Pen-y-Dre Solar Farm

Green Infrastructure Statement

19th November 2024

1.0 Overview

1.1 As part of the development process, the existing Green Infrastructure (GI) asset has been assessed through landscape desktop survey, and the context of the site, in its wider GI network, and within the policy framework in updated Chapter 6 of PPW 12, (Feb 2024). This states at that *"all reasonable steps must be taken to maintain and enhance biodiversity and promote the resilience of ecosystems and these should be balanced with the wider economic and social needs of business and local communities."*

1.2 The following statement reports on the iterative GI process and how it has influenced the design approach, focusing on the appropriate and proportionate GI benefits that development of this site can contribute, with regard to, and taking all reasonable steps to enhance, the most valuable GI assets.

2.0 Introduction & Background

Definition of Green Infrastructure

2.1 The term *'Green Infrastructure'* first came to prominence in the early 2000's most notably in the Landscape Institute Position Statement *'Green Infrastructure An integrated approach to land-use' (2009).*

2.2 This document defined GI as:

'The network of natural and semi-natural features, green spaces, rivers and lakes that intersperse and connect villages, towns and cities. It is a natural, service-providing infrastructure that is often more cost effective, more resilient and more capable of meeting social, environmental and economic objectives than grey infrastructure.'

2.3 GI Functions are described as the:

'roles that assets can play if planned, designed and managed in a way that is sensitive to, and includes provision for, natural features and ecosystems services. They may have obvious primary functions, but each asset can perform different functions simultaneously – multifunctionality.'

2.4 Green/Blue Infrastructure is the term adopted in this document to incorporate the drainage requirements for developments under SABs, (Sustainable Drainage Approval Body), in Wales, along with other GI elements.

2.5 Provision of GI offers a multitude of ecosystem services, (i.e. the benefits that people derive from nature) and forms part of a sustainable approach to the management of natural resources. New infrastructure should seek to strengthen and reinforce existing assets within a site and it should be planned and designed to be beneficially multi-functional.

Principal GI Design Aims.

2.6 The principal multi-functional targeted benefits of GI are to:

a. Protect and enhance biodiversity and the resilience of ecosystems and their connectivity.
b. Consider opportunities for habitat protection, restoration, creation and management in the provision of GI.
c. Contribute to improved mental health with more direct contact with nature, the seasons and natural processes.
d. Identify opportunities where existing and potential green infrastructure could be improved and enhanced as part of place-making.
e. Provide opportunities for improved physical health and wellbeing through recreational access, community permeability and connectivity.
f. Enhance place-making identity and sense of community ownership.
g. Improve townscape and landscape quality and visual amenity.
h. Integrate play and recreation in GI networks.
i. Improve micro-climate (summer cooling/winter shelter).
j. Mitigate and adapt to the impacts of climate changes in relation to improving or addressing.
    - Oxygen production.
    - Carbon sequestration (locking carbon in vegetation and soils).
    - Water sequestration (vegetation evapotranspiration and formal attenuations).
    - Air and water quality.
    - Flood risks.
    - Transportation opportunities (cycling/walking/public transport links).

3.0 Policy & Guidance

National Planning Policy

3.1 Future Wales: The National Plan 2040 (FW) is the Welsh Government's national development framework and provides a national spatial strategy setting out where Wales should focus development to address key national priorities through the planning system until 2040. Together, FW alongside PPW, (below), sets out how the planning system should respond to and address national challenges and opportunities.

3.2 *Policy 9 – Resilient Ecological Networks and Green Infrastructure* states that:

"To ensure the enhancement of biodiversity, the resilience of ecosystems and the provision of green infrastructure, the Welsh Government will work with key partners to:

- *identify areas which should be safeguarded and created as ecological networks for their importance for adaptation to climate change, for habitat protection, restoration or creation, to protect species, or which provide key ecosystems services, to ensure they are not unduly compromised by future development; and*
- *identify opportunities where existing and potential green infrastructure could be maximised as part of placemaking, requiring the use of nature-based solutions as a key mechanism for securing sustainable growth, ecological connectivity, social equality and well-being.*

Planning authorities should include these areas and/or opportunities in their development plan strategies and policies in order to promote and safeguard the functions and opportunities they provide. In all cases, action towards securing the maintenance and enhancement of biodiversity (to provide a net benefit), the resilience of ecosystems and green infrastructure assets must be demonstrated as part of development proposals through innovative, nature-based approaches to site planning and the design of the built environment.
As part of a green infrastructure assessment, broad opportunities for habitat protection, restoration or creation and the provision of green infrastructure may be specified as part of identifying areas to be safeguarded or may take the form of more specific allocations. This may be achieved, for example, through the provision of buffer areas around protected sites or stepping-stones connecting habitats or through the identification of green infrastructure in and around urban areas."

3.3 National Planning Policy in Wales is set by Planning Policy Wales 2024 (12th Edition) (PPW). The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales.

3.4 With regard to GI, Section *6.2 Green Infrastructure* states that:

"Green infrastructure plays a fundamental role in shaping places and our sense of well-being, and are intrinsic to the quality of the spaces we live, work and play in. The planning system should protect and enhance green infrastructure assets and networks because of these multi-functional roles. The protection and enhancement of biodiversity must be carefully considered as part of green infrastructure provision alongside the need to meet society's wider social and economic objectives and the needs of local communities. The multiple benefits that resilient ecosystems and green infrastructure offer to society, including the economic and social contribution they make to local areas, should be taken into account when balancing and improving these needs."

"The quality of the built environment should be enhanced by integrating green infrastructure into development through appropriate site selection and use of creative design. With careful planning and design, green infrastructure can embed the benefits of biodiversity and ecosystem services into new development and places, helping to overcome the potential for conflicting objectives, and contributing towards health and well-being outcomes."

3.5 PPW also states that

"Permanent removal of trees, woodland and hedgerows will only be permitted where it would achieve significant and clearly defined public benefits. Where individual or groups of trees and hedgerows are removed as part of a proposed scheme, Planning Authorities must first follow the step-wise approach."

3.6 Where loss is unavoidable, developers will be required to provide compensatory/replacement planting and this will need to be:

- Proportionate to the proposed loss as identified through an assessment of GI value (including biodiversity, landscape value and carbon capture).
- Provided at a ratio equivalent to the quality, environmental and ecological importance of the tree(s)/GI asset lost. A minimum ratio is required of at least 3 trees of a similar type and compensatory size planted for every 1 lost. Where a woodland or a shelterbelt area is lost as part of a proposed scheme, the compensation planting must be at a scale, design and species mix reflective of that area lost. In such circumstances, the planting rate must be at a minimum of 1600 trees per hectare for broadleaves, and 2500 trees per hectare for conifers.

Local Planning Policy

3.7 *Policy SW11: Sustainable Design and Placemaking (Merthyr Tydfil LDP 2016 – 2031)* states that:

"Development must contribute to the creation of attractive and sustainable places through high quality, sustainable drainage systems where appropriate, and ensure that the County Borough's network of green infrastructure is accessible and connected;"

"Amongst the list of detailed considerations the policy requires the provision and integration of Green Infrastructure in new development proposals which may, for example, include open space and Sustainable Drainage System (SuDS) features. The integration of Green Infrastructure is important as it can realise other positive benefits to health and well-being. This can include for example, the provision of healthy and active environments, flood management, water and air quality improvements, reduced noise pollution, climate moderation, climate change mitigation and food production. Examples of features that can help address these wider objectives can include landscaping, green roofs, grass verges, sustainable urban drainage, open spaces and gardens."

"The Council's Biodiversity Action Plan and future Nature Recovery Action Plan will identify local biodiversity issues and opportunities for green infrastructure enhancement that can inform the planning and design of development proposals. Examples of landscape-scale green infrastructure within the County Borough that can provide enhancement

opportunities and which are areas of high biodiversity value include former mineral and coal spoil tips and the Coedcae (Fridd) mosaic habitats that exist on predominantly steep valley sides between the valley floor and upland areas. The Council's Open Space Strategy and Local Nature Reserve can also be used in the consideration of potentially suitable locations for off-site compensation where there is unavoidable loss of sites important for biodiversity". "The Council's Biodiversity Action Plan and future Nature Recovery Action Plan will identify local biodiversity issues and opportunities for enhancement and will supplement the information contained in NRW's Area Statements. As well as identifying opportunities to promote ecosystem resilience, the Council's Open Space Strategy and Local Nature Reserve can also be used to identify potentially suitable locations for securing off-site compensation. Further information regarding the consideration of Green Infrastructure in new development can be found under Policy SW11: Sustainable Design and Placemaking".

3.8 *Objective 3: Increase the resilience of our natural environment by restoring degraded habitats and habitat creation (Merthyr Tydfil Nature Recovery Action Plan 2019 – 2024)* states that:

"Landowners will be positively influenced to undertake land management that will restore degraded habitats and/or create new habitats" (pg. 23).

4.0 Development GI Process

4.1 As part of the development process, the existing Green Infrastructure (GI) assets have been assessed through landscape, ecological, arboricultural and Sustainable drainage assessments, including the GI connectivity of the site and associated protected species.

4.2 These assessments are illustrated and reported in the following documents and drawings:

- *Arboricultural Report (Ref - ArbTS_1751.4_Goetre Primary School, 22nd November 2024).*
- *Ecological Appraisal (Ecological Services Ltd 4th July 2022).*
- *Biodiversity Strategy (Ecological Services Ltd 23rd July 2024).*
- *2488501-SBC-XX-XX-DR-L-201 Green Infrastructure Context Plan*
- *2488501-SBC-XX-XX-DR-L-401 Strategic Landscape Plan*
- *2488501-SBC-XX-XX-DR-L-202 Green Infrastructure Plan*

4.3 As part of the Ecology Assessment of the site, the 7-stage stepwise process *(PPW 12, Feb 2024, page 148 figure 12)* has been followed. A summary of the stepwise approach is provided below:

1. ***Avoid***

   To avoid damage to biodiversity and ecosystem functioning.

2. ***Minimise***

   Alternative sites that would result in less harm, no harm or gain are to be fully considered to minimise the any harmful environment effects.

3. ***Mitigate/Restore***

   '...ensure that features and elements of biodiversity or green infrastructure value are retained on site and enhanced or created wherever possible.'

4. ***Compensate on-site***

   Onsite compensation must be sought when all other options have been exhausted.

5. ***Compensate off-site***

   Offsite compensation must be sought when all other options have been exhausted.

6. ***DECCA Framework***

   By assessing resilience attributes of the site, appropriate enhancements can be proposed through the landscape design:

   - *Diversity: Biological diversity and all scales of the environment underpins biodiversity and resilient ecosystems. A more diverse ecosystem is more resilient to external influences.*
   - *Extent: The size of an ecosystem will affect its capacity to adapt, recover or resist disturbance. The smaller the extent of an ecosystem, the less species it can support and the less resilient it is to extreme events.*
   - *Condition: This relates to the overall condition of an ecosystem, which could be measured by several factors including presence, abundance, structure, range of habitats and species, and water/air/soil quality. Ecosystems in better condition will be more resilient to change.*
   - *Connectivity: "Connectivity refers to the links between and within habitats, which may take the form of corridors, stepping stones or patches of the same or related vegetation types." "Connectivity is a major driver for spatial variation which affects diversity and the abundance of living organisms."*
   - *Adaptability: Ecosystem resilience is thought to emerge from the four attributes above, and may appear in three distinct aspects: adaptability, resistance, or recovery to/from disturbance.*

7. ***Long Term Management***

   Long Term Management of retained and new GI assets to secure enhancement.

4.4 GI context connecting to the site and the local GI network, has also influenced the on-site GI mitigation and enhancement approach adopted by the Proposed Development.

5.0 Development GI Aims

5.1 Guiding GI Principles, summarised below, have been applied to achieve the GI proposals for the site.

Multifunctional	Ensure that the GI proposals achieve deliverable multifunctional benefits, including: • Creation of an improved aesthetic context for the site, • Provision of visual mitigation identified at outline planning stage. • Reduction of pollution and/or flooding, • Provision of shelter and/or food for native species,
Adapted for Climate Change	Attenuate, filtrate and alleviate flooding with biodiversity enhancement and mitigate the effects of climate change.
Health and well being	Providing features to absorb pollution, improve air quality, clean water, improve microclimate and to provide features so the public can have improved contact with nature.
Biodiversity	Supporting a wide variety of native species providing shelter and food and creating improved green corridor links with existing GI networks.
Smart and Sustainable	Providing solutions, techniques and technologies that are low maintenance and reduce pollution and waste.

5.2 Design team reviews were carried out through the design process to establish how the development GI could most appropriately address and enhance the above GI principles in relation to the existing GI network.

5.3 The existing site for the Proposed Development comprises expanses of neutral semi-improved and marshy grassland supplemented with some limited areas of woody scrub and occasional trees. Beyond the site boundary there are some more expansive stands of scrub and grassland connecting to the wider GI network of hedges and woodlands that extend through the surrounding landscape. The Proposed Development aims to strengthen, reinforce and reinstate GI connectivity to this network through the creation of multifunctional GI corridors, including a native hedgerow to the perimeter of the site that will connect the Proposed Development site to the wider GI context.

5.4 The Proposed Development includes a SuDS drainage scheme comprising an attenuation basin which will retain a degree of water run-off and encourage natural drainage in-situ on-site, as well as increasing evaporation and micro-climate benefits. Extensive wildflower meadow seeding (tolerant of occasional flooding) within the basin will provide valuable habitat and ecological resources for the local ecosystem.

6.0 Summary of Effects, Mitigation & Enhancement

6.1 The GI Plan, *(Figure 2488501-SBC-XX-XX-DR-L-202 Site Green Infrastructure Plan),* illustrates the GI context and proposed principal GI elements integral to the proposed development.

6.2 The Green Infrastructure strategy illustrated follows the stepwise approach as set out in PPW paragraph 6.4.15. The following summarises how the development GI proposals have responded to this approach.

Step 1: **Avoid:**

- Ecology, Landscape and Arboricultural surveys have identified the GI assets of greatest value. Whilst the Proposed Development seeks to avoid impacts on these. Each PV unit will be mounted on a frame and fixed to the ground using ground screws, so that the amount of direct habitat loss attributed to the PV units is considered to be minimal. However, the footprint of the proposed development would result in some unavoidable GI losses. To avoid impacts, other sites had been considered, however the location of the site best fits the community and development needs.

Step 2: **Minimise:**

- Existing GI within the site boundary is largely species- rich neutral semi-improved and marshy grassland. Tree and scrub cover is sparse but where present the approach is to retain these elements as far as possible. However, the footprint of the proposed development would require the unavoidable removal of 1,367m^2 existing grassland, 5,400m^2 scrub and 3no trees/combined tree group.

Steps 3 to 5: **Mitigate/Restore/Compensation (on and off site):**

- To help compensate for the loss of 3no. trees (including 1no. combined tree group) and 5,400m^2 scrub, it is proposed to create strengthened GI corridors defined with a native hedgerow to the perimeter of the Proposed Development site. The hedge will be supplemented with 9no. native trees to compensate for the tree loss at the required ration of 3 to 1. Scrub removal areas will be enhanced with a more diverse wildflower mix. The total compensatory planting amounts to a total of 1,928 sq. m. Furthermore, the long-term management of the retained grassland habitat, supplemented with replacement seeding where necessary, aims to increase the overall diversity within the site. Wildflower seeding within the SuDS features will also deliver a more diverse ecosystem, which will support different species and mediate the environment through pollutant and dust capture, evapotranspiration, and biological filtration, as well as contributing to ecosystem resilience through additional and improved habitats. Provision of bird and bat boxes, hibernacula, and insect houses will further bolster the ecological value of the proposed landscape.

Step 5: **Decca Framework**

- *Diversity*: The current habitats on the site are dominated by species-rich grassland, with patches of less diverse scrub cover. Proposed wildflower meadow mixes will add greater diversity to the areas including where scrub will need to be removed as well as to the overall retained grassland within the area. Proposed hedgerow and tree planting will provide additional ecological resources for local wildlife by increasing the diversity of species within the site and providing additional structure and shelter not currently available. The proposed attenuation basin will also provide additional habitat within the site.
- *Extent*: Unavoidable loss of scrub, 3no trees and some areas of grassland will be required to accommodate the proposed development and will reduce the extent of these habitats within the site. However, proposed wildflower meadow seeding and new hedgerow and tree planting will help mitigate for the losses. Areas of retained species-rich grassland will be managed to increase diversity.
- *Condition*: Proposed wildflower meadow mixtures, hedgerow and tree planting will add diversity to the retained grassland. Furthermore, the proposed long-term management regime will seek to increase diversity of the grassland habitat.
- *Connections*: The diversity of new habitats being proposed as part of the development, particularly new hedgerows and trees, will significantly increase the green connections between habitats.
- *Adaptability*: The increased variety of plant species that will be introduced as part of the proposed development will provide greater adaptability of the ecosystem to outside influence, particularly the effects of climate change.

Step 6: **Long Term Management**

- An additional benefit which can result from the Proposed Development would be the opportunity for the long-term management of the retained and new GI assets to secure these enhancements and their value in the long term. Measures required will be identified in the LEMP to be produced in support of the Proposed Development.

7.0 GI Conclusion

7.1 The above Stepwise GI process adopted through the design development process, demonstrates that where possible, negative impacts have been avoided or minimised where possible. Whilst it has not been possible to demonstrate a net gain in replacement planting to mitigate for the loss of scrub habitat, GI provision provides some beneficial multi-functional GI outcomes. These will strengthen and diversify the current GI assets and provide the opportunity for a more climate change resilient matrix of beneficial and diverse GI components. Furthermore, site development provides the opportunity to secure beneficial long-term management, contributing

more extensively to community and environmental (multifunctional GI habitat and sustainable drainage) needs.

GI Vegetation Retained

Item lost	*Number/Length (m)*	*Area (m^2)*
Grassland habitat	-	22,800
Combined Total	-	22,800

GI Vegetation Lost

Item lost		*Number/Length (m)*	*Area (m^2)*
Trees	**Grade A**	-	-
	Grade B	1	77
	Grade C	2 (includes a young group counted as individual)	238
	U Class	-	-
Scrub		-	5,400
Grassland		-	1,367
Combined Total		-	7,082

GI Vegetation Proposed

Item proposed	*Number/length*	*Area (m^2)*
Individual Trees	9 (assume canopy radius of 1.5m)	65
Hedgerow (1.5m thick)	672	1008
Grassland - retained and managed.	-	22,800
Grassland – proposed general wildflower mix.	-	495
Grassland - attenuation basin wildflower mix.	-	400
Combined Total excluding retained existing grassland habitat.		1,968
Combined Total		26,736

Note:

- For the purposes of the above tables, all area calculation have been rounded up to the nearest m2.
- All existing U Class vegetation is calculated to be removed, but not included within total figures.