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# 5.18.2.1

## Soil Profiles, ALC Calculations and Land Holding Data Chapter 18 – Appendix 1

#### National Grid (North Wales Connection Project)

Regulation 5(2)(a) including (l) and (m) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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## **North Wales Connection Project**

### Volume 5

## Document 5.18.2.1 Appendix 18.1 Soil Profiles, ALC Calculations and Land Holding Data

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## 1 Appendix 18.1: Soil profiles, ALC calculations and landholding data

#### 1.1 INTRODUCTION

- 1.1.1 This appendix contains details of the methodologies used to obtain soil profile data and calculate Agricultural Land Classification (ALC); along with the data used within those calculations.
- 1.1.2 Additionally, the appendix contains anonymised landholding data.
- 1.1.3 The areas of permanent land take (excluding pylons), comprising the Substation extension at Pentir and the Cable Sealing End Compounds (CSEC) and Tunnel Head Houses (THH) at Braint (Anglesey) and Tŷ Fodol (Gwynedd)and associated permanent access tracks were subject to detailed soil surveys on the 6 and 7 December 2016. Survey methodology followed the guidance set out in Natural England's Technical Information Note 049, Agricultural Land Classification: protecting the Best and Most Versatile agricultural land (Ref 18.1.1). The ALC for the areas of temporary land take, such as access tracks, and also for pylon locations was assessed in a desk-based study using published and other pre-existing data sources. This appendix describes the methodology used for the surveys and desk-based study, and their results.
- 1.1.4 This methodology was agreed by the Land Quality Advice Service (LQAS), Department for Environment and Rural Affairs, Welsh Government (see Appendix 18.2; (**Document 5.18.2.2**).

Agricultural Land Classification (ALC)

1.1.5 The ALC is a standardised method for classifying agricultural land according to its versatility, productivity and workability, based upon inter-related parameters including climate, relief, soil characteristics and drainage. These factors form the basis for classifying agricultural land into one of five grades (with Grade 3 land divided into Subgrades 3a and 3b), ranked: excellent (Grade 1), very good (Grade 2), good (Subgrade 3a), moderate (Subgrade 3b), poor (Grade 4), and very poor (Grade 5) quality agricultural land. ALC is determined using Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.

1.1.6 The grade or subgrade is determined by the most limiting factor (limitation) present. For example, if wetness and droughtiness are the only factors limiting the quality of the land, and they limit it to Subgrade 3b and Grade 2, respectively, such land is classed as Subgrade 3b.

#### Best and Most Versatile (BMV) agricultural land

1.1.7 Best and most versatile (BMV) land is defined as land of excellent (ALC Grade 1), very good (Grade 2) and good (Grade 3a) agricultural quality. BMV land is afforded a degree of protection against irreversible (permanent) development within planning policy (see section 2 Chapter 18 Agriculture (**Document 5.18**)). Moderate, poor and very poor quality land is designated Subgrade 3b or Grades 4 and 5 respectively.

#### The limitations to agricultural land quality

- 1.1.8 The agroclimatic data of a site influences the ALC in respect of growing conditions and the soil reaction in terms of wetness and droughtiness. The Meteorological Office published agroclimatic data for England and Wales on a five-kilometre grid basis (Ref.18.1.vii), from which site specific data can be estimated. The overall climatic limitation is assessed using the average annual rainfall and accumulated temperature at crop establishment (January to June). It reflects the direct effects of water supply and energy available for photosynthesis on plant growth.
- 1.1.9 Gradient has a significant effect on mechanised farm operations since most conventional agricultural machinery performs best on level ground. The safe and efficient use of machinery on sloping land depends very much on the type and design of the machine and on the nature of the slope being farmed. Microrelief involves complex changes in slope angle and direction over short distances, or the presence of boulders or rock outcrops; all of which can impact upon the use agricultural machinery.
- 1.1.10 Flooding can affect choice of crops to be grown, because it may have negative influence on the yield of some crops and restricts soil cultivation. The main factor determining the risk of flooding is topography. Local conditions can be assessed based on local knowledge and information from the water authorities. Floods which occur in summer are generally more damaging than winter floods because the growing roots of the crops are more sensitive to waterlogging. The flood limitation is therefore assessed separately for a 'winter' and a longer 'summer' periods (the latter including spring sowing and autumn cultivation).
- 1.1.11 Soil depth is important when determining available water capacity. Shallowness can affect cropping in several ways, such as restricting the

range of cultivation methods available, restricting nutrient uptake and root growth.

- 1.1.12 Stones act as an impediment to cultivation, harvesting and crop growth. A high stone content reduces the potential for certain agricultural crop management, can cause wear and tear to agricultural implements and tyres, and can reduce the quality of crops (i.e. bruising potatoes during harvesting).
- 1.1.13 Physical limitations resulting from interactions between climate, site and soil characteristics are soil wetness and droughtiness. Soil wetness adversely affects plant growth and agricultural management (e.g. restricts grazing and operation of farm machinery). Droughtiness is most likely to be a significant limitation to crop growth in areas with low rainfall and high evapotranspiration, or where the soil profile holds only small reserves of moisture, for example if the soil is sandy.
- 1.1.14 For ALC purposes soil wetness assessment takes account of duration of the period when soil moisture is at field capacity, and soil susceptibility to waterlogging, based on the following soil profile characteristics: depth to slowly permeable layer, depth to gleying, and topsoil texture.
- 1.1.15 Droughtiness is assessed based on the average drought risk of two reference crops: winter wheat and potatoes. The method uses rooting depth and foliar characteristics of the reference crops to estimate soil moisture balance at a given location.
- 1.1.16 A secondary factor, accompanying other more critical limitations such as slope or droughtiness, is erosion related to wind or water action. Soils can be at risk of a loss of topsoil, seeds, seedlings and fertiliser, plants can also be damaged by abrasion. Knox *et al.*, (2015) published a comprehensive list of soil associations at risk of wind and water erosion, ranging from a very small risk to a very high risk for England and Wales (Ref. 18.1.i).

#### 1.2 METHODOLOGY: SOIL SURVEY AND ALC CALCULATIONS

#### Soil Survey (permanent land take areas except pylon footprint)

1.2.1 Soil surveys were undertaken for the THH/CSECs at Braint and Tŷ Fodol and the substation extension at Pentir and their permanent access tracks. The survey methodology followed Natural England's Technical Information Note 049, 'Agricultural Land Classification: protecting the Best and Most Versatile agricultural land' (Ref. 18.1.ii). The survey data were used determine the ALC for those areas according to the guidelines (Ref 18.1.iii). The descriptions of the soil profiles obtained during the survey are presented in

section 1.3. The droughtiness calculations are presented in section 1.4 and the resulting ALC presented in section 1.5.

Desk-based assessment (temporary land take and pylon footprint)

- 1.2.2 It is important to note that the desk-based methodology was utilised for areas of temporary land take and at pylon locations. Areas of permanent land take (excluding pylons) were subject to detailed soil survey as described above.
- 1.2.3 The most current and detailed published ALC data covering the study area is the Provisional 1:250,000 ALC map of Wales (Ref. 18.1.iv). The study area for the assessment of agricultural impacts, is considered to be the Order Limits. The Order Limits are the extent of the 'Order Land' for the Development Consent Order (DCO); the Order Limits and Order Land that are applied for are the full extent of area required to locate and construct the Proposed Development. The Order Limits are illustrated on Figure 3.1 (**Document 5.3.1.1**).
- 1.2.4 The ALC map of Wales is titled 'provisional' as its use should be limited to strategic purposes, and not to describe ALC at an individual field or farm level. This is because it does not generally show areas of different land quality of less than about 80 ha, and does not distinguish between ALC Subgrade 3a and 3b. Therefore, when used in isolation, the Provisional ALC data cannot be used to identify the presence or absence of Best and Most Versatile (BMV) land. To overcome this limitation the 1:250,000 scale ALC mapping has been used in conjunction with the LandIS NATMAP Vector digital map (Ref: 18.1.v) and descriptions of the mapped soils (properties of which are summarised in Table 18.1.1) from the Soil Survey of England and Wales publication: 'Soils and their use in Wales' (Ref: 18.1.vi), together with the agroclimatic dataset (Ref: 18.1.vi).
- 1.2.5 Whilst it is possible that the ALC grade or soil association derived from this data does not reflect the grade in a particular location within a field (pylon location), it does reflect the dominant land quality or soil characteristics and therefore provides an average for a larger area, such as the Order Limits. Therefore, the ALC grade or soil association has been characterised at appropriate scale for the assessments which are provided on a Project-wide basis, rather than a pylon by pylon basis.
- 1.2.6 The 1:250,000 scale National Soil Map dataset (Ref: 18.1.v) covering the study area was purchased from the National Soil Resources Institute (NSRI), Cranfield University. The dataset contains NATMAP Vector data, which provides spatial distribution of soil associations; and associated datasets containing properties of soil associations, such as percentage of the dominant

and main component soil series. The percentage disregards any ancillary soil series which only make up a small proportion of the soils within some of the associations. The percentage distribution of the dominant soil series is therefore adjusted so that their total equals 100%; this is because inclusion of the lesser ancillary series would unnecessarily complicate the assessment without increasing its accuracy. The area covered by each key soil series, within areas identified as ALC Grade 3 land on the Provisional ALC mapping was then derived.

- 1.2.7 Soil series descriptions provided by Soil Survey of England and Wales (Ref: 18.1.vi), were used to identify the typical limitations to ALC grading displayed by each of the soils. Limitations include typical soil depth, soil texture, soil stone content and soil wetness. These limitations were then used to determine the subdivision of ALC Grade 3 into Subgrade 3a and 3b; using the methodology set out below and described in the ALC guidelines. The results of this assessment are provided in Table 18.1.1.
- 1.2.8 The soil texture information was obtained from the published soil profile descriptions. Where a soil texture is identified as heavy or medium (i.e. silty clay loam and clay loam), it is assumed the distribution is a fifty-fifty split. Additionally, if more than one soil texture is listed in the description of soils series, their proportions have been assumed to be equal. Furthermore, if more than one soil wetness is listed in the description of soils series, the proportions have been assumed to be equal. Where soil wetness can be improved via appropriate land management, it has been assumed that appropriate management practices are in place.
- 1.2.9 The overall climatic limitation is assessed using the average annual rainfall and accumulated temperature. These data for the study area were obtained from the Meteorological Office agroclimatic data for England and Wales published on a five-kilometre grid basis (Ref 18.1.vii). The climatic limitation for the study area does not limit the ALC grade more than 3a.
- 1.2.10 From the climatic data, the number of field capacity days (FCD) can be determined. The number of FCD impacts the wetness limitation of the soils depending on their location within the study area. The study area is characterised by FCD in two categories, 176–225 and above 225. For the same soil present in the higher FCD category, the wetness limitation is usually higher due to longer period of waterlogging, which restricts the range of farming operations and crops that can be grown. To ensure that the assessment remains robust, it was assumed that the entire study area falls into the lower FCD category of 176–225 days, which is more likely to result in overestimation of the area of BMV land affected rather than underestimation of it.

- 1.2.11 The assessment has been carried out on mapped Grade 3 land (Provisional 1:250,000 mapping). Where the calculation of the ALC grade from the published data resulted in a grade other than Subgrade 3a or 3b, the grade was corrected as follows to sit within ALC Grade 3. For example, a calculated Grade 1 or 2 remained BMV land, but was re-assigned to Subgrade 3a; whilst a calculated Grade 4 or 5 remained non-BMV, but was re-assigned to Subgrade 3b. Where it was not possible to determine one single grade for a soil series, equal proportions were assumed.
- 1.2.12 The combination of the soil series areas within agricultural land mapped as ALC Grade 3 on the Provisional mapping; the proportion of Subgrade 3a and 3b of each series; and the Provisionally mapped ALC Grades 1 and 2 land, therefore provided the total potential area of BMV within the study area.
- 1.2.13 It is noted that the spatial arrangement of the ALC Grading cannot be obtained from the NATMAP data, as only the proportion of each soil series within an association is provided, not their geographical location. Therefore, the relative proportions of Subgrade 3a and 3b within the study area can only be presented in a tabular form and not represented in a mapped format (Table 18.1.1 and 18.1.2). The lack of spatial information does not affect the reporting or impact assessment.

#### Summarised Soil Association Data

1.2.14 Soil Survey of England and Wales (1984), Soils and their Use in Wales (Ref 18.2) identified eleven soil associations within the study area. A summary of published soil association data is provided in Table 18.9 (**Document 5.18**), together with a calculation of the area each association occupies within the study area. Estimates of the proportion of Subgrade 3a and 3b within the land mapped as Grade 3 on the Provisional ALC map, are presented in Table 18.1.1 and summarised in Table 18.1.2.

| Table 18.1.1 S | Soil Associations | with | in the | study | area, li | mitations to | ag | ricultural | land qu      | ality, Su | ubgrade   | 3a and 3 | 3b estin | nates     | wher           | e ma          | pped   | as G   | rade | 3 |   |        |        |        |      |
|----------------|-------------------|------|--------|-------|----------|--------------|----|------------|--------------|-----------|-----------|----------|----------|-----------|----------------|---------------|--------|--------|------|---|---|--------|--------|--------|------|
| Soil           | Component soi     | I    | Soil   | h     | Tex.     | Stoniness    | ;  | Org        | Wet.<br>Clas | Possi     | ble textu | ires     |          | We<br>con | tness<br>nbina | Clas<br>tions | s x te | exture | )    |   |   | 3a/3b  | estima | te for |      |
| association    | series            |      | aepti  | n<br> | L.       |              |    | min.       | S            |           |           |          |          | Α         | Α              | Α             | Α      | В      | В    | В | В | Series | 5      | Asso   | c.   |
|                | Name              | %    | V.     | L.    |          | V.           | L. |            | A B          | 1         | 2         | 3        | 4        | 1         | 2              | 3             | 4      | 1      | 2    | 3 | 4 | % 3a   | % 3b   | % 3a   | % 3b |
| 541c           | Eardiston         | 67   | 60     | 1     | no       | slightly     | 1  | no         | 1            | SZL       |           |          |          | 1         |                |               |        |        |      |   |   | 100    |        | 67     |      |
| Eardiston 1    | Bromyard          | 18   | 100    | 1     | no       | stoneless    | 1  | no         | 2            | MZCL      | HZCL      |          |          | 3a        | 3a             |               |        |        |      |   |   | 100    |        | 18     |      |
|                | Bromsgrove        | 15   | 90     | 1     | no       | stoneless    | 1  | no         | 1            | SL        |           |          |          | 1         |                |               |        |        |      |   |   | 100    |        | 15     |      |
|                | 1                 |      |        |       |          | r            | •  | 1          |              |           |           |          |          | -         |                |               |        |        |      |   |   |        | Total  | 100    |      |
| 541j           | Denbigh           | 54   | 100    | 1     | no       | slightly     | 1  | no         | 1            | MCL       | HCL       |          |          | 2         | 3a             |               |        |        |      |   |   | 100    |        | 54     |      |
| Denbigh        | Powys             | 13   | 25     | 3b    | no       | slightly     | 1  | no         | 1            | MCL       | HCL       | MZCL     | HZCL     | 2         | 3a             | 2             | 3a     |        |      |   |   | 100    |        | 13     |      |
|                | Sannan            | 7    | 100    | 1     | no       | slightly     | 1  | no         | 2 3          | MCL       | HCL       |          |          | 3a        | 3a             |               |        | 3a     | 3b   |   |   | 75     | 25     | 5.25   | 1.75 |
|                | Barton            | 13   | 70     | 1     | no       | slightly     | 1  | no         | 1            | MZCL      | HZCL      |          |          | 2         | 3a             |               |        |        |      |   |   | 100    |        | 13     |      |
|                | Manod             | 13   | 60     | 1     | no       | slightly     | 1  | no         | 1            | MZCL      | HZCL      |          |          | 2         | За             |               |        |        |      |   |   | 100    |        | 13     |      |
|                | 1                 |      | 1      | 1.    | 1        | <u> </u>     |    | 1          | <u> </u>     |           |           | 1        | 1        |           |                |               |        |        |      |   | - |        | Total  | 98.3   | 1.75 |
| 541r           | Wick              | 56   | 120    | 1     | no       | slightly     | 1  | no         | 1            | SL        | SZL       |          |          | 1         | 1              |               |        |        |      |   |   | 100    |        | 56     |      |
| VVICK          | Arrow             | 25   | 100    | 1     | no       | slightly     | 1  | no         | 1            | SL        |           |          |          | 1         |                |               |        |        |      |   |   | 100    |        | 25     |      |
|                | Newport           | 19   | 120    | 1     | 2/no     | slightly     | 1  | no         | 1            | SL        | LS        |          |          | 1         | 1              |               |        |        |      |   |   | 100    |        | 19     |      |
|                | 1                 |      |        |       | 1        |              |    | 1          | - L - L      | 1         |           | 1        |          |           |                |               |        |        |      |   |   |        | Total  | 100    |      |
| 541x           | East Keswick      | 53   | 100    | 1     | no       | slightly     | 1  | no         | 1            | MCL       | HCL       |          |          | 2         | 3a             |               |        |        |      |   |   | 100    |        | 53     |      |
| East Keswick   | Nercwys           | 35   | 100    | 1     | no       | slightly     | 1  | no         | 2            | MCL       | HCL       |          |          | 3a        | 3a             |               |        |        |      |   |   | 100    |        | 35     |      |
| 1              | Arrow             | 12   | 100    | 1     | no       | slightly     | 1  | no         | 2            | SL        |           |          |          | 2         |                |               |        |        |      |   |   | 100    |        | 12     |      |
|                |                   |      |        |       |          |              |    |            |              |           |           |          |          |           |                |               |        |        |      |   |   |        | Total  | 100    |      |
| 541z           | East Keswick      | 63   | 100    | 1     | no       | slightly     | 1  | no         | 1            | MCL       | HCL       |          |          | 2         | 3a             |               |        |        |      |   |   | 100    |        | 63     |      |
| East Keswick   | Wilderhope        | 25   | 70     | 1     | no       | slightly     | 1  | no         | 1            | MCL       | HCL       | SZL      |          | 2         | 3a             | 1             |        |        |      |   |   | 100    |        | 25     |      |
| 3              | Crwbin            | 12   | 25     | 3b    | no       | slightly     | 1  | no         | 1            | MCL       | HCL       |          |          | 2         | 3a             |               |        |        |      |   |   | 100    |        | 12     |      |

| I.E.    |              |
|---------|--------------|
| · · · · | - <b>-</b> - |

| Soil         | Component so  | il | Soil | h        | Tex. | Stoniness | 5  | Org  | W<br>CI  | et.<br>as | Possik | ole textu | res |   | Wet con | ness<br>bina | Clas<br>tions | ss x t<br>s | exture | ÷  |   |   | 3a/3b | estima | te for |      |
|--------------|---------------|----|------|----------|------|-----------|----|------|----------|-----------|--------|-----------|-----|---|---------|--------------|---------------|-------------|--------|----|---|---|-------|--------|--------|------|
| association  | series        |    | dept | n        | L.   |           |    | min. | S        |           |        |           |     |   | Α       | Α            | Α             | Α           | В      | В  | В | В | Serie | S      | Asso   | с.   |
|              | Name          | %  | ۷.   | L.       |      | ۷.        | L. |      | Α        | В         | 1      | 2         | 3   | 4 | 1       | 2            | 3             | 4           | 1      | 2  | 3 | 4 | % 3a  | % 3b   | % 3a   | % 3I |
|              |               |    |      |          |      |           |    |      |          |           |        |           |     |   |         |              |               |             |        |    |   |   |       | Total  | 100    |      |
| 713c         | Fforest       | 79 | 100  | 1        | no   | slightly  | 1  | no   | 4        | 5         | MZCL   | HZCL      |     |   | 3b      | 4            |               |             | 4      | 4  |   |   |       | 100    |        | 79   |
| Fforest      | Wenallt       | 11 | 100  | 1        | no   | stoneless | 1  | no   | 4        | 5         | PTY    |           |     |   | 3a      |              |               |             | 4      |    |   |   | 50    | 50     | 5.5    | 5.5  |
|              | Llangendeirne | 10 | 90   | 1        | no   | slightly  | 1  | no   | 4        | 5         | MCL    | HCL       |     |   | 3b      | 4            |               |             | 4      | 4  |   |   |       | 100    |        | 10   |
|              |               |    | _    |          |      |           |    |      |          |           |        |           |     |   |         |              |               |             | _      |    |   |   |       | Total  | 5.5    | 94.5 |
| 713d         | Cegin         | 47 | 100  | 1        | no   | slightly  | 1  | no   | 4        |           | MZCL   | HZCL      |     |   | 3b      | 4            |               |             |        |    |   |   |       | 100    |        | 47   |
| Cegin        | Greyland      | 18 | 100  | 1        | no   | slightly  | 1  | no   | 4        |           | MCL    | HCL       |     |   | 3b      | 4            |               |             |        |    |   |   |       | 100    |        | 18   |
|              | Brickfield    | 12 | 100  | 1        | no   | slightly  | 1  | no   | 4        |           | MCL    | HCL       |     |   | 3b      | 4            |               |             |        |    |   |   |       | 100    |        | 12   |
|              | Sannan        | 12 | 100  | 1        | no   | slightly  | 1  | no   | 3        |           | MCL    | HCL       |     |   | 3a      | 3b           |               |             |        |    |   |   | 50    | 50     | 6      | 6    |
|              | Denbigh       | 11 | 100  | 1        | no   | slightly  | 1  | no   | 1        |           | MCL    | HCL       |     |   | 2       | 3a           |               |             |        |    |   |   | 100   |        | 11     |      |
|              | 1             |    | 1    |          | -    |           |    |      |          |           | 1      | 1         |     |   |         | T            |               | 1           | -      | 1  |   |   | 1     | Total  | 17     | 83   |
| 713f         | Brickfield    | 53 | 100  | 1        | no   | slightly  | 1  | no   | 3        | 4         | MCL    | HCL       |     |   | 3a      | 3b           |               |             | 3b     | 4  |   |   | 25    | 75     | 13.3   | 39.8 |
| Brickfield 2 | Nercwys       | 27 | 100  | 1        | no   | slightly  | 1  | no   | 3        | 4         | MCL    | HCL       |     |   | 3a      | 3b           |               |             | 3b     | 4  |   |   | 25    | 75     | 6.75   | 20.3 |
|              | East Keswick  | 20 | 100  | 1        | no   | slightly  | 1  | no   | 1        |           | MCL    | HCL       |     |   | 2       | За           |               |             |        |    |   |   | 100   |        | 20     |      |
|              |               |    | -    |          | -    | _         |    |      |          |           |        |           |     |   |         |              |               |             |        |    |   |   |       | Total  | 40     | 60   |
| 721c         | Wilcocks      | 72 | 100  | 1        | no   | stoneless | 1  | yes  | 5        | 6         | PTY    | MCL       | HCL |   | 4       | 4            | 4             |             | 5      | 5  | 5 |   |       | 100    |        | 72   |
| Wilcocks 1   | Kielder       | 17 | 100  | 1        | no   | stoneless | 1  | yes  | 5        | 6         | PTY    | MCL       | HCL |   | 4       | 4            | 4             |             | 5      | 5  | 5 |   |       | 100    |        | 17   |
|              | Fordham       | 11 | 100  | 1        | no   | slightly  | 1  | yes  | 5        | 6         | ΡΤΥ    | SL        |     |   | 4       | 4            |               |             | 5      | 5  |   |   |       | 100    |        | 11   |
|              |               |    |      |          |      |           |    |      |          |           |        |           |     |   |         |              |               |             |        |    |   |   |       | Total  |        | 100  |
| 811b         | Conway        | 59 | 120  | 1        | no   | stoneless | 1  | no   | 4        | 5         | MZCL   | HZCL      |     |   | 3b      | 4            |               |             | 4      | 4  |   |   |       | 100    |        | 59   |
| Conway       | Clwyd         | 24 | 100  | 1        | no   | stoneless | 1  | no   | 2        | 3         | MZCL   | HZCL      |     |   | 3a      | 3a           |               |             | 3a     | 3b |   |   | 75    | 25     | 18     | 6    |
|              | Fladbury      | 17 | 100  | 1        | no   | stoneless | 1  | no   | 4        | 5         | с      |           |     |   | 4       |              |               |             | 5      |    |   |   |       | 100    |        | 17   |
|              |               |    |      | <u> </u> | 1    |           |    |      | <u> </u> |           |        | 1         |     | 1 | 1       |              |               |             | 1      |    |   | 1 | 1     | Total  | 18     | 82   |

| Table 18.1.1 S  | Soil Associations | with | in the | study | area, lii | mitations to | o agi | icultural | land      | l qua     | ality, Su | bgrade    | 3a and 3 | 3b estin | nates      | where          | e ma         | pped   | as G   | rade | 3 |   |        |        |        |      |
|---|-------------------|------|--------|-------|-----------|--------------|-------|-----------|-----------|-----------|-----------|-----------|----------|----------|------------|----------------|--------------|--------|--------|------|---|---|--------|--------|--------|------|
| Soil  | Component soil    |      | Soil   | th    | Tex.      | Stoniness    | 5     | Org       | We<br>Cla | et.<br>as | Possib    | ole textu | ires     |          | Wet<br>com | ness<br>Ibinat | Clas<br>ions | s x te | exture | •    |   |   | 3a/3b  | estima | te for |      |
| association   | Series            |      | dep    | un    | <b>_</b>  |              |       |           | S         |           |           |           |          |          | Α          | Α              | Α            | Α      | В      | В    | В | В | Series | 5      | Asso   | ю.   |
|   | Name              | %    | ۷.     | L.    |           | ۷.           | L.    |           | Α         | В         | 1         | 2         | 3        | 4        | 1          | 2              | 3            | 4      | 1      | 2    | 3 | 4 | % 3a   | % 3b   | % 3a   | % 3b |
| Abbreviations: V. – value, L. – limitation, Tex. – topsoil texture (particle size distribution of the fine fraction), Orgmin. – organo-mineral or peaty soil, PTY – peaty, CL – clay loam, ZCL – silty clay loam, M – medium (less than 27% clay, H – beavy (more than 27% clay), SL – sandy loam, C – clay |                   |      |        |       |           |              |       |           |           |           |           |           |          |          |            |                |              |        |        |      |   |   |        |        |        |      |

| Table 18.1.2: BMV propo<br>area where present with | ortions for Soil Associat<br>in areas mapped as Gra | tions in the study<br>ade 3 |
|--|---|-----------------------------|
| Soil Association                                   | % 3a  | % 3b                        |
| Eardiston (541c)                                   | 100   | 0                           |
| Denbigh 1 (541j)                                   | 98  | 2                           |
| Wick 1 (541r)                                      | 100   | 0                           |
| East Keswick 1 (541x)                              | 100   | 0                           |
| East Keswick 3 (541z)                              | 100   | 0                           |
| Fforest (713c)                                     | 5   | 95                          |
| Cegin (713d)                                       | 17  | 83                          |
| Brickfield 2 (713f)                                | 40  | 60                          |
| Wilcocks 1 (721c)                                  | 0   | 100                         |
| Conway (811b)                                      | 18  | 82                          |
| Rounded to nearest perce                           | nt: Adventurers' 1 (1024;                           | a) soils are only           |

#### Calculated BMV proportions for Soil Associations

Rounded to nearest percent; Adventurers' 1 (1024a) soils are only present within Grade 4 or 5 areas

#### 1.3 DESCRIPTION OF SOIL PROFILES FROM THE DETAILED SOIL SURVEYS

- 1.3.1 Table 18.1.3 provides a description for the non-self-explanatory terms used in the description of the soil profile.
- 1.3.2 The Braint THH/CSEC study area is located on Anglesey and the results from the soil survey are presented in Table 18.1.4.
- 1.3.3 The Tŷ Fodol THH/CSEC study area is located in Gwynedd and the results from the soil survey are presented in Table 18.1.5.
- 1.3.4 The Pentir Substation extension is located in Gwynedd and the results from the soil survey are presented in Table 18.1.6.

| Table 18.1.3: Legen<br>profile descriptions                | d for non-self-explanatory terms used in soil   |
|--|---|
| Terminology  | Description   |
| Horizons   | number of different horizons identified within the profile  |
| Depth  | depth to the bottom of the horizon in cm  |
| Soil Type  | mineral (M) or organic-mineral (OM)/peaty (P) texture   |
| Texture  | C - clay, ZC - silty clay, SC - sandy clay, CL - clay<br>loam, SCL – sandy clay loam, ZCL - silty clay loam,<br>SL - sandy loam, LS - loamy sand, S - sand). OS –<br>organic sands, OL – organic loams, OC – organic<br>clays, PS – peaty sands, PL – peaty loams, SP –<br>sandy peats, LP – loamy peats, HP – humified<br>peats, FP – fibrous peats, SFP – semi-fibrous peats* |
| *Abbreviations M and<br>Clay) Abbreviations F<br>textures. | H medium and heavy texture (M <27 %, H > 27 %<br>F, M and C refer to fine, medium and coarse sandy  |
| Colour   | Hue - Munsell colour hue  |
|  | Value - Munsell colour value  |
|  | Chroma - Munsell colour chroma  |
| Von Post   | The degree of humification is graded on a scale from 1 to 10 and designated H1 to H10   |
| Water Content  | Water content is estimated on a scale from 1 (dry) to 5 (very high), designated B1 to B5  |
| Fine Fibre Content   | Fine fibres are defined as fibres or stems smaller<br>than 1mm in diameter or width. The content of fine<br>fibres is graded on a scale from 0 to 3 as follows: F0<br>(Nil); F1 (Low content); F2 (Moderate content) and<br>F3 (High content)   |
| Coarse Fibre<br>Content                                    | Coarse fibres are defined as fibres, stems and<br>rootlets greater than 1 mm in diameter or width. The<br>content of coarse fibres is graded on a scale from 0<br>to 3 as follows: R0 (Nil); R1 (Low content); R2<br>(Moderate content); and R3 (High content)  |

**Overall ALC** 

| profile descriptions      | d for non-self-explanatory terms used in soil   |
|---------------------------|---|
| Terminology               | Description   |
| Wood remains              | Wood and shrub content is graded on a scale from 0<br>to 3 as follows: W0 (Nil); W1 (Low content); W2<br>(Moderate content); and W3 (High content),<br>replacing with N for shrub remains |
| Mottling abundance        | presence of >2 % mottling, followed by Munsell colour (value and chroma) of the mottles   |
| Ped face different colour | colour of ped faces different from the main horizon colour  |
| Biopores                  | 'yes' if >0.5 % biopores greater than 0.5 mm diameter present   |
| Stones                    | Stones > 2 cm - Percentage of 2 – 6 cm diameter<br>stones. Stones > 6 cm - Percentage of > 6 cm<br>diameter stones  |
| Structure                 | Structure type; SG - single grain; GR – granular;<br>SAB - subangular blocky; AB - angular blocky; PR –<br>prismatic; PL – platy; MAS – massive   |
| Development               | How well the structure is developed; W – weak; M – moderate; S – strong   |
| Strength                  | Soil consistence; L – loose; VFR - very friable; FR –<br>friable; FIR – firm; VFIR - very firm; EXFIR -<br>extremely firm; EXHD - extremely hard  |
| SPL                       | Slowly permeable layer  |
| FCD                       | Field capacity days   |

This part of the table combines results of the

classification for every limitation

#### Table 1 profile

| Table 18 | .1.4: Soil P | rofile Des | cription | : Braint T | HH/CSE    | C     |        |                         |                 |                   |                    |                                    |          |                  |                  |           |             |             |          |
|----------|--------------|------------|----------|------------|-----------|-------|--------|-------------------------|-----------------|-------------------|--------------------|------------------------------------|----------|------------------|------------------|-----------|-------------|-------------|----------|
| Sample   | Gradient     | Horizon    | Depth    | Texture    | Hue       | Value | Chroma | Mottling<br>(abundance) | Mottling<br>Hue | Mottling<br>Value | Mottling<br>Chroma | Ped<br>face<br>different<br>colour | Biopores | Stones<br>> 2 cm | Stones<br>> 6 cm | Structure | Development | Ped<br>size | Strength |
| 1        | 0            | 1          | 40       | MZCL       | 2.5YR     | 3     | 3      | 0                       |                 |                   |                    | NO                                 | YES      | 5                | 0                | AB        | М           | М           | FR       |
|          |              | 2          | 80       | SCL        | 5YR       | 5     | 4      | 20                      | 10YR            | 7                 | 8                  | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FR       |
| 2        | 0            | 1          | 30       | SZL        | 5YR       | 4     | 3      | 0                       |                 |                   |                    | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FIR      |
|          |              | 2          | 75       | SCL        | 5YR       | 4     | 6      | 20                      | 10YR            | 6                 | 8                  | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FR       |
| 3        | 0            | 1          | 30       | SCL        | 5YR       | 4     | 3      | 0                       |                 |                   |                    | NO                                 | NO       | 5                | 0                | AB        | Μ           | М           | FIR      |
|          |              | 2          | 70       | MCL        | 5YR       | 4     | 3      | 20                      | 7.5YR           | 5                 | 6                  | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FR       |
| 4        | 0            | 1          | 30       | MZCL       | 7.5YR     | 4     | 3      | 0                       |                 |                   |                    | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FIR      |
|          |              | 2          | 60       | ZCL        | 10YR      | 6     | 3      | 40                      | 10YR            | 7                 | 8                  | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FR       |
| 5        | 0            | 1          | 40       | MZCL       | 10YR      | 4     | 1      | 20                      | 10YR            | 6                 | 6                  | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FR       |
|          |              | 2          | 75       | HZCL       | Gley<br>1 | 6     | 5G/1   | 20                      | 2.5YR           | 7                 | 8                  | NO                                 | NO       | 5                | 0                | AB        | М           | Μ           | FR       |
| 6        | 0            | 1          | 35       | SCL        | 10YR      | 3     | 6      | 0                       |                 |                   |                    | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FIR      |
|          |              | 2          | 55       | SCL        | 10YR      | 4     | 4      | 2                       | 2.5YR           | 5                 | 2                  | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FR       |
|          |              | 3          | 75       | SC         | Gley<br>1 | 6     | 5G/1   | 20                      | 2.5YR           | 6                 | 4                  | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FIR      |
| 7        | 0            | 1          | 60       | ZL         | 10YR      | 3     | 4      | 0                       |                 |                   |                    | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FR       |
|          |              | 2          | 90       | SZL        | 7.5YR     | 5     | 3      | 20                      | 10YR            | 7                 | 8                  | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FIR      |
| 8        | 0            | 1          | 40       | MZCL       | 10YR      | 4     | 4      | 0                       |                 |                   |                    | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FIR      |
|          |              | 2          | 60       | MZCL       | 10YR      | 4     | 4      | 2                       | 10YR            | 7                 | 8                  | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FIR      |
| 9        | 0            | 1          | 35       | MZCL       | 10YR      | 3     | 2      | 0                       |                 |                   |                    | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FR       |
|          |              | 2          | 65       | SCL        | 10YR      |       |        | 0                       |                 |                   |                    | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FIR      |
|          |              | 3          | 88       | SCL        | 10YR      | 7     | 3      | 0                       |                 |                   |                    | NO                                 | NO       | 5                | 0                | PL        | М           | М           | FIR      |
| 10       | 0            | 1          | 30       | MZCL       | 10YR      | 3     | 4      | 0                       |                 |                   |                    | NO                                 | NO       | 5                | 0                | AB        | М           | М           | L        |
|          |              | 2          | 60       | SCL        | 10YR      | 3     | 3      | 2                       | Gley 1          | 6                 |                    | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FR       |
| 11       | 0            | 1          | 60       | ZL         | 10YR      | 3     | 4      | 0                       |                 |                   |                    | NO                                 | NO       | 5                | 0                | AB        | М           | М           | L        |
|          |              | 2          | 90       | SZL        | 7.5YR     | 5     | 3      | 20                      | 10YR            | 7                 | 8                  | NO                                 | NO       | 5                | 0                | AB        | М           | М           | FR       |

| Table 18 | .1.5: Soil P | rofile Des | cription | : Tŷ Fodo | I THH/C | SEC   |        |                         |                 |                   |                    |                                    |          |                  |                  |           |             |             |          |
|----------|--------------|------------|----------|-----------|---------|-------|--------|-------------------------|-----------------|-------------------|--------------------|------------------------------------|----------|------------------|------------------|-----------|-------------|-------------|----------|
| Sample   | Gradient     | Horizon    | Depth    | Texture   | Hue     | Value | Chroma | Mottling<br>(abundance) | Mottling<br>Hue | Mottling<br>Value | Mottling<br>Chroma | Ped<br>face<br>different<br>colour | Biopores | Stones<br>> 2 cm | Stones<br>> 6 cm | Structure | Development | Ped<br>size | Strength |
| 1        |              | 1          | 30       | CSZL      | 7.5YR   | 4     | 3      | 0                       |                 |                   |                    | NO                                 | YES      | 10               | 0                | SAB       | М           | С           | FR       |
| 2        |              | 1          | 30       | CSZL      | 5YR     | 4     | 3      | 0                       |                 |                   |                    | NO                                 | YES      | 10               | 0                | SAB       | Μ           | С           | FR       |
| 3        |              | 1          | 30       | CSZL      | 5YR     | 3     | 3      | 0                       |                 |                   |                    | NO                                 | YES      | 10               | 0                | SAB       | М           | С           | FR       |
| 4        |              | 1          | 22       | MSZL      | 10YR    | 4     | 3      | 0                       |                 |                   |                    | NO                                 | YES      | 10               | 0                | SAB       | Μ           | М           | FR       |
|          |              | 2          | 35       | CSZL      | 10YR    | 6     | 6      | 0                       |                 |                   |                    | NO                                 | YES      | 10               | 5                | SAB       | М           | С           | VFR      |
|          |              |            | 70       | CS        | 10YR    | 5     | 6      | 0                       |                 |                   |                    | NO                                 | NO       | 5                | 10               | GR        | Μ           | С           | VFR      |
| 5        |              | 1          | 38       | MSZL      | 10YR    | 2     | 2      | 0                       |                 |                   |                    | NO                                 | YES      | 10               | 0                | SAB       | Μ           | М           | FR       |
|          |              | 2          | 50       | CSZL      | 10YR    | 5     | 4      | 20                      | 10YR            | 7                 | 8                  | YES                                | NO       | 10               | 5                | SAB       | Μ           | С           | FR       |
| 6        |              | 1          | 35       | MSZL      | 7.5YR   | 4     | 2      | 0                       |                 |                   |                    | NO                                 | YES      | 10               | 0                | SAB       | Μ           | М           | FR       |
|          |              | 2          | 45       | CSZL      | 10YR    | 5     | 4      | 20                      | 10YR            | 7                 | 8                  | YES                                | NO       | 10               | 5                | SAB       | Μ           | С           | FR       |

| Table 18 | able 18.1.6: Soil Profile Description: Pentir Substation Extension |       |         |       |       |        |                         |                 |                   |                    |                                    |          |                  |                  |           |             |             |          |
|----------|--|-------|---------|-------|-------|--------|-------------------------|-----------------|-------------------|--------------------|------------------------------------|----------|------------------|------------------|-----------|-------------|-------------|----------|
| Sample   | Horizon  | Depth | Texture | Hue   | Value | Chroma | Mottling<br>(abundance) | Mottling<br>Hue | Mottling<br>Value | Mottling<br>Chroma | Ped<br>face<br>different<br>colour | Biopores | Stones<br>> 2 cm | Stones<br>> 6 cm | Structure | Development | Ped<br>size | Strength |
| 1        | 1  | 25    | MZCL    | 10YR  | 3     | 2      | 2                       | 10YR            | 6                 | 4                  | NO                                 | YES      | 0                | 0                | GR        | М           | М           | FR       |
|          | 2  | 70    | SCL     | 10YR  | 5     | 3      | 20                      | 10YR            | 5                 | 6                  | YES                                | NO       | 0                | 0                | AB        | М           | М           | FIR      |
| 2        | 1  | 25    | MZCL    | 10YR  | 4     | 3      | 0                       |                 |                   |                    | NO                                 | YES      | 0                | 0                | GR        | М           | М           | FR       |
|          | 2  | 70    | MZCL    | 10YR  | 6     | 2      | 20                      | 7.5YR           | 6                 | 8                  | YES                                | NO       | 0                | 0                | AB        | М           | М           | FIR      |
| 3        | 1  | 15    | MZCL    | 10YR  | 3     | 2      | 0                       |                 |                   |                    | NO                                 | YES      | 0                | 0                | GR        | М           | М           | L        |
|          | 2  | 24    | SCL     | 10YR  | 5     | 8      | 40                      | 2.5YR           | 6                 | 2                  | NO                                 | NO       | 0                | 0                | AB        | М           | М           | FIR      |
|          | 3  | 65    | ZCL     | 2.5YR | 6     | 2      | 20                      | 5YR             | 2.5               | 1                  | YES                                | NO       | 0                | 0                |           |             |             |          |
| 4        | 1  | 31    | SCL     | 10YR  | 3     | 2      | 0                       |                 |                   |                    | NO                                 | YES      | 15               | 10               | GR        | Μ           | М           | FR       |

| Table 18 | .1.6: Soil I | Profile D | escriptio | n: Penti | r Substa | ation Exte | nsion                   |                 |                   |                    |                                    |          |                  |                  |           |             |             |          |
|----------|--------------|-----------|-----------|----------|----------|------------|-------------------------|-----------------|-------------------|--------------------|------------------------------------|----------|------------------|------------------|-----------|-------------|-------------|----------|
| Sample   | Horizon      | Depth     | Texture   | Hue      | Value    | Chroma     | Mottling<br>(abundance) | Mottling<br>Hue | Mottling<br>Value | Mottling<br>Chroma | Ped<br>face<br>different<br>colour | Biopores | Stones<br>> 2 cm | Stones<br>> 6 cm | Structure | Development | Ped<br>size | Strength |
|          | 2            | 55        | SCL       | 10YR     | 4        | 3          | 20                      | 10YR            | 5                 | 6                  | YES                                | NO       | 15               | 10               | AB        | М           | М           | FR       |
|          | 3            | 87        | MZCL      | 10YR     | 5        | 4          | 40                      | 7.5YR           | 5                 | 6                  | NO                                 | NO       | 15               | 10               | AB        | М           | М           | FIR      |
| 5        | 1            | 30        | MZCL      | 10YR     | 3        | 4          | 0                       |                 |                   |                    | NO                                 | YES      | 15               | 10               | GR        | М           | М           | L        |
|          | 2            | 60        | MZCL      | 2.5YR    | 6        | 4          | 20                      | 10YR            | 6                 | 8                  | NO                                 | NO       | 15               | 10               | AB        | М           | М           | FR       |
| 6        | 1            | 28        | MZCL      | 10YR     | 4        | 2          | 0                       |                 |                   |                    | NO                                 | YES      | 15               | 10               | GR        | М           | М           | FR       |
|          | 2            | 45        | MZCL      | 10YR     | 4        | 2          | 40                      | 10YR            | 6                 | 6                  | NO                                 | NO       | 15               | 10               | AB        | М           | М           | FR       |
| 7        | 1            | 40        | SCL       | 10YR     | 6        | 4          | 0                       |                 |                   |                    | NO                                 | YES      | 15               | 10               | GR        | М           | М           | FR       |
|          | 2            | 72        | SCL       | 2.5YR    | 6        | 2          | 20                      | 10YR            | 5                 | 6                  | NO                                 | NO       | 15               | 10               | AB        | М           | М           | FR       |

#### 1.4 DROUGHTINESS CALCULATIONS

- 1.4.1 Table 18.1.7 provides a description for the abbreviations used in the droughtiness calculations.
- 1.4.2 The droughtiness calculations for Braint THH/CSEC, Tŷ Fodol THH/CSEC and the Pentir Substation extension are presented in Tables 18.1.8 to 18.1.10.

| Table 18.1.7: Droughtiness   | Calculation abbreviations  |
|--|--|
| Abbreviations  | Description  |
| ΤΑν  | Total amount of soil water available to<br>plants, considered to be the volumetric soil<br>water content between 0.05 and 15 bar<br>suction or, in case of sands and loamy<br>sands, 0.10 and 15 bar suction. These<br>suctions approximate to the conditions of<br>field capacity and wilting point (when the<br>plants can extract no more moisture from<br>the soil)* |
| EAv  | Easily available water, held in the soil<br>between 0.05 and 2.0 bar suction, used for<br>calculating cereal available water below 50<br>cm depth where root systems are less well<br>developed, and the plant's ability to extract<br>water is diminished*  |
| *Values of TAv and EAv are texture and structural condition 1988). | estimated for each horizon based on soil on according to the ALC guidelines (MAFF,   |
| AP   | Crop adjusted available water capacity, a<br>measure of the quantity of water held in<br>the soil profile which can be taken up by a<br>specific crop  |
| MD   | The moisture deficit term used in the ALC<br>droughtiness assessment is a crop-related<br>meteorological variable which represents<br>the balance between rainfall and potential<br>evapotranspiration calculated over a<br>critical portion of the growing season   |

| Table 18.1.7: Droughtiness | Calculation abbreviations   |
|----------------------------|---|
| Abbreviations              | Description   |
| MB                         | Moisture balance: MB=AP-MD, MB for<br>wheat and potatoes determines limitation<br>by droughtiness |

| Table 18 | .1.8: Drou | ghtiness Ca          | lculations | s: Braint   | THH/CSEC             |       |      |                |              |                      |              |                   |                        |             |             |                             |                |                               |              |
|----------|------------|----------------------|------------|-------------|----------------------|-------|------|----------------|--------------|----------------------|--------------|-------------------|------------------------|-------------|-------------|-----------------------------|----------------|-------------------------------|--------------|
| Sample   | Horizon    | Horizon<br>thickness | Texture    | %<br>stones | Structural condition | TAv % | EAv% | Start<br>depth | End<br>depth | Horizon<br>thickness | TAv /<br>EAv | %<br>non<br>stone | TAv /<br>EAv<br>stones | %<br>stones | AP<br>wheat | AP(wheat)<br>-<br>MD(wheat) | AP<br>potatoes | AP(potato)<br>-<br>MD(potato) | ALC<br>limit |
| 1        | 1          | 40                   | MZCL       | 5           | good                 | 19    |      | 0              | 40           | 40                   | 19           | 95                | 0                      | 5           | 114.95      | 36                          | 114.95         | 51                            | 1            |
|          | 2          | 40                   | SCL        | 5           | moderate             | 15    | 10   | 40             | 80           | 10                   | 15           | 95                | 0                      | 5           |             |                             |                |                               |              |
| 2        | 1          | 35                   | SZL        | 5           | good                 | 19    |      | 0              | 35           | 35                   | 19           | 95                | 0                      | 5           | 108.3       | 30                          | 113.05         | 49                            | 2            |
|          | 2          | 40                   | SCL        | 5           | moderate             | 15    | 10   | 35             | 75           | 15                   | 15           | 95                | 0                      | 5           |             |                             |                |                               |              |
| 3        | 1          | 30                   | SCL        | 5           | good                 | 17    |      | 0              | 30           | 30                   | 17           | 95                | 0                      | 5           | 97.85       | 19                          | 109.25         | 46                            | 2            |
|          | 2          | 40                   | MCL        | 5           | moderate             | 16    | 10   | 30             | 70           | 20                   | 16           | 95                | 0                      | 5           |             |                             |                |                               |              |
| 4        | 1          | 30                   | MZCL       | 5           | good                 | 19    |      | 0              | 30           | 30                   | 19           | 95                | 0                      | 5           | 95.95       | 17                          | 102.6          | 39                            | 2            |
|          | 2          | 30                   | ZCL        | 5           | moderate             | 17    | 10   | 30             | 60           | 20                   | 17           | 95                | 0                      | 5           |             |                             |                |                               |              |
| 5        | 1          | 40                   | MZCL       | 5           | good                 | 19    |      | 0              | 40           | 40                   | 19           | 95                | 0                      | 5           | 112.1       | 34                          | 120.65         | 57                            | 1            |
|          | 2          | 35                   | HZCL       | 5           | moderate             | 17    | 10   | 40             | 75           | 10                   | 17           | 95                | 0                      | 5           |             |                             |                |                               |              |
| 6        | 1          | 35                   | SCL        | 5           | good                 | 17    |      | 0              | 35           | 35                   | 17           | 95                | 0                      | 5           | 97.85       | 19                          | 103.55         | 40                            | 2            |
|          | 2          | 20                   | SCL        | 5           | moderate             | 15    | 10   | 35             | 55           | 15                   | 15           | 95                | 0                      | 5           |             |                             |                |                               |              |
|          | 3          | 20                   | SC         | 5           | poor                 | 13    | 8    | 55             | 75           | 0                    | 13           | 95                | 0                      | 5           |             |                             |                |                               |              |
| 7        | 1          | 60                   | ZL         | 5           | good                 | 23    |      | 0              | 60           | 50                   | 23           | 95                | 0                      | 5           | 137.75      | 59                          | 147.25         | 84                            | 1            |
|          | 2          | 30                   | SZL        | 5           | moderate             | 17    | 10   | 60             | 90           | 0                    | 17           | 95                | 0                      | 5           |             |                             |                |                               |              |
| 8        | 1          | 40                   | MZCL       | 5           | good                 | 19    |      | 0              | 40           | 40                   | 19           | 95                | 0                      | 5           | 97.85       | 19                          | 104.5          | 41                            | 2            |
|          | 2          | 20                   | MZCL       | 5           | moderate             | 17    | 10   | 40             | 60           | 10                   | 17           | 95                | 0                      | 5           |             |                             |                |                               |              |
| 9        | 1          | 35                   | MZCL       | 5           | good                 | 19    |      | 0              | 35           | 35                   | 19           | 95                | 0                      | 5           | 120.65      | 42                          | 113.05         | 49                            | 1            |
|          | 2          | 30                   | SCL        | 5           | moderate             | 15    | 10   | 35             | 65           | 15                   | 15           | 95                | 0                      | 5           |             |                             |                |                               |              |
|          | 3          | 23                   | SCL        | 5           | moderate             | 15    | 10   | 65             | 88           | 0                    | 15           | 95                | 0                      | 5           |             |                             |                |                               |              |
| 10       | 1          | 30                   | MZCL       | 5           | good                 | 19    |      | 0              | 30           | 30                   | 19           | 95                | 0                      | 5           | 92.15       | 14                          | 96.9           | 33                            | 2            |
|          | 2          | 30                   | SCL        | 5           | moderate             | 15    | 10   | 30             | 60           | 20                   | 15           | 95                | 0                      | 5           |             |                             |                |                               |              |
| 11       | 1          | 60                   | ZL         | 5           | good                 | 23    |      | 0              | 60           | 50                   | 23           | 95                | 0                      | 5           | 137.75      | 59                          | 147.25         | 84                            | 1            |
|          | 2          | 30                   | SZL        | 5           | moderate             | 17    | 10   | 60             | 90           | 0                    | 17           | 95                | 0                      | 5           |             |                             |                |                               |              |

| Table 18 | .1.9: Drou | ghtiness Ca          | lculation | s: Tŷ Fod   | ol THH/CSE           | С     |      |                |              |                      |              |                   |                        |             |             |                             |                |                               |              |
|----------|------------|----------------------|-----------|-------------|----------------------|-------|------|----------------|--------------|----------------------|--------------|-------------------|------------------------|-------------|-------------|-----------------------------|----------------|-------------------------------|--------------|
| Sample   | Horizon    | Horizon<br>thickness | Texture   | %<br>stones | Structural condition | TAv % | EAv% | Start<br>depth | End<br>depth | Horizon<br>thickness | TAv /<br>EAv | %<br>non<br>stone | TAv /<br>EAv<br>stones | %<br>stones | AP<br>wheat | AP(wheat)<br>-<br>MD(wheat) | AP<br>potatoes | AP(potato)<br>-<br>MD(potato) | ALC<br>limit |
| 1        | 1          | 30                   | CSZL      | 10          | good                 | 19    |      | 0              | 30           | 30                   | 19           | 90                | 0                      | 10          | 51.3        | -21                         | 51.3           | -5                            | 3b           |
| 2        | 1          | 30                   | CSZL      | 10          | good                 | 19    |      | 0              | 30           | 30                   | 19           | 90                | 0                      | 10          | 51.3        | -21                         | 51.3           | -5                            | 3b           |
| 3        | 1          | 30                   | CSZL      | 10          | good                 | 19    |      | 0              | 30           | 30                   | 19           | 90                | 0                      | 10          | 51.3        | -21                         | 51.3           | -5                            | 3b           |
| 4        | 1          | 22                   | MSZL      | 10          | good                 | 19    |      | 0              | 22           | 22                   | 19           | 90                | 0                      | 10          | 76.21       | 3                           | 77.91          | 22                            | За           |
|          | 2          | 13                   | CSZL      | 15          | good                 | 23    | 17   | 22             | 35           | 13                   | 23           | 85                | 0                      | 15          |             |                             |                |                               |              |
|          | 3          | 35                   | CS        | 15          | good                 | 5     | 4    | 35             | 70           | 15                   | 5            | 85                | 0                      | 15          |             |                             |                |                               |              |
| 5        | 1          | 38                   | MSZL      | 10          | good                 | 19    |      | 0              | 38           | 38                   | 19           | 90                | 0                      | 10          | 76.2        | 3                           | 76.2           | 20                            | За           |
|          | 2          | 12                   | CSZL      | 15          | moderate             | 11    | 6    | 38             | 50           | 12                   | 11           | 85                | 0                      | 15          |             |                             |                |                               |              |
| 6        | 1          | 35                   | MSZL      | 10          | good                 | 19    |      | 0              | 35           | 35                   | 19           | 90                | 0                      | 10          | 76          | 3                           | 76             | 20                            | 3a           |
|          | 2          | 10                   | CSZL      | 15          | moderate             | 19    | 11   | 35             | 45           | 10                   | 19           | 85                | 0                      | 15          |             |                             |                |                               |              |

| Table 18. | 1.10: Drou | ghtiness Ca          | lculations | Pentir Su   | ubstation Exter      | nsion |      |                |              |                      |              |                   |                        |             |             |                             |                |                               |              |
|-----------|------------|----------------------|------------|-------------|----------------------|-------|------|----------------|--------------|----------------------|--------------|-------------------|------------------------|-------------|-------------|-----------------------------|----------------|-------------------------------|--------------|
| Sample    | Horizon    | Horizon<br>thickness | Texture    | %<br>stones | Structural condition | TAv % | EAv% | Start<br>depth | End<br>depth | Horizon<br>thickness | TAv /<br>EAv | %<br>non<br>stone | TAv /<br>EAv<br>stones | %<br>stones | AP<br>wheat | AP(wheat)<br>-<br>MD(wheat) | AP<br>potatoes | AP(potato)<br>-<br>MD(potato) | ALC<br>limit |
| 1         | 1          | 25                   | MZCL       |             | GOOD                 | 19    |      | 0              | 25           | 25                   | 19           | 100               | 0                      | 0           | 105         | 36                          | 115            | 64                            | 1            |
|           | 2          | 45                   | SCL        |             | MODERATE             | 15    | 10   | 25             | 70           | 25                   | 15           | 100               | 0                      | 0           |             |                             |                |                               |              |
| 2         | 1          | 25                   | MZCL       |             | GOOD                 | 19    |      | 0              | 25           | 25                   | 19           | 100               | 0                      | 0           | 110         | 41                          | 124            | 73                            | 1            |
|           | 2          | 45                   | MZCL       |             | MODERATE             | 17    | 10   | 25             | 70           | 25                   | 17           | 100               | 0                      | 0           |             |                             |                |                               |              |
| 3         | 1          | 15                   | MZCL       |             | GOOD                 | 19    |      | 0              | 15           | 15                   | 19           | 100               | 0                      | 0           | 82.2        | 13                          | 91.2           | 40                            | 2            |
|           | 2          | 9                    | SCL        |             | MODERATE             | 15    | 10   | 15             | 24           | 9                    | 15           | 100               | 0                      | 0           |             |                             |                |                               |              |
|           | 3          | 41                   | ZCL        |             | MODERATE             | 12    | 6    | 24             | 65           | 26                   | 12           | 100               | 0                      | 0           |             |                             |                |                               |              |
| 4         | 1          | 31                   | SCL        | 25          | GOOD                 | 17    |      | 0              | 31           | 31                   | 17           | 75                | 0                      | 25          | 88.65       | 20                          | 85.65          | 35                            | 2            |
|           | 2          | 24                   | SCL        | 25          | MODERATE             | 15    | 10   | 31             | 55           | 19                   | 15           | 75                | 0                      | 25          |             |                             |                |                               |              |
|           | 3          | 32                   | MZCL       | 25          | MODERATE             | 17    | 10   | 55             | 87           | 0                    | 17           | 75                | 0                      | 25          |             |                             |                |                               |              |

| Table 18. | 1.10: Drou | ghtiness Ca          | Iculations | : Pentir S  | ubstation Exter      | nsion |      |                |              |                      |              |                   |                        |             |             |                             |                |                               |              |
|-----------|------------|----------------------|------------|-------------|----------------------|-------|------|----------------|--------------|----------------------|--------------|-------------------|------------------------|-------------|-------------|-----------------------------|----------------|-------------------------------|--------------|
| Sample    | Horizon    | Horizon<br>thickness | Texture    | %<br>stones | Structural condition | TAv % | EAv% | Start<br>depth | End<br>depth | Horizon<br>thickness | TAv /<br>EAv | %<br>non<br>stone | TAv /<br>EAv<br>stones | %<br>stones | AP<br>wheat | AP(wheat)<br>-<br>MD(wheat) | AP<br>potatoes | AP(potato)<br>-<br>MD(potato) | ALC<br>limit |
| 5         | 1          | 30                   | MZCL       | 25          | GOOD                 | 19    |      | 0              | 30           | 30                   | 19           | 75                | 0                      | 25          | 75.75       | 7                           | 81             | 30                            | 2            |
|           | 2          | 30                   | MZCL       | 25          | MODERATE             | 17    | 10   | 30             | 60           | 20                   | 17           | 75                | 0                      | 25          |             |                             |                |                               |              |
| 6         | 1          | 28                   | MZCL       | 25          | GOOD                 | 19    |      | 0              | 28           | 28                   | 19           | 75                | 0                      | 25          | 61.57       | -7                          | 61.575         | 11                            | 3a           |
|           | 2          | 17                   | MZCL       | 25          | MODERATE             | 17    | 10   | 28             | 45           | 17                   | 17           | 75                | 0                      | 25          | 5           |                             |                |                               |              |
| 7         | 1          | 40                   | SCL        | 25          | GOOD                 | 17    |      | 0              | 40           | 40                   | 17           | 75                | 0                      | 25          | 78.75       | 10                          | 84.75          | 34                            | 2            |
|           | 2          | 32                   | SCL        | 25          | MODERATE             | 15    | 10   | 40             | 72           | 10                   | 15           | 75                | 0                      | 25          |             |                             |                |                               |              |

#### 1.5 OVERALL ALC CALCULATIONS

1.5.1 The overall ALC calculation are presented for Braint THH/CSEC; Tŷ Fodol THH/CSEC and the Pentir substation extension are presented in Tables 18.1.11 to 18.1.13.

| Table 18 | .1.11: Soil     | Profile ALC | : Braint      | THH/CS        | EC                   |                  |                       |                   |                    |              |               |   |                                   |
|----------|-----------------|-------------|---------------|---------------|----------------------|------------------|-----------------------|-------------------|--------------------|--------------|---------------|---|-----------------------------------|
| Sample   | Climatic<br>ALC | Gradient    | Flood<br>Risk | Soil<br>Depth | Topsoil<br>stoniness | Wetness<br>Class | Wetness<br>limitation | Drought-<br>iness | Topsoil<br>texture | ALC<br>Grade | Limited<br>by | SPL criteria                                  | Criteria for the limitation(s)    |
| 1        | 2               | 1           | 1             | 1             | 1                    | IV               | 3b                    | 1                 | 1                  | 3b           | Wetness       | Red soils with SPL within 60cm and FCD of 233 | SPL within 60 cm,<br>MZCL topsoil |
| 2        | 2               | 1           | 1             | 1             | 1                    | IV               | 3b                    | 2                 | 1                  | 3b           | Wetness       | Red soils with SPL within 60cm and FCD of 233 | SPL within 60cm,<br>SZL topsoil   |
| 3        | 2               | 1           | 1             | 1             | 1                    | IV               | 3b                    | 2                 | 1                  | 3b           | Wetness       | Red soils with SPL within 60cm and FCD of 233 | SPL within 60 cm,<br>SCL topsoil  |
| 4        | 2               | 1           | 1             | 1             | 1                    | IV               | 3b                    | 2                 | 1                  | 3b           | Wetness       | Red soils with SPL within 60cm and FCD of 233 | SPL within 60 cm,<br>MZCL topsoil |
| 5        | 2               | 1           | 1             | 1             | 1                    | IV               | 3b                    | 1                 | 1                  | 3b           | Wetness       | Red soils with SPL within 60cm and FCD of 233 | SPL within 60 cm,<br>MZCL topsoil |
| 6        | 2               | 1           | 1             | 1             | 1                    | IV               | 3b                    | 2                 | 1                  | 3b           | Wetness       | Red soils with SPL within 60cm and FCD of 233 | SPL within 60 cm,<br>SCL topsoil  |
| 7        | 2               | 1           | 1             | 1             | 1                    | IV               | 3b                    | 1                 | 1                  | 3b           | Wetness       | Red soils with SPL within 60cm and FCD of 233 | SPL within 60 cm,<br>ZL topsoil   |
| 8        | 2               | 1           | 1             | 1             | 1                    | IV               | 3b                    | 2                 | 1                  | 3b           | Wetness       | Red soils with SPL within 60cm and FCD of 233 | SPL within 60 cm,<br>MZCL topsoil |
| 9        | 2               | 1           | 1             | 1             | 1                    | IV               | 3b                    | 1                 | 1                  | 3b           | Wetness       | Red soils with SPL within 60cm and FCD of 233 | SPL within 60 cm,<br>MZCL topsoil |
| 10       | 2               | 1           | 1             | 1             | 1                    | IV               | 3b                    | 2                 | 1                  | 3b           | Wetness       | Red soils with SPL within 60cm and FCD of 233 | SPL within 60 cm,<br>MZCL topsoil |
| 11       | За              | 1           | 1             | 1             | 1                    | IV               | Зb                    | 1                 | 1                  | 3b           | Wetness       | Red soils with SPL within 60cm and FCD of 233 | SPL within 60 cm,<br>ZL topsoil   |

| Table 18 | .1.2: Soil P    | rofile ALC: 1 | Îŷ Fodol 🛛    | THH/CS            | EC                   |                  |                       |                   |                    |              |                  |              |                                   |
|----------|-----------------|---------------|---------------|-------------------|----------------------|------------------|-----------------------|-------------------|--------------------|--------------|------------------|--------------|-----------------------------------|
| Sample   | Climatic<br>ALC | Gradient      | Flood<br>Risk | Soil<br>Dep<br>th | Topsoil<br>stoniness | Wetness<br>Class | Wetness<br>limitation | Drough<br>t-iness | Topsoil<br>texture | ALC<br>Grade | Limited<br>by    | SPL criteria | Criteria for the<br>limitation(s) |
| 1        | 3a              | 1             | 1             | 3a                | 2                    | I                | 2                     | 3b                | 1                  | 3b           | Droughtin<br>ess |              |                                   |

| Table 18 | .1.2: Soil P    | rofile ALC: 1 | Îŷ Fodol 1    | THH/CS            | SEC                  |                  |                       |                   |                    |              |                               |              |                                   |
|----------|-----------------|---------------|---------------|-------------------|----------------------|------------------|-----------------------|-------------------|--------------------|--------------|-------------------------------|--------------|-----------------------------------|
| Sample   | Climatic<br>ALC | Gradient      | Flood<br>Risk | Soil<br>Dep<br>th | Topsoil<br>stoniness | Wetness<br>Class | Wetness<br>limitation | Drough<br>t-iness | Topsoil<br>texture | ALC<br>Grade | Limited<br>by                 | SPL criteria | Criteria for the<br>limitation(s) |
| 2        | 3a              | 1             | 1             | За                | 2                    | 1                | 2                     | 3b                | 1                  | 3b           | Droughtin<br>ess              |              |                                   |
| 3        | 3a              | 1             | 1             | За                | 2                    | 1                | 2                     | 3b                | 1                  | 3b           | Droughtin<br>ess              |              |                                   |
| 4        | 3a              | 1             | 1             | 1                 | 2                    | 1                | 2                     | 3а                | 1                  | 3a           | Climate &<br>Droughtin<br>ess |              |                                   |
| 5        | 3a              | 1             | 1             | 2                 | 2                    | I                | 2                     | 3a                | 1                  | 3a           | Climate &<br>Droughtin<br>ess |              |                                   |
| 6        | 3a              | 1             | 1             | 2                 | 2                    | I                | 2                     | 3а                | 1                  | 3a           | Climate &<br>Droughtin<br>ess |              |                                   |

| Table 18.1 | .13: Soil F      | Profile ALC: | Pentir Sub    | statior           | n extension          |                   |                       |                   |                    |              |               |   |                                   |
|------------|------------------|--------------|---------------|-------------------|----------------------|-------------------|-----------------------|-------------------|--------------------|--------------|---------------|---|-----------------------------------|
| Sample     | Climati<br>c ALC | Gradient     | Flood<br>Risk | Soil<br>Dep<br>th | Topsoil<br>stoniness | Wetnes<br>s Class | Wetness<br>limitation | Drough<br>t-iness | Topsoil<br>texture | ALC<br>Grade | Limited<br>by | SPL criteria  | Criteria for the<br>limitation(s) |
| 1          | 3a               | 1            | 1             | 1                 | 1                    | V                 | 4                     | 1                 | 1                  | 4            | Wetness       | SPL within 35 cm,<br>ped faces gleyed and<br>FCD of 238 | SPL within 35 cm, MZCL topsoil    |
| 2          | 3a               | 1            | 1             | 1                 | 1                    | V                 | 4                     | 1                 | 1                  | 4            | Wetness       | SPL within 35 cm,<br>ped faces gleyed and<br>FCD of 238 | SPL within 35 cm, MZCL topsoil    |
| 3          | 3a               | 1            | 1             | 1                 | 1                    | V                 | 4                     | 2                 | 1                  | 4            | Wetness       | SPL within 35 cm,<br>ped faces gleyed and<br>FCD of 238 | SPL within 35 cm, MZCL topsoil    |
| 4          | 3a               | 1            | 1             | 1                 | За                   | IV                | 3b                    | 2                 | 1                  | 3b           | Wetness       | SPL within 35 cm,<br>ped faces gleyed and<br>FCD of 238 | SPL within 35 cm, SCL topsoil     |

| Table 18.1 | 1.13: Soil F     | Profile ALC: | Pentir Sul    | bstatio           | n extension          |                   |                       |                   |                    |              |               |   |                                   |
|------------|------------------|--------------|---------------|-------------------|----------------------|-------------------|-----------------------|-------------------|--------------------|--------------|---------------|---|-----------------------------------|
| Sample     | Climati<br>c ALC | Gradient     | Flood<br>Risk | Soil<br>Dep<br>th | Topsoil<br>stoniness | Wetnes<br>s Class | Wetness<br>limitation | Drough<br>t-iness | Topsoil<br>texture | ALC<br>Grade | Limited<br>by | SPL criteria  | Criteria for the<br>limitation(s) |
| 5          | 3a               | 1            | 1             | 1                 | За                   | IV                | 3b                    | 2                 | 1                  | 3b           | Wetness       | SPL within 35 cm,<br>ped faces gleyed and<br>FCD of 238 | SPL within 35 cm, MZCL topsoil    |
| 6          | 3а               | 1            | 1             | 2                 | 3a                   | IV                | 3b                    | 3a                | 1                  | 3b           | Wetness       | SPL within 35 cm,<br>ped faces gleyed and<br>FCD of 238 | SPL within 35 cm, MZCL topsoil    |
| 7          | 3a               | 1            | 1             | 1                 | 3a                   | IV                | 3b                    | 2                 | 1                  | 3b           | Wetness       | SPL within 35 cm,<br>ped faces gleyed and<br>FCD of 238 | SPL within 35 cm, SCL topsoil     |

- 1.6.1 The assessment of impact to landholding is based upon detailed data collated by National Grid. When collating the data, National Grid assigned a unique identifier to each party or individual who registered an interest in the land with them (registered party of interest). Consequently, each landholding may have more than one registered party of interest, for instance this has occurred for some family-run farms where different family members have each registered an interest with National Grid. As a result, for the 271 landholdings within the Order Limits, there are 351 registered parties of interest. The landholding numbers given in Table 18.1.13 were assigned for means of identification.
- 1.6.2 Based upon the layout of the Proposed Development as shown on the Construction Plans (**Document 4.14**), 100 of the 271 landholdings within the study area (Order Limits) experience no temporary or permanent land take due to the Proposed Development. These landholdings have no temporary or permanent infrastructure on their land, but may have land which would be beneath (over-sailed by) the OHL. It is acknowledged that these over-sailed landholdings will be required to consider the health and safety implications of working beneath the OHL, however it is considered that the designed clearance between the OHL and the land surface is sufficient so as not to impact normal farm operations. Other landholdings may simply lie within the study area in a location where the layout of the Proposed Development shows no development to occur. Landholdings which only experience oversail or which are otherwise avoided by development are therefore excluded from the assessment, as there is no direct impact to land.
- 1.6.3 Within the assessment, impact is assessed for each landholding experiencing temporary land take, rather than for each registered party of interest. Permanent land take (loss of landholding area) is not considered within the assessment as the effects to landholdings are considered to be fully mitigated through the process of discussion and negotiation between National Grid, the landowners and any agricultural tenants (if applicable), with the environmental impacts assessed through the permanent loss of agricultural land assessment. However, details of both temporary and permanent loss of land holding area are presented within this appendix for information purposes, as is information regarding over-sailed or undisturbed land holdings (Table 18.1.15).
- 1.6.4 Impact is assessed as the amount of agricultural land take as a percentage of the overall landholding. The overall landholding as described as the all land owned and/or tenanted by a business or farming enterprise; both within and without the Order Limits. Consequently, where an individual field within the

Order Limits is tenanted it will be considered twice within the assessment, once as part of the tenanted landholding and once as part of the landowners' estate (landholding).

- 1.6.5 Table 18.1.15 lists all landholdings; along with details of the size of landholdings, and calculated temporary and permanent land take. It is noted that for landholdings 133, 159, 190, 205 and 218 the amount of permanent land take is reduced as a consequence of the removal of pylons and the assumed reversion of this land to agricultural use; permanent land 'take' for these landholdings is therefore reported as a negative number.
- 1.6.6 For necessary reasons of privacy and confidentiality, the data are anonymous; however, the location of each landholding and identity of each party is known to National Grid, such that where potential impacts to landholdings are identified appropriate mitigation would be put in place. Additionally, for necessary privacy and confidentiality, the locations of landholdings are not represented as a Figure within the ES.
- 1.6.7 It should be noted that, as described in sections 5.1 of Chapter 18: Agriculture (**Document 5.18**) and in Chapter 3 Description of the Proposed Development (**Document 5.3**), there are two Options for the OHL routeing in the vicinity of a property at Dolydd Newydd in Section D:
  - Option A: the property is over-sailed.
  - Option B: the longer route (property is avoided).
- 1.6.8 Option A results in the loss of one pylon (pylon 4AP065) and the locations of pylons 4AP064 and 4AP066 would be different from the Option B design. These Options impact the amount of temporary and/or permanent land take for seven landholdings (83, 95, 97, 142, 165, 193 and 200). Table 18.1.15 considers both Options (data for these landholdings are presented at the end of the Table).
- 1.6.9 The following elements of infrastructure were considered:

#### Permanent Land Take

- pylons (measured as footprint within the leg span);
- the tunnel head houses (THH);
- the cable sealing end compounds (CSEC);
- new permanent accesses; and

 areas of mitigation where land is removed from agricultural use (such as new woodland planting on current agricultural land).

Temporary Land Take

- pylon working areas;
- access tracks;
- third part access tracks and working areas (non-overlapping with access tracks);
- scaffold working areas;
- bridge working areas;
- drainage mitigation areas; and
- bellmouths.
- 1.6.10 The magnitude of impact due to the temporary loss of landholding area is displayed in Table 18.1.14, according to the criteria in Table 18.3 of Chapter 18 Agriculture (**Document 5.18**).

| Table 18.1.14: Magnitude of Impact |                           |                                     |                                      |                                  |  |  |
|------------------------------------|---------------------------|-------------------------------------|--------------------------------------|----------------------------------|--|--|
| Magnitude of impact                | negligible                | low                                 | medium                               | high                             |  |  |
| Criteria                           | <1 % of total landholding | 1 to 4.9 of<br>total<br>landholding | 5 to 10 %<br>of total<br>landholding | >10 % of<br>total<br>landholding |  |  |

1.6.11 It should be noted that, contrary to the matrix above, landholdings 129, 192 and 296 are shown to have a temporary land take of 5 % which is of low significance and landholding 87 is shown to have a temporary land take of 10 % which is of medium significance. This is due to rounding up within the Table; and all landholdings and percentage land takes are of less than 5 % and less than 10 % respectively when the unrounded figure is investigated.

| Table 18.1.15: Landholding Assessment Data |  |                      |                             |                   |                   |  |  |
|--|--|----------------------|-----------------------------|-------------------|-------------------|--|--|
|  | <b>T</b> .(.)                          | PERM                 | ANENT                       | TEMPORARY         |                   |  |  |
| Landholdin<br>g number                     | I otal<br>landholdin<br>g area<br>(m2) | Land<br>take<br>(m2) | % of<br>land<br>holdin<br>g | Land take<br>(m2) | % of land holding |  |  |
| 1  | 192                                    | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 2  | 195                                    | 0                    | 0.0%                        | 194               | 99.5%             |  |  |
| 3  | 215                                    | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 4  | 349                                    | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 5  | 500                                    | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 6  | 588                                    | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 7  | 765                                    | 0                    | 0.0%                        | 717               | 93.7%             |  |  |
| 8  | 812                                    | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 9  | 841                                    | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 10   | 864                                    | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 11   | 924                                    | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 12   | 1012                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 13   | 1052                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 14   | 1117                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 15   | 1194                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 16   | 1226                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 17   | 1230                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 18   | 1290                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 19   | 1364                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 20   | 1445                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 21   | 1531                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 22   | 1579                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 23   | 1687                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 24   | 1697                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 25   | 1864                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |

| Table 18.1.15: Landholding Assessment Data |  |                      |                             |                   |                   |  |  |
|--|--|----------------------|-----------------------------|-------------------|-------------------|--|--|
|  | <b>.</b>                               | PERMANENT            |                             | TEMPORARY         |                   |  |  |
| Landholdin<br>g number                     | I otal<br>landholdin<br>g area<br>(m2) | Land<br>take<br>(m2) | % of<br>land<br>holdin<br>g | Land take<br>(m2) | % of land holding |  |  |
| 26   | 1872                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 27   | 2059                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 28   | 2103                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 29   | 2182                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 30   | 2220                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 31   | 2382                                   | 0                    | 0.0%                        | 186               | 7.8%              |  |  |
| 32   | 2536                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 33   | 2629                                   | 0                    | 0.0%                        | 9                 | 0.3%              |  |  |
| 34   | 2909                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 35   | 2970                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 36   | 3082                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 37   | 3529                                   | 0                    | 0.0%                        | 266               | 7.5%              |  |  |
| 38   | 3801                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 39   | 3955                                   | 0                    | 0.0%                        | 1000              | 25.3%             |  |  |
| 40   | 4329                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 41   | 4707                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 42   | 4717                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 43   | 4939                                   | 0                    | 0.0%                        | 725               | 14.7%             |  |  |
| 44   | 5901                                   | 0                    | 0.0%                        | 505               | 8.6%              |  |  |
| 45   | 6149                                   | 0                    | 0.0%                        | 477               | 7.8%              |  |  |
| 46   | 6569                                   | 0                    | 0.0%                        | 202               | 3.1%              |  |  |
| 47   | 8224                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 48   | 8404                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 49   | 8539                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 50   | 9171                                   | 0                    | 0.0%                        | 32                | 0.3%              |  |  |

| Table 18.1.15: Landholding Assessment Data |  |                      |                             |                   |                   |  |  |
|--|--|----------------------|-----------------------------|-------------------|-------------------|--|--|
|  | <b>T</b> .(.)                          | PERM                 | ANENT                       | TEMPORARY         |                   |  |  |
| Landholdin<br>g number                     | I otal<br>landholdin<br>g area<br>(m2) | Land<br>take<br>(m2) | % of<br>land<br>holdin<br>g | Land take<br>(m2) | % of land holding |  |  |
| 51   | 9253                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 52   | 9454                                   | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 53   | 9922                                   | 0                    | 0.0%                        | 33                | 0.3%              |  |  |
| 54   | 10008                                  | 0                    | 0.0%                        | 207               | 2.1%              |  |  |
| 55   | 10198                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 56   | 10349                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 57   | 11850                                  | 0                    | 0.0%                        | 4                 | 0.0%              |  |  |
| 58   | 12391                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 59   | 12889                                  | 0                    | 0.0%                        | 3555              | 27.6%             |  |  |
| 60   | 12969                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 61   | 14100                                  | 0                    | 0.0%                        | 996               | 7.1%              |  |  |
| 62   | 16435                                  | 0                    | 0.0%                        | 1741              | 10.6%             |  |  |
| 63   | 17128                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 64   | 17260                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 65   | 17728                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 66   | 18134                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 67   | 19451                                  | 0                    | 0.0%                        | 1424              | 7.3%              |  |  |
| 68   | 20122                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 69   | 20621                                  | 0                    | 0.0%                        | 3128              | 15.2%             |  |  |
| 70   | 23543                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 71   | 23953                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 72   | 25002                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 73   | 25168                                  | 0                    | 0.0%                        | 364               | 1.4%              |  |  |
| 74   | 25533                                  | 0                    | 0.0%                        | 80                | 0.3%              |  |  |
| 75   | 28248                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |

| Table 18.1.15: Landholding Assessment Data |  |                      |                             |                   |                   |  |  |
|--|--|----------------------|-----------------------------|-------------------|-------------------|--|--|
|  | PERMANENT TEMPORARY                    |                      |                             |                   |                   |  |  |
| Landholdin<br>g number                     | I otal<br>landholdin<br>g area<br>(m2) | Land<br>take<br>(m2) | % of<br>land<br>holdin<br>g | Land take<br>(m2) | % of land holding |  |  |
| 76   | 28360                                  | 0                    | 0.0%                        | 940               | 3.3%              |  |  |
| 77   | 28425                                  | 0                    | 0.0%                        | 505               | 1.8%              |  |  |
| 78   | 29066                                  | 0                    | 0.0%                        | 178               | 0.6%              |  |  |
| 79   | 30127                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 80   | 32026                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 81   | 32133                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 82   | 39345                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 84   | 41990                                  | 0                    | 0.0%                        | 10474             | 24.9%             |  |  |
| 85   | 43583                                  | 0                    | 0.0%                        | 72                | 0.2%              |  |  |
| 86   | 44466                                  | 0                    | 0.0%                        | 1293              | 2.9%              |  |  |
| 87   | 47331                                  | 83                   | 0.18%                       | 4716              | 10.0%             |  |  |
| 88   | 47438                                  | 50                   | 0.11%                       | 11769             | 24.8%             |  |  |
| 89   | 49237                                  | 0                    | 0.0%                        | 1683              | 3.4%              |  |  |
| 90   | 49789                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 91   | 52366                                  | 83                   | 0.16%                       | 5922              | 11.3%             |  |  |
| 92   | 52940                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 93   | 54397                                  | 0                    | 0.0%                        | 1683              | 3.1%              |  |  |
| 94   | 55995                                  | 50                   | 0.09%                       | 11769             | 21.0%             |  |  |
| 96   | 57044                                  | 0                    | 0.0%                        | 10252             | 18.0%             |  |  |
| 97   | 57772                                  | 0                    | 0.0%                        | 903               | 1.6%              |  |  |
| 98   | 59405                                  | 0                    | 0.0%                        | 1492              | 2.5%              |  |  |
| 99   | 60110                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 100  | 64484                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 101  | 64657                                  | 83                   | 0.13%                       | 5844              | 9.0%              |  |  |
| 102  | 66771                                  | 0                    | 0.0%                        | 2302              | 3.4%              |  |  |

| Table 18.1.15: Landholding Assessment Data |  |                      |                             |                   |                   |  |  |
|--|--|----------------------|-----------------------------|-------------------|-------------------|--|--|
|  |  | PERMANENT TEMPORARY  |                             |                   |                   |  |  |
| Landholdin<br>g number                     | I otal<br>landholdin<br>g area<br>(m2) | Land<br>take<br>(m2) | % of<br>land<br>holdin<br>g | Land take<br>(m2) | % of land holding |  |  |
| 103  | 68670                                  | 0                    | 0.0%                        | 2302              | 3.4%              |  |  |
| 104  | 69581                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 105  | 71076                                  | 71                   | 0.10%                       | 5917              | 8.3%              |  |  |
| 106  | 74466                                  | 0                    | 0.0%                        | 160               | 0.2%              |  |  |
| 107  | 75740                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 108  | 76244                                  | 0                    | 0.0%                        | 11                | 0.0%              |  |  |
| 109  | 77912                                  | 0                    | 0.0%                        | 71                | 0.1%              |  |  |
| 110  | 84827                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 111  | 88796                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 112  | 89273                                  | 96                   | 0.11%                       | 9155              | 10.3%             |  |  |
| 113  | 89357                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 114  | 90378                                  | 0                    | 0.0%                        | 510               | 0.6%              |  |  |
| 115  | 90422                                  | 60                   | 0.07%                       | 13036             | 14.4%             |  |  |
| 116  | 90439                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 117  | 91710                                  | 0                    | 0.0%                        | 6557              | 7.1%              |  |  |
| 118  | 92322                                  | 71                   | 0.08%                       | 12367             | 13.4%             |  |  |
| 119  | 94271                                  | 3286<br>5            | 34.9%                       | 3571              | 3.8%              |  |  |
| 120  | 96602                                  | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 121  | 98796                                  | 0                    | 0.0%                        | 2237              | 2.3%              |  |  |
| 122  | 100399                                 | 83                   | 0.08%                       | 14030             | 14.0%             |  |  |
| 123  | 101174                                 | 50                   | 0.05%                       | 11369             | 11.2%             |  |  |
| 124  | 101908                                 | 0                    | 0.0%                        | 8984              | 8.8%              |  |  |
| 125  | 102063                                 | 0                    | 0.0%                        | 8984              | 8.8%              |  |  |
| 126  | 103641                                 | 40                   | 0.04%                       | 5168              | 5.0%              |  |  |

| Table 18.1.15: Landholding Assessment Data |  |                      |                             |                   |                   |  |  |
|--|--|----------------------|-----------------------------|-------------------|-------------------|--|--|
|  | -                                      | PERMANENT TEMPORARY  |                             |                   |                   |  |  |
| Landholdin<br>g number                     | I otal<br>landholdin<br>g area<br>(m2) | Land<br>take<br>(m2) | % of<br>land<br>holdin<br>g | Land take<br>(m2) | % of land holding |  |  |
| 127  | 103875                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 128  | 104969                                 | 0                    | 0.0%                        | 4995              | 4.8%              |  |  |
| 129  | 104999                                 | 0                    | 0.0%                        | 5245              | 5.0%              |  |  |
| 130  | 106299                                 | 40                   | 0.04%                       | 5168              | 4.9%              |  |  |
| 131  | 107238                                 | 0                    | 0.0%                        | 5168              | 4.8%              |  |  |
| 132  | 110539                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 133  | 110733                                 | -45                  | -<br>0.04%                  | 8593              | 7.8%              |  |  |
| 134  | 111330                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 135  | 114272                                 | 126                  | 0.11%                       | 22317             | 19.5%             |  |  |
| 136  | 114833                                 | 0                    | 0.0%                        | 4                 | 0.0%              |  |  |
| 137  | 119409                                 | 60                   | 0.05%                       | 13036             | 10.9%             |  |  |
| 138  | 121644                                 | 49                   | 0.04%                       | 10468             | 8.6%              |  |  |
| 139  | 123401                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 140  | 123605                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 141  | 124912                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 143  | 130302                                 | 0                    | 0.0%                        | 366               | 0.3%              |  |  |
| 144  | 136805                                 | 96                   | 0.07%                       | 14134             | 10.3%             |  |  |
| 145  | 137471                                 | 69                   | 0.05%                       | 6087              | 4.4%              |  |  |
| 146  | 137594                                 | 60                   | 0.04%                       | 4518              | 3.3%              |  |  |
| 147  | 137970                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 148  | 147992                                 | 60                   | 0.04%                       | 7312              | 4.9%              |  |  |
| 149  | 155573                                 | 71                   | 0.05%                       | 7487              | 4.8%              |  |  |
| 150  | 156215                                 | 71                   | 0.05%                       | 7487              | 4.8%              |  |  |
| 151  | 171828                                 | 131                  | 0.08%                       | 18346             | 10.7%             |  |  |

| Table 18.1.15: Landholding Assessment Data |  |                      |                             |                   |                   |  |  |
|--|--|----------------------|-----------------------------|-------------------|-------------------|--|--|
|  | -                                      | PERM                 | ANENT                       | TEMPORARY         |                   |  |  |
| Landholdin<br>g number                     | l otal<br>landholdin<br>g area<br>(m2) | Land<br>take<br>(m2) | % of<br>land<br>holdin<br>g | Land take<br>(m2) | % of land holding |  |  |
| 152  | 172573                                 | 0                    | 0.0%                        | 956               | 0.6%              |  |  |
| 153  | 173515                                 | 131                  | 0.08%                       | 18346             | 10.6%             |  |  |
| 154  | 174773                                 | 1922<br>1            | 11.0%                       | 26993             | 15.4%             |  |  |
| 155  | 175649                                 | 60                   | 0.03%                       | 17876             | 10.2%             |  |  |
| 156  | 176297                                 | 0                    | 0.0%                        | 205               | 0.1%              |  |  |
| 157  | 181926                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 158  | 185857                                 | 0                    | 0.0%                        | 444               | 0.2%              |  |  |
| 159  | 207371                                 | -95                  | -<br>0.05%                  | 19217             | 9.3%              |  |  |
| 160  | 212286                                 | 0                    | 0.0%                        | 5291              | 2.5%              |  |  |
| 161  | 216908                                 | 0                    | 0.0%                        | 58                | 0.0%              |  |  |
| 162  | 222025                                 | 71                   | 0.03%                       | 12077             | 5.4%              |  |  |
| 163  | 234397                                 | 0                    | 0.00%                       | 4137              | 1.8%              |  |  |
| 164  | 235912                                 | 212                  | 0.09%                       | 25582             | 10.8%             |  |  |
| 166  | 242296                                 | 0                    | 0.0%                        | 1196              | 0.5%              |  |  |
| 167  | 244500                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 168  | 248965                                 | 0                    | 0.0%                        | 5291              | 2.1%              |  |  |
| 169  | 263269                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 170  | 263805                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 171  | 268460                                 | 50                   | 0.02%                       | 6776              | 2.5%              |  |  |
| 172  | 269573                                 | 71                   | 0.03%                       | 8522              | 3.2%              |  |  |
| 173  | 273301                                 | 0                    | 0.0%                        | 1620              | 0.6%              |  |  |
| 174  | 276607                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 175  | 287961                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |

| Table 18.1.15: Landholding Assessment Data |  |                      |                             |                   |                   |  |  |
|--|--|----------------------|-----------------------------|-------------------|-------------------|--|--|
|  |  | PERM                 | ANENT                       | TEMPORARY         |                   |  |  |
| Landholdin<br>g number                     | l otal<br>landholdin<br>g area<br>(m2) | Land<br>take<br>(m2) | % of<br>land<br>holdin<br>g | Land take<br>(m2) | % of land holding |  |  |
| 176  | 289308                                 | 121                  | 0.04%                       | 121869            | 42.1%             |  |  |
| 177  | 290599                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 178  | 292505                                 | 0                    | 0.0%                        | 36                | 0.0%              |  |  |
| 179  | 292671                                 | 207                  | 0.07%                       | 21878             | 7.5%              |  |  |
| 180  | 294248                                 | 0                    | 0.0%                        | 2258              | 0.8%              |  |  |
| 181  | 304223                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 182  | 305390                                 | 85                   | 0.03%                       | 17467             | 5.7%              |  |  |
| 183  | 314076                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 184  | 317558                                 | 142                  | 0.04%                       | 30760             | 9.7%              |  |  |
| 185  | 320649                                 | 0                    | 0.0%                        | 3248              | 1.0%              |  |  |
| 186  | 322314                                 | 0                    | 0.0%                        | 3248              | 1.0%              |  |  |
| 187  | 325463                                 | 0                    | 0.0%                        | 7531              | 2.3%              |  |  |
| 188  | 326598                                 | 154                  | 0.05%                       | 19044             | 5.8%              |  |  |
| 189  | 328105                                 | 177                  | 0.05%                       | 22609             | 6.9%              |  |  |
| 190  | 332880                                 | -34                  | -<br>0.01%                  | 36698             | 11.0%             |  |  |
| 191  | 340592                                 | 107                  | 0.03%                       | 3793              | 1.1%              |  |  |
| 192  | 346967                                 | 71                   | 0.02%                       | 17260             | 5.0%              |  |  |
| 194  | 389235                                 | 50                   | 0.01%                       | 16738             | 4.3%              |  |  |
| 195  | 392074                                 | 96                   | 0.02%                       | 12112             | 3.1%              |  |  |
| 196  | 404868                                 | 96                   | 0.02%                       | 3400              | 0.8%              |  |  |
| 197  | 407702                                 | 1647                 | 0.4%                        | 81086             | 19.9%             |  |  |
| 198  | 411415                                 | 126                  | 0.03%                       | 22317             | 5.4%              |  |  |
| 199  | 412994                                 | 0                    | 0.0%                        | 6714              | 1.6%              |  |  |
| 201  | 420675                                 | 71                   | 0.02%                       | 22282             | 5.3%              |  |  |

| Table 18.1.15: Landholding Assessment Data |  |                      |                             |                   |                   |  |  |
|--|--|----------------------|-----------------------------|-------------------|-------------------|--|--|
|  |  | PERM                 | ANENT                       | TEMPORARY         |                   |  |  |
| Landholdin<br>g number                     | l otal<br>landholdin<br>g area<br>(m2) | Land<br>take<br>(m2) | % of<br>land<br>holdin<br>g | Land take<br>(m2) | % of land holding |  |  |
| 202  | 428198                                 | 0                    | 0.0%                        | 6911              | 1.6%              |  |  |
| 203  | 445655                                 | 0                    | 0.0%                        | 205               | 0.0%              |  |  |
| 204  | 450213                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 205  | 450795                                 | -3                   | 0.0%                        | 24391             | 5.4%              |  |  |
| 206  | 450893                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 207  | 462321                                 | 0                    | 0.0%                        | 5269              | 1.1%              |  |  |
| 208  | 467842                                 | 0                    | 0.0%                        | 4298              | 0.9%              |  |  |
| 209  | 470707                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 210  | 478414                                 | 267                  | 0.06%                       | 55371             | 11.6%             |  |  |
| 211  | 478993                                 | 96                   | 0.02%                       | 12112             | 2.5%              |  |  |
| 212  | 510752                                 | 60                   | 0.01%                       | 12216             | 2.4%              |  |  |
| 213  | 541964                                 | 0                    | 0.0%                        | 2298              | 0.4%              |  |  |
| 214  | 551432                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 215  | 565528                                 | 305                  | 0.05%                       | 34307             | 6.1%              |  |  |
| 216  | 581517                                 | 154                  | 0.03%                       | 40118             | 6.9%              |  |  |
| 217  | 596685                                 | -34                  | -<br>0.01%                  | 36698             | 6.2%              |  |  |
| 218  | 598879                                 | -22                  | 0.0%                        | 39142             | 6.5%              |  |  |
| 219  | 601736                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 220  | 624814                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 221  | 656238                                 | 0                    | 0.0%                        | 2258              | 0.3%              |  |  |
| 222  | 666313                                 | 0                    | 0.0%                        | 4856              | 0.7%              |  |  |
| 223  | 668431                                 | 0                    | 0.0%                        | 8                 | 0.0%              |  |  |
| 224  | 721460                                 | 0                    | 0.0%                        | 173               | 0.0%              |  |  |
| 225  | 796948                                 | 1738                 | 0.2%                        | 28777             | 3.6%              |  |  |

| Table 18.1.15: Landholding Assessment Data |  |                      |                             |                   |                   |  |  |
|--|--|----------------------|-----------------------------|-------------------|-------------------|--|--|
|  | <b>T</b> ( )                           | PERM                 | ANENT                       | TEMPORARY         |                   |  |  |
| Landholdin<br>g number                     | I otal<br>landholdin<br>g area<br>(m2) | Land<br>take<br>(m2) | % of<br>land<br>holdin<br>g | Land take<br>(m2) | % of land holding |  |  |
| 226  | 800819                                 | 0                    | 0.0%                        | 1209              | 0.2%              |  |  |
| 227  | 805298                                 | 1610                 | 0.2%                        | 19379             | 2.4%              |  |  |
| 228  | 811206                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 229  | 862947                                 | 2792<br>9            | 3.2%                        | 4052              | 0.5%              |  |  |
| 230  | 897404                                 | 0                    | 0.0%                        | 1737              | 0.2%              |  |  |
| 231  | 904222                                 | 208                  | 0.02%                       | 15228             | 1.7%              |  |  |
| 232  | 908465                                 | 0                    | 0.0%                        | 1560              | 0.2%              |  |  |
| 233  | 922831                                 | 1282                 | 0.14%                       | 2732              | 0.3%              |  |  |
| 234  | 932817                                 | 333                  | 0.04%                       | 31739             | 3.4%              |  |  |
| 235  | 964706                                 | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 236  | 980382                                 | 401                  | 0.04%                       | 43462             | 4.4%              |  |  |
| 237  | 990199                                 | 68                   | 0.01%                       | 17663             | 1.8%              |  |  |
| 238  | 1055601                                | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 239  | 1119094                                | 343                  | 0.03%                       | 25925             | 2.3%              |  |  |
| 240  | 1128657                                | 4410<br>6            | 3.9%                        | 68430             | 6.1%              |  |  |
| 241  | 1181273                                | 255                  | 0.02%                       | 19050             | 1.6%              |  |  |
| 242  | 1189831                                | 168                  | 0.01%                       | 20646             | 1.7%              |  |  |
| 243  | 1207911                                | 173                  | 0.01%                       | 20197             | 1.7%              |  |  |
| 244  | 1276254                                | 255                  | 0.02%                       | 19050             | 1.5%              |  |  |
| 245  | 1322088                                | 0                    | 0.0%                        | 177               | 0.0%              |  |  |
| 246  | 1363973                                | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 247  | 1438205                                | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 248  | 1545135                                | 107                  | 0.01%                       | 3793              | 0.2%              |  |  |

| Table 18.1.15: Landholding Assessment Data |  |                      |                             |                   |                   |  |  |
|--|--|----------------------|-----------------------------|-------------------|-------------------|--|--|
|  | <b>.</b>                               | PERM                 | ANENT                       | TEMPORARY         |                   |  |  |
| Landholdin<br>g number                     | I otal<br>landholdin<br>g area<br>(m2) | Land<br>take<br>(m2) | % of<br>land<br>holdin<br>g | Land take<br>(m2) | % of land holding |  |  |
| 249  | 1572373                                | 343                  | 0.02%                       | 25925             | 1.6%              |  |  |
| 250  | 1750147                                | 107                  | 0.01%                       | 3793              | 0.2%              |  |  |
| 251  | 1771907                                | 0                    | 0.0%                        | 1561              | 0.1%              |  |  |
| 252  | 1786839                                | 607                  | 0.03%                       | 76973             | 4.3%              |  |  |
| 253  | 1833654                                | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 254  | 1848502                                | 107                  | 0.01%                       | 3793              | 0.2%              |  |  |
| 255  | 1875025                                | 85                   | 0.0%                        | 17467             | 0.9%              |  |  |
| 256  | 1893268                                | 4424<br>7            | 2.3%                        | 106997            | 5.7%              |  |  |
| 257  | 1970758                                | 181                  | 0.01%                       | 31030             | 1.6%              |  |  |
| 258  | 2071163                                | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 259  | 2135075                                | 206                  | 0.01%                       | 33511             | 1.6%              |  |  |
| 260  | 2136576                                | 0                    | 0.0%                        | 1490              | 0.1%              |  |  |
| 261  | 2167699                                | 323                  | 0.01%                       | 36713             | 1.7%              |  |  |
| 262  | 2199747                                | 4424<br>7            | 2.0%                        | 106997            | 4.9%              |  |  |
| 263  | 2426747                                | 403                  | 0.02%                       | 64640             | 2.7%              |  |  |
| 264  | 2561058                                | 50                   | 0.0%                        | 14577             | 0.6%              |  |  |
| 265  | 2634919                                | 213                  | 0.01%                       | 54773             | 2.1%              |  |  |
| 266  | 2638460                                | 213                  | 0.01%                       | 54773             | 2.1%              |  |  |
| 267  | 3745618                                | 393                  | 0.01%                       | 69649             | 1.9%              |  |  |
| 268  | 4093610                                | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |
| 269  | 7292847                                | 485                  | 0.01%                       | 26438             | 0.4%              |  |  |
| 270  | 8520850                                | 1015                 | 0.01%                       | 160827            | 1.9%              |  |  |
| 271  | 765                                    | 0                    | 0.0%                        | 0                 | 0.0%              |  |  |

| Table 18.1.15: Landholding Assessment Data |                                       |                      |                             |                   |                      |  |  |  |
|--|---------------------------------------|----------------------|-----------------------------|-------------------|----------------------|--|--|--|
| Landholdin<br>g number                     | Total<br>landholdin<br>g area<br>(m2) | PERMANENT            |                             | TEMPORARY         |                      |  |  |  |
|  |                                       | Land<br>take<br>(m2) | % of<br>land<br>holdin<br>g | Land take<br>(m2) | % of land<br>holding |  |  |  |
| Option A                                   |                                       |                      |                             |                   |                      |  |  |  |
| 83   | 40409                                 | 83                   | 0.2%                        | 7562              | 18.7%                |  |  |  |
| 95   | 56245                                 | 83                   | 0.15%                       | 7562              | 13.4%                |  |  |  |
| 142  | 125083                                | 0                    | 0.0%                        | 5163              | 4.1%                 |  |  |  |
| 142  | 125083                                | 0                    | 0.0%                        | 5163              | 4.1%                 |  |  |  |
| 165  | 240398                                | 121                  | 0.05%                       | 18129             | 7.5%                 |  |  |  |
| 193  | 365365                                | 165                  | 0.05%                       | 34302             | 9.4%                 |  |  |  |
| 200  | 419760                                | 192                  | 0.05%                       | 30206             | 7.2%                 |  |  |  |
| Option B                                   |                                       |                      |                             |                   |                      |  |  |  |
| 83   | 40409                                 | 82                   | 0.2%                        | 8453              | 20.9%                |  |  |  |
| 95   | 56245                                 | 82                   | 0.15%                       | 8453              | 15.0%                |  |  |  |
| 142  | 125083                                | 46                   | 0.04%                       | 6343              | 5.1%                 |  |  |  |
| 165  | 240398                                | 100                  | 0.04%                       | 19306             | 8.0%                 |  |  |  |
| 193  | 365365                                | 165                  | 0.05%                       | 33838             | 9.3%                 |  |  |  |
| 200  | 419760                                | 171                  | 0.04%                       | 31383             | 7.5%                 |  |  |  |

1.6.12 The data for landholdings experiencing permanent or temporary land take presented in Table 18.1.15 are summarised in Table 18.1.16. There are also an additional 100 landholdings which are either over-sailed or not impacted by development as per the assessed design.

| Table 18.1.16: Number of Landholdings Experiencing Temporary and / orPermanent Land Take and Scale of Change (as % of total landholding area). |                        |                           |                          |                        |  |  |  |  |
|--|------------------------|---------------------------|--------------------------|------------------------|--|--|--|--|
| Scale of loss  | <1 % of<br>landholding | 1 to 4.9 % of landholding | 5 to 10 % of landholding | >10% of<br>landholding |  |  |  |  |
| Option A: Expedited Route  |                        |                           |                          |                        |  |  |  |  |
| Temporary<br>land take   | 43                     | 64                        | 33                       | 31                     |  |  |  |  |
| Permanent<br>land take   | 165                    | 4                         | 0                        | 2                      |  |  |  |  |
| Option B: Longer Route   |                        |                           |                          |                        |  |  |  |  |
| Temporary<br>land take   | 43                     | 63                        | 34                       | 31                     |  |  |  |  |
| Permanent<br>land take   | 165                    | 4                         | 0                        | 2                      |  |  |  |  |

## 2 References

- 2.1.1 Ref. 18.1.1: Knox et al., (2015); Research to develop the evidence base on soil erosion and water use in agriculture. Final Technical Report, Cranfield University.
- 2.1.2 Ref 18.1.2: Natural England, (2012); Technical Information Note 049, 'Agricultural Land Classification: protecting the Best and Most Versatile agricultural land'. Available at http://publications.naturalengland.org.uk/file/4424325 [Accessed 24 February 2017].
- 2.1.3 Ref 18.1.3: MAFF (1988); Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land, also available online: http://archive.defra.gov.uk/foodfarm/landmanage/landuse/documents/alc-guidelines-1988.pdf
- 2.1.4 Ref 18.1.4: ADAS (1977); 1:250,000 "Provisional Agricultural Land Classification Sheet, Wales.
- 2.1.5 Ref 18.1.5: Cranfield University, (2015); The Soils Guide, available at: www.landis.org.uk. [Accessed 22 January 2017].
- 2.1.6 Ref 18.1.6: Soil Survey of England and Wales (1984); Soils and their Use in Wales and accompanying 1:250,000 map Sheet 2.
- 2.1.7 Ref 18.1.7: Met Office, (1989); Climatological Data for Agricultural Land Classification: Gridpoint datasets of climatic variables at 5km intervals for England and Wales

2.1.8