, and avoid impacts on waterways, public and private water supplies, and wetlands.

Expected Mitigation and Enhancement

- Best practice construction including buffers to protect waterways
- Avoid impacts on natural flood management
- Use of SUDS during construction and operation to control run-off
- Minimise impermeable surfaces including hardstanding areas
- Minimise vegetation removal and restore immediately
- A water quality management plan, and/or a flood risk and drainage impact assessment may be required

Refer: Water Guidance (SEPA)

8.2.4 SOILS AND PEAT

New large biomass installations, and all trenches for pipework, should avoid areas of peat and carbon rich soils. Any proposals here should minimise and address impacts in line with LDP Policy EP1A and SEPA guidelines and propose effective management and restoration. On Prime Agricultural Land[3], 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.

Applicants proposing short term coppice or energy crops are expected to identify and avoid peat and carbon rich soils in management plans, use sub-prime land and address any impacts on prime agricultural land and food production.

Ash residue should be used as fertiliser, ideally returned to the source crop, subject to SEPA approval.

Refer: Peatland Development Guidance (SEPA)
Carbon and Peatland Map (SNH, 2016)

8.2.5 HISTORIC ENVIRONMENT

Once energy efficiency measures are addressed, biomass of a suitable scale and design can be used in the historic environment where impacts on setting or building fabric can be addressed:

- Integrate micro and small biomass into existing buildings
- Respect the character and setting of historic interests in design
- Site flues and storage areas discretely and using existing outbuildings and chimneys
- Consider the impacts of fuel deliveries on historic interests
- Site and design proposals in line with LDP Historic Environment Policies, including the settings of Listed Buildings, Conservation Areas, Gardens and Designed Landscapes, Historic Battlefields and Scheduled Monuments identified on the PKC Heritage Map
- Identify archaeology and discuss value and mitigation with Perth and Kinross Heritage Trust

Refer: Managing Change in Historic Environment: Setting (HES, 2010)
Managing Change: Micro Renewables (HES, 2016)
Planning Advice Note 2/2011 Planning and Archaeology

8.2.6 RESIDENTIAL AMENITY

Operation and construction of all woody biomass can impact on amenity through lighting and vibration, in addition to the issues below.

Noise

Submissions should demonstrate that nearby dwellings are not adversely affected by noise from construction, internal mechanisms, plant operations and fuel deliveries. The Environmental Health team can advise on the relevant noise limits for the location and Noise Impact Assessment (NIA) requirements. Expected mitigation includes acoustically enclosing buildings and equipment, considerate timing of deliveries, and carrying out operations off-site or in closed buildings.

Air Quality and Odour

All biomass installations including microgeneration not covered by PDR, 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. Provide details of:

- boiler size (kW)
- height and diameter of stack (m)
- dimensions of buildings within 5 times the stack height including the boiler building
- maximum emission rates of NO_2 and PM_{10} (g/s)

AQAs should take into account cumulative effects and the replaced heat source. SEPA regulates the burning of fuels and will be consulted where of a scale that a permit may be required. Mitigation of air quality effects include:

- When siting take into account neighbouring properties, relative heights, window locations, topography and dispersion effects
- Technical abatement measures possible for larger boilers
- Use the right fuel at the right moisture content – for all sizes of biomass
- Store fuel per manufacturer's recommendations for air quality and safety

Dust

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

See: Permitting Guidance for Biomass Combustion (SEPA, 2012)
Air Quality Guidance (PKC)

8.2.7 AVIATION

All tall structures, including construction cranes, 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. Any proposed technical mitigation measures will need to be agreed by the relevant authorities.

See: Safeguarding Airfields SG (PKC, 2012)
Aviation and Defence Safeguarding Map

8.2.8 EXTENSIONS AND REPOWERING

Any material alteration to biomass installations, including upgrading boiler capacity will require a fresh planning application, particularly with regard to residential amenity. Upgrading existing installations is encouraged where this makes the most of the site and enhances, or has no significant adverse impact on, the surrounding environment. The existing installation will be a material consideration in the assessment of the application.

8.2.9 DECOMMISSIONING AND RESTORATION

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.

9 ANAEROBIC DIGESTION

Anaerobic digestion (AD) produces **biogas** from waste including agriculture slurry, poultry litter, crop, food and garden waste, distillery waste or energy crops. The biogas can then provide electricity and heat, be injected into the gas grid or be processed into transport fuel. AD helps to reduce greenhouse gas emissions from both waste and energy production while reducing inputs to landfill, and controlling pathogens and odours. The residual digestate can also be used as fertiliser. All proposals should also address General Considerations as relevant.

AD installations may consist of:

- Self-contained micro AD in portakabins or shipping containers
- New or existing buildings for storage of feedstock and digestate
- New buildings for the AD plant(s)
- New or existing building for the boiler or CHP unit
- Pipework
- Flue and flare stack
- Hardstanding and access roads or tracks
- Potential electricity connection

Consultation Question 19
Do you agree with the approach we have suggested for anaerobic digestion proposals in this section? If not, what could we do differently?

Planning permission will be required where there is external work, subject to exceptions, and will depend on the size of installation:

Micro AD <45kWth, <50kWe	Planning permission is required except where new or altered buildings and flues on agricultural or forestry land are covered by Permitted Development Rights (PDR) outwith historic interests. PDR is subject to restrictions including Air Quality Management Areas (AQMAs), size and location, and is subject to prior notification and approval.
Large AD >45kWth, >50kWe	Planning permission required for new buildings and associated infrastructure including flues and pipework.

Further requirements may include:

- An EIA for large AD in sensitive areas
- A licence from SEPA relating to waste management and the water environment
- A listed building consent and/or building warrant, and other environmental licences. See Appendix 3

See: Prior Notification Submission Checklist (PKC, 2016)
Licensing of Anaerobic Digestion Plants (SEPA, 2017)
PPC Technical Guidance Note 38: Anaerobic Digestion (SEPA, 2015)
Planning Circular 2/2011 on Non-Domestic Microgeneration

9.1 AD Locational Guidance

AD plants locations should ideally:

- Be located close to waste streams to minimise transport issues
- Allow for the creation of, or connection to, existing or potential heat networks
- Avoid sensitive habitats, landscapes and visual receptors
- Be located on or near farms, industrial estates, food processing and waste water treatment facilities
- Be a minimum of 250m away from dwellings or other sensitive receptors unless impacts can be mitigated to acceptable levels

9.2 AD Planning Considerations

The main planning considerations are likely to be:

- Visual impacts
- Impacts on sensitive habitats, soils and the water environment from construction and potential operational hazards
- Residential amenity: odours and emissions
- Impacts from the transport of feedstock and digestate

Pre-application enquires are encouraged. Please provide as much relevant information as possible, including:

- Size and specifications of plant, generator, flue and infrastructure
- A location plan including access points and the nearest dwellings
- A site plan including plant site, and supporting infrastructure including access tracks, pipework, feedstock storage, gas and thermal storage, flue and flare stack where relevant
- Site photos
- Feedstock to be used, source, and proposed treatment processes
- Location of proposed grid connections or users of heat/electricity.
- Description of any ancillary works required

Submissions should include the information detailed in this guidance, an EIA Report where required, and relevant surveys, assessments and plans (see Appendix 2)

Cumulative assessments may be required for:

- Landscape and Visual Impacts
- Residential Amenity
- Prime Agricultural Land
- Traffic and Transport

Construction best practice should be followed. Where there is potential for impacts on a water body, natural heritage or archaeological designation, or other environmentally sensitive constraint a Construction Method Statement (CMS) may be required.

9.2.1 LANDSCAPE AND VISUAL IMPACTS

Appropriately sited and designed micro AD in built or industrial settings, and large AD in agricultural settings may have limited landscape impacts. Most AD proposals have potential for adverse visual impacts. Submissions should address:

- Appropriateness of self-contained micro AD size, materials colour and design in its setting
- Visual impacts of flues and flares for all applications
- Landscape impacts of large AD buildings, units, fencing, lighting, pipework, concrete hard standings and construction compounds

Landscape and Visual Impact Assessments (LVIA)

Submissions should address the scale, design, colour, material and visibility of all new infrastructure and how it relates to its setting.

- All submissions should include site photos and plans
- Visualisations may be required for micro AD located in urban areas, landscape designations or close to recreation or tourist routes
- For large AD visualisations will be required and an LVIA may be required

The Planning Authority will help to identify the extent of the LVIA, viewpoints, receptors, and the zone of theoretical visibility (ZTV).

Refer: Guidelines for Landscape and Visual Impact Assessment (3rd ed) (The Landscape Institute, 2015)

Landscape Designations and Wild Land

AD proposals in National Scenic Areas, Special Landscape Areas, and those visible from National Parks, may be appropriate if associated by scale and design with existing agricultural buildings. Large biomass may introduce an unacceptable human influence on Wild Land Areas. Submissions should address the special qualities of these areas.

Refer: The Special Qualities of the National Scenic Areas (SNH, 2010)
Landscape Supplementary Guidance (PKC, 2015)
Assessing Impacts on Wild Land (SNH, 2017)

Expected Mitigation and Enhancement

- Locate in agricultural or industrial landscapes
- Work with topography and vegetation to minimise visual impacts
- Avoid compromising tourist, recreational, or historic views
- Design and site new structures to respect the scale of the landscape
- Consider screening, cladding and siting of micro AD
- Use existing buildings where possible for micro AD
- Minimise adverse visual impacts of infrastructure through use of siting, colours, materials, landscaping and screening
- Locate cables and grid connections underground
- Shield flare stacks where possible
- Identify appropriate and timely post-construction restoration
- A habitat management plan and/or landscape plan

9.2.2 BIODIVERSITY AND NATURAL HERITAGE

AD proposals in agricultural or industrial settings may have limited impacts but there is potential for adverse impacts on:

- Loss of woodland or sensitive habitats
- contamination of habitats and waterways
- Loss and fragmentation of roosting, breeding and foraging habitat
- Displacement of species including breeding birds from the site
- Disruption to commuting and navigation from lighting and fencing

Designated Sites

In designated biodiversity sites (SPAs, SACs, SSSI, NNRs) self-contained micro AD may be suitable but large AD is unlikely to be appropriate particularly due to potential contamination issues. Submissions for Large AD applications should identify and address impacts on nearby or ecologically connected designated sites.

Species and Habitats

Submissions should address impacts on habitats and species in line with LDP Policy NE3. Survey and mitigation requirements will depend largely on the site location and infrastructure requirements.

Due to potential impacts on biodiversity and natural heritage, sustainable feedstock use is encouraged and can be demonstrated by reference to Ofgem's land sustainability criteria.

Expected Mitigation and Enhancement

- Use buffers between site and trees, waterways and sensitive habitats
- Avoid loss or fragmentation of habitat, trees and woodland
- Carry out timely habitat restoration, screening and compensation
- Aim to enhance biodiversity, amenity, recreation and flood control
- Use best practice construction including buffers and exclusion
- A Landscape Plan and/or Habitat Management Plan for mitigation, restoration and enhancement

See: Feed-in Tariffs: Draft guidance on sustainability criteria and feedstock restriction (Ofgem, 2017)

9.2.3 THE WATER ENVIRONMENT

AD operation, storage of fuel and construction has potential to contaminate waterways, groundwater, and private supplies. Impacts to address include:

- Spillage or leakage from treatment facilities or delivery of waste
- Increased runoff from new buildings and hardstandings
- Impacts on water supplies and Ground Water Dependent Terrestrial Ecosystems (GWDTEs) from excavations

All submissions should:

- detail measures for containing and management potential contamination
- Identify and address impacts on water supplies and GWDTEs in line with SEPA guidance
- Detail any water requirements and source. This should be sustainable, and any abstraction will require a SEPA licence
- Identify flood risk and drainage measures

Expected Mitigation

- Best practice construction including buffers from waterways
- SUDS to control run-off from construction and installed buildings
- Use bunds for all tanks containing potentially harmful liquids
- Use excavated material for bunding
- Locate away from areas of flood risk
- A water management plan, and flood risk and drainage impact assessments may be required

Refer: Assessing Impacts of Development Proposals on GWDTEs (SEPA, 2014)
SEPA Guidance on Abstractions
Flood Risk and Flood Risk Assessments (PKC, 2014)

9.2.4 SOILS AND PEAT

AD installations, hardstandings and trenches for pipework, should avoid impacts on peat and carbon rich soils. Any proposals here should minimise and address impacts in line with LDP Policy EP1A and SEPA guidelines and propose effective management and restoration.

On prime agricultural land[6], AD with a minimal footprint may be appropriate where necessary for the continued agricultural use of the land and no other land is available. Soil should be protected from contamination by bunding, preferably using soil removed during construction. The use of digestate as fertiliser is encouraged, subject to SEPA standards.

Refer: Peatland Development Guidance (SEPA)
Food Waste Management in Scotland (SEPA, 2017)
Regulation of Outputs from AD Processes (SEPA, 2017)
Carbon and Peatland Map (SNH, 2016)

9.2.5 HISTORIC ENVIRONMENT

AD may have visual impacts on heritage interests, or impacts on archaeology through construction. All proposals affecting the setting of, or views from, Listed Buildings, Conservation Areas, Gardens and Designed Landscapes, Historic Battlefields and Scheduled Monuments will need to carefully consider the impacts on the historic character in line with LDP Historic Environment Policies.

Known archaeological sites should be identified and potential archaeological value discussed with the Perth and Kinross Heritage Trust, who can also advise on mitigation.

Refer: Managing Change in Historic Environment: Setting (HES, 2010)
PKC Advice on Conservation Areas
PKC Heritage Map
Planning Advice Note 2/2011 Planning and Archaeology

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

9.2.6 RESIDENTIAL AMENITY

Noise

Submissions should demonstrate that nearby dwellings are not adversely affected by noise from the 24/7 operation of CHP, flare stack, and vehicle movements. 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.

Air Quality and Odour

CHP combustion, and the composition of gases produced, can impact on air quality. All proposals are likely to require an Air Quality Assessment and should demonstrate exhaust emissions and flare operations adhere to SEPA Waste Guidance.

AD operation, storage and transport, can also cause odour issues, 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.

Lighting

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

Dust

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

Pests

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

9.2.7 AVIATION

All tall structures, including construction cranes, and flues, can present a hazard to air navigation. AD may also attract birds which may present a hazard to aircraft. Consultation is required for applications within the safeguarding zone of Perth, Fife and Dundee airports, or any Perth and Kinross airfield. The CAA should also be consulted where an installation will involve flaring of biogas. Any technical mitigation will need to be agreed by the relevant authorities.

See: Safeguarding Airfields SG (PKC, 2012)
Aviation and Defence Safeguarding Map

9.2.8 EXTENSIONS AND REPOWERING

Physical extensions or upgrading of technology (repowering) are likely to require a fresh application for planning permission, including where this involves engineering works, such as new AD tanks, or a material change to the specification of equipment. Upgrading existing installations is encouraged where this makes the most of the site and maximises sustainable waste disposal, and enhances, or has no significant adverse impact on, the surrounding environment. The environmental impact of the existing installation will be a material consideration.

9.2.9 DECOMMISSIONING AND RESTORATION

AD 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. DMS should contain:

- Proposed options and associated impacts and mitigation particularly regarding removal of waste
- Measures to prevent contamination of waterways and soil

10 WASTE SOURCES

10.1 Landfill Gas

Utilising the gas produced by organic matter in landfill to provide heat and power promotes the efficient use of a source which would otherwise go to waste or pose a health risk. By converting methane and other gases into CO_2, the greenhouse gas impact is reduced and health and environmental risks controlled. A landfill gas operation already operates at Binn Farm and, as gas mitigation will be required from any new landfill operation, production of energy during that process can provide additional benefits.

Despite being associated with landfill sites, a landfill gas energy installation may still have adverse impacts due to a site edge location closer to trees, habitats and other buildings. SEPA should be involved at an early stage to inform the design and location. Applicants are also encouraged to discuss planning considerations with the planning team early in the process including:

- Landscape impacts including cumulative landscape impacts of other industrial features including wind turbines, electricity pylons and grid infrastructure requirements of the current proposal
- Visual impacts from extraction and generation plant, air safety lighting, pipework, flue and flare stack, fencing and security lighting.
- Measures to protect the water environment
- Air quality and monitoring
- Noise and odour impacts
- Aviation and defence in relation to high structures and gas flaring
- Decommissioning and decontamination

All proposals should also address General Considerations as relevant.

10.2 Waste Heat

Large industrial processes can produce surplus heat that can be capture for distribution to other users through heat networks. By replacing fossil fuel heating from heat that would otherwise lost, waste heat is considered a low carbon source of heat. Waste heat can potentially be used for:

- Reuse on the same site
- Use “over the fence” by other industry users
- Supporting CHP
- Delivery to the boundary of the facility to support heat networks

A large number of factors influence the viability of the use of waste heat including the type of gases, variability of flow, technical and commercial considerations and the existence or potential of heat users, networks or grid connections. Applicants are encouraged to discuss requirements with the Planning Authority early in the process.

Planning considerations of any external plant required for waste heat use will depend on the existing nature of the site but are likely to include:

- Visual impacts of tanks, pumps, pipework
- Residential amenity including noise
- Contribution to low carbon targets

All proposals should also address General Considerations as relevant.

10.3 Energy From Waste (EfW)

Energy can be produced from waste either by anaerobic digestion of organic matter (see 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. 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.

Combustion incinerates waste directly producing heat and ash waste.
Pyrolysis uses an anaerobic thermal treatment to produce gas and a waste solid residue (char).
Gasification involves heating organic material to high temperature to produce a gas which can then be used for heat or electricity production and ash.

Facilities should be located close to waste streams and heat demand. The Council can help identify demand opportunities and the Council's Environment Service can help identify and co-ordinate potential waste streams. Facilities should be located to not adversely impact on landscape, ecological, geological or historical designations.

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 is regulated by SEPA, an EfW permit and other regulatory requirements are likely to apply 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. These include:

- Landscape and Visual impacts of the plant and chimney or flue including cumulative impacts of other industrial features including wind turbines, electricity pylons and grid infrastructure requirements of the current proposal
- The source of materials over the expected life of the project
- Impacts on natural heritage from construction and contamination
- Potential pollution of the water environment
- Odour and dust control
- Air pollution control and disposal of associated residues
- Noise from 24/7 operation, vehicle movement and construction
- Visual amenity including chimney, any flare stack and lighting
- Pest control
- Aviation and defence in relation to high structures
- Construction and waste delivery transport impacts
- Decommissioning and decontamination

All proposals should also address General Considerations as relevant

See: Energy from Waste Guidance (SEPA)

Consultation Question 20
Do you agree with the approach we have suggested for landfill gas, waste heat and energy from waste proposals? If not, what could we do differently?

Consultation Question 21
Do you think the Guidance covers all the relevant issues and relevant technologies appropriately? Any further comments?

11 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.

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

Historic Interests (PDR) These vary between technologies. Scottish Government guidance 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.

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

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

Appendix 2: Assessments and Surveys

The following assessments, surveys and plans may be required depending on the size of the installation and the receiving environment. See individual topics for more information

General Application
Planning Processing Agreement
Prior Notification

Net Economic Benefit
Social and Economic Impact Assessment

Traffic and Transport
Construction Traffic Management Plan
Transport Assessment

Construction Impacts
Construction Environmental Management Plan (draft)
Construction Method Statement (draft)

Communities
Pre-application Consultation Report

Renewables Targets and GHG Emissions
Carbon Calculator

Electricity Connections

Landscape and Visual Impacts
Design Statement
Visualisations
Landscape and Visual Impact Analysis (and Cumulative LVIA)
Landscape Management Strategy
Wild Land Assessment

Biodiversity and Natural Heritage
Ecological Impact Assessment (EcIA)
EIA Report (EIA)
Appropriate Assessment (Habitat Regulations Appraisal)
Phase 1 Habitat Survey
Detailed Habitat Survey (NVC)
Tree Survey
Protected Species Surveys
Site Biodiversity Action Plan
Habitat Management Plan
Construction Environment Management Plan
Aftercare Monitoring Plan

The Water Environment
Flood Risk Assessment
Drainage Impact Assessment
Construction Method Statement
Private Water Action Plan

Soils and Peat
Agricultural Land Assessment
Peat Management Plan
Peatland Restoration Plan

Historic Environment
Archaeological Survey / Archaeological Study
Heritage Impact Assessment

Recreation and Tourism
Access Management Plan
Tourism Impact Assessment

Residential Amenity
Shadow Flicker Assessment
Glint and Glare Assessment
Noise Impact Assessment
Air Quality Assessment
Odour Management Plan
Vibration Assessment
Dust Assessment

Aviation, Broadcasting and Telecommunications
TV and Radio Reception Mitigation Plan

Extensions and Repowering Decommissioning
Decommissioning and Restoration Plan
Decommissioning Method Statement

Appendix 3: Environmental Assessments and Licences

Natura 2000 Sites
Due to their rural nature renewable energy proposals may affect Special Protection Areas (SPAs) and Special Areas of Conservation (SACs). An Appropriate Assessment of activities affecting these areas may be required. LDP Policy NE1 describes more information on requirements.
See: SNH Guidance on Protected Areas

Sites of Special Scientific Interest (SSSIs)
Consent may be required from SNH to carry out operations within a Site of Special Scientific Interest (SSSI).
See: SNH Guidance on SSSI Management

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
See: SNH Guidance on Protected Species

Forestry Commission Scotland
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. Felling or planting may require a separate environmental impact assessment.
See: 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.
See: SEPA Guidance on Pollution Prevention and Control

Proposals which produce or utilise **waste**, including biomass, anaerobic digestion and Energy from Waste, may require a permit from SEPA under the Waste Management Licensing (Scotland) Regulations 2011.
See: 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 (“CAR”). This includes 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.

Appendix 4: 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:

1. 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 and 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?

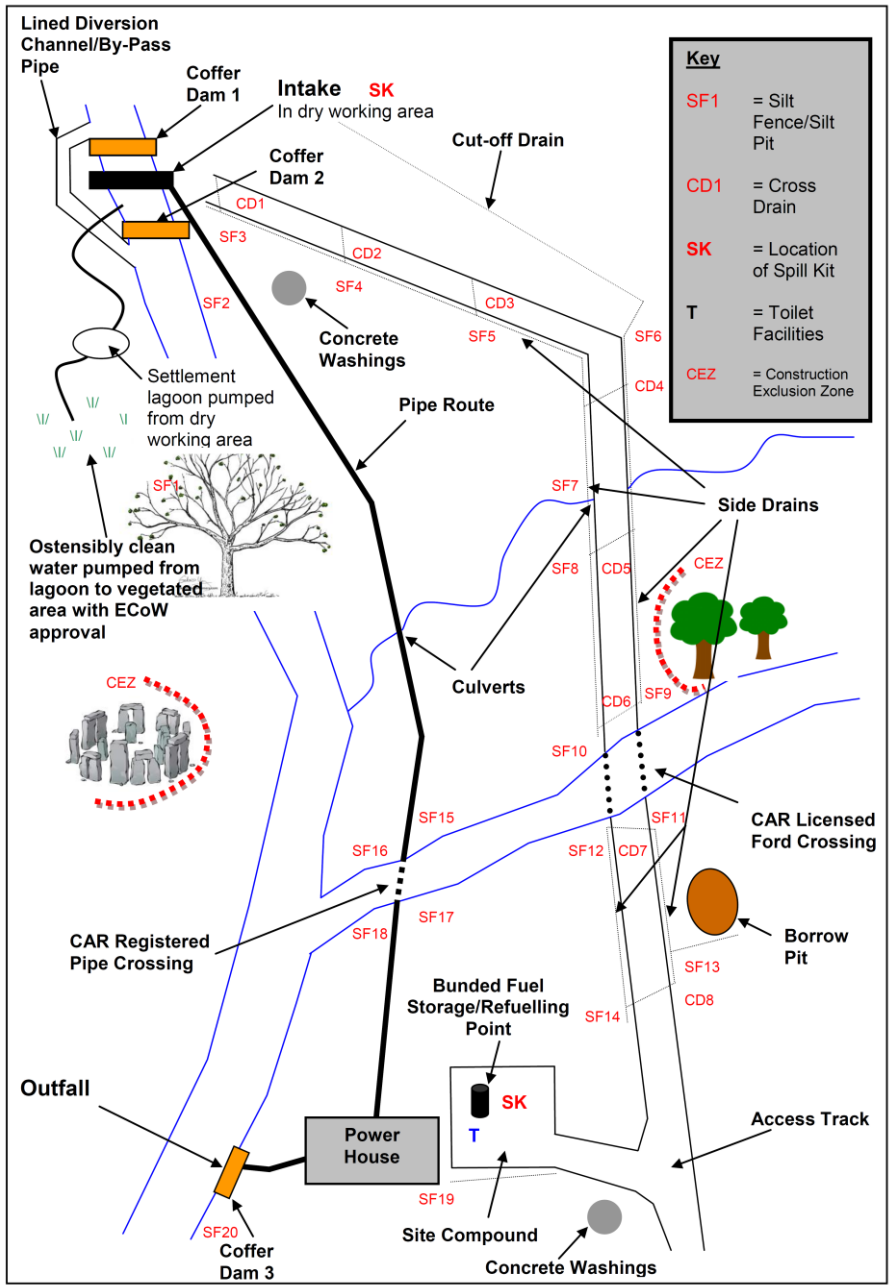
CMS Template

A CMS template has been devised, 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 and 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.

Example Site Plan



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Construction Traffic Management Plan (CTMP)

CTMPs will be required by condition. The information required will be advised by the Council Roads Department and 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 roads 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;

(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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Appendix 5: Highland Boundary Fault and Iconic Viewpoints

Nb: Sensitive Visual Compartment around iconic viewpoints will depend largely upon the size and extent of the proposed installation.

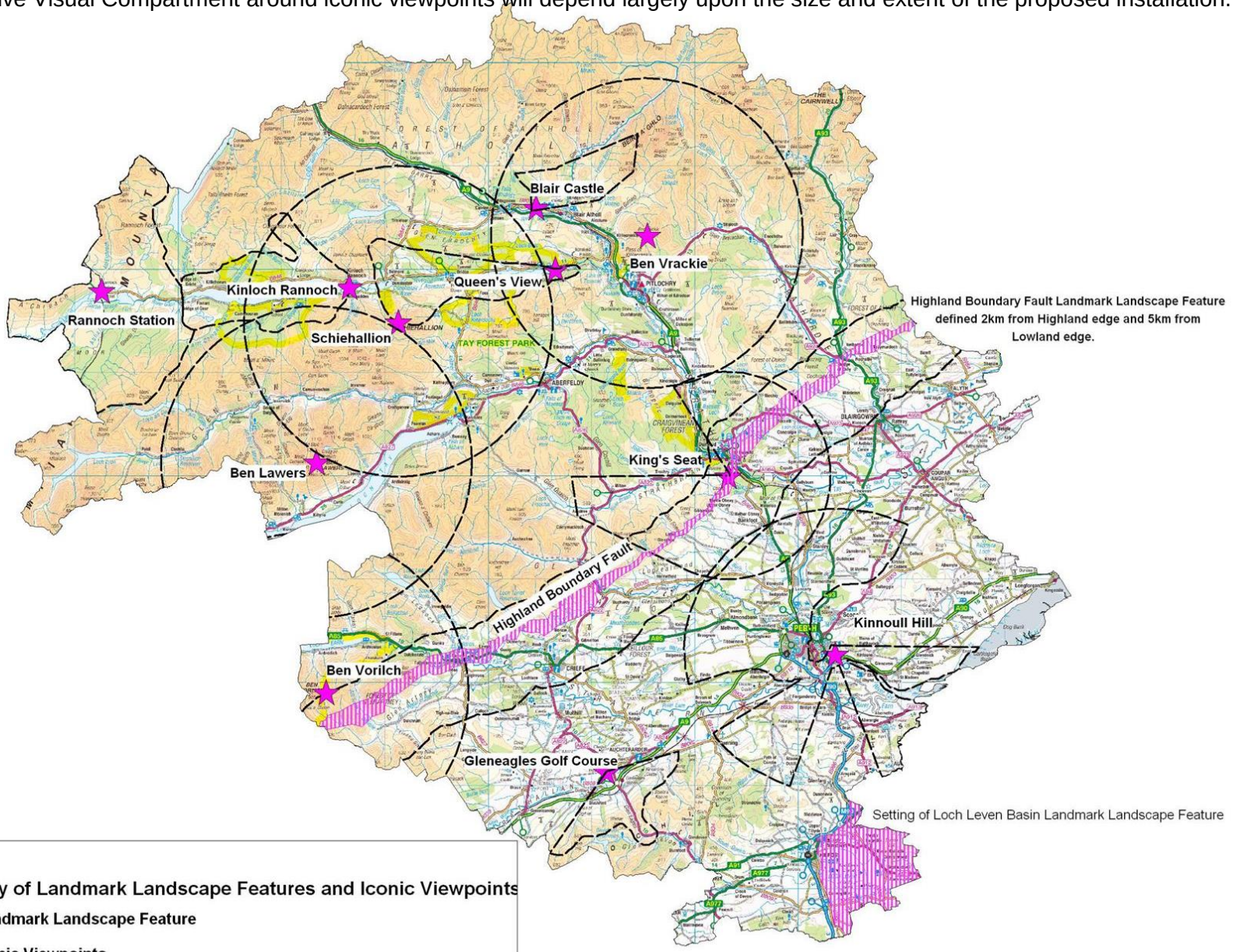

Figure 4.
Sensitivity of Landmark Landscape Features and Iconic Viewpoints

- Landmark Landscape Feature
- Iconic Viewpoints
- Sensitive Visual Compartment

NOT TO RECOGNISED SCALE

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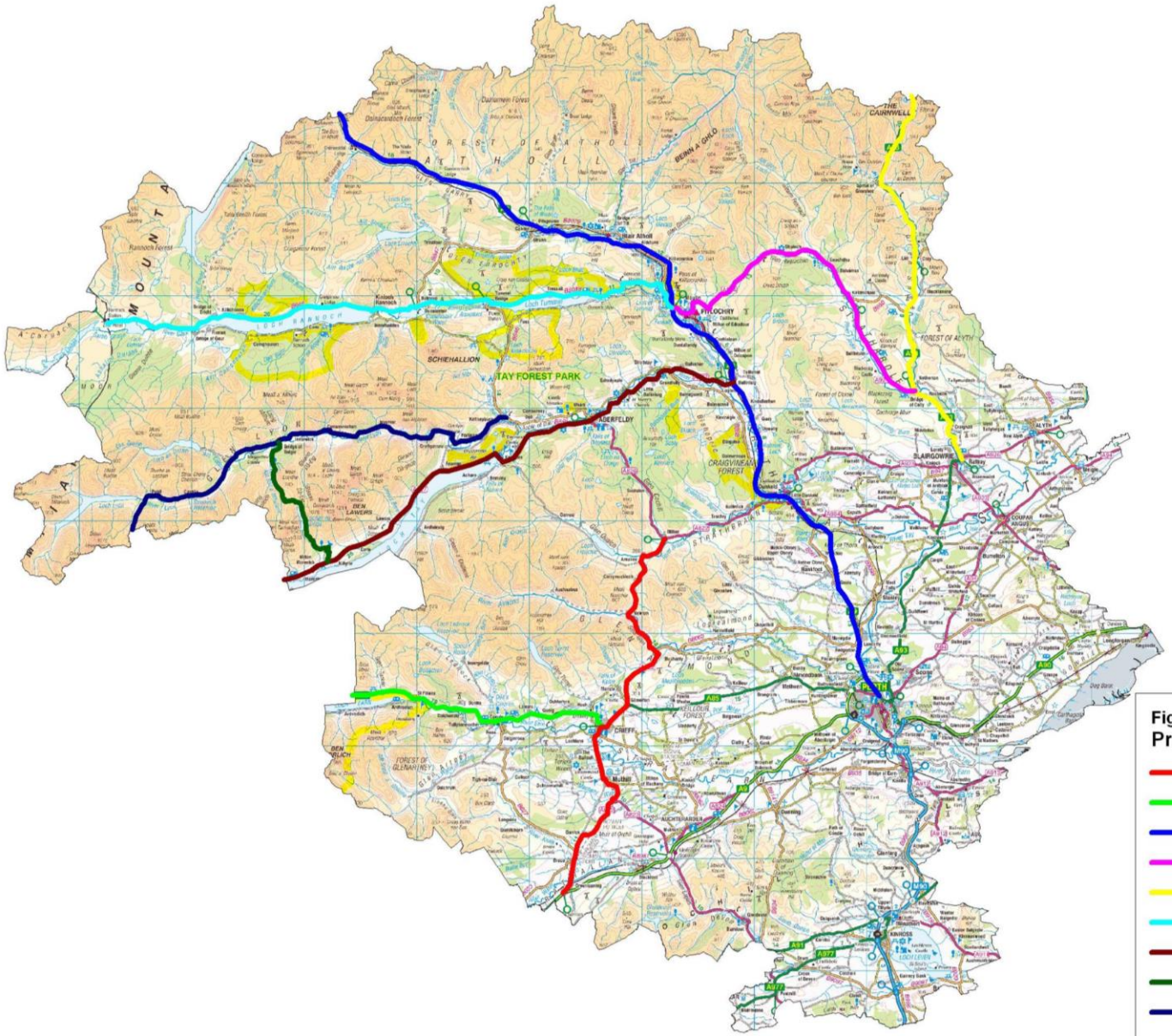
Appendix 6: Principal Tourist and Amenity Routes



DTA (2010) Landscape Study to Inform Planning for Wind Energy

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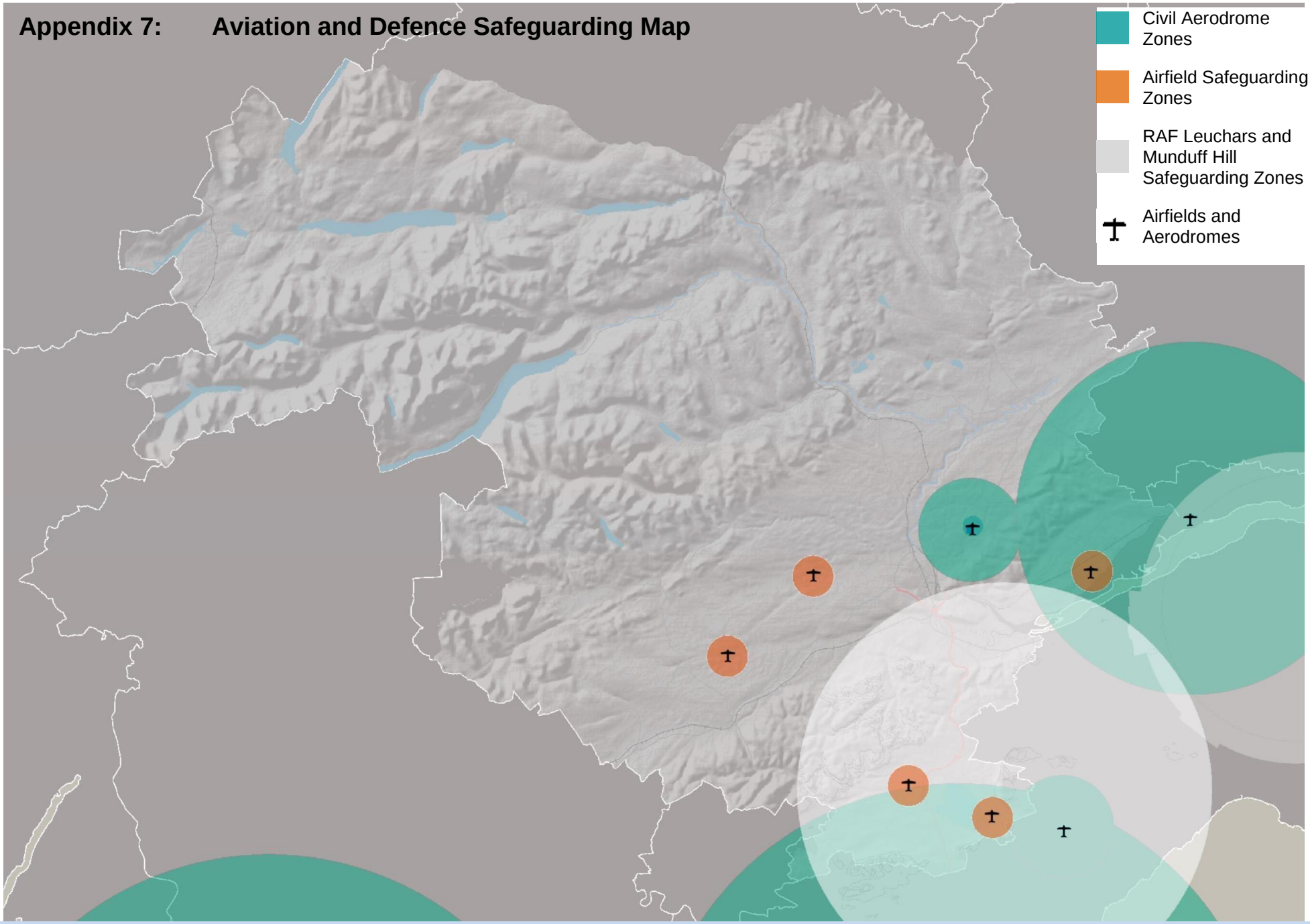
Appendix 7: Aviation and Defence Safeguarding Map



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Appendix 8: Biodiversity Survey and Mitigation Calendars

Survey Calendar:

Recommended period for survey	Sub-optimal period for survey	Surveys not possible

Target	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Habitat and Vegetation	Phase 1 only			Phase 1 and NVC Detailed habitat assessment surveys				Phase 1 only (least suitable time) No other detailed plant surveys				
	Mosses and Lichens No other detailed plant surveys			Mosses and Lichens		No surveys for mosses and Lichens		Mosses and Lichens				
Badgers	Limited Sett/bait surveys		Bait marking and sett surveys		Limited bait marking and sett surveys			Sett surveys				Limited Sett/bait surveys
Bats	Inspection of hibernation roosts (difficult)			Limited activity		Summer roost emergence surveys and activity surveys (internal inspection of roof spaces possible throughout April – October)			Limited activity		Inspection of hibernation roosts (difficult)	
Birds	Winter species		Breeding birds/ migrant species		Breeding birds		Low activity	Migrant species			Winter species	
Great Crested Newts	Newts hibernating			Pond surveys for adults / terrestrial survey Egg surveys April – mid June Larvae surveys from mid May				Habitat survey		Newts hibernating		
Reptiles	Reptiles hibernating			Peak survey months April and May		Reduced basking time lowers effectiveness of refugia surveys		Peak survey month	Limited activity	Reptiles hibernating		
Red Squirrel	Optimum time			Breeding den surveys		Optimum time		Surveys possible, weather dependent				
Otters	Limited by vegetation cover and weather conditions rather than seasons											
Water Voles	Low activity		Initial habitat survey	Habitat and field signs/ activity surveys. May be limited by vegetation cover and weather					Initial habitat survey		Low activity	
Fish	For coastal, river and stream-dwelling species, the timing of surveys will depend on the migration pattern of the species concerned. Where surveys require information on breeding, the survey timings will need to coincide with the breeding period which may be summer or winter months depending on the species.											

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Mitigation Calendar:

Recommended period for mitigation	Sub-optimal period for mitigation	Mitigation not possible

Target	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Habitat and Vegetation	Planting and translocation				No mitigation for most species					Planting and translocation		
Badgers	Construction of artificial setts only (No disturbance of existing setts)							Exclusion from setts and destruction				Construction of artificial setts only as January
Bats	Maternity roost work until mid May					No maternity roost works				Maternity roost work from mid-September		
	Hibernation period			Hibernation roost works from mid-March								Hibernation period
Birds	Clearance works			Nesting season (Avoid ALL clearance works without a breeding bird survey)					Clearance works			
Great Crested Newts	Pond management only			Both terrestrial and aquatic trapping possible			Terrestrial trapping only				Pond management only	
Reptiles	Scrub clearance			Capture and translocation programmes and scrub clearance			Weather dependent, but likely to be sub-optimal due to temperatures	Capture and translocation		Scrub clearance		
Red Squirrel	Avoid all works in red squirrel habitat									Optimum time for works		Avoid all works
Otters	No seasonal constraints, however restrictions are likely during breeding season											
Water Voles	Avoid works in habitat		Trapping & exclusion		Avoid works (breeding season)				Trapping and exclusion		Avoid works in habitat	
Fish	Mitigation for the protection of watercourses is required at all times of year Mitigation for particular species will need to be timed so as to avoid their breeding season, this varies between species											

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Appendix 9: Draft Guidance Version Control

Version	Date	Pg	Change Made
1.1	17 July 2017	16	Watermark removed from f4.2
1.1	17 July 2017	31	Colour and label for low capacity corrected for hydropower
1.1	17 July 2017	17	Consultation question and Wind SLUC updated with online map
1.1	17 July 2017	31	Consultation question and Hydro SLUC updated with online map
1.1	17 July 2017	42	Consultation question and Wind SLUC updated with online map
1.2	28 July 2017	17	Wind Consultation question updated with online consultation form
1.2	28 July 2017	15	Reference to online map moved to 4.1.2
1.2	28 July 2017	31	Hydro Consultation question updated with online consultation form
1.2	28 July 2017	30	Reference to online map moved to 5.1.1
1.2	28 July 2017	42	Solar Consultation question updated with online consultation form
1.2	28 July 2017	41	Reference to online map moved to 6.1.1
1.3	15 August 2017	16,17, 31, 32, 42, 43	Updated maps with boundary/basemap and legend corrected.