



Awel y Môr Offshore Wind Farm

Outline Soil Management Plan (Clean)

Deadline 2

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Abbreviations and acronyms

TERM	DEFINITION
ALO	Agricultural Liaison Officer
BMV	Best and Most Versatile
CMS	Construction Method Statement
CoCP	Code of Construction Practice
DCC	Denbighshire County Council
DCO	Development Consent Order
ECoW	Ecological Clerk of Works
ES	Environmental Statement
NRW	Natural Resources Wales
OWF	Offshore Wind Farm
SMP	Soil Management Plan
TCC	temporary construction compound
WTGs	Wind turbine generators

1 Introduction

1.1 Purpose of this Outline SMP

- 1 This Outline Soil Management Plan (Outline SMP) is provided as Appendix 4 to the Outline Code of Construction Practice (CoCP) (application ref: 8.13)) as part of the Environmental Statement (ES).
- 2 This is an outline document that, by reference to the assessments reported in the ES, sets out the key elements that will be secured in the detailed SMP which Awel y Môr Offshore Wind Farm Limited (The Applicant) will be required to submit to Denbighshire County Council (DCC) for approval under a requirement of the DCO.
- 3 This Outline SMP provide details of mitigation measures and best practice handling techniques to safeguard soil resources by ensuring their protection, conservation and appropriate reinstatement during the construction of the onshore works and should be read in conjunction with the Outline CoCP and all of its supporting appendices.

1.2 Scope of this Outline SMP

- 4 For the avoidance of doubt, this Outline SMP relates to the onshore elements of the Awel y Môr OWF only (i.e. landward of Mean High Water Springs). This document does not relate to offshore works seaward of Mean High Water Springs that are principally marine activities.
- 5 Details surrounding the decommissioning phase are yet to be fully clarified, such as whether onshore ducts to remain *in situ* with only the cable removed. In addition, it is also recognised that policy, legislation and local sensitivities will evolve.
- 6 The scope for a decommissioning phase soil management plan would be determined through development of the written scheme of decommissioning that is required under DCO Requirement 22. A decommissioning phase soil management plan would be provided as part of the decommissioning phases CoCP (DCO Requirement 22 (2)).

2 Pre Construction Surveys

- 7 Prior to construction, an agricultural liaison officer will be employed to ensure that information on existing agricultural management and soil/land conditions is obtained, recorded and verified by way of detailed pre-construction soil condition surveys and intrusive soil survey trial pits to identify and describe the physical and nutrient characteristics of the existing soil profiles. The surveys will be undertaken by a specialist soil surveyors (professional members of the British Society of Soil Science) according to best practice (typically one intrusive investigation per 100 m for linear routes or 1 per hectare elsewhere).
- 8 The survey work will include the identification of the physical characteristics of profiles at agreed intervals. Trial pits will also be examined at appropriate locations to provide information on soil structure.
- 9 The survey will provide information on the following soil physical characteristics:
 - ▲ Soil horizon depths for topsoil and subsoil horizons;
 - ▲ Soil textures of all horizons;
 - ▲ Soil colour;
 - ▲ Stone contents, estimated from augering, confirmed by soil pit excavation/ and or sample analysis;
 - ▲ Soil wetness indicators;
 - ▲ Identification of slowly permeable layers; and
 - ▲ Identification of impenetrable rock layers
- 10 As part of the soil condition survey, and in addition to addressing matters relating to soils and other factors including existing crop regimes, the position and condition of field boundaries, existing drainage of the soil, existing access arrangements and private water supplies (as far as reasonable investigations allow), the type of agriculture taking place, the yield of crops and the quality of grazing land will also be recorded. Liaison with affected landowners and tenants will be undertaken to identify potential constraints and barriers to construction and identify the provision of any temporary drainage requirements and/or diversions.

- 11 Such aspects will be recorded and entered into a pre-entry record of condition for the affected landowner. The commencement of construction will reflect agreements made with affected parties to minimise disruption, where possible, to existing farming regimes and timings of activities (e.g. cropping).
- 12 The agricultural liaison officer will undertake site inspections during construction to monitor working practices and ensure landowners' and farmers' reasonable requirements are fulfilled. The agricultural liaison officer will also retain a function with regards to agreeing reinstatement measures following completion of the works.
- 13 The responsibility for ensuring that measures set out in the Final Soil Management Plan (Final SMP) are delivered, including all supervision, monitoring and auditing of activities affecting the soils, will rest with the Principal Contractor(s) and agricultural liaison officer.
- 14 The qualifications, responsibilities and authority of the agricultural liaison officer (and/or appointed soil specialist as part of the agricultural liaison officer role) will be confirmed via the Final SMP as will confirmation that the agricultural liaison officer would have the overall authority to stop works on site if ground conditions are not suitable and there are risks to soils.

3 General Construction Methodology

3.1 Cable Route

- 15 The sequence of activities for construction of the onshore ECC and OnSS is provided in the outline Construction Method Statement (CMS) that is provided as Appendix 1 of the outline CoCP (application ref: 8.13.1).

3.1.1 Working Width

- 16 The working width will typically be between 40 to 60 m, allowing for up to two wide cable trenches, temporary soil stockpiles, drainage, haul road and working areas around the cable trenches. The expected width of each cable trench will be up to 5m.

3.1.2 Topsoil Stripping

- 17 Once the working width has been cleared of vegetation, existing topsoil will be stripped (with the exception of an area to be used for topsoil storage). The precise method of stripping and the depth to which the soil will be stripped will be determined during the detailed design phase. The detailed design stage will include soil surveys to be undertaken along the cable route; the findings of which will determine the depth to subsoil. Alternatively, temporary matting may be used to reduce topsoil stripping, however, this would be confirmed following detailed design and the soil condition survey and would be included in the Final SMP.
- 18 Appropriate machinery and methods will be identified and agreed in the Final SMP and used to minimise soil compaction where the soil conditions indicate that compaction is possible.

- 19 Stripped topsoil will be stored to the side/s of the working width in a manner that provides separation from subsoil and vehicles. This will be stored as an earth bund of a maximum height of 4 m to avoid compaction from the weight of the soil. Storage time will be kept to the practicable minimum to prevent the soil deteriorating in quality. Topsoil will be stored on a section of working width that is not stripped. Topsoil stripped from different fields will be stored separately, as will soil from hedgerow banks or woodland strips, to reduce the potential for crop contamination during reinstatement.

3.1.3 Haul Roads

- 20 A temporary haul road will be constructed within the working width. It is assumed that there will be a requirement to import aggregates to create a stable surface for construction traffic movements (unless matting is used). Other options such as bog-matting, trackway or geotextiles will also be considered where required. Vehicle passing points will be created to facilitate safe two way traffic flow on the haul route.

3.1.4 Installation and backfilling

- 21 Following trench excavation, a thin layer of stabilised cement bound sand will be packed around the ducts in order to aid heat dissipation. Subsoil and topsoil previously removed will then be backfilled.
- 22 Although there is unlikely to be significant amounts of surplus material from either the cable corridor or substation works, any surplus subsoil material from trench excavation will be spread and compacted across the working width prior to topsoil reinstatement on a field-by-field basis. This would only be undertaken so as not to impede achievement of restoration objectives and provided the materials are compatible, in consultation with the relevant landowner.
- 23 If required, offsite disposal of surplus soil material shall only be considered where use on-site is not feasible. The landowner/occupier will be consulted before any off-site disposal is planned. In such instances disposal will be undertaken in accordance with the Waste (England and Wales) Regulations 2011 and the Site Waste Management Plan (an outline Site Waste Management Plan is provided as Appendix 5 (application ref: 8.13.5) of the outline CoCP).

3.1.5 Reinstatement

- 24 The final SMP will include an appropriate restoration methodology based on the results of the site investigation and soil resource survey reports.
- 25 The main objectives for the reinstatement of the land will be to restore it to its pre-development quality as far as is reasonably practicable, as determined by the information obtained during the pre-construction soils survey. Land will be reinstated as soon as reasonably practical after completion of the construction works.
- 26 Material will be re-used on site and replaced in its original location and correct depositional sequence in accordance with the SMP and the soil resource survey reports. Material sent offsite for re-use or appropriate soil treatment/disposal will be minimised.
- 27 Disturbed ground will be reinstated with the stored topsoil and subsoil following trenching. If necessary, the subsoil will be ripped prior to topsoil placement if compaction has occurred. Topsoil will be spread in such a way as to ensure that it does not become compacted.

3.2 Substation

- 28 Construction of the substation and establishment of a temporary construction compound (TCC) will initially affect approximately 87,500 m² of land comprising a substation footprint of approximately 50,000 m² and TCC area of approximately 37,500 m². In addition, construction access and a new permanent access will also be required.

3.2.1 Topsoil stripping and earthworks

- 29 Once the substation compound has been cleared of vegetation, existing topsoil will be stripped. Stripped topsoil will be stored within the works area.

3.2.2 Reinstatement

- 30 Given the volume of soil being stripped, there may be a requirement to remove soil off-site. Where possible, stripped topsoil will be re-used in landscaping and excavated material will be used in landscaping screening bunds (if required).

- 31 Wherever possible, material will be re-used on site and replaced in its original location and correct depositional sequence in accordance with the SMP and the soil resource survey reports. Material sent offsite for re-use or appropriate soil treatment/disposal will be minimised.

4 Soil Management

4.1 General

- 32 All soil handling, placing, compaction and management will be undertaken in accordance with best practice (DEFRA, 2009). Mitigation measures will comprise the following:
- 33 Topsoil from areas currently in agricultural use will be stripped before the start of general construction works.
- Soils of different types (as identified by the detailed pre-construction soil survey) will be stockpiled/stored accordingly;
 - Soils will be replaced within the same field as excavated;
 - Soils suitable for reuse as part of wider mitigation associated with the OnSS (e.g. planting areas) to be reused in a broadly similar location to their origin, and stored for the shortest amount of time permissible;
 - Any surplus soils from the OnSS works to be re-used for landscaping or disposed of in an appropriate manner off-site; and
 - Vehicle movements will be restricted on waterlogged soils and will be subject to an assessment of ground conditions which will be undertaken on a site by-site basis to avoid compaction and damage
- 34 The Final SMP will be developed based on the results of a pre-construction condition survey, which will specify the detail of the existing soil characteristics and the depths and properties of topsoil and subsoil horizons. The final SMP will include details of the methods of working, proposed site machinery and tillage equipment, materials and health and safety requirements. The Final SMP will set out where soil storage areas will be located along the Onshore ECC and OnSS works areas. The working plans will identify the area required for soil storage based on soil resources estimates and bund height / slope constraints.
- 35 As part of the SMP, soils will be segregated into stockpiles (typically of no more than 5,000m³) based on their origin and type (e.g., topsoil, subsoil and Made Ground). Each stockpile will be labelled with appropriate signage and a unique identifier if required.

- 36 If export of excess topsoil and subsoil associated with the OnSS is proposed following detailed design, material will be tested in accordance with the appropriate British Standard guidance (e.g. BS 3882:2015 and BS8601:2013) to assess the quality of the soils and determine if they meet the required standards for re-use. Copies of any laboratory certificates, if obtained will also be held on record within the site file.
- 37 Best practice measures will be implemented to prevent accidental mixing during all phases of soil handling, and this will include the following measures:
- ▲ Use of a soil resource plan, informed by the condition survey showing soil units to be stripped with information provided to operatives to distinguish types and layers, and ranges of thickness
 - ▲ Determination of stripping depths to allow segregation of topsoil and subsoil
 - ▲ Use of clear signage to identify the content of stockpiles where appropriate.
- 38 The following measures will be used to protect stored soils:
- ▲ No trafficking of vehicles/plant or storage of materials to take place outside designated working areas. Heavy plant and vehicles to be restricted to specific routes;
 - ▲ No trafficking of vehicles or plant on stockpiled or reinstated soils (topsoil or subsoil);
 - ▲ Stripping areas are to be protected from in flow of water and ponding. Wet areas will be drained in advance of stripping;
 - ▲ Soils will only be moved when they are in a dry and friable condition, based on field assessment of the soils' wetness in relation to its lower plastic limit;
 - ▲ No mixing of topsoil with subsoil, or of soil with other materials.
- 39 Details of the soil management works will be recorded as part of the daily record/site diary, and these records will be checked on a weekly basis for compliance with the SMP, and these details recorded.
- 40 The plasticity of the stored soils will be assessed at regular intervals by the Agricultural land officer (or appointed soil specialist) (at least one test per 1000m³ of soil) in the field using a Soil Consistency Test comprising two stages:

- ▲ Step A - Attempt to roll a soil sample into a ball by hand
 - ▲ Step B - Attempt to roll ball into a 3mm diameter thread by hand
- 41 If it is not possible to roll the soil into a ball or a 3mm diameter thread the soil will be determined to be below the plastic limit.
- 42 The most appropriate methodology for handling and storage of the soils will then be determined and agreed via the final SMP based on the plasticity and the moisture content of the soils.
- 43 Most inappropriate handling can be prevented by a detailed soils assessment combined with a set of construction rules which control timings of machinery handling in relation to winter wet (field capacity) periods and heavy rain at other times of year.

4.2 Timing of works

- 44 The detailed timing of different aspects of the construction will be established post-consent during detailed design. The final scheme design and construction methodology will be informed by a number of pre-commencement surveys, including ecological surveys, arboricultural surveys and a soil condition survey (as set out in Section 2).

4.3 Construction Mitigation

- 45 All site operatives who will be involved in the excavation or movement of soils will be briefed on the final SMP as part of the initial site induction process, and each site operative will sign copies of the appropriate method statements held within the site register to confirm acknowledgement of this information.
- 46 This information will be refreshed throughout the project as part of the daily toolbox talks, and key works relating the SMP will be recorded in the daily record/site diary maintained by the site manager (e.g. material movements/stockpiling, soil sampling/testing, etc).
- 47 Communication and understanding of the information relating to the SMP will be assessed as part of weekly review and regular site audits.

48 Before commencing work on site, where soils are to be disturbed, the Contractor will be required to ensure that the construction plant being proposed is appropriate to the size of the site, the volume of soil and haul distances. The selection of appropriate equipment and work practices is important as mishandling of soil can have an adverse effect on its fertility, permeability, ecological diversity, and the performance and visual quality of vegetated areas. Mishandling can also increase the risk of flooding and off-site discharges. Multiple handling of soil materials will be minimised.

4.4 Drainage

49 Existing land drains, where encountered during construction, will be appropriately marked. Temporary drainage will be installed within the working width to intercept existing field drains and ditches in order to maintain the integrity of the existing field-drainage system. Such measures will also assist in reducing the potential for wet areas to form during the works, with a consequential impact on soil structure and fertility. Where necessary, existing land drains will be replaced to ensure continued agricultural use.

50 Particular care will be taken to ensure that the existing land drainage regime is not compromised as a result of construction. Land drainage systems will be maintained during construction and reinstated on completion. Where required along the cable route, temporary cut-off drains will be installed parallel to the trench-line to intercept soil and surface water before it reaches the trench. A temporary ditch will also be installed along the relevant boundary of the substation site which will catch runoff from the substation platform during the construction period.

4.5 Compaction

51 Plant and traffic movements will be confined to designated routes to minimise the potential for soil disturbance, compaction and indirect contamination. Tracked equipment will be used wherever possible to reduce compaction.

4.6 Stripping

4.6.1 Topsoil

- 52 Topsoil stripping will be undertaken along the working width for the cable route and at the substation site. Appropriate soil handling machinery will be used and where possible, stripping will be programmed to reduce potential soil damage from handling in unsuitable weather conditions. Where topsoils are stripped best practice guidance and methods will be followed (such as the MAFF Soil Handling Guide (MAFF 2000),
- 53 Stripping will generally be undertaken by an excavator positioned on the surface of the topsoil, excavating to the maximum topsoil depth without disturbing or removing the subsoil. Alternatively a dozer can be used to strip the topsoil by pushing the topsoil into a bund or to an excavator.
- 54 The initial topsoil strip will be subject to monitoring to ensure that the handling method is implemented correctly.

4.6.2 Subsoil

- 55 Following the topsoil strip, subsoil will be excavated to the required depth from the trenches. Excavation will be undertaken by an excavator positioned on the surface of the subsoil.
- 56 No maximum height has been set out for subsoil stockpiles within this outline document. The height of stockpiles will depend on several factors, including the amount of space available, the nature and composition of the soil, the prevailing weather conditions at the time of stripping and will be agreed via the final SMP.

4.7 Storage

4.7.1 Locating soil stores

57 The stripped topsoil and excavation subsoil will be stored within the working width. The ground where the soil stores will be located will be free from vegetation and waste, and positioned away from tree crowns, root protection zones, watercourses and ditches. To ensure soil stores are located away from runoff, cut off ditches and swales will be used to divert water to a suitable drainage system. All designated soil storage areas would be a minimum of 10 m from any open watercourse features, where practicable.

4.7.2 Timing of soil storage

58 Effective programming will ensure soil is stored for the minimum time possible. Where soil is to be stored for over 6 months it will be covered to minimise erosion or allowed to re-vegetate naturally to minimise soil runoff.

59 Where it is not possible to re-vegetate stored soil, use of hessian, mulches or trackifiers to cover stored soil will be considered, should this be required for dust management or stabilisation purposes.

60 Consideration will also be given to re-vegetating, seeding, or covering soil that is being stored less than 6 months if this is required for dust management or stabilisation purposes.

4.7.3 Formation of soil stores

61 Topsoil and subsoil will be stored separately and once stored, appropriately demarcated with signage to clearly identify the type of soil contained within each store.

4.7.4 Reinstatement

- 62 Following installation of the cable, all areas of disturbed ground will be restored to their original levels and profiles using the stored subsoil followed by the topsoil. The working area will be reinstated to pre-existing condition as far as reasonably practical in line with Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra 2009)
- 63 Subsoils will be placed and ‘naturally’ consolidated (to the same as the surroundings) within the trench excavations and in reverse order to its removal. Where there is excess subsoil within an area, soils will be spread over the working width and in consultation with the relevant landowner. Agricultural fields will be restored, as far as possible, to their previous condition. Topsoil will be prepared and seeded using an appropriate seed mix or returned to arable cultivation. If required, loosening operations will be undertaken within the TCC areas.

5 Monitoring and Review

- 64 Details of the soil management works will be inspected and recorded as part of the daily record/site diary, and these records will be checked on a weekly basis for compliance with the Final SMP.
- 65 A programme of monitoring and reporting will be set out in the Final SMP for approval (by DCC) and then implemented to ensure soil handling processes are being appropriately implemented, with additional visits during the initial soil strip and store of soil materials.
- 66 In addition, the SMP will be reviewed, periodically, with any required updates communicated to and approved by DCC.

6 Decommissioning

- 67 Details surrounding the decommissioning phase are yet to be fully clarified. Specific decommissioning requirements and potential concerns with regards to soils would be discussed with DCC, NRW and any other relevant statutory consultees at the time.
- 68 With respect to the buried onshore cables, these are likely to be left in place after decommissioning. At the present time, allowing the cables to remain in place is considered an acceptable option with minimal environmental impact. Jointing bays may be removed, depending on agreements reached with the statutory authorities in place at the time. Removal of any impermeable structures would return the site to its pre-Project state.
- 69 It is anticipated that the OnSS and TJB would be gradually dismantled on site with certain infrastructure removed for recycling/re-use. Following this, the area is likely to be remediated and restored.
- 70 The decommissioning methodology would be finalised nearer to the end of the lifetime of AyM, to be in line with current guidance, policy and legislation. Any such methodology would be agreed with the relevant authorities and statutory consultees. The DCO includes a requirement to submit a written scheme of decommissioning 6 months before decommissioning starts.
- 71 The soil condition survey, undertaken pre-construction, will inform the baseline used to the inform decommissioning methodology, target restoration and site aftercare and these would be agreed via the written scheme of decommissioning (DCO Requirement 6).

7 Pre-Commencement

72 The draft DCO (as amended at Deadline 1 during Examination), includes the following definition of 'pre-commencement' activities:

onshore works comprising surveying or investigatory works including archaeological investigations, environmental surveys, investigations for the purpose of assessing ground conditions; preparatory works to existing infrastructure and diversion and laying of utilities and services; creation of any temporary means of access; site clearance including vegetation clearance; erection of screening and fencing, site security works, creation of temporary hard standing, or the temporary display of site notices or advertisements

73 The relevant aspects of this Outline SMP that will be adhered to in carrying out 'pre-commencement' activities (where relevant to those activities), are as follows:

- ▲ Section 4 - Soil Management; and
- ▲ Section 5 - Monitoring and Review.

74 In addition to being secured prior to commencement of any stage of the onshore works under requirement 10 of the DCO, the relevant aspects of section 2 (pre-construction surveys) will also be adhered to for the relevant survey area where the 'pre-commencement' activities do not include those environmental surveys.

8 References

Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Department for Environment, Food and Rural Affairs (DEFRA)), 2009



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