Craig y Perthi Solar Farm

Design and Access Statement

Prepared for

JBM Solar Projects 25 Limited

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3312-01-DAS-001

Document Control

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1.0 INTRODUCTION

1.1.1 This Design and Access Statement (DAS) has been prepared in support of a photovoltaic solar array, battery energy storage facility and associated infrastructure ('the Proposed Development') on land to the east of Newport, Wales. The application has been made by JBM Solar Projects 25 Ltd ('the Applicant').

1.1.2 The Proposed Development is considered a Development of National Significance (DNS) under the DNS (Specified Criteria and Prescribed Secondary Consents) (Wales) Regulations 2016, as the generating capacity of the proposal exceeds the 10 MW threshold. As a result, this planning application is submitted to Planning, Environment Decisions Wales (PEDW).

1.1.3 This DAS provides an overview of how the proposal has been designed and located, noting that a significant amount of infrastructure is pre-fabricated. This report discusses access arrangements for installation and subsequent maintenance, and also considers the anticipated decommissioning access after approximately 40 years.

1.1.4 This report follows the recommended structure as set out in the Welsh Government's Design and Access Statements in Wales (April 2017) guidance, which supports Technical Advice Note (TAN) 12: Design (2016) and TAN 18: Transport (2007).

2.0 SUMMARY OF THE PROPOSAL

2.1 Site Location

2.1.1 The Site, including the associated infrastructure, cable run, wildflower meadows and wildlife enhancement areas, covers approximately 240 ha, and is currently used for agriculture as part of several pastoral and arable agricultural holdings, with the focus being at Castle Farm. The proposed area within fencing that will contain panelling is limited to around 135 ha.

2.1.2 The Site is adjacent to the South Wales Main Line railway, approximately 4 km to the east of the city of Newport. The railway line forms the southern boundary to the Site, whilst to the north and northwest, the Site is bounded by agricultural fields and areas of woodland within Llanwern Park. To the east, the Site is again largely bounded by agricultural fields.

2.1.3 Whilst being used for agriculture and being of a rural nature, the Site is located within a heavily industrialised area of South Wales. To the south of the site, operations are ongoing at the Tata Steel Llanwern site. The western portion of the site is now redundant and being developed as part of the Newport Eastern Expansion Area at Glan Llyn, which will provide an additional urban environment. The eastern portion of the Tata Steel Llanwern site is still used for the rolling of steel.

2.1.4 To the east of the Site is Magor Brewery, currently operated by AB InBev, which produces over one billion pints of beer a year. There are plans to extend the site further, including the installation of hydrogen technology to power the site. The Magor Brewery is currently also powered by a single 150m tall wind turbine, located nearby, within the Gwent Levels.

2.1.5 To the southeast of the Site is the Gwent Europark, a logistics hub that includes storage and distribution facilities for national retailers including Tesco and Wickes, with the Tesco distribution facility equipped with two wind turbines.

2.1.6 The village of Bishton is located south of the central area of the Proposed Development, with a buffer of existing field units to the west and a minimum 75 m buffer to the nearest houses on the east of the village.

2.1.7 The boundaries of the Site are generally formed by hedgerows and trees as part of recognised field boundaries within agricultural holdings. The southern boundary of

the Site is made up of a combination of the South Wales Main Line, Bishton Road, and an unnamed road between Bishton and Wilcrick.

2.1.8 The Gwent Levels - Redwick and Llandevenny Site of Special Scientific Interest (SSSI) briefly overlaps the Site within the south-easternmost portion, with the majority of the SSSI outwith of the site, separated by the Tata Steelworks, Tesco Distribution Centres, and the South Wales Main Line railway. The SSSI is 940 ha in total, with only a small area included within the Site. A large proportion of this area is devoted to serve as a wildlife enhancement area in the plans. Further details on this SSSI can be found in Chapter 6.0 of this ES.

2.1.9 The proposed cable route connects the Site to the Grid Supply Point (GSP) at Uskmouth Power Station. This is an approximate 10 km grid connection within the highway boundary. Towards the GSP at Uskmouth Power Station, the cable route would be located in the existing highway adjacent to and within the Gwent Levels - Nash and Goldclif SSSI and then adjacent to an approximate 200 m section of the Newport Wetlands SSSI.

2.1.10 No other statutory environmental designations are within the Site, though there are three schedule monuments near to the Site. These are:

i) Bishton Castle – located to the north of Bishton, adjacent to the Site boundary, and is the former location of a medieval castle or fortified house, with no ruins remaining.
ii) Wilcrick Hill Camp – located approximately 600 m to the east of the Site, and is the location of a probable Iron Age Hillfort.
iii) Deserted Medieval Village – Located to the northwest of Wilcrick Hill Camp, and is a collection of earthworks comprising four rectangular enclosures.

2.2 The Proposed Development

2.2.1 JBM Solar Projects 25 (‘the Applicant’) (part of the RWE Group), is seeking planning consent for the installation and operation of a renewable energy generating station comprising ground-mounted photovoltaic solar arrays and battery-based electricity storage containers together with substation, switchgear container, inverter/transformer units, Site access, internal access tracks, security measures, access gates, other ancillary infrastructure and landscaping and biodiversity enhancements. This solar photovoltaic electricity generating station (or ‘solar farm’)

would have an export capacity of approximately 99.9 MW, with battery storage co-located strategically within the Site. The electricity generated would be enough to provide electricity for approximately 45,374 typical Welsh homes[1] and result in an approximate saving of 3,180,368 tonnes of CO_2 over the life of the development, compared with generation from fossil fuels. The inclusion of batteries ensures the maximum efficiency of the Site, working with the electricity distribution system to enable surplus energy to be stored and released as needed, and provide vital balancing services to the grid network.

2.2.2 The main components of the Proposed Development are:

i) Photovoltaic solar panels and associated support frames.
ii) Central Inverter Stations.
iii) Containerised Battery Energy Storage Systems (BESS), including battery storage containers, DC-DC converters and associated hybrid inverters.
iv) An onsite 132 kv substation.
v) A switchgear building.
vi) Approximately 4.9 km of improved footpaths/green lanes, enhancing Public Rights of Way through the site.
vii) Approximately 3.3 km of new permissive path walkways.
viii) Wooden post deer/stock fencing.
ix) In-ward facing infrared CCTV cameras on 3 m poles.
x) Ecological enhancements including bee hotels, reptile hibernacula, bird boxes, insect hotels, log piles, wildflower meadows enhanced for shrill carder bees, and a dedicated enhanced habitat for lapwing.
xi) Over 11 km of new native species hedgerow / tree planting, with existing hedgerows filled in / improved.
xii) Areas of native species woodland planting and creation of a community orchard.

2.3 Construction

2.3.1 The timing of the construction works would be dependent on the grant of planning permission for the Proposed Development, subsequent contract negotiations and prevailing weather and ground conditions.

[1] *Subnational Electricity and Gas Consumption Statistics Regional and Local Authority, Great Britain, 2021* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1126284/subnational_electricity_and_gas_consumption_summary_report_2021.pdf

2.3.2 The construction period is anticipated to take approximately 24 weeks, including testing and commissioning.

2.3.3 This construction programme would allow for the following key construction-related works to be undertaken:

i) Erection of Heras fencing around tree root protection areas.
ii) Establishment of site compound.
iii) Construction of site access tracks.
iv) Erection of deer / stock fencing and gates to site perimeter.
v) Installation of solar panels and frames.
vi) Installation of CCTV poles and cameras.
vii) Installation of string inverters and transformer stations.
viii) Installation of cable trenches.
ix) Installation of BESS containers.
x) Installation of control building, switchroom building and substation building;
xi) Installation of filter drains.
xii) Igrid connection.
xiii) Cultivation and seeding.
xiv) Hedgerow and woodland planting.

Site Access and Compounds

2.3.4 The Proposed Development is located in a predominantly rural area with local roads commensurate with its location. As a result, the applicant is keen to minimise the potential impact of the development on the local roads, especially during the construction period when the volume of vehicles generated by the development will be highest.

2.3.5 In order to reduce the impact of vehicles accessing the site from local roads, two centralised main site compounds will be implemented. The purpose of these two main site compounds is to allow all deliveries to be made to two centralised areas, to the east and west of Bishton Road then (in most instances) shuttled across the site (internally) to various parcels of land using a tractor and trailer. It should however be noted that on some occasions, there maybe a requirement to access various land parcels by road, this is due to the fragile nature of some deliveries, it will however be kept to a minimum, so as not to increase HGV traffic along local roads.

2.3.6 The location of these two compounds would be in the vicinity of access points 1 and 2, highlighted below on Image 2.1.

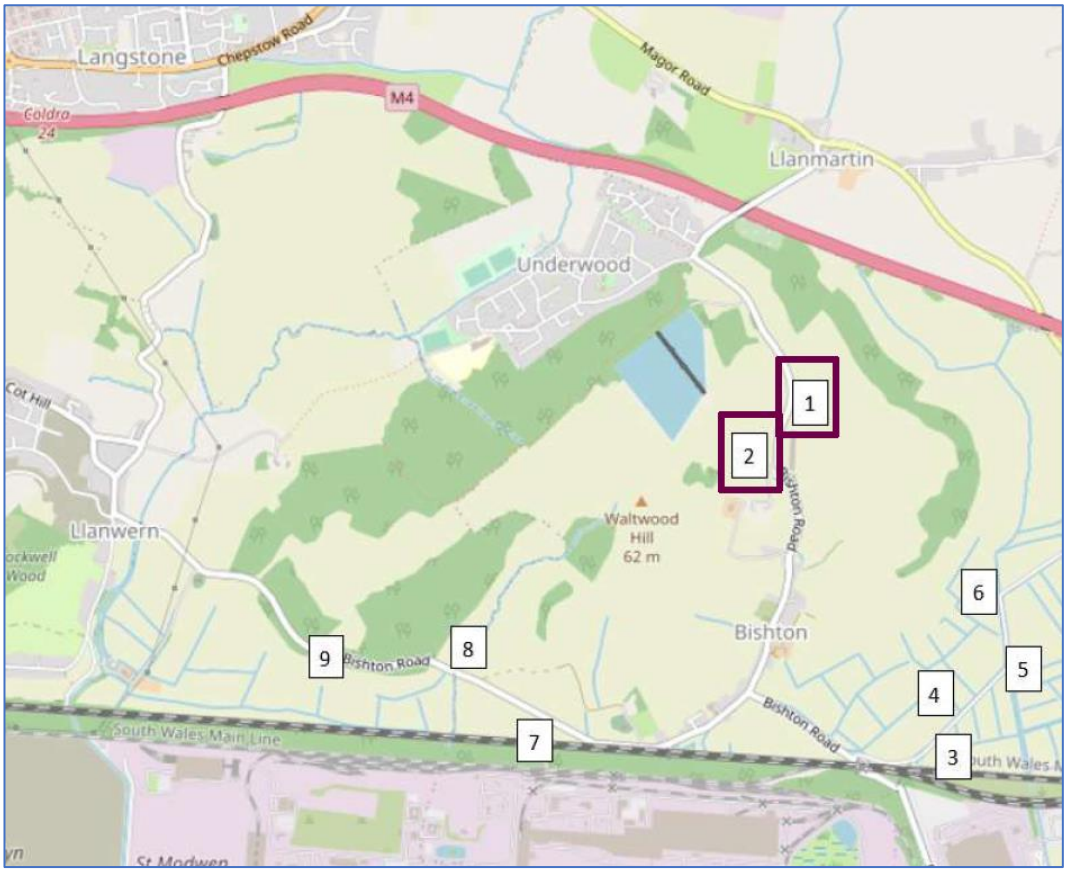


Image 2.1 Location of access points for main construction compounds

2.3.7 The compounds are located to the east and west of Bishton Road, access to each central compound will be promoted via existing accesses, the first currently serving the egg factory, the second serving Castle Farm Dairy. Compounds would typically measure 75m in length and 75m in width. A 'Durabase Mat System' or a similar non-ground penetrating mat system would be used within the compounds.

2.3.8 An indication of a typical site compound layout is shown below in Image 2.3.

Image 2.3 Typical construction compound layout

2.3.9 The temporary construction compounds would contain construction worker welfare facilities, a site office, limited parking, wheel wash area, plant and machinery storage, Heavy Goods Vehicle (HGV) / delivery turning area and waste storage areas.

2.3.10 For security and safety purposes, any live construction areas would be closed to the public throughout the construction phase. Site security staff would patrol the Panel Areas in addition to hazard warning signs and CCTV.

2.3.11 The main compound would include:

i) temporary offices/buildings providing office, canteen, and welfare facilities for construction operatives.
ii) parking areas construction workers.
iii) dedicated waste storage areas.
iv) fuel and oil chemical stores.

v) equipment and material laydown areas.

2.3.12 All construction staff would arrive and park at the main construction compound. During periods of maximum construction activity, when manpower requirements would be greatest, staff would be encouraged to car share and/or use minibuses provided by the contractor from a central pickup location away from the Site. These arrangements would be included within a Construction Phase Travel Plan, which would be agreed as part of the consenting process.

2.3.13 At the end of the construction period the construction compound would be decommissioned. Materials would be removed, and the areas would be restored to grassland.

Construction Plant

2.3.14 Plant on site is likely to comprise:

i) A number of small scale mechanical pile driving rigs for frame supports.
ii) 360° excavators.
iii) Dumper trucks and rollers for access tracks.
iv) Trenching machines.
v) Telehandlers.
vi) Cranes for transformers and Battery Energy Storage System and inverter containers.

2.4 Main Construction Works

2.4.1 The main construction phases of the project are described below.

Site Preparation and Development of Construction Compounds

2.4.2 The perimeter of the construction Site would be fenced with the proposed deer / stock fencing. Temporary Heras fencing or similar would be used around compounds and other work areas until the perimeter fencing is erected and the Site secured.

2.4.3 The construction compound(s) would be created for the initial Site earthworks phase. The compound would provide temporary Site offices, welfare facilities and material and plant storage areas. Dedicated refuelling areas and chemical and oil storage

areas would also be provided within the compound as required and these would be fully bunded to comply with Natural Resources Wales requirements.

2.4.4 The numbers and size of this equipment would depend on the works that are being undertaken on site at a given time.

Earthworks, Foundations and Piling

Excavations

2.4.5 The topsoil excavated for the permanent access tracks and foundations for the Transformer Stations, BESS, Substation Building, Control Room and Switchroom Building would be re-used on site or stored adjacent to the excavations for use in restoration following decommissioning.

Temporary Excavations

2.4.6 Temporary excavations required for construction would be minimal and would primarily be associated with trench excavations for cable runs. Topsoil and subsoil would be stored separately immediately adjacent to the excavation in stockpiles not exceeding 1 m in height. Temporary excavations would be reinstated immediately following construction to restore the previous soil profile. Topsoil would be graded out to marry the excavations with the existing site levels and the areas would be seeded with a meadow grassland seed mix suitable for sheep grazing as detailed above.

Foundations

2.4.7 The foundations for the Transformer Stations, Substation, Control Room and Switchroom Building would be slab foundations or concrete sleepers, depending on ground conditions.

2.4.8 Foundation slabs and sleepers would be cast in-situ and concrete would be delivered directly to the Site via concrete mixer lorry.

Piling

2.4.9 As set out above the support posts for the solar panel frame would be ram driven into the ground using a number of specialist small scale GPS controlled piling machines to a depth of approximately 1.2 m depending on ground conditions. A

typical small scale piling machine used for solar farm construction is illustrated in the image below.

Lighting

2.4.10 Lighting during construction would need to be sufficient to satisfy health and safety requirements, whilst ensuring impacts on the surrounding environment, including from sky glow, glare and light spillage, are minimised.

2.4.11 Artificial lighting would only be used during the hours of darkness, low levels of natural light or during specific construction tasks to ensure the health, safety and welfare of those on site, including construction staff and visitors.

2.4.12 Appropriate lighting would be installed and operated to ensure that:

i) access/egress points are clearly visible during operational hours.
ii) staff and visitors can move safely around site.
iii) site security can be monitored and maintained.
iv) sufficient area lighting is provided for the Site office and laydown areas.

2.4.13 This would involve the use of mobile task lighting to provide the lighting necessary to satisfy Health and Safety requirements. Mobile lighting would be mounted on telescopic poles.

2.4.14 Construction would take place 07:00 until 18:30 Mon to Friday and 07:00 until 13:00 on Saturday. No construction would take place on Sundays or Bank Holidays.

2.5 Operation

2.5.1 Once the Proposed Development is constructed access to the Site would be limited to routine solar maintenance and landscape management operations. The Proposed Development would not be permanently staffed. Maintenance access to the Site would be by a small van or similar.

2.5.2 Should more major repairs be required, such as the replacement of transformer stations, more staff and specialist equipment (cranes and low loaders) would be required. This is not anticipated to be a regular occurrence.

2.5.3 The main operational noise would be associated with the string inverters, transformer station, and BESS containers. These noise levels have been determined to be not

significant through the design process, with levels emitted by fixed plant predicted to be below background noise levels at sensitive receptors.

2.5.4 As set out above the main activity during the operational phase of the development would be grazing of a flock of sheep below the solar panels and/or periodic mowing or other landscape maintenance. This would retain most of the Site in productive agricultural use.

2.6 Decommissioning

2.6.1 At the end of the Solar Farm's 40-year life the Proposed Development would be decommissioned and the Site would be returned to solely agricultural use, unless a new planning application is forthcoming. Decommissioning would require similar plant to the construction phase and would result in very similar traffic impacts.

2.6.2 All above and below ground infrastructure would be removed from Site and would be recycled, if possible. Following decommissioning at the end of the schemes operational life or when panels need to be replaced due to failures/damage solid waste would be created. Solar panels comprise a high proportion of glass along with smaller amounts of aluminium and other metals. All of these components are readily recyclable. As the solar industry expands the recycling market is following. There are an increasing number of specialist recycling firms that are developing technologies to allow the photovoltaic cells to be more easily recycled, enabling an even greater proportion of the solar panels to be recycled. In addition, support frames, fencing, CCTV poles and cabling all contain recyclable materials and stone/concrete can be processed for use as secondary aggregate.

2.6.3 Solid waste generated by decommissioning works can therefore be effectively managed by moving waste up the waste hierarchy through recycling for beneficial use. As such significant effects associated with disposal of waste as a result of the Proposed Development would not occur.

3.0 THE BRIEF AND VISION

3.1.1 Newport City Council declared a climate and ecological emergency in November 2021.**Error! Bookmark not defined.** Subsequently, an Organisational Climate Change Plan[2] was developed which sets out the themes, priorities, actions and milestones required to achieve net zero carbon by 2030, and that the services provided support the city's journey to net zero and adaptation to climate change. One of the measures to reduce emissions cross the city is to continue to install solar PV wherever possible. The report highlights the need for ground based solar PV, in stating that larger schemes "*can make a greater contribution to tackling the climate emergency*".

3.1.2 Newport has demonstrated a downwards trend in GHG emissions since 2005, with nearly a quarter of Newport's total renewable energy generation attributed to solar. A significant supplier is Llanwern Solar Farm, which experienced the largest increase in energy generation across all renewable technologies between 2020 and 2021. Llanwern Solar Farm and associated battery storage has a capacity of 75 MW, which demonstrates the even greater contribution the Proposed Development can make at an export capacity of 99.9 MW.

3.1.3 Solar farms, such as Craig y Perthi, would make a meaningful contribution to both local, and national climate commitments, and help tackle both the climate and cost of living crises we face. The Proposed Development would be able to meet the equivalent energy needs of over 45,374 Welsh homes and save 3,180,368 tonnes of CO_2, which is the equivalent of planting over 52 million trees.

3.1.4 The need for the Proposed Development as a contributor towards the UK's and Newport's target to reach Net Zero by 2030 is clear. If the legal commitments set out within the Act and the subsequent Climate Change Regulations have any chance of being achieved, through a sustainable solution, there is a need for significant deployment of grid scale renewable energy such as the Proposed Development.

[2] *Newport City Council Organisational Climate Change Plan 2022-27*

4.0 SITE AND CONTEXT ANALYSIS

4.1.1 It is appropriate for the Applicant to consider how the development can be designed so that it integrates as far as possible into the locality, is sympathetic to the local character and history of the area, as well as overcoming any environmental or land-use constraints that may influence the design of the project.

4.1.2 Historically, due to the cost of solar panels and price disparity with fossil fuels, the development of large-scale solar farms was only economically feasible with the support of Government subsidies. More recently, the cost of manufacturing large-scale solar panels has dropped. Alongside significant improvements in the efficiency of the panels themselves, it has meant that development of commercial solar projects, within areas of the world that do not benefit from extensive periods of sunshine across the year, has become much more commercially viable. Nonetheless, and solar farm project needs to be carefully designed to ensure that the cost of grid connection in particular, is minimised by reducing the distance across which connection cabling is required. Locating solar arrays to their point of connection to the grid also helps to reduce the need for third-party land negotiations and minimised the loss of efficiency when transferring electricity along the cables once it is operational. For this reason, a site has been sought that can accommodate a substation and can connect to the National Grid via underground cabling to Severn Power Station.

4.1.3 At the outset of the project a desk-based review was undertaken to identify the extent of which the environmental conditions on the Site and the surrounding area which could influence the design of the facility. This included the following:

i) The Gwent Levels Landscape of Historic Interest and the Caldicot Levels Special Landscape Area (SLA) are located approximately 1.1 km to the south of the Site
ii) Magor Conservation Area is located approximately 2 km to the east. The centre of Redwick to the south is also recognised as a conservation area
iii) Scattered Ancient Woodland located to the east and west of Bishton and on the western fringes of the site boundary
iv) Llanwern Park, a Registered Park and Garden, is located to the north west of the Site
v) The Gwent Levels - Redwick and Llandevenny SSSI briefly overlaps the Site within the south-easternmost portion, with the majority of the SSSI outwith of the

site, separated by the Tata Steelworks, Tesco Distribution Centres, and the South Wales Main Line. The SSSI is 940 ha in total, with only a small area included within the Site. A large proportion of this area is devoted to serve as a wildlife enhancement area in the plans.

vi) No other statutory environmental designations are within the Site, though there are three schedule monuments near to the Site. These are:

vii) Bishton Castle – located to the north of Bishton, adjacent to the Site boundary, and is the location of a medieval castle or fortified house.

viii) Wilcrick Hill Camp – located approximately 600 m to the east of the Site, and is the location of a probable Iron Age Hillfort.

ix) Deserted Medieval Village – Located to the northwest of Wilcrick Hill Camp, and is a collection of earthworks comprising four rectangular enclosures.

4.1.4 Solar farms are not vulnerable to the effects of flooding since the majority of the development is raised off the ground allowing for arable grazing to continue throughout the life of the development. Some elements, for example, the transformer station and battery units, could be impacted upon by flood event, and it is best practice and sequentially preferable to therefore avoid development in fluvial flood zones. For this reason, the substation and BESS facilities were not located within areas at risk of flooding.

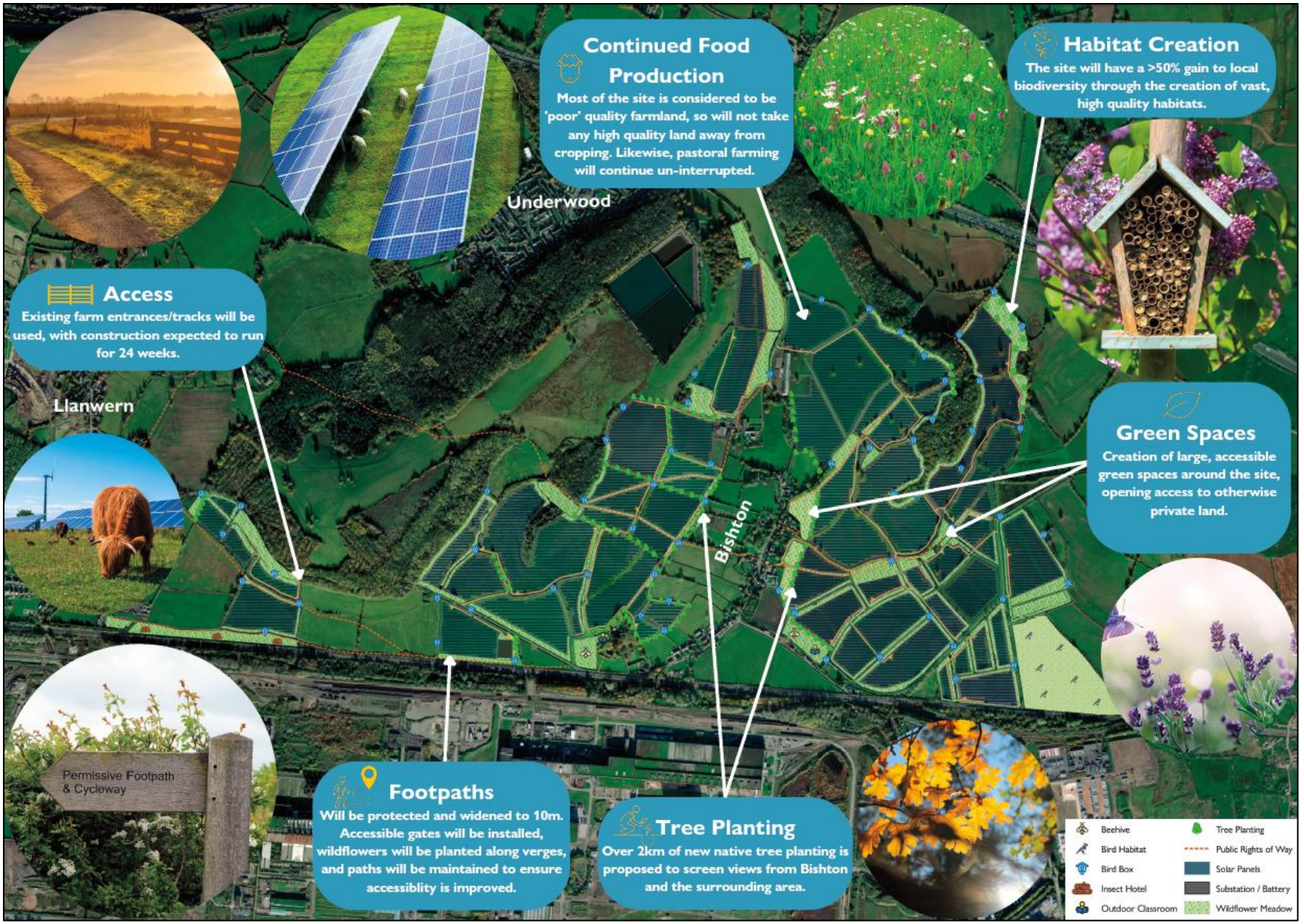
4.1.5 Due to the relatively flat nature of the Site and screening offered by established trees and hedgerows, the development would have a limited impact on the local landscape. Nonetheless, the layout of the Proposed Development has been Buffers of 5 m would be retained between solar panels and existing hedgerows to ensure they would not be affected or need grubbing-up and removing ahead of panel installation.

5.0 INTERPRETATION

5.1.1 Image 5.1 presents a concept plan that conveys the main ideas for the Proposed Development. The main components of the site design include the following elements:

i) Existing farm entrances and track would be used during the 24-week construction period.
ii) Pastoral farming is able to continue uninterrupted, as no high-quality land would be lost.
iii) The site would have over 50% biodiversity net gain through the creation of vast, high quality habitats.
iv) Large, accessible green spaces would be created around the site, opening access to otherwise private land.
v) Over 2 km of new native tree planting is proposed to screen views from Bishton village and the surrounding area.
vi) Footpaths would be protected and widened to 10 m and accessible gates would be installed. Wildflowers would be planted along verges and paths would be maintained to ensure accessibility is improved.

Image 5.1: Concept Plan



6.0 DESIGN DEVELOPMENT

6.1.1 At the outset of the project a desk-based review was undertaken to identify the extent to which the environmental conditions on the Site or in the local area, could influence the design. This review identified the following:

i) The Site, as originally identified was outside of any statutory environmental designation.[3]
ii) The local topography was relatively flat, with a network of existing hedgerows and trees capable of being retained and thus providing a good level of screening of development on the Site, particularly given local heritage receptors such as St Mary's Church and (former) Bishton Castle.
iii) The site is within an area that has a relatively low population density.
iv) Good access to the M4 motorway via Magor Interchange and Coldra Roundabout.

6.1.2 Areas of flood risk were identified within the Site from the Natural Resources Wales' Flood Risk Map Viewer. Solar farms are not particularly vulnerable to the effects of flooding by virtue of the majority of the development being raised off the ground i.e., the bottom edge of the solar panels are 800 mm above ground level. Certain elements could be impacted by flooding e.g., transformer station, control room etc. However, these are capable of being designed so they are raised above flood levels on development plinths. On the basis that the facility would not be permanently staffed and can be managed remotely there is no material risk to staff from flooding events.

6.1.3 Surface water flooding generally occurs during intense rainfall events as a result of local topography, lack of storage in local drainage networks and/or ground conditions. As set out above flood risk does not present a significant development constraint. However, it was considered preferable to locate the main operational compound, which includes the Battery Energy Storage compound, outside areas shown to be susceptible to surface water flooding.

6.1.4 Solar farms are not particularly noisy. However, there is potential for noise to be generated from the Battery Energy Storage containers, the associated transformers

[3] As a result of feedback gained through engagement with Natural Resources Wales a small area of the Gwent Levels – Redwick and Llandevenny Site of Special Scientific Interest was included within the planning boundary for the purposes of providing enhanced mitigation in the form of lapwing habitat.

and inverters, as well as the substation. Alternative locations for the compound were considered to minimise distance to the Castletown Sub-station and alternatively minimise distance to the road network. However, it was decided to locate the compound in a position where the distance to the nearest properties was maximised, whilst paying regard to other factors such as flood risk.

6.1.5 The factors set out above provided the main drivers for the layout of the scheme. Other design principles which were adopted to reduce the environmental effects of the development were:

i) Retaining the existing field patterns and hedgerows by maintaining a minimum 5 m buffer between field boundary vegetation and the fencing around the development areas.
ii) Use of existing field access routes/gates between fields to reduce loss of hedgerow and existing trees.
iii) Retaining existing topography across the Site by using ram-driven posts to mount the solar arrays, which result in minimal soil disturbance and do not require cut-and-fill construction methods, allowing the existing landform to be retained.
iv) Locating transformers at distances greater than 50 m from properties to reduce noise impacts.
v) Application of a 4.5 m buffer from the 33kV OHL, with the exception of access tracks crossing beneath.

6.1.6 A preliminary layout was developed, and this was subject to assessment by the following various specialists appointed on the project:

i) Landscape.
ii) Heritage.
iii) Ecology.
iv) Trees.
v) Noise.
vi) Glint and Glare.
vii) Agricultural Soils.
viii) Transport.

6.1.7 Having reviewed the initial layout, the Glint and Glare specialists advised that there was potential for impact on residential receptors at Bishton and users of a 400 m

section of the M4 motorway, for a just west of Junction 23, and 800 m section of the B4245 by Wilcrick. Impacts from glint and glare arise when the angle and tilt of the panels reflect sunlight towards receptors during certain times of the year and day. Mitigation was subsequently proposed to provide a suitable level of vegetation screening. With this mitigation implemented, any risk associated with glint and glare would be low.

6.1.8 Noise, which can arise from equipment such as the Battery Energy Storage containers varies depending on the specification/manufacturer of the equipment. However, detailed noise modelling identified that noise emitted from operational plant required for the Proposed Development would be lower at noise sensitive receptors that nth existing ambient noise levels. Therefore, not considered necessary to amend scheme design in relation to potential noise impacts.

6.1.9 A tree survey and assessment of the Site was undertaken, which identified numerous trees, including some potential veteran and ancient trees, that could be impacted by the proposed layout. Suitable buffer zones for these trees were identified, which required the removal of a limited number of solar arrays.

6.1.10 Unlike other forms of development, solar farms generally have very minor impacts on soil quality due to their physical footprint being limited to the hollow solar panel supports, which are driven into the ground, access roads, compounds and Battery Energy Storage containers/inverter stations. Nonetheless, to reduce impact on soil quality, the access roads incorporated within the Site make use of farm access tracks where practicable to do so, and Battery Energy Storage / inverter stations have been positioned alongside these access tracks, at the edge of field units.

6.1.11 Onsite surveys to establish the agricultural land classification for the Site were undertaken by Amet Property in October and November 2021. These surveys confirmed that the Site did not include any land graded at 3b or above, which is considered Best and Most Versatile Agricultural Land. The Site consists of 31.1 ha of Grade 3b land and 163.6 ha of Grade 4 land.

6.1.12 Despite the lack of Best and Most Versatile Agricultural Land within the Site, the access roads and Battery Energy Storage / inverter stations were retained in the original locations, where there would be the least amount of impact on soil quality within the individual field units.

6.1.13 In relation to impact on agriculture it should be noted that the vast majority of a solar farm can remain within agricultural use by grazing sheep beneath the panels. Further the reduced intensity of agricultural practices, including application of fertiliser, biocides, reduced soil disturbance and soil compaction means that over the lifetime of the solar farm the soil quality at the Site is likely to improve. When the solar farm is decommissioned, the land can continue to be used for agriculture, potentially with greater productivity.

6.1.14 In relation to impacts on landscape character and visual amenity, the preliminary assessment concluded that the development would have a relatively limited impact on local landscape character outside the Site, largely due to extensive vegetation at field boundaries creating relatively contained field units. However, it was advised that a number of measures could be adopted to reduce and mitigate the landscape and visual effects of the development, several of which would also deliver biodiversity benefits:

i) Removing fields from the Proposed Development that were near Bishton, near St Cadwaladr's Church, to the east in close proximity to Wilcrick Hill and to the west and north close to Llanwern Park. This resulted in the final design being more logical and compact, less 'visible' and better integrated into the immediate and wider landscape.
ii) Proposed native species rich gap filling planting would be introduced into the existing retained vegetative structure. This would strengthen and give additional height to the existing vegetative structure, where required and reinforce the surrounding regular landscape pattern.
iii) Incorporating substantial offsets from the settlement fringes of Bishton.
iv) Providing wide corridors of improved access, signage and information along all PRoW that cross and border the Site.
v) Selected managing, retaining and enhancing of boundary and internal vegetation, including the reens.
vi) All existing retained hedgerows surrounding and within the Proposed Development would be enhanced, where appropriate and maintained at a minimum height of 3 m.

7.0 THE PROPOSAL

7.1 Character

7.1.1 The Proposed Development would generate and store electricity from photovoltaic solar panels and associated battery storage. The use of inverter technology would allow direct current (DC) into alternating current (AC) which could then be exported to the local electricity distribution network.

7.1.2 The panels would be tilted at a horizontal angle of approximately 15-25° and would face due south, or 180° from north. The layout, angle and tilt of the solar panels has been designed to maximise solar efficiency across the solar farm, whilst avoiding adverse impacts in relation to glint and glare. The solar farm layout has been designed by modelling sun paths and the shadowing that this results in. This results in an optimum design of solar exposure of the panels, whilst ensuring there is no overshadowing of adject arrays.

7.1.3 Whilst due south is the optimum direction for solar arrays, often impacts associated with glint and glare require slight amendments to the layout and orientation of solar arrays to avoid adverse impacts at local receptor points. An assessment of glint and glare impacts was undertaken on the solar arrays orientated due south, focusing on potential impacts at local residential receptors, the South Wales Main Line railway and nearby road infrastructure, comprising the B4245 and the M4.

7.1.4 Whilst the orientation of the solar arrays has not deviated from due south, glint and glare impacts have been mitigated, either through the presence of existing vegetation screening, or the additional of new screening, as indicated on Figure 4.1 Landscape Masterplan. As the issues associated with glint and glare have been iterative to the emerging design, it is unlikely that there would be any glint and glare impacts as a result of the Proposed Development that cannot be mitigated.

7.1.5 The solar PV support frames would be arranged into rows set 4 m to 10 m apart, depending on the location within the Solar Farm and the requirement for access between frames. The lower, front edge of the solar panels would be raised approximately 800 - 1050 mm above ground level, with the rear edge raised to a maximum of 3 m above ground Level. This spacing would enable the area under the panels to be continuously grazed by sheep.

7.1.6 The solar PV support frame structures would consist of steel uprights and aluminium or steel cross bars. The steel uprights would comprise hollow 3 mm sheet steel post with a u-shaped cross section.

7.1.7 The posts would be ram driven into the ground using several specialist small scale GPS controlled piling machines to a depth of approximately 1 m to 2 m, depending on ground conditions. The rest of the support frame would then be fitted to the posts to create angled support tables ready for the solar panel installation.

7.1.8 The solar PV modules would be mounted support frame tables, which would be pre-constructed to help minimise on-site construction activity. The individual solar PV modules within the Proposed Development would likely consist of dark blue, dark grey or black photovoltaic cells, however solar technologies are developing rapidly and it is not possible to specify the precise panel type, as this would depend on the competitive procurement.

7.2 Access

7.2.1 Operational access to the Site would largely be from the east via Bishton Road.

7.2.2 The Proposed Development would seek to use existing farm track routes, where practicable, alongside new access tracks approximately 4 m wide and constructed of crushed hardcore. The access tracks have been located so they utilise existing field gates between fields to reduce the impact on hedgerows.

7.2.3 The permanent access track would be formed by excavating 200 mm and laying clean Type 1 hardcore within a geogrid over a compacted soil base.

7.3 Movement

7.3.1 During the operational phase, the Proposed Development would greatly improve accessibility of pathways with the installation of accessible gates, re-stating all footpath bridges across ditches and reens and creating enhanced footpaths. All footpaths would be protected and widened to 10 m, equipped with educational plaques describing local wildlife and the surrounding landscape. Furthermore, the introduction of new permissive pathways would allow additional use of an otherwise private site, linking the pathways to 36 ha wildflower meadows and recreational sites situated in several areas across the Site. All footpaths would be planted with wildflower margins.

7.4 Environmental Sustainability

Landscape / Habitat

7.4.1 The landscape proposals for the Site are illustrated indicatively on Figure 4.2 of the ES and would be developed in detail prior to commencement of the development.

7.4.2 The soft landscape proposals build on the existing landscape features and comprise:

i) Retention of existing vegetation patterns as far as practicable by maintaining a minimum 5 m buffer between field boundary hedgerows and woodland, and the stock fencing around the development areas.
ii) Creation of buffer zones between fence lines and field boundaries for habitat connectivity, either seeding these areas with species-rich grassland mixes or allowing natural regeneration through a managed rewilding approach.
iii) Gaps in existing hedgerows would be planted up, and the hedgerows would be maintained at a height of approximately 3 m to provide enhanced visual screening.
iv) Planting over 11 km of new hedgerow.
v) Planting belts of specimen trees along field boundaries within the Site to screen local views and provide habitat connectivity.
vi) Use of Native species trees and shrubs to diversify the range of native species in the local area to reduce biosecurity threats from pests and disease.
vii) Creation of approximately 12 hectares of breeding bird habitat.

7.4.3 With respect to bird species using the Site, during the accepted nesting season (March to August inclusive) construction would not take place in areas where nesting birds have been recorded. This would require the installation programme to be managed in a way that is complimentary to the establishment of further breeding bird mitigation, as described in Chapter 9 of the is ES.

7.4.4 Existing farm access tracks would be used wherever practicable during construction, maintenance and decommissioning. This would help to utilise existing hedgerow gaps, which would minimise the loss of breeding habitat for birds.

7.4.5 The solar arrays have been designed with significant clearance between rows, which would permit vegetation growth beneath the panels and continue to provide bird foraging and potential nesting habitat. By design, solar panels would be positioned

at an inclined angle and this, along with the large gaps between rows, would enable birds to distinguish the surface of the solar panels from a water body.

7.4.6 With respect to otter and water voles, the Proposed Development has also been designed so that it there would be no obstructions to watercourses, therefore allowing any fauna to commute freely.

Energy and Resource Efficiency

7.4.7 The Proposed Development would result in the displacement of over 3,350,000 tonnes of CO_2 from equivalent fossil fuel energy, which equates to taking c. 707,000 cars off the road for a year or planting 52 million trees.

7.4.8 The inclusion of a BESS onsite ensures that solar farm can be as flexible as possible in delivering energy to the grid. The solar farm would generate enough clean, cheap energy to meet the equivalent annual energy needs of over 45,347 Welsh homes.

7.5 Community Safety

7.5.1 During construction of the Proposed Development, working hours would be restricted to the following days and hours of working to minimise noise and disturbance on the local community:

i) Monday to Friday 08:00 – 18:00 and Saturday 08:00-13:00; with
ii) No works on Sundays or Bank Holidays.

7.5.2 Further information is provided in Chapter 4.0 of the ES. Construction would be undertaken in line with standard highway safety protocols and guidance. During operation, the Proposed Development would remain within background noise levels, adding no additional noise to the area.

7.5.3 The perimeter of the Proposed Development would be secured with Heras fencing and CCTV during and after construction.

7.5.4 There is no existing or proposed public access to the site. However, there are a number of Public Rights of Way that cross the Site which represent well established and historic community routes. These are illustrated on Figure 4.2 of the ES. The majority of these PRoW are designated as footpaths, with the exception of a Restricted Byway (388/22/1) that runs for approximately 150 m south of Castle Farm

Shop, and a Green Lane (388/GL4/1), which starts immediately south of the residential property called Wellsworth, and runs north-east through to Ridings Wood.

7.5.5 All of these PRoW would remain open for public use during both construction and operation of the Proposed Development. All footpaths would be widened to a minimum of 10 m to improve accessibility, with ongoing management to maintain surfaces and the wildflower margins that would be planted within these routes.

7.6 Response to Planning Policy

7.6.1 The Intergovernmental Panel on Climate Change (IPCC) was set up by the World Meteorological Organization (WMO) and the United Nations Environmental Programme (UNEP) to provide an objective source of scientific information on climate change. In 2013, the IPCC provided a globally peer-reviewed report about the role of human activity in climate change when it released its Fifth Assessment Report. The report was categorical in its conclusion: climate change is real and human activities, largely the release of polluting gases from burning fossil fuel (coal, oil, gas) is the main cause."

7.6.2 The impacts of a 1.1°C increase are already being experienced in the increased frequency and magnitude of extreme weather events from heatwaves, droughts, flooding, winter storms and wildfires. The UN Environment Programme (UNEP) has concluded the following:

i) The global average temperature in 2019 was 1.1°C above the pre-industrial period; (WMO).
ii) 2019 concluded a decade of exceptional global heat, retreating ice and record sea levels driven by greenhouse gases produced by human activities. (WMO).
iii) 30% of the world's population is exposed to deadly heat waves more than 20 days a year (Cooling and Climate Change fact sheet, UNEP).
iv) Average temperatures for the five-year (2015-2019) and ten-year (2010-2019) periods are the highest on record. (WMO).
v) In 2019, total greenhouse gas emissions, including land-use change, reached a new high of 59.1 gigatonnes of carbon dioxide equivalent (GtCO2e). (EGR, 2020).
vi) Based on today's insufficient global commitments to reduce climate polluting emissions, a rebound in greenhouse gases from a return to high-carbon societies

after the pandemic may push 2030 emissions even higher – up to 60 GtCO2e (EGR, 2020).

7.6.3 In 2019, the UNEP, in parallel with the IPCC, set out a series of measures required to limit global warming and act on the climate emergency. This included:

i) *"To prevent warming beyond 1.5°C, we need to reduce emissions by 7.6% every year from this year to 2030. (EGR, 2019).*
ii) *10 years ago, if countries had acted on this science, governments would have needed to reduce emissions by 3.3% each year. Every year we fail to act, the level of difficulty and cost to reduce emissions goes up. (EGR, 2019)*
iii) *Deep reductions in methane will be necessary to help limit global warming to 1.5°C or 2°C, according to IPCC. Over 75 per cent of methane emissions could be mitigated with technology that exists today – and up to 40 per cent at no net cost according to the International Energy Agency. (Methane Emissions fact sheet, UNEP)*
iv) *For governments, a green COVID-19 recovery could cut 25 per cent off 2030 emissions, putting the world on track to a 2°C pathway. (EGR, 2020)*
v) *Nations agreed to a legally binding commitment in Paris to limit global temperature rise to no more than 2°C above pre-industrial levels but also offered national pledges to cut or curb their greenhouse gas emissions by 2030. This is known as the Paris Agreement. The initial pledges of 2015 are insufficient to meet the target, and governments are expected to review and increase these pledges as a key objective this year, 2021.*
vi) *The updated Paris Agreement commitments will be reviewed at the climate change conference known as COP 26 in Glasgow, UK in November 2021. This conference will be the most important intergovernmental meeting on the climate crisis since the Paris agreement was passed in 2015.*
vii) *The success or otherwise of this conference will have stark consequences for the world. If countries cannot agree on sufficient pledges, in another 5 years, the emissions reduction necessary will leap to a near-impossible 15.5% every year. The unlikelihood of achieving this far steeper rate of decarbonization means the world faces a global temperature increase that will rise above 1.5°C. Every fraction of additional warming above 1.5°C will bring worsening impacts, threatening lives, food source, livelihoods and economies worldwide*
viii) *Countries are not on track to fulfil the promises they have made".*

7.6.4 The COP26 International Climate Conference took place in Glasgow from 31 October to 12 November 2021. The main goal was to secure global net zero by mid-century and keep a maximum of 1.5°C of warming within reach ('the Glasgow Climate Pact'). This is to be achieved by:

i) Accelerating the phase-out of coal.
ii) Curtailing deforestation.
iii) Speeding up the switch to electric vehicles.
iv) Encouraging investment in renewables.
v) Adapt to protect communities and natural habitats.
vi) Mobilise at least $100bn in climate finance per year.

7.6.5 The COP27 International Climate Conference took place in Sharm el-Sheikh, Egypt from the 6 November to the 18 November 2022. The 2015 Paris agreement contained two temperature goals – to keep the rise "*well below 2°C*" above pre-industrial levels, and "*pursuing efforts*" to keep the increase to 1.5°C. Science since then has shown that 2°C is not safe, so at COP26 countries agreed to focus on a 1.5°C limit. As their commitments on cutting greenhouse gas emissions were too weak to stay within the 1.5°C limit, they also agreed to return each year to strengthen them, a process known as the ratchet.

7.6.6 The COP27 agreement contained a provision to boost "*low-emissions energy*". That could mean many things, from wind and solar farms to nuclear reactors, and coal-fired power stations fitted with carbon capture and storage. What is clear is that the world is slowly waking up to the need to tackle climate change, and that need is getting increasingly critical every year.

Future Energy Scenarios 2022

7.6.7 The UK/Welsh Government published a Future Energy Scenarios report in 2022 which contemplated a number of options to meet the energy demand in line with the legally binding target of reaching Net Zero by 2050, as well as running a fully decarbonised electricity system consistently by 2035.

7.6.8 Whilst the use of an interconnector to provide resilience and flexibility may be part of the solution, this opens up the Island energy market to a number of risks from external factors. Since this report was produced the world, in particular Europe, has

experienced a seismic shift in the way the energy market is viewed. This has highlighted the value and importance of domestic sources of energy.

7.6.9 Energy markets began to tighten in 2021 because of a variety of factors, including the extraordinarily rapid economic rebound following the pandemic. But the situation escalated dramatically into a full-blown global energy crisis following Russia's invasion of Ukraine in February 2022. The price of natural gas reached record highs, and as a result so did electricity in some markets.

7.6.10 Higher energy prices have contributed to painfully high inflation, pushed families into poverty, forced some factories to curtail output or even shut down, and slowed economic growth to the point that some countries are heading towards severe recession. Europe, whose gas supply is uniquely vulnerable because of its historic reliance on Russia, could face gas rationing this winter, while many emerging economies are seeing sharply higher energy import bills and fuel shortages5.

7.6.11 The entire world economy is much more interlinked than it was 50 years ago, magnifying the impact. That's why this recent crisis has been referred to as the first truly global energy crisis. Climate policies have been blamed in some quarters for contributing to the recent run-up in energy prices, but there is no evidence to support this theory. In fact, it is widely recognised that a greater supply of clean energy sources and technologies would have protected consumers and mitigated some of the upward pressure on fuel prices.

7.6.12 Whist the FES concludes that reliance on the Interconnector to meet the climate change obligations is economically preferrable, over-reliance on it at the cost of on-island generation of renewable and low carbon options is dangerous from an energy price and sector stability perspective.

7.6.13 Achieving energy self-sufficiency alongside carbon net-zero may in reality be a pipedream without huge investment and loss of natural resources. Nonetheless it is widely recognised that it is economically, socially, and environmentally preferrable to have a wide basket of energy options so that the electricity sector can react to cost variation and technology failing. The Proposed Development would assist both Newport and Wales in both in terms of meeting their climate change obligations, and help safeguard businesses and communities as a result of global events beyond Newport's control.

8.0 CONCLUSION

8.1.1 This DAS has been produced as part of the Pre-Application Consultation in relation to a DNS application to be made by JBM Solar Projects 25 Ltd to PEDW. The Proposed Development consists of photovoltaic solar panels and associated battery storage, with an export capacity of 99.9 MW. The solar farm would operate for 40 years, after which all components would be removed and the Site returned to its current condition and use.

8.1.2 The Proposed Development has been strategically located to accommodate a substation which would connect to the Severn Power Station via underground cabling and exported to the National Grid, whilst minimising impacts on nearby constraints. The Proposed Development also includes proposals to maximise usage of the surrounding landscape and achieve a biodiversity net gain of over 50%.

8.1.3 No physical alterations to the existing access from the highway network are proposed. Traffic management measures for construction are detailed in the submitted CTMP and would be secured via pre-commencement planning conditions.

8.1.4 Following installation, the site would be limited to routine solar maintenance and landscape management operations. The Proposed Development would not be permanently staffed and maintenance access would be by a small van or similar.

8.1.5 Craig y Perthi Solar Farm would produce enough clean electricity to power approximately 45,374 Welsh homes, equivalent to two thirds of homes in Newport. The Proposed Development would therefore make a significant contribution to renewable energy and Net Zero targets, in line with regional and national policy.