

CHAPTER 4 ALTERNATIVES

4 ALTERNATIVES & DESIGN EVOLUTION

Introduction

- 4.1 Under the EIA Regulations, an ES is required to provide a description of the reasonable alternatives studied by the Applicant and the reasons for the choices made including a comparison of environmental effects.
- 4.2 Regulation 17 of the EIA Regulations require an applicant to provide:
- *“a description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment”.*
- 4.3 Schedule 4 (2) is worded slightly differently and requires:
- *‘A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.’*
- 4.4 The form and location of the Development has been influenced by a range of factors, including surrounding uses and landscape character, environmental impact assessment and input from PCC, Natural Resources Wales (NRW), Cadw, Dŵr Cymru (DCWW), Heneb and other statutory consultees and stakeholders.
- 4.5 This chapter, therefore, reviews the principal land use and siting options explored and the reasoning for the selection of the current design for the Development which forms the subject of assessment within the ES, with a comparison of environmental effects. The following four alternative options have been identified:
- The ‘do nothing’ alternative where the Development is not progressed;
 - Alternative locations for the Development;
 - Alternative uses for the Site; and
 - Alternative design / layout for the Development in the context of the design evolution.

The ‘do nothing’ Alternative

- 4.6 The ‘do nothing’ alternative refers to the option of leaving the Site in its current state, as described in Chapter 3 Site and Development Description, and the Development would not be progressed. In this scenario, the existing configuration of the land would remain the same in the form of agricultural fields that are predominately used for agricultural purposes as well as horse livery. As such, the significant impacts both adverse and beneficial that are highlighted in this ES would not occur.
- 4.7 The generation of solar energy is one of the key elements towards the UK achieving net zero carbon, therefore not adding to the total amount of greenhouse gases in the atmosphere. Under current legislation and policy, the UK Government is obligated by law to reduce carbon emissions and to achieve net zero carbon emissions by 2050. These obligations underpin the need for renewable energy, such as solar. The Development will have an export capacity of approximately 30MW. Should the Development not be taken forward, its energy-generating potential and potential carbon savings would not be achieved. The ‘do nothing’ alternative would result in the loss of the generation of this renewable energy in line with UK Government targets, therefore the Applicant did not consider this to be an acceptable or realistic alternative option.

Consideration of Alternative Locations & Uses

- 4.8 The Development must be located near an existing grid connection to ensure that renewable electricity generated can be viably exported to the National Grid Electricity Distribution (NGED) network with minimal new infrastructure. The Applicant has a tee-in agreement at or near pole 82 of the Pembroke to Golden Hill 132 kV circuit. Owing to the Applicant having a viable point of connection which can facilitate the Development and enable the project to energise in July 2027, and the Welsh Government’s ambitious target for the deployment of new solar generating capacity by 2030 no other uses were considered for the Site.
- 4.9 The Applicant assessed potential sites that could accommodate the Development within a 3km radius of the 132 kV circuit, which begins at Pembroke Substation and ends at Golden Hill Substation. The assessment follows a sequential approach whereby potential sites were assessed against the site selection criteria to determine suitability for the Development, starting with previously developed land (PDL) which would compromise locations such as former golf courses. If there are no suitable PDL sites that meet the site selection criteria within the search area, then a search for suitable non-agricultural sites will be considered. Following this, if non-agricultural sites are not suitable, sites with lower grade agricultural land (Grades 3b, 4 and 5) or the minimum amount of BMV (with preference given to Grade 3a, followed by Grade 2 and, as a last resort Grade 1) will be identified. Previously developed sites, non-agricultural sites, and agricultural land will only be identified as suitable if they are within the defined search area and meet the site selection criteria.
- 4.10 The site selection criteria included operational requirements and environmental considerations. Operational requirements include locations which benefit from high levels of solar radiation, suitable size, shape, orientation and topography, road access suitability for construction phase deliveries, availability for the lifetime of the Development, distance from settlements and not being allocated in the PCC Local Development Plan. Environmental considerations covered sensitive areas as classified by the EIA Regulations, flood risk, landscape and visual effect, heritage and ecology
- 4.11 As set out in the Alternative Site Assessment, a total of 9 sites were considered. Table 4.1 summarises the environmental considerations related to why the alternative sites were unsuitable for development.

Table 4.1: Environmental Considerations of the Alternative Sites

	Alternative Sites	The Site
Reasons for suitability or unsuitability	<p>The discounted alternative sites had one or more of the following unsuitable features:</p> <ul style="list-style-type: none"> • <u>Dwellings, commercial buildings and proximity to settlements</u> - sites with close proximity to settlements often can have visual, glint and glare and noise impacts from a solar farm development; therefore, sites located within close proximity to settlements were considered unsuitable. • <u>Proximity to the Pembrokeshire Coast National Park</u>- sites located within close proximity to the National Park pose a significant planning and environmental constraint to development. • <u>Logistics constraints</u> - sites needed adequate accessibility for construction and maintenance activities, as well as needed to be available for a 40-year operational period. 	<p>The Site has the following favourable conditions:</p> <ul style="list-style-type: none"> • No noise or glint and glare impacts are anticipated to nearby residential dwellings and there is distance from the villages of Pembroke and Lamphey • No visual impact to the Pembrokeshire Coast National Park • It is available for a 40-year operational period and concluded to have adequate access

Environmental Effects	<ul style="list-style-type: none"> • Sites with features such as woodlands and established field boundaries would require greater damage of these features to facilitate the Development. • Sites within or in close proximity to statutory ecology designations have a greater potential for environmental impacts to species and habitats. • Sites which contain cultural heritage assets such as Listed Buildings, Scheduled Monuments and Registered Historic Parks and Garden could lead to potential effects on these designations. • Sites with established rivers can be impacted in regard to water quality and increased surface water runoff. 	<p>The characteristics of the Site reduce the likelihood of environmental effects. There will be no removal of trees and hedgerows which will limit effects to species and habitats. There is low flood risk on Site, ensuring impacts to flood risk and water quality are reduced. As detailed in Chapter 6 Historic Environment and Chapter 9 Biodiversity, historic and ecological designations on Site are likely to experience beneficial effects as a result of the proposed planting regime.</p>
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4.12 In summary, the Site was identified as the most suitable option for the Development after consideration of operational requirements and environmental constraints.

4.13 The Site could connect to the grid network as early as 2027 thereby contributing to the 2030 Welsh renewable targets. Any new connection at this or any other location in the area, would only be available post 2035. This is due to the need for a new overhead line due to be constructed by 2036 to reinforce the grid network. This Site therefore avoids the long grid reinforcement timescales and associated constraints with the wider network. In view of the tight and challenging timescale for delivering the Government's ambitious target for the deployment of new solar generating capacity, a delay of this duration means that there isn't really any alternative.

Review of Land Availability and Suitability

Irradiance and Site Topography

4.14 The amount of electricity generated by the Development is directly affected by irradiance levels. Irradiance can be affected by surrounding topography, with an uncovered or exposed site of good elevation and favourable south-facing aspect more likely to increase year-round irradiance levels. The land within Pembroke is considered as having potential to locate a utility-scale solar development due to the large open area of undeveloped land, characterised by gently undulating topography, which would provide uniform exposure to irradiance, and generally sparse settlement patterns.

4.15 Given the rural nature of the immediate vicinity, there are numerous areas of open space, namely agricultural fields, along the 132kV point of connection. The nature of this landscape means many of these fields are devoid of overshadowing from vegetation (which is generally constrained to field or property boundaries) or tall buildings.

Agricultural Land Classification

4.16 As stated in Chapter 3 Site and Development Description of the ES, Welsh Agricultural Land Classification mappingⁱ, has shown that Grades 2 and 3a BMV land, as well as non-BMV, Grade 3b, is likely to be present within the Site. The Site was surveyed in April 2023 and January 2024 by Amet Property to determine the agricultural quality of the land. The survey (Appendix 8.1) identified the Site comprises 7.4ha of Grade 2, 35.3ha of Grade 3a, 46.8ha of Grade 3b and 6.5ha of non-agricultural land. Therefore, the Site has been assessed to contain 42.7ha of BMV land. However, the design of the Development has been focussed on avoiding and limiting the use of BMV land. Only approximately 8.6ha of BMV land will be temporarily used for the infrastructure within the Development, this represents

approximately 10% of the Site as a whole and within PCC this only relates 0.03% of BMV land. See Chapter 8 (Agricultural Land and Soils) of this ES for further details including mitigation.

Proximity to Dwellings

- 4.17 Due to the size of utility-scale solar development, the Site selected may have a significant zone of visual influence; therefore, the proximity to existing sensitive receptors is an important consideration to ensure visual amenity and glint and glare impacts are minimised.
- 4.18 Settlements within close proximity to the Site include:
- Approximately 370m to the west of the village of Lamphey; and
 - Approximately 190m to the south-east of the village of Pembroke.

Capacity of the Site

- 4.19 In order to maximise the irradiance levels at a solar development site, and to ensure efficient generation of energy, the layout (orientation and spacing) must be optimal within the footprint of the selected site. As identified in Chapter 3 Site and Development Description, the Site comprises a total area of approximately 96ha, of which 42.8ha will comprise the 'developable area' containing solar PV panels and associated infrastructure, access roads, and landscaping. This area is considered to be of a suitable size so as to ensure adequate space for solar PV provision that may generate energy for the agreed export capacity (approximately 30MW).

Accessibility

- 4.20 The suitability of vehicular access routes to and from a solar development site must be considered to ensure construction, operational and decommissioning traffic does not cause significant adverse effects to transport. Being situated in proximity of the A477, A4075, A139, Lower Lamphey Road and Watery Lane, the Site is considered to have good accessibility for construction, operation and decommissioning. Lower Lamphey Road provides viable access for HGVs to enter and exit the Site from the wider road network during the construction period.

Design Evolution and Environmental Considerations

- 4.21 The Site Layout Plan that is being assessed for the purposes of the ES (Figure 3.3) has been informed by the following environmental considerations:

Agricultural Land

- There will be no built development comprising PV solar panels on the two most north-eastern fields (Field numbers F5 and F7 on Figure 3.1 Field Numbering Plan) which comprise Grade 2 BMV agricultural land. Solar infrastructure has also been reduced to minimise use of Grade 3a BMV land as part of the design evolution, so that fields F12, F13 and F14, which comprise Grade 3a BMV agricultural land, are free of development. The distribution of the Development has therefore been informed by the location of BMV agricultural land on Site to ensure potential effects are minimised.

Landscape

- Retention and enhancement of existing vegetation within the Site, where practicable providing benefits to biodiversity and landscape. These areas are primarily found within the southern and western regions of the Site as well as within the centre. During design evolution it was decided to remove proposed solar panels from the north, to reduce adverse landscape and visual effects and provide a buffer for properties. Adapted buffers and the removal of panels were also incorporated into design to reduce impacts of the residential dwelling on Watery Lane.

- The protection and enhancement of Alleston Wood, an Ancient Woodland, which lies within the central and southern region of the Site. The layout was designed to protect the ancient woodland and trees, as well as minimise the impact on hedgerows.

Biodiversity

- Improving biodiversity across the Site by introducing a variety of ecological habitats to include species-rich hedgerows, native tree planting, and wildflower meadows. These will mitigate for any potential harm and result in an overall net benefit for biodiversity.

Heritage

- Views from the Grade II Listed Alleston Farmhouse will be retained as panels were removed from the field to the north of this heritage asset. Additionally, planting is proposed surrounding Alleston Farmhouse to preserve any key views.

Flooding

- Areas susceptible to flooding within these regions of the Site have been considered in the layout to avoid development within such areas. Therefore, reducing adverse effects on the risk of surface water flooding than would have been the case otherwise.
- A Flood Consequential Assessment has been undertaken and is submitted separate to the ES, as part of the planning application. It confirms that a sequential approach has been applied within the Site, with all Development located outside of the floodplain.
- Both vulnerability classes are considered appropriate development within Flood Zone A. The Development is also located outside of the Small Watercourse and Surface Water Flood Zone i.e. within Flood Zone 1.

Design Evolution

- 4.22 The design of the Development has evolved through technical input and consultation to shape the Site Layout Plan. The design changes in the Site Layout Plan from previous iterations and how this has influenced the potential effects on the environment can be seen below in Table 4.2. These changes were made in relation to feedback from Pembroke Council, consultees and local stakeholders at different stages of the project consultation phase. The built Development has been reduced in size whilst the amount of green infrastructure has increased.

Table 4.2: Design Evolution and Environmental Effects

Design Iteration	Design Amendments	Environmental Considerations
Previous Site Layout Plan (November 2023) (Figure 4.1)	Exclusion of fields F14 and 13	To reduce harm to the agricultural business on Site as fields F14 and F13 are dedicated to equestrian activities.
	Exclusion of field F1	Minimise the use of BMV agricultural land.
	Introducing buffers to nearby properties on Lower Lamphey Road and Watery Lane	Mitigate the noise and visual impacts to properties.
	Provisional re-routing of PRoW SP32/51	Provides the PRoW with enhancements and allows the public to avoid walking through the Development.
Site Layout Plan (August 2024) (Figure 3.1)	Removal of panels in field F6	Reduces harm to the Grade II Listed Building Alleston Farmhouse and associated buildings. This area will thus be used for orchard planting to enhance the setting of the heritage asset and simultaneously provide a biodiversity benefit.
	Removal of panels in F5 and F7	Reduces the amount of panels on BMV agricultural land, as well as to enhance biodiversity in the streams on fields F5 and F7, reduce flood risk from these watercourses and protect the views from dwellings along Lower Lamphey Road.
	Adapted buffers to the residential dwelling on Watery Lane	Reducing the potential visual impact to this dwelling as the topography of the Site would provide a clear view of the panels.
	Removal of panels in field F3 and repositioning of roads and cable trenches in field F6	Following an archaeological survey, adjusting these aspects of the Development would reduce risk to potential archaeology features on Site.
	Adapting fence lines	Reduces the disturbance of hedgerows and trees while maximising the renewable energy generation from the Development.
	Placing panels underneath the 400 kV overhead line	This placement of panels will reduce on-Site noise and views of construction in comparison to panels being placed alongside boundaries where impacts to visuals and from noise would be increased.
	Redesigning the substation on-Site	Newly updated requirements from NGED were adhered to whilst managing visual impact and avoiding disturbance to ecological habitats.

References

ⁱ Available at: <https://www.gov.wales/agricultural-land-classification-predictive-map>