

# Prosiect Maen Hir

Solar a Storio Ynni



## Preliminary Environmental Information Report Volume I, Chapter 12: Soils and Agriculture

Prosiect Maen Hir - September 2024

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lightsourcebp





## Table of Contents

|           |  |          |
|-----------|--|----------|
| <b>12</b> | <b>Soils and Agriculture .....</b>                         | <b>5</b> |
| 12.1      | Introduction .....   | 5        |
| 12.2      | Baseline Conditions .....                                  | 5        |
| 12.3      | Assessment Methodology .....                               | 9        |
| 12.4      | Embedded Mitigation .....                                  | 17       |
| 12.5      | Preliminary Assessment of Likely Significant Effects ..... | 19       |
| 12.6      | Additional Mitigation .....                                | 28       |
| 12.7      | Residual Effects .....                                     | 28       |
| 12.8      | References.....  | 28       |

## List of Tables

|            |                                    |    |
|------------|------------------------------------|----|
| Table 12-1 | ALC Grading.....                   | 7  |
| Table 12-2 | Receptor Sensitivity Criteria..... | 12 |
| Table 12-3 | Impact Magnitude Criteria.....     | 13 |
| Table 12-4 | Significance of Effect Matrix..... | 14 |
| Table 12-5 | Significance Categories .....      | 15 |
| Table 12-6 | ALC Results.....                   | 16 |

## List of Figures

Figure 12-1 Predictive ALC Mapping

## List of Images

|            |                                   |    |
|------------|-----------------------------------|----|
| Image 12-1 | Soil Bunding.....                 | 20 |
| Image 12-2 | Piling Activities.....            | 22 |
| Image 12-3 | Piles for Solar PV Tables.....    | 23 |
| Image 12-4 | Panel Cleaning .....              | 25 |
| Image 12-5 | Operational Vehicle Tracking..... | 25 |
| Image 12-6 | Retrenching .....                 | 26 |

## Appendices

Appendix 12-1 Agricultural Land Classification Report



## 12 Soils and Agriculture

### 12.1 Introduction

12.1.1 This Chapter assesses the potential likely significant effects of the Project on soils and agriculture during the construction, operation and decommissioning phases. This includes the consideration of the following:

- Potential effects on agricultural land quality from any works involving the physical moving or sealing of land;
- Potential effects on soil structure/quality from vehicle tracking and other activities; and
- Potential effects on agricultural enterprises and land use.

12.1.2 The assessment principally focusses on the land and soils within the Solar PV Site and the Mitigation and Enhancement Areas. The assessment of potential effects on land and soils within the Cable Route Corridor and Grid Connection Corridor is more preliminary due to the uncertainty on the precise location of the works within these areas at this stage. The land within the Highway Works (which forms remainder of the PEIR Boundary) is not assessed as it does not comprise any agricultural land.

### 12.2 Baseline Conditions

#### Overview

12.2.1 The baseline conditions have been determined through the review of published information, and targeted field survey work.

12.2.2 The quality of agricultural land in England and Wales is assessed using a system of Agricultural Land Classification (ALC) devised by the then Ministry of Agriculture, Fisheries and Food (MAFF) in 1988 (Ref 12-70). This grades land into five grades, with Grade 3 subdivided into subgrades 3a and 3b. The description of grades from the ALC Guidelines (Ref 12-1) is as follows:

- Grade 1 'excellent'
- Grade 2 'very good'
- Grade 3a 'good'
- Grade 3b 'moderate'
- Grade 4 'poor'
- Grade 5 'very poor'

12.2.3 Planning Policy Wales defines land of Grades 1, 2 and 3a as the ‘*best and most versatile*’ (BMV) land. The Welsh Government has produced a Predictive ALC map (v2, 2021). This map identifies the potential quality of land based on known limitations. The Welsh Government Predictive ALC Map (Wales) Guidance Note (v2.1) (Ref 12-72) that accompanies the Predictive ALC Map identifies that where land is shown as subgrade 3b, 4 or 5 field survey is not required.

#### **Study Area**

12.2.4 The Study Area covers the Solar PV Site, Mitigation and Enhancement Areas and Cable Route Corridor. The location of the Grid Connection Corridor is not known as this stage so the baseline conditions cannot be presented in the PEIR but will be presented in the ES. The land within the Highways Works does not comprise any agricultural land so is not within the Study Area. This Study area is considered sufficient to capture any potential adverse effects on agriculture and soils as the only works with the potential to generate these effects will be limited to the Solar PV Site, Mitigation and Enhancement Areas, Cable Route Corridor and Grid Connection Corridor.

#### **Predictive ALC Mapping**

12.2.5 The Predictive ALC Mapping (see Figure 12-1) shows Maen Hir North to be mostly subgrade 3a, but with potential areas of Grades 2 and 3a, as shown below. The Cable Route Corridor in this area is a similar mix. Maen Hir Central is shown on the Predictive ALC as all subgrade 3a, with most of the Cable Route Corridor subgrade 3a with smaller areas of Grade 2. The Maen Hir South A area, and the Cable Route Corridor, are largely shown as predictive ALC Grade 2 and subgrade 3a. The Maen Hir South B area is predicted to be a mix of Grade 2 and subgrades 3a and 3b.

#### **Detailed ALC Survey Mapping**

12.2.6 Field surveys are only required in areas shown as predictive ALC Grades 1, 2 and 3a as agreed with Welsh Government's Agricultural Land Use and Soil Policy Advisor. In areas of Grade 3b, 4 and 5, no survey is required (Ref 12-73). Consequently a detailed ALC survey has been completed for those parts of the Solar PV Site and Mitigation and Enhancement Areas that are shown on the Predictive ALC Mapping as potentially being of Grade 2 or subgrade 3a quality.

- 12.2.7 The Predictive ALC Mapping shows 198ha in Maen Hir North and 84ha in Maen Hir South B as subgrade 3b, and therefore no field survey was carried out for those areas.
- 12.2.8 The field survey has focussed on the Solar PV Site and Mitigation and Enhancement Areas as those areas are where construction activities are considered most likely to affect soils and land quality. The Cable Route Corridor and Grid Connection Corridor will be considered for survey depending on the grading within the Predictive ALC Mapping and through consultation with LQAS once the route of the cabling is refined. The result of this will be reported in the ES.
- 12.2.9 The detailed ALC results of the area surveyed in the Agricultural Land Classification Report (Appendix 12-1) are summarised Table 12-1 alongside the Predictive ALC Mapping. This area extends beyond the Solar PV Site and Mitigation and Enhancement Areas and as such totals a larger area than is contained by these areas. The ES will report on the areas and proportions of grades for the Solar PV Site, Mitigation and Enhancement areas, Cable Route Corridor and Grid Connection Corridor.

**Table 12-1 ALC Grading**

| <b>ALC Grade</b>  | <b>Area (ha)</b> | <b>Proportion (%)</b> |
|---|------------------|-----------------------|
| Grade 2 very good (per the detailed ALC survey)                                       | 26               | 2.0                   |
| Grade 3a good (per the detailed ALC survey)   | 296              | 22.7                  |
| Grade 3b moderate (per the detailed ALC survey)                                       | 289              | 22.1                  |
| Grade 4 poor (per the detailed ALC survey)  | 371              | 28.4                  |
| Shown not to be BMV on the Predictive ALC Map and therefore not surveyed <sup>1</sup> | 282              | 21.6                  |
| Non-agricultural <sup>2</sup>   | 42               | 3.2                   |
| <b>Total</b>  | <b>1,306</b>     | <b>100.0</b>          |

<sup>1</sup> This land is Grade 3B, Grade 4 or Grade 5 per the predictive ALC map and therefore was not included in the detailed ALC survey.

<sup>2</sup> This land is not agricultural land and therefore was not included in the detailed ALC survey.

- 12.2.10 The soils across the Study Area have been assessed from the published information on the Soil Survey of England and Wales (SSEW) 1:250,000 Sheet 2 'Soils of Wales' (1983) (Ref 12-71) and from the soil survey of 981 ha as part of the ALC.
- 12.2.11 In Maen Hir North the topsoils vary quite significantly in both colour and texture from medium sandy silty loam to organic clay and dark yellowish brown to grey and often change repeatedly over short distances. In some areas there is no subsoil with the ground becoming impenetrable at as shallow as 20cm due to shaley slatey material or sometimes solid rock or boulder. In other areas there is a moderately to poorly structured clay loam or clay subsoil usually gleyed and sometimes slowly permeable. The slowly permeable subsoils were predominantly found at lower elevations, but subsoils changed repeatedly over short distances in the same way as topsoils.
- 12.2.12 In the Maen Hir Central and South (A and B) areas topsoil colour is mostly brown, dark brown or dark greyish brown. Topsoil texture was largely just either side of the change from heavy clay loam to clay with some areas where it was noticeably lighter. The lab tests all showed it to still be heavy clay loam but closer to the change to medium clay loam than to clay.
- 12.2.13 Soils are shallow in places (largely where the British geological survey maps show there to be no superficial deposits). Where soils are shallow they are usually at least slightly stony and as depth increases the number and size of stones increases until there is a layer of either rock or boulder that is too big to be dug through.
- 12.2.14 Where there are subsoils, they were recorded in field and confirmed by lab tests to be either clay or occasionally silty clay, sometime clay loam. Most of these Sub soils are gleyed from between 25 and 70 cm with structures ranging from moderately structured (weak fine or medium subangular blocky) to poorly structured (coarse angular blocky, weak coarse angular blocky and subangular blocky and weak medium angular blocky). Some soils have strong evidence of biopores and rooting suggesting that they drain relatively well while others have little or no evidence of permeability and are recorded as slowly permeable.



- 12.2.15 No evidence of peat was found in any of the surveyed areas, and none is reported in NRW mapping as falling within the PEIR Boundary.
- 12.2.16 Land within the Study Area is largely agricultural the majority of which is used for grazing with some also mown as forage. There is very little arable land evident. Periodically, some fields in the area are cultivated and reseeded, and this practice (including frequency) will be examined as part of the assessment. Field sizes are variable, with Maen Hir South A and B in particular having many small fields. Farming operations will be identified in greater detail based on farmer interviews and will be reported in the ES.

### 12.3 Assessment Methodology

#### Assessment Scope

- 12.3.1 The scope of the assessment is the extent to which agricultural resources or assets and businesses might be affected, temporarily or permanently, from the construction, operation and decommissioning phases of the Project.
- 12.3.2 The construction and decommissioning phases are mostly likely to disturb soil or affect land quality. During operation there is no potential for further effects to soils other than vehicles tracking between Solar PV Panels where no Access Tracks are present. The following likely effects of construction are considered in the assessment:
- likely effect on agricultural land quality from any works involving the physical moving or sealing of land, and whether those are reversible (i.e. permanent) or temporary effects.
  - likely effect of construction methods, and whether these works might result in the permanent downgrading of agricultural land.
  - likely effect on soils from any land work or vehicle movements, and the extent to which these could affect soil structure, and whether that is a temporary or permanent effect.
  - likely effect on farm businesses, temporary or long term, and any adverse or beneficial effects on agricultural enterprises and land use.
- 12.3.3 The assessment then considers the decommissioning works and the likely effects on soils and on agricultural land quality, and the extent to which areas affected

temporarily are capable of full restoration back to pre-commencement quality. Decommissioning involves physical works, some involving movement of soils.

- 12.3.4 Peat was identified in the Scoping Study area and as such was scoped into the assessment. However, the land that formerly contained peat no longer forms part of the PEIR Boundary and as such peat has been scoped out of the assessment.

#### **Legislation, Policy and Guidance**

- 12.3.5 The following policy and guidance have informed the assessment of Soils and Agriculture:

- Overarching National Policy Statement for Energy (EN-1)
- Draft Overarching National Policy Statement for Energy (EN-1)
- National Policy Statement for Renewable Energy Infrastructure (EN-3)
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)
- National Planning Policy Framework (NPPF)
- A New Perspective on Land and Soil in Environmental Impact Assessments

- 12.3.6 Appendix 12-1 provides a summary of this policy and guidance in the context of Soils and Agriculture.

#### **Approach**

- 12.3.7 The assessment is based on Predictive ALC Mapping and detailed ALC survey of the Solar PV Site and Mitigation and Enhancement Areas. The assessment approach considers the impact that the works would have on soil qualities during construction, operation and decommissioning, and in particular whether this will result in any sealing or permanent downgrading of agricultural land. It considers the removal of the panels and the reversibility of the impact, and effects on soils and land quality.

- 12.3.8 The assessment considers the nature of the soils within the Study Area. Clayey soils are less resilient to being handled and are more susceptible to damage from machinery travel, especially in wet conditions. The assessment therefore considers the soils and the methodologies appropriate to minimise disturbance to soil structure from construction and decommissioning activities.

- 12.3.9 During the operational phase there is limited need for activities that might disturb soils or affect land quality. The assessment considers maintenance (of land and

equipment) and replacement activities, and their potential effects, in addition to the effects on soils from long-term grassland use.

- 12.3.10 The effect of the Project on the nature of the agricultural businesses, farm enterprises and farm labour, is assessed at a preliminary stage. The chapter considers the current farming practices at a high level. These likely effects will be assessed in greater detail in the ES, to include details of agricultural business development, land management, and farm diversification where relevant. The assessment goes on to consider the extent to which agricultural use can continue during the life of the Project.

#### **Determining Significance of Effect**

- 12.3.11 The methodology to determine the significance of effect has had regard to the Institute of Environmental Management and Assessment (IEMA) Guide “A New Perspective on Land and Soil in Environmental Impact Assessment” (February 2022) (hereafter the 'IEMA Guide') (Ref 12-74), together with professional judgement as described in the chapter.
- 12.3.12 The assessment methodology identifies the sensitivity of the various receptors in terms of their importance. Land that is of ALC grade 1 (none in the Study Area), Grade 2 (2% in the Study Area) and sub-grade 3a (less than 23% in the Study Area) is defined in planning policy as the “*best and most versatile*” agricultural land (BMV), and is therefore considered to be of high sensitivity. To put this in context, based on the predictive ALC maps about 19% of agricultural land across Wales is of BMV quality.
- 12.3.13 The assessment methodology places land of ALC Grade 1, 2 and 3a to be of ‘*high*’ sensitivity, and land of Subgrade 3b to be of ‘*medium*’ sensitivity. Land of Grades 4 and 5 is considered to be of ‘*low*’ sensitivity.
- 12.3.14 Soils can usually be handled and moved without adverse effects. The trafficability of soils, being the resilience of the soils to deformation from vehicular movements, and the suitability of soils to being moved, depends on the soil type and the wetness status of the soil at the time. The IEMA Guide methodology considers soils of high clay content in this climate region (which is between 202 and 216 Field Capacity Days (FCD) as identified in the ALC report) to be of high sensitivity because they have a low resilience to structural damage. Soils of medium

resilience to structural damage in this climate area (including medium silty clay loams, medium clay loams and sandy clay loams) are of medium sensitivity.

12.3.15 The IEMA Guide does not provide sensitivity definitions for farm businesses, although effects are described in the Guide at paragraph 8.3.3. The criteria in the tables below are based on professional judgement. The methodology considers farm businesses to be generally resilient to change. Farm businesses are regularly changing enterprise or management influenced by a wide variety of factors both external (e.g. commodity prices, grant funding, disease, weather) and internal (e.g. farmer choice, labour availability, machinery availability, finances). The sensitivity of farms is reflective of their reliance to change. Full-time farm businesses are considered to be of higher sensitivity to part-time farms. Farms which have a particular sensitivity to access to land, e.g. for grazing such as dairy farms, are more sensitive than arable farms.

12.3.16 The criteria used to determine sensitivity is set out in Table 12-2.

**Table 12-2 Receptor Sensitivity Criteria**

| <b>Sensitivity</b> | <b>ALC/biomass production</b>           | <b>Sensitivity of topsoil and subsoil</b>             | <b>Agricultural businesses</b>  |
|--------------------|---|---|---|
| <b>High</b>        | Land of ALC Grades 1, 2 and Subgrade 3a | High clay soils where the FCD (i) is >150             | -   |
| <b>Medium</b>      | Land of ALC Subgrade 3b                 | Medium textured soils where the FCD is <225           | Full-time businesses, and farm businesses where the location of land is particularly important such as dairy farms. |
| <b>Low</b>         | Land of ALC Grades 4 and 5              | Soils with a high sand fraction where the FCD is <225 | Part-time farms or farms with low sensitivity to change, e.g. arable land held on short-term arrangements.          |
| <b>Negligible</b>  | Indirect links                          | -   | Agricultural land that is not farmed or does not form part of a farm business.                                      |

*(i) Field Capacity Days, i.e. days when the soil is replete with water*

- 12.3.17 The impact magnitude in the IEMA Guide is based on the "*permanent, irreversible loss of one or more soil functions or soil volumes (including the permanent sealing or land quality downgrading)*". The assessment therefore adopts that definition and considers whether there is permanent sealing or downgrading as a result of the Project. The impact magnitude assessment is based on the areas that are sealed or downgraded, not the magnitude of the land areas included within the Project but where there is no sealing or downgrading.
- 12.3.18 Under the IEMA Guide the methodology considers the permanent sealing of land or ALC downgrading of more than 20ha to be a major adverse magnitude of impact. It considers losses of 5 – 20ha to be a moderate adverse magnitude and losses of less than 5ha to be a minor adverse impact. These thresholds are adopted for the assessment.
- 12.3.19 The criteria used to determine impact magnitude are set out in Table 12-3.

**Table 12-3 Impact Magnitude Criteria**

| Magnitude of Impact | Definition   |  |
|---------------------|--|--|
|                     | Effects on Agricultural Land (Soils)   | Effects on Farm Businesses (agricultural businesses)   |
| Major               | Permanent, irreversible loss or improvement of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading), over an area of more than 20ha or loss/gain of soil-related features.     | The impact of the Project would render a full-time agricultural business non-viable.   |
| Moderate            | Permanent, irreversible loss or improvement of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading), over an area of between 5 and 20ha or loss/gain of soil-related features. | Significant changes in the day-to-day management of a full-time agricultural business, or closure of a part-time agricultural business. Loss of buildings or impacts on drainage or water supplies affecting the potential for at least 5ha of adjacent land to be farmed fully. |
| Minor               | Permanent, irreversible loss or improvement of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading), over an area of less  | Land take would require only minor changes in the day-to-day management / structure of a full-time agricultural business or land take would have a significant effect on a part-time business.   |

| Magnitude of Impact | Definition  |   |
|---------------------|---|---|
|                     | Effects on Agricultural Land (Soils)  | Effects on Farm Businesses (agricultural businesses)  |
|                     | than 5ha or loss/gain of soil-related features.                               | Minor effects, direct or indirect, on surrounding land beyond the boundaries of the site.   |
| Negligible          | No discernible loss or reduction or improvement of soil functions or volumes. | Land take would require only negligible changes in the day-to-day management of a full-time agricultural business or land take would require only minor changes to a part-time farm business. |

- 12.3.20 The Welsh Government’s Agricultural Land Use and Soil Policy Advisor is consulted on development for non-agricultural purposes that involves the loss of not less than 20 hectares of agricultural land. For this assessment ‘loss’ is defined as per the IEMA Guide as sealing over or permanent downgrading of agricultural land. Such losses are considered as a loss of national significance. Losses of less than 20ha are usually considered a matter of local significance only.
- 12.3.21 The matrix used to determine the resulting significant of effects based on receptor sensitivity/importance and magnitude of impact is set out in Table 12-4.

**Table 12-4 Significance of Effect Matrix**

|                      |            | Impact Magnitude |          |          |            |
|----------------------|------------|------------------|----------|----------|------------|
|                      |            | Negligible       | Minor    | Moderate | Major      |
| Receptor sensitivity | High       | Slight           | Moderate | Large    | Very Large |
|                      | Medium     | Neutral          | Slight   | Moderate | Large      |
|                      | Low        | Neutral          | Neutral  | Slight   | Moderate   |
|                      | Negligible | Neutral          | Neutral  | Neutral  | Slight     |

- 12.3.22 Whether these effects are significant or not in EIA terms is assessed as set out in Table 12-5.

**Table 12-5 Significance Categories**

| <b>Significance Category</b> | <b>Typical Description</b>   |
|------------------------------|--|
| Very Large                   | Effects at this level are material in the decision-making process, and are considered significant  |
| Large                        | Effects at this level are likely to be material in the decision-making process, and are considered significant   |
| Moderate                     | Effects at this level can be considered to be material in the decision-making process, and depending on individual factors may be considered significant                   |
| Slight                       | Effects at this level are not material in the decision-making process, and are considered not significant  |
| Neutral                      | No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error, and are considered not significant |

12.3.23 As such, effects of slight or neutral significance are considered to be not significant. Effects of moderate significance, depending on relevant individual environmental factors and based on professional judgement, may be considered to be significant and material in the decision-making process. Effects of large or very large significance are considered to be significant and material in the decision-making process, and significant in the EIA process.

**Baseline Surveys**

12.3.24 As set out above, the Welsh Government Predictive ALC Map (Wales) Guidance Note (v2.1) (Ref 12-72) advises that where land is shown as predictive Grades 1, 2 and 3a, ALC field survey is required. Where land is shown as predictive Grades 3b, 4 and 5, field survey is not required. This guidance has been followed.

12.3.25 The Welsh Government ALC Frequently Asked Questions (Ref 12-73) advises that there is no prescribed guidance on the sampling density of field surveys. A detailed ALC typically involves one per hectare, but "*depending upon the type of development, location, scale, purpose of the survey, availability of existing ALC data etc, less detailed surveys (or sometimes more detailed) surveys may be undertaken, but expert advice must be sought by a soil scientist or other practitioner experienced in undertaking ALC survey work*". This guidance has been followed and surveys at one per hectare have been undertaken.

- 12.3.26 Within the Solar PV Site and Mitigation and Enhancement Areas some 282 ha of land is shown as of sub-grade 3b, or grade 4 or 5 quality, or non-agricultural, and therefore no survey is required for those areas. The methodology, and the areas that required detailed field survey, were agreed in advance with the Agricultural Land Use and Soil Policy Advisor in the Land Quality Advice Service (LQAS), Wales. A detailed ALC survey has been undertaken, at a sampling density of one sample per hectare, to classify 982 hectares of agricultural land that is shown as potentially of BMV quality. To support the analysis 22 soil pits, representing all the main soil types found over the Study Area, have been dug, to a depth of 120cm or as deep as was physically possible. The results are set out in the ALC report (Appendix 12-1).
- 12.3.27 The results are shown in Table 12-6. The Solar PV Array and Mitigation Enhancement area covers 1306 hectares. The table shows the results of the ALC surveys over 982 ha, plus the 282 ha of land shown on the provisional ALC maps as subgrade 3b, plus the non-agricultural land within the Study Area.

**Table 12-6 ALC Results**

| <b>ALC Grade</b>                            | <b>Area (ha)</b> | <b>Proportion (%)</b> |
|---|------------------|-----------------------|
| Grade 2 very good                           | 26               | 2.0                   |
| Grade 3a good                               | 296              | 22.7                  |
| Grade 3b moderate                           | 289              | 22.1                  |
| Grade 4 poor                                | 371              | 28.4                  |
| Shown not to be BMV on the predictive ALC   | 282              | 21.6                  |
| Non-agricultural and therefore not surveyed | 42               | 3.2                   |
| <b>Total</b>                                | <b>1,306</b>     | <b>100.0</b>          |

- 12.3.28 The detailed ALC survey results show that across the Solar PV Site and Mitigation and Enhancement Area, some 322 hectares falls into the definition of BMV land, which amounts to 24.7% of the area surveyed. The majority (75.3%) of the area surveyed, 982 hectares, is poorer quality agricultural land or is non-agricultural. .
- 12.3.29 Soil information has been collected as part of the ALC survey. As described in the ALC Survey (Appendix 12-1) there is a considerable variation in the soil type.



The detailed soil information will feed into soil management and handling controls as the Project develops.

- 12.3.30 The Solar PV Site and Mitigation and Enhancement Areas are farmed by 21 different landowners and occupiers, on a mixture of full and part time, owned and rented basis.

#### **Assumptions and Limitations**

- 12.3.31 The ALC data presented across the Solar PV Site comprises both detailed ALC data collected for the Project and the Predictive ALC Mapping as agreed with Welsh Government's Agricultural Land Use and Soil Policy Advisor. As such, the Predictive ALC Mapping is assumed to be representative of actual ALC classification.
- 12.3.32 The detailed ALC data coverage is limited to the areas of the Solar PV Site and Mitigation and Enhancement Areas that are shown on the predictive ALC as potentially being of Grade 2 or subgrade 3a quality as agreed with Welsh Government's Agricultural Land Use and Soil Policy Advisor. There is no detailed ALC survey coverage of the Cable Route Corridor or Grid Connection Corridor (location yet to be determined). The requirement for an ALC survey of these areas will be discussed with LQAS.

#### **Consultation and Engagement**

- 12.3.33 Engagement with Welsh Government's Agricultural Land Use and Soil Policy Advisor has taken place to agree the scope and extent and the sampling density of the ALC survey. It was agreed in 2024 that only areas shown on the Predictive mapping to be Grades 3a and 2 should be surveyed.
- 12.3.34 Preliminary results from the ALC survey including lab results on the composition of the soils were shared with Welsh Government's Agricultural Land Use and Soil Policy Advisor.

## **12.4 Embedded Mitigation**

### **Design**

- 12.4.1 The Solar PV Site is largely located within agricultural land that that is not BMV and is predominantly used for grazing which has the potential to continue during operation of the Project. The proposed locations for the elements of the Project that have the largest footprints (and will remove land from agricultural production

during the lifespan of the Project) largely avoid BMV land. The Former Oil Depot is non-agricultural and the proposed area within Maen Hir Central is largely not BMV with the exception of an area of Grade 3a land.

12.4.2 So far as is practicable, Access Tracks will make use of existing farm tracks within the Solar PV Site or will follow field boundaries and other fixed boundaries to minimise disturbance of agricultural land.

### **Construction and Decommissioning**

12.4.3 Good soil management practices such as avoiding vehicle tracking across and handling soils when wet and restoring soils into trenches in the same order they came out will be adhered to during the construction and decommissioning phase of the Project. An outline Soil Management Plan (oSMP) will be prepared that will incorporate these practices and identify those areas within the PEIR Boundary which are more susceptible to soil damage when wet. The oSMP will include measures relating to the following to avoid adverse effects to soils:

- Timing of topsoil stripping and tracking of vehicles over soils to avoid wet conditions when soils are susceptible to structural damage from compaction.
- Measures to ameliorate soil compaction when this occurs.
- Retaining soil profiles of excavated soils so that they can be returned to trenches or soil bunds appropriately.
- Storing soils in appropriate locations and conditions to maintain soil structure and composition.

12.4.4 Construction activities will also be managed by the oCEMP which will secure good practices measures to avoid the contamination of soils through the fugitive release of fuel and hydraulic fluids.

12.4.5 The oCEMP and oSMP will be submitted with the DCO Application with the detailed plans to be approved by IoACC post-consent.

### **Operation**

12.4.6 Whilst the potential impact on soils during the operational phase is expected to be minimal, the outline Operational Environmental Management Plan (OEMP) and oSMP will require that good practice be employed to ensure that any works (such as the maintenance of the PV Modules and the management of the land

underneath the PV Arrays) will be undertaken in a manner that avoids damage to the soil resource, so far as possible.

- 12.4.7 There may, on occasion, be a need to repair or replace equipment, as set out in Chapter 5: Project Description. The oOEMP and oSMP will require that works are scheduled for period when ground conditions are sufficiently dry for there to be no impact on the soils. Where there may be a minor, localised adverse effects, these will be readily rectified with normal agricultural machinery which will be secured by the oOEMP and oSMP.
- 12.4.8 Large areas within the Solar PV Site will be capable of continuing to support agriculture and to be farmed by way of sheep grazing, or fodder production, with associated land management of the grassland as necessary. The design of the PV Arrays has been chosen to enable agricultural use for example minimum height of the panels being 0.8m to allow sheep to move freely underneath the PV Arrays.
- 12.4.9 The Project design will continue to evolve in consultation with the landowners. The design and the layout are being developed to minimise adverse effects on land management and to minimise construction disruption to the farms that are included in the Project.

## 12.5 Preliminary Assessment of Likely Significant Effects

### Construction

- 12.5.1 The potential for adverse effects on agricultural land (both on the soils and the land quality) resulting from the construction and decommissioning of the following elements of the Project are considered in the PEIR:
- Construction Compounds
  - Access Tracks
  - 33kV and 132kV Substations
  - Project Substation and BESS
  - PV Arrays
  - Vehicle tracking
  - Grid Connection Corridor and Cable Route Corridor
- 12.5.2 The locations of these elements are shown on the Parameter Plans (see Figures 5-1 to 5-4).

***Land Quality and Soils***

**Construction Compounds**

- 12.5.3 Construction Compounds are created by removing topsoil, then laying down a matting followed by a stone temporary surface. The topsoil removed for the Construction Compounds will be placed temporarily in a low-level bund or bunds. These bunds are short-term storage areas for the topsoil, which will be used in restoration of these areas at end of the construction phase in accordance with the oSMP. At the end of the construction phase the stone is removed, the matting removed, the subsoil loosened by agricultural machinery and the topsoil replaced. An example is shown in Image 12-1.

**Image 12-1 Soil Bunding**



- 12.5.4 At this stage the locations of potential Construction Compounds has not been identified so it is not possible to determine the quantum of BMV land or types of soils that would be affected. However, taking into account the temporary bunding and restoration of soils, the effects would be short-term and temporary. As such, the Construction Compounds would have a negligible magnitude of impact, and accordingly of negligible significance of effect which is not significant.

**Access Tracks and 33kV/132kV Substations**

- 12.5.5 The Access Tracks and 33kV/132kV Substations are constructed in a similar way to the construction compounds. The topsoil removed will be placed in bunds in proximity to where it is excavated. However, for these elements of the Project which will be in place throughout operation, the bunds are long-term storage areas for the topsoil, which will be used in restoration when the Project is decommissioned after 60 years of operation. As such, the Access Tracks and

33kV/132kV Substations will not have any permanent significant adverse effects on soils or agricultural land quality.

- 12.5.6 The Access Tracks will be located along the boundaries of fields within the Solar PV Site and the 33kV Substations will be located within the fields. The specific locations these elements of the Project will not be designed in detail for the DCO Application so a worst-case scenario in terms of agricultural land affected must be determined.
- 12.5.7 The Parameter Plans (see Figures 5-1 – 5-4) identify areas for the potential 132kV Substations. The two areas in Maen Hir North are mostly poorer quality land, with the western area all subgrade 3b on the Predictive ALC Map. The eastern area within Maen Hir North has been surveyed as mostly subgrade 3b with patches of subgrade 3a of circa 0.5 and 0.7ha at the field edges. The area within Maen Hir Central has been surveyed as ALC Grade 4. The area in Maen Hir South A is Grade 3b and Grade 4. The area in Maen Hir South B is subgrade 3a of in the order of 5 ha, in two blocks and mostly surrounded by Grade 4 poor quality land but with two patches of subgrade 3b. Applying a reasonable worst case scenario to the micro siting of the 132kv Substation within these areas, approximately 6.2ha of subgrade 3a ‘good’ quality land would be affected.
- 12.5.8 Based on a worst case assumption on the area of agricultural land affected by the Access Tracks and 33kV Substations in addition the 6.2ha of subgrade 3a that would potentially be affected by the 132kV Substations, it is estimated that an area of between 5 and 20ha of land of BMV quality is likely to be affected in total. This would result in a moderate magnitude impact on a resource of high sensitivity, which is a temporary effect of large significance, which is significant.

*Project Substation and BESS*

- 12.5.9 The preferred location for the BESS and Project Substation is within the Former Oil Depot within Maen Hir North, and therefore on non-agricultural land. There will be no effect on agricultural land as a result.
- 12.5.10 The location within Maen Hir Central proposed for the BESS and Project Substation includes about 5.5ha of subgrade 3a quality land mixed with subgrade 3b and grade 4 land (see Appendix 12-1 and Figure 5-3). If the Project Station and BESS could not be micro sited to avoid this BMV then there would be a

moderate magnitude impact (5-20 ha) on a resource of high sensitivity, resulting in a large temporary adverse effect, which is significant.

PV Arrays

- 12.5.11 The PV Modules will be mounted onto piles, or on concrete blocks, subject to ground conditions. Where piles are used, they will be inserted into the ground using a pneumatic ramming machine, which pushes the piles straight down into the soil to the correct depth. This process does not involve any digging or mixing of the soils. It is similar to the process of knocking-in a fence post as the soil simply moves laterally as the pile is knocked in. Agricultural land where ground conditions require concrete blocks will have very shallow soils over rock, and consequently would be very unlikely to be BMV land due to the type and formation of the ground (i.e. rocky outcrops). In addition, panels mounted in concrete blocks would have no significant effect on land quality. Examples of pile driving machinery and of piles driven into the ground are shown in Image 12-2 and Image 12-3.

**Image 12-2 Piling Activities**



**Image 12-3 Piles for Solar PV Tables**

- 12.5.12 Consequently whilst the Solar PV Arrays are installed over a large area, the quantum of land irreversibly downgraded as a consequence of the works, is negligible. Localised effects on soils during construction will be readily resorted and no land quality downgrading will result. Therefore the magnitude of impact is anticipated to be minor or negligible adverse (< 5 ha) on resources of low, medium and high sensitivity, resulting in effects of neutral, slight and moderate, which are not significant.

#### Vehicle Tracking

- 12.5.13 Construction of the Project will necessitate vehicle tracking over agricultural land, for example for transporting the piles and frames across the Solar PV Site, for ramming in the piles, and transporting the panels to the frames. Use will be made so far as possible of the internal tracks for the main haulage. There is the potential for the soil to be adversely affected by vehicular movement if not managed properly.
- 12.5.14 However, the oSMP will include sufficient controls to mitigate adverse effect to soils (e.g. compaction). The oSMP will advise when soils are suitable to be tracked over so as to minimise any adverse effects. Soils may be adversely affected by vehicular travel when conditions are wet, but by adhering to the advice in the oSMP this will be minimised. Surface disturbance of this nature is readily restored using ordinary agricultural machinery, such as chisel harrows and rollers. There is unlikely to be any adverse effects from vehicular movement that will result in compaction or damage that might result in the downgrading of the ALC value. As such, the quantum of land of high or medium sensitivity that will be affected from

vehicular damage will be negligible, resulting in an effect of slight or neutral adverse effect which is not significant.

*Electrical Cabling*

- 12.5.15 Cabling around the PV Modules is typically limited to the end of each string, connecting back to the transformers. This cabling typically involves a narrow trench with soils replaced in the same order as they were removed, shortly after the trench is dug. This operation does not cause a significant effect on soils. These impacts are considered to be short-term, reversible and of negligible magnitude. Within the Solar PV Site and Mitigation and Enhancement Areas, a negligible impact on resources of high or medium sensitivity results in an effect of slight or neutral significance, which is not significant.
- 12.5.16 A larger cable connection will be required in the Cable Route Corridor and the Grid Connection Corridor. This will involve a trench, and short-term disturbance, and no long-term adverse effect on soils. The works will be subject to the oSMP, and the effects are considered likely to be short-term, and reversible. The ES will consider this in greater depth once further details are known, but the effect is expected to be minor magnitude (<5ha) on resources of high or medium sensitivity, leading to a slight adverse significance effect.

***Farm Enterprises***

- 12.5.17 The farms included in the PEIR Boundary have or are in the process of entering into option agreements for the Project. At this preliminary stage, and pending further design details, limited information has been collected about the farming operations and activities. However, the construction will take place in a pre-planned and phased manner and with due advance notice to those involved there are not expected to be any significant adverse construction phase effects on farm enterprises and businesses. Further details will be provided in the ES.

**Operation**

***Land Quality and Soils***

- 12.5.18 Most land under and around the PV Arrays will be kept in grassland use with the potential for the land to be farmed by the grazing of sheep or production of fodder. Depending upon the grazing regime, there may be periodic need for some mowing or topping of grassland, but this will be normal agricultural activity and should have



no adverse effect on soils. The machinery involved in cleaning and maintaining the panels is generally light, as per Image 12-4.

**Image 12-4 Panel Cleaning**



- 12.5.19 Panel maintenance may periodically involve the need for travel between the panels in machinery when ground conditions are not optimal, and this may create localised rutting, such as the example shown in Image 12-5. This occurs frequently with standard farm operations and can be readily rectified with light cultivation equipment when conditions allow.

**Image 12-5 Operational Vehicle Tracking**



- 12.5.20 There may be a periodic need to carry out repairs, such as the example in Image 12-6 of a section of retrenching. These are usually small and localised areas, and easily restored.

**Image 12-6 Retrenching**



- 12.5.21 There is no requirement for soil movement, except in small and localised areas, and land will not be sealed. The adverse impacts are negligible on resources of medium and high sensitivity, leading to an adverse effect of neutral or slight significance, which is not significant.

### ***Agricultural Enterprises***

The Project has the potential for adverse agricultural economic impacts, as a result of reduced agricultural income for the businesses affected during the operational stage, but this will be mitigated by alternative incomes received by leasing of the land for the Project. It is anticipated that agricultural activity, involving grazing of sheep, will be part of the ongoing land management. The effects of farm businesses overall are considered to be of minor magnitude, on resources of medium and low sensitivity which results in a moderate beneficial effect.

### **Decommissioning**

#### ***Soils and Land Quality***

##### *PV Arrays*

- 12.5.22 Panel removal typically involves the unbolting of the PV Array panels, and their loading onto vehicles and removal from the site. The framework will then likely be disassembled, leaving just the piles. These, as per the installation example below, would all need to be lifted out of the ground. This would be done mechanically when ground conditions are suitable, using a vibrating lifting technique. The resultant void in the ground will be small, and it will naturally fill within a few weeks

as the adjacent soil expands and fills the gap. As such, there will be no adverse effects on soils and land quality.

Electrical Cabling

- 12.5.23 Shallow cable removal will be carried out in a similar manner to the installation, with a trench dug and top and subsoils separated for replacement in the original order. For deeper cables, those below the depth at which agricultural machinery is ever likely to operate, may be left in-situ. These would not prevent the future agricultural use of the land, and their retention will not affect soil quality utility and function or land quality. As such, there will be no adverse effects on soils and land quality.

Vehicle Tracking

- 12.5.24 As with the construction process, there will be the potential for localised effects, such as wet spots in otherwise dry fields, but these are all capable of remediation using normal agricultural cultivation equipment. However, the oSMP will include sufficient controls to mitigate adverse effect to soils (e.g. compaction). As such, the quantum of land of high or medium sensitivity that will be affected from vehicular damage will be negligible, resulting in an effect of slight or neutral adverse effect which is not significant.

Project Substation, BESS, 132kV/33kV Substations and Access Tracks

- 12.5.25 The infrastructure that has sealed land during operation will be removed and the soils replaced. The equipment will be removed, the store base and matting removed, and the area then loosened with agricultural machinery. Following that the topsoil, which will have been stored nearby, will be spread over the area, and the area will be cultivated and returned to agricultural use. Therefore, decommissioning will not result in any sealing or land quality downgrading. The adverse impact will therefore be of negligible magnitude on resources of medium or high sensitivity, leading to an overall effect of neutral or slight adverse significance, which is not significant.

***Agricultural Enterprises***

- 12.5.26 Decommissioning will potentially have short term disruptive effects on farm businesses if they are occupying the site for grazing, but the works will have been planned in advance and any effects will be negligible adverse. Therefore the

economic effects will be of negligible magnitude on resources of medium sensitivity, leading to a negligible adverse effect.

### 12.6 Additional Mitigation

12.6.1 The final design and layout of the Project will seek to minimise the need for any disturbance to BMV land, particularly Grade 2, as far as is reasonably practical. This will involve locating infrastructure that will seal land during operation (33kv/13kv Substations, Access Tracks, Project Substation and BESS) on land of poorer quality. This will be embedded into the Project design and set out in the ES.

### 12.7 Residual Effects

12.7.1 In the absence of additional mitigation that can be specified at this stage, the residual effects are the same as the potential effects set out in Section 12.5. However, it is anticipated that further development of the Project Design such as micro siting of infrastructure will reduce the residual effects.

### 12.8 References

- Ref 12-1 Agricultural Land Classification of England and Wales: revised guidelines and criteria for grading the quality of agricultural land, MAFF (1988).
- Ref 12-2 Soil Survey of England and Wales 1:250,000 Sheet 2 "Soils of Wales" (1983)
- Ref 12-3 Predictive Agricultural Land Classification Map (Wales) Guidance Note version 2.1, Welsh Government (May 2021)
- Ref 12-4 Agricultural Land Classification: Frequently Asked Questions, Welsh Government (May 2021)
- Ref 12-5 Institute of Environmental Management and Assessment (IEMA) Guide "A New Perspective on Land and Soil in Environmental Impact Assessment" (February 2022) (hereafter the 'IEMA Guidance')

