Technical Appendix 1B: Green Infrastructure Strategy

Penpergwm Solar Farm

23/06/2021

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INTRODUCTION

Overview of Green Infrastructure

1.1. The Landscape Institute (LI) describes Green Infrastructure (GI) as:

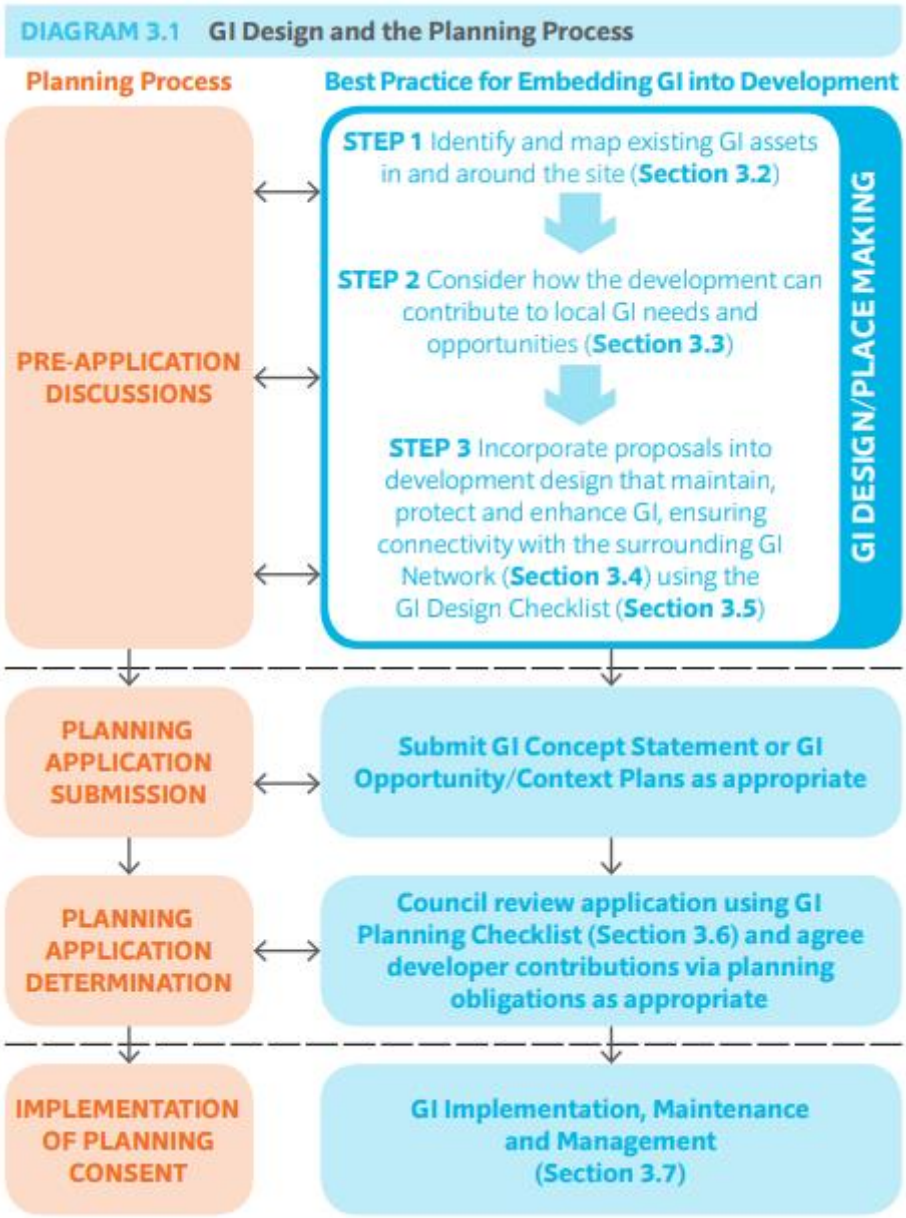
"GI is the network of natural and seminatural features, green spaces, rivers and lakes that intersperse and connect villages, towns and cities. Individually, these elements are GI assets, and the roles that these assets play are GI functions. When appropriately planned, designed and managed, the assets and functions have the potential to deliver a wide range of benefits – from providing sustainable transport links to mitigating and adapting"[1]

1.2. The existing GI assets of the Application Site and potential future GI have been considered as part of the iterative design process. The overall GI Strategy is to respond to existing landscape features, ecology and human amenity. Monmouthshire County Council provides GI Supplementary Planning Guidance[2] (SPG) which has been used to inform this report. The SPG supports the interpretation and implementation of green infrastructure policies S13 and GI1 of the Monmouthshire adopted Local Development Plan[3].

1.3. Diagram 3.1 of the SPG outlines the Council's expectations for how on and off-site green infrastructure should be considered and embedded within development proposals. This has been reproduced below:

[1] Landscape Institute (2013) Green Infrastructure An integrated approach to land use
[2] Monmouthshire Council (2015) Green Infrastructure Supplementary Guidance, Adopted April 2015
[3] Adopted-Local-Development-Plan-with-PDF-tags.pdf (monmouthshire.gov.uk)

Figure 1. GI Design and the Planning Process Schematic



Purpose of this Report

1.4. The Proposed Development is described in the Design and Access Statement and shown on Figure 4 of Volume 2: Planning Application Drawings. This GI strategy has been prepared in support of the planning application for Penpergwm Solar Farm (the "Proposed Development"), in accordance with Monmouthshire Council (2015) Green Infrastructure Supplementary Guidance, Adopted April 2015.

1.5. The green infrastructure strategy will illustrate:

- The proposed green infrastructure comprising hedgerow and tree planting, species rich grasslands and wildflower meadow which will provide ecological and human benefits;

- The majority of the existing landscape and ecological elements retained where practicable; and
- The investment in green infrastructure as part of the overall Proposed Development will improve biodiversity opportunities and contribute to climate change resilience.

1.6. The strategy will identify and confirm the key ecosystem service functions provided through the GI assets that are retained and proposed by the Proposed Development. This will demonstrate compliance with policies S13 and GI1, while supporting the overall success of the Proposed Development through its sustainable design, and long-term operation.

1.7. Ecosystem functions include:

- Landscape setting & quality of place;
- Habitat provision, connectivity and biodiversity;
- Green space provision, connectivity & enjoyment;
- Sustainable energy use; and
- Flood attenuation & water resource management.

EXISTING GI RESOURCES

Application Site Characteristics

1.8. Detailed descriptions and assessment/appraisal of the Proposed Development are reported separately within the following Technical Appendices:

- TA 1A: Landscape and Visual Appraisal (LVA)
- TA 2A: Ecological Impact Assessment (EcIA)
- TA 2B: Ecological Design Strategy
- TA 3: Cultural Heritage Impact Assessment (CHIA)
- TA 4: Flood Consequence Assessment and Drainage Impact Assessment (FCA/DIA)
- TA 5: Construction Traffic Management Plan (CTMP)
- TA 6: Noise Impact Assessment (NIA)
- TA 7: Glint and Glare Assessment (G&G)
- TA 8: Outline Construction Environmental Management Plan (OCEMP)
- TA 9: Agricultural Land Classification (ALC)
- TA 10A: Tree Constraints
- TA10B: Arboricultural Impact Assessment (AIA) and Tree Protection Plan

1.9. The Application Site is located on land 0.5km north of Penpergwm and comprises 14 agricultural fields covering c. 70.03 hectares (ha) in total, with only c. 17.61 hectares of the landscape under the solar arrays themselves. See **Figure 1 of Volume 2: Planning Application Drawings** for details

1.10. Land within the Application Site itself is undulating, ranging between 68m to 132m Above Ordnance Datum (AOD) and consists of fields typically of medium scale, bound by a mixture of grassy field margins, semi-mature hedgerows, and hedgerow trees. A pylon line crosses Field 3 and Field 6.

1.11. The local area comprises a patchwork of agricultural fields and areas of woodland, punctuated by individual properties and farmsteads; the nearest residential areas are the villages of Penpergwm and The Bryn; located 0.5km and 0.9km north respectively. Two Public Rights of Way (PRoW), and an Other Route with Public Access (ORPA) are found in the southern part of the site. A portion of PRoW 368/55/1 passes through Fields 8 and 9 to the south connecting

Great House with the access to farmsteads to the south. A portion of PRoW 368/56/1 passes through Fields 10 and 11 in the southeastern part of the site connecting Great House with the minor road on the south eastern site boundary. The ORPA passes from Great House, east of Field 14 and through the treeline on the southern border of Fields 5, 6 and 7.

1.12. Recreational routes are also located close to the Application Site, PRoW 368/182/1 passes along the northern boundary of Fields 1, 3 and 4. PRoW 368/10/1 and PRoW 368/11/1 pass with c. 0.2km of Great House and eastern Fields 4 and 10, providing recreational connectivity north of the Application Site.

1.13. While there are a number of drains and watercourses throughout the Application Site, including a small tributary of the Frwd Brook bordering Field 11, the site is entirely contained within Flood Zone A, an area described as having a "*Low probability*" of flooding.

1.14. The Application Site will be accessed via an improved farm access situated on the southern boundary. Traffic will approach the site entrance from the south using a local road from Penpergwm for approximately 800m. Traffic will be routed to Penpergwm from the north via the B4598. This road connects to the strategic road network south of Abergavenny at the A40 / A465 interchange.

1.15. The higher elevations of the Application Site, particularly the north and south western fields have a strong visual relationship with the surrounding landscape including Brecon Beacons National Park (BBNP) which is located c.3.1km to the west of the Application Site's outer boundary.

Surrounding Characteristics

1.16. The Application Site is set within a wider predominately settled rolling lowland rural valley landscape influenced by a number of existing electricity infrastructure features. The immediate landscape surrounding the site to the north, east and south comprises agricultural fields delineated by a mix of mature informal hedgerows and individual trees. Pockets of mixed woodland are found to the south and east.

1.17. The Usk River south of the Application Site largely divides the rolling lowland to the north and west and the uplands to the west and southwest which lie within the Brecon Beacons National Park (BBNP) and the Blaenavon Industrial Landscape World Heritage Site (BILWHS). The hills of the uplands are predominantly open moorland on higher ground with pasture and woodland located on the lower slopes. The highest points in the study area include the Blorenge (552m AOD) within the BBNP 5.8km southwest and Ysgyrd Fach (250m) 2.3km northwest of the site. Lower elevations cover the Usk valley floor, and the Monmouthshire Brecon Canal, located on the eastern edge of the BBNP (within c. 2.9km at the closest point).

1.18. Settlements are largely associated with the river valley and main transport routes; the largest population centre, Abergavenny, lies c.3.9km to the northeast of the site. A number of individual residential properties and farmsteads lie in relatively close proximity (within 1km) to the Application Site. Smaller villages within the Study Area are accessed by main transport

routes including the A40, A4042, B4233, B4598 and a network of minor roads. The Merthyr, Tredegar and Abergavenny Railway is also found in the study area passing over the Usk River and running largely parallel to the south of the A40 to Abergavenny.

1.19. Recreational routes in the study area include a network of PRoWs, the Usk Valley Walk, National Cycle and National Cycle Network (NCN) Routes 42, 49, and 46. More distant walking routes include the Iron Mountain Trail - a circular walking route around the Blorenge.

1.20. Existing elements of electricity infrastructure present within the surrounding landscape and within the 5km study area are a solar farm at Manor Farm c.4.5km north. Four pylon lines are found in the study area and are evident against localised and more distant skylines. These include the pylon line which crosses the Application Site from north to south and pylon lines which pass further west of the Application site and south of Ysgyryd Fach.

1.21. Generally, the Application Site has strong links with surrounding vegetation and habitats. Existing hedgerows within the north-western and south-western parts of the site largely connect with existing treelines and woodland to the north, north west and south west, Existing boundary hedgerows within the south-eastern part of the site largely link to the existing wider patchwork of hedgerows such as those close to the south eastern boundaries. Although, there are some occasional gaps along sections of the hedgerows.

1.22. There are strong recreational links providing connectivity between the Application Site and the wider PRoW network. This includes eventual links from the Application Site following the existing PRoW to the Usk Valley Walk to the south and NCN route 42 to the east.

Overall GI Appraisal

Figure 1.23: GI Assets and Opportunities Plan of Technical Appendix 1: Landscape and Visual Assessment and **Figures 2 and 3** below show the main existing GI resources and connections on the site.

Figure 2: GI Assets

Figure 3: GI Links

1.23. Figure 3 shows that the Application Site is well connected in terms of ecological links and recreational routes for human amenity.

Existing GI Assets

1.24. Table 1 below summarises the presence or absence of GI Assets within the Application Site. Assets are graded according to their presence and coloured in relation to either being present or not, as follows: not present (red), present (amber), and fully present (green) and where benefits from these existing assets are being entirely realised.

Table 1: Existing GI Asset Catalogue

GI Asset	Present on Site	Description
Landscape setting & quality of place	Fully Present	Much of the high elevations of the Application Site have a strong visual relationship with the surrounding landscape. This includes areas to the north at a lower elevation and lower and higher elevations to the south and southwest, including areas within the BBNP. Overall, the setting and quality of place is high. The landscape fabric of the Application Site is of reasonable to high quality with a number of existing recreational routes.
Habitat provision, connectivity and biodiversity	Present	Some habitat opportunities are provided by the existing hedgerows and individual trees within the Application Site. Although there are gaps in some existing hedgerows and separation between some internal and external green links which have the potential to be reinforced.
Green space provision, connectivity & enjoyment	Present	Recreational routes pass within and close to the Application Site, along and close to existing green corridors. There are opportunities to provide links between the Proposed Development and these routes through features such as interpretive information panels and viewpoints. There are opportunities to introduce other areas of recreational and education green space within the Application Site, and also to provide further biodiversity opportunities. This could include wildflower meadows.
Sustainable energy use	Not Present	No energy generation is present.

Flood attenuation & water resource management	Present	The site lies within the Severn River Basin District. Within this, the site lies in the Usk Management Catchment. The Application Site itself has a number of small watercourse/field drains which lead into the Ffwrd Brook, and onward to the River Usk/Afon.

DESIGN PROCESS

SWOT Analysis

1.25. The following Strengths, Weaknesses, Opportunities and Threat (SWOT) analysis considers the existing GI and future GI that can be provided by the Proposed Development within the Application Site.

Strengths

- Existing field boundary hedgerows;
- Existing hedgerow trees and individual trees;
- Existing recreational links;
- Existing aesthetic value; and
- Existing visual connection with the surrounding landscape.

Weaknesses

- Gaps in existing hedgerows;
- Separations between some existing hedgerows and external vegetation links; and
- Some existing uses of recreational routes may be considered antisocial, such as the use of quad bikes.

Opportunities

- To reinforce and provide additional ecological links between the existing hedgerows and external habitats;
- To provide additional habitat and biodiversity opportunities through planting and ecological interventions such as bug hotels, and bird and bat boxes;
- To connect existing recreational routes with external routes;
- To provide path upgrades and interpretive information about the Proposed Development and surrounding area; and
- To provide sustainable energy generation.

Threats

- Impact of the Proposed Development on the existing aesthetic qualities present within the Application Site and sense of place (genius loci); and
- Potential for increased human activity.

GI Design Principles

The SWOT analysis above informs the following design principles for the Proposed Development:

Spaces within the Application Site:

- Make best use of existing site assets by enhancing the biodiversity and amenity value of the existing vegetation through appropriate management;
- Provide high quality, planted areas and green space place;
- Create robust, functional biodiversity opportunities;
- Provide opportunities for education and recreation, and create spaces for human interaction with ecology, landscape and renewable energies; and
- Mitigate potential effects of the Proposed Development on the overall aesthetic and amenity value of the Application Site.

Local connections:

- Provide connectivity through green corridors informed by the green fingers present in the surrounding landscape; and
- Improve routes for people across and out of the site by enhancing links.

Landscape and visual interactions:

- Landscape proposals will be reflective of the surrounding landscape characteristics of the local rural area as well as the formal planting and parkland settings of the surrounding Garden and Designed Landscapes (GDLs); and
- Protect and reinforce existing vegetation within and along the Application Site boundaries where practicable.

POST DEVELOPMENT GI RESOURCES

Appraisal of GI Proposals

1.26. GI proposals are indicated on **Figure 1.24** of **Appendix 1A: Technical Appendix 1**, which indicates additional green links through hedgerow, tree and infill planting. The proposed mitigation planting will provide additional biodiversity opportunities and habitat links while helping contain the elements of the Proposed Development within the Application Site.

1.27. The addition of viewpoint areas with interpretive information will provide a link between the Proposed Development, education and the wider landscape.

Proposed GI Assets

1.28. The range of GI assets that will be provided by the Proposed Development are outlined in **Table 2** below.

Table 2: Proposed GI Assets

GI Asset	Present on Application Site	Present if Proposed Development Implemented	Description
Landscape setting & quality of place	Fully Present	Present	The Proposed Development will locally affect the rolling and undulating agricultural lands within the Application Site, changing the existing agricultural land use to a solar farm. This will alter the landscape setting and quality of place. However, elements of the Proposed Development will be contained within the existing field pattern, and landform within the Application Site will be largely unaffected. New hedgerow, infill and tree planting will reinforce the existing landscape fabric.
Habitat provision, connectivity and biodiversity	Present	Present	Some habitat opportunities are provided by the existing hedgerows and individual trees within the Application Site. Existing hedgerows will be reinforced where practicable and new hedgerows and tree planting introduced to provide additional green linkages to habitats outside the Application Site.

			Species rich grassland will be introduced below and around the solar panels and a wildflower meadow will be seeded in the south western fields allowing for additional biodiversity opportunities and informal recreation. Ecological features including bat/bird boxes and invertebrate hotels will also be introduced, informed by existing habitats.
Green space provision, connectivity & enjoyment	Present	Present	An informal route will be provided through the proposed wildflower meadow providing a new recreational link within the Application Site. Viewpoints and interpretative information will be provided adjacent to the recreational routes within the south eastern parts of the Application Site. These will be constructed from local natural materials and will provide information on the Proposed Development and the surrounding area.
Sustainable energy use	Not Present	Not Present	A solar farm of c. 40MW will be introduced within the Application Site.
Flood attenuation & water resource management	Present	Present	It is proposed to construct six soakaway channels/ filter drains within the Application Site. The location of the channels has been chosen to intercept flows before they enter the existing drainage system surrounding the site. Surface run-off will be collected and conveyed by the provision of filter drains to a detention basin for the 1 in 100 year storm event.

Summary of GI Benefits

1.29. The Application Site presently provides GI assets, linkages and open spaces. The GI proposals which form part of the overall Proposed Development will help reinforce and link existing assets with the wider environment and provide additional ecological and human benefits.

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