

Rhoscrowther | Wind Farm



Environmental Statement

Volume III: Technical Appendices

Appendix 3.1 - Draft Construction Environmental Management Plan

October 2021

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1 INTRODUCTION

Report Purpose

1.1 This Construction Environmental Management Plan (CEMP) has been prepared for the construction phase of the Rhoscrowther Wind Farm.

The works that will be undertaken include:

- Construction of new access tracks;
- Construction of turbine crane hardstandings;
- Construction of turbine foundations;
- Onsite cabling works; and
- Delivery, installation and commissioning of the turbines.

1.2 This report has been prepared by Rhoscrowther Wind Farm Limited (RWFL). No liability is accepted for the use of all or part of this report by third parties. Any other persons who use any information contained herein do so at their own risk.

1.3 This CEMP has been produced to provide an overview of the methods which will be used during construction of the development in order to mitigate against any potential pollution, which could impact on the environment. Processes and methodologies described in this statement are based on previous experience and best practice.

1.4 This CEMP is an iterative document that will be adapted throughout the construction phase of the wind farm to reflect any new environmental concerns or constraints that arise during the construction process. It is intended that this document will be updated and approved by the local planning authority prior to the commencement of development. Furthermore the Contractors employed by RWFL will develop and update this CEMP as the construction progresses.

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- 1.5 The CEMP outlines the minimum standards which shall be met. RWFL will employ experienced principal contractors who have a proven track record in successfully constructing wind farm projects.
- 1.6 RWFL will also ensure that all design and construction works are undertaken in accordance with their obligations outlined within the Construction, Design and Management Regulations 2015.
- 1.7 The environmental impacts of the construction of the wind farm will be kept under review by the developer and the ECoW and where any new risks are identified to protected species/habitats, to surface water, material storage or pollution control then this document will be updated and submitted to the Local Planning Authority.

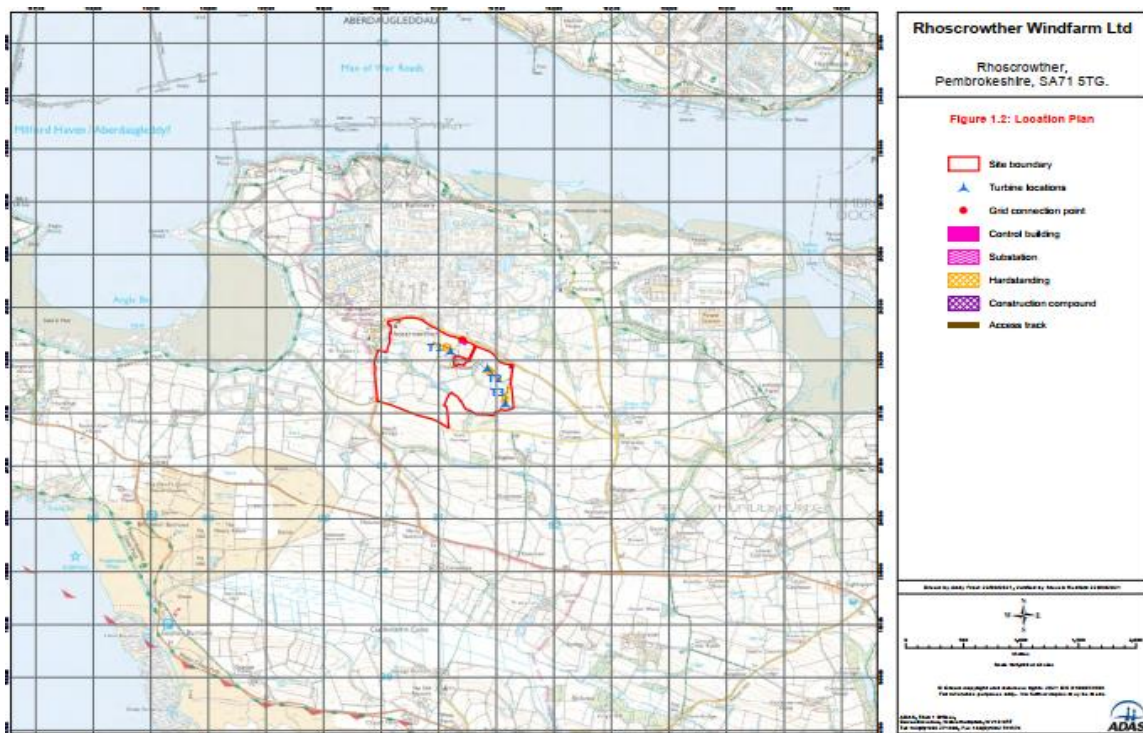
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2 WIND FARM DETAILS

Development Location

2.1 The wind farm is located on land south of the Valero Refinery near the village of Rhoscrowther, within the Haven Waterway Enterprise Zone, approximately 9km west of Pembroke and 4km east of Angle in south west Wales.

Figure 2.1: Site Location



Proposed Development

2.2 The proposed development will feature three wind turbines at a maximum tip height of 135m.

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3 ELEMENTS OF CONSTRUCTION WORKS

Programme of Proposed Works

3.1 The construction programme will include:

Site mobilisation and establishment, construction of temporary site compound, construction of access tracks, control building, cable installation, turbine foundations and crane pads and delivery, installation and commissioning of turbines.

3.2 This CEMP contains all the necessary information in relation to the construction of the wind farm. The proposed works respect major ecological constraint windows. Where works may impact upon sensitive periods, the Ecological Clerk of Works (ECoW) will be consulted and activities monitored.

New Tracks

3.3 A new access track is required to facilitate construction of, and ongoing operational access to, the turbines and switchgear and metering building, including the delivery of turbine components and turbine erection traffic.

3.4 In line with turbine manufacturer guidelines, the access track will be up to 4.5m wide at the running surface (excluding shoulders/verges, widening at bends, junctions, and crane hardstandings) to satisfy the requirements of the safe operation of construction and turbine deliveries.

3.5 The access track layout will be micro-sited to minimise cut and fill and earthworks requirement requirements. This will help to mitigate environmental impacts during the works, and also visual impact associated with cut slopes and batters.

3.6 Access track construction will involve the removal of vegetation and top soil, excavation of the underlying subsoil to a suitable bearing stratum, and profiling of the ground as required to suit turbine access guidelines.

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- 3.7 The topsoil and any incorporated seed bank will be stored as required in suitable stockpiles for use in reinstatement works. Topsoil shall be stockpiled separately to any sub soil material to avoid contamination and to allow restoration to occur successfully. Stockpiles shall not exceed 3m in height.
- 3.8 Particular attention shall be given to cutting, storing and re-instating top soil on the road edges and batters in order to encourage regeneration of vegetation following construction.
- 3.9 Previously stripped soils, vegetated layers or turfs will be reinstated/restored back over the verges of constructed tracks and disturbed areas within as short a time period as reasonably possible, to give the seed bank and vegetation the best chance of an early regeneration. Turfs and topsoil will be matched to the adjacent habitats where possible. These will be used to create low angle (where possible) landscaped verges that will assist in providing visual continuity between the access track and the surrounding ground.
- 3.10 Stone for the construction of the tracks will be imported from suitable local quarries.
- 3.11 Appropriate drainage infrastructure will be provided. The drainage system will incorporate sediment management measures to help mitigate effects on the hydrological environment. Extreme care will be taken throughout the construction stage to minimise impacts.
- 3.12 Passing places and sections of access track that are not required for maintenance access or use for agricultural access will be narrowed by covering the track in geotextile and covering in top soil. Should a major component need to be replaced, the geotextile can be removed and the track re-exposed.
- 3.13 Following completion of the construction all exposed soil bunds, banks and embankments will be seeded to stabilise the surface. An appropriate seed mix will

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be sown at the rate prescribed by the supplier during the first autumn or spring sowing season following completion of the construction phase.

- 3.14 Prior to and during the construction of the new infrastructure, there will be a small number of sites, which will need fencing off, or existing fencing maintained, up to an agreed buffer zone relative to each site's boundaries, under the supervision of the ECoW, so as to ensure that the sites are adequately protected to prevent any possibility of any random access by machines and equipment.
- 3.15 Where the construction of the access tracks leads to the removal of hedgerow sections, these sections are to be replaced on a daily basis during construction period with 'Heras' or similar fencing to act as 'replacement' flightlines. Areas where hedgerows have been removed will be replanted to gap up any missing sections. Any remaining gaps (i.e. those where the track passes through the hedgerow) will to be filled with gates (kept closed at night) to allow continuation of flight lines.

Crane Hardstandings

- 3.16 Hardstandings will be created next to the turbine bases and will be used as lay-down areas and as stable platforms for cranes and other vehicles to operate during construction activities. The size of the hardstandings will be dictated by the requirements of the turbine supplier and the crane contractor.
- 3.17 The blade laydown area will be formed from temporary structures such as bog matting which will be removed on completion.
- 3.18 Hardstandings will be constructed using a cut and fill method of construction, similar to the site tracks and will be constructed from crushed aggregate, laid over a geotextile (as required in accordance with the track designers and manufacturers guidelines). The hardstandings will feature a layer of higher quality crushed stone and greater rates of compaction to comply with the appropriate crane lift loadings.

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- 3.19 Following successful commissioning of the turbines, the crane hardstandings will be left in situ.

Turbine Foundations

- 3.20 The foundation details to be utilised for the turbines will be designed to suit ground conditions specific to each turbine location.
- 3.21 The turbine foundations will be reinforced concrete bases. The turbine will be anchored to the foundation concrete using a cage or anchor ring assembly cast into the concrete. Each foundation will require circa 350m³ of concrete.
- 3.22 The foundation geotechnical design will be based on the information contained in the site investigation interpretative report and the peat slide risk assessment report and appropriate factors of safety will be incorporated in accordance with European design standards.
- 3.23 It is not anticipated that piling will be required however If piling is required, a stone piling platform will be constructed in the base of the foundation excavation to provide a firm, level, surface for a piling rig. Piles will then be installed into the ground by the piling rig in accordance with the piling design. It is anticipated that driven steel or pre-cast concrete piles will be utilised.
- 3.24 Steel reinforcement bar and ducts for the base will be lowered into the excavation by crane. The reinforcement structure is built up and supported until the concrete pour is ready. Concrete pouring is carried out as a single continuous activity.
- 3.25 Factors such as weather, access for transport and other activities which could affect the success of the pour are all considered by the contractor before a decision to pour is made. Formwork will be removed after satisfactory curing and the void around the base backfilled and holes for cable ducts will be carefully protected. The topsoil from the store areas will be used to cover around the surface of the turbine base to minimise the visual impact of the works.

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- 3.26 However, special measures will be in place to manage the pouring of the concrete foundation. The principal risk associated with the foundation construction is the escape of concrete during the pour or wash waters from the equipment which has to be cleaned on site. Therefore, the following activities present the greatest risk areas and will be specially managed:
- Transport of the concrete
 - Pumping the concrete into the shuttered foundation; and,
 - The whole operation will be governed by bespoke Risk Assessment and Method Statements prepared by the BoP contractor.
- 3.27 The principal control measure is to isolate the turbine foundation from the surface water system. This will be achieved by bunding the work area (concrete works will take place within an excavation) to create a sump to contain any rainfall and spillages. This area therefore allows for containment of spillages and primary settlement. Discharge locations will be at appropriate distance from watercourses to ensure natural filtration/settlement of sit within discharged water before entering any surface water courses.
- 3.28 The entire foundation will be fully shuttered with preformed steel shutters that bolt together to provide secure containment for the concrete. Shutters will be backfilled with earth on their external face to provide additional support and robustness.
- 3.29 Concrete loads will be transported to foundation locations by mixer waggons which will pour their load into a concrete pump set up adjacent to the foundation location, the pump directs the concrete via a hose to the turbine base. The risks associated with this operation are spillages of concrete while being discharged from the mixer waggon into the hopper of the pump; and, a break in the hose during the pumping operation.

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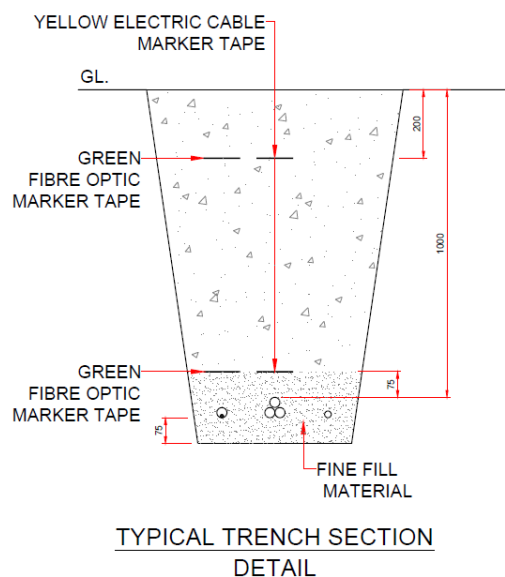
- 3.30 Spillages during the transfer of the concrete will be small scale (if they occur at all) and can be contained as the area where the concrete is transferred is on level ground, and takes place on a stoned area underlain by a geo-textile. Any spillages can be immediately excavated and placed in a skip and disposed of off-site. The operation will be fully supervised by trained operators and the ECoW who has the authority to suspend the operation.
- 3.31 If a breakage occurs in the hose, pumping will be immediately stopped and any spillages immediately removed from site. Work will not recommence until the hose has been repaired.
- 3.32 The final sensitive operation is washing of various components such as the pump and chutes of concrete mixer waggons. After discharging their concrete load at the foundation, mixer waggons will proceed to a designated washout area. The washout area will comprise a sump lined with an impermeable membrane to fully contain concrete washout water. It will be located in a suitable area, close to the pour location, and remote from watercourses or other environmentally sensitive areas. Following the concrete works, water contained within the washout sump will be pumped to a tanker and removed from site to a licenced waste facility. The washout area will then be cleared and fully reinstated.
- 3.33 Designated washout areas shall be located at appropriately remote from watercourses or other environmentally sensitive areas. The contents of the sealed sumps or tanks will be removed from site by a licensed waste disposal company.

On-site Cabling

- 3.34 Underground cabling will link turbines to the control building/sub-station and will be required to provide power and data connections to the met mast. Cabling will also be required to link the control building with the grid connection point via the metering building.

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- 3.35 Cable runs, including High Voltage (HV) cables, SCADA cables and earth conductors shall generally be located alongside the site tracks (typically within 2 m of track edges) at nominal 1000mm depth to the top surface of the HV cables (or to the appropriate design specification). Sand or dust will be used to bed and surround the cables. Cables shall be suitably protected by appropriate ducting where they cross roads / tracks and cable markers. The cable trenches shall be backfilled appropriately and reinstated using the topsoil excavated from the initial trench excavation.
- 3.36 Cable trenches will be constructed to detailed construction and trenching specifications, which will be dependent upon the ground conditions encountered. Excavated material and vegetation will be appropriately segregated and stored for reinstatement. Cable bedding material, warning tape and markers will be provided in accordance with relevant standards and the requirement of the Employer. The ground shall be reinstated to a condition equivalent to the land adjoining the trenches. Typical cable trench details are illustrated in the Figure below.



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3.37 The site cable trenches shall be designed to prevent them acting as land drains, this will be undertaken by installing clay bungs or sandbags at regular intervals, where required.

3.38 Where possible, cables or cable conduits shall be laid down and reinstated during construction/prior to reinstatement of access tracks or other adjacent infrastructure, in order to avoid disturbing reinstated ground. However, this cannot be guaranteed as it is not always possible or practicable.

3.39 No on-site cabling works are required as part of Phase One. All cabling required for commissioning will be laid over the ground from the turbine to the temporary electrical compound.

Temporary Construction Compounds

3.40 The main temporary construction compound for the works is to be located on near to the western entrance to the Site.

3.41 The compound will provide:

- Temporary portable buildings housing site offices and welfare facilities for contractors;
- Containers and secure facilities for tool and equipment storage;
- Portable site toilets with sealed waste storage;
- Parking for contractors vehicles;
- Electrical generators; and
- Material storage facilities and hoppers.

3.42 Fuels, lubricants and hydraulic fluids will only be stored at the contractor's compound(s), which will be fenced and have a lockable gate, thereby making sure that the area in which fuels, lubricants and hydraulic fluids are stored will be properly secured against unauthorised access or vandalism. The storage area within the compound will contain a small bund lined with an impermeable membrane in order to prevent any contamination of the surrounding soils and

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vegetation and of groundwater. Alternatively, double skinned/bunded storage containers will be used. A designated, secure, COSHH store will be provided in the compound for storage of any hazardous substances.

- 3.43 Following completion of the construction phase, any stone placed to form a surface of the main compound, which is out with the footprint of the permanent crane hardstanding, and any secondary compound areas, will be removed, along with any geotextile. The surface of such areas will then be ripped to alleviate compaction. The top and subsoils will be replaced by 360⁰ excavator working from the surface of the compound to minimise the tracking over newly placed soils.

Drainage Infrastructure

- 3.44 Control of water is essential to ensure that there are no adverse impacts on rivers and waterways, as well as to help minimise erosion across the steeper sections of the site.
- 3.45 Fresh construction works are generally more often to be susceptible to erosion than areas with established vegetation in place. The project tracks shall be designed in accordance with best practice procedures to minimise run-off and capture water locally to where it falls. Sustainable drainage features will be incorporated to ensure silt run-off does not occur. Construction activities will be closely monitored by the ECoW).
- 3.46 Drainage proposals are described in Section 6 of this document.
- 3.47 The drainage design will incorporate the following features.
- The drainage design will seek to use blind ditches, cross drains, and checkdams constructed in discrete sections as blind ditches and not, where possible, interconnected to the wider surface water drainage channels but used to infiltrate water back into the ground. Drainage ditches will therefore provide temporary storage of run-off from the tracks to allow the fallout of any suspended solids while the collected water soaks away naturally. The size of

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the channels will be designed according to the areas being drained and augmented as necessary to suit local conditions.

- Surface water cut off ditches will be installed on steep slopes to intercept water above the tracks and to transfer it under the track where it will be allowed to percolate back into the vegetation lower down the slope.
- The installation of interceptor ditches to collect clean run-off from sub-catchments above the roads, and the ability to regulate the discharge rate and provide buffer storage will prevent excessive flows into the watercourses and slow the speed of water as it moves down slope. This will reduce the risk of flash flooding and the risk of erosion and sedimentation caused by scouring from fast flowing water.

Sequencing of Activities

- 3.48 The following paragraphs detail the high level sequencing of construction activities, which will be subject to detailed programming by the BoP contractor.
- 3.49 Following initial site mobilisation, the site entrances will be established with appropriate traffic management measures and signage set up. Accesses to the temporary compound area will be upgraded/re-surfaced to ensure suitability for ongoing vehicle and plant access. Set up of the temporary construction compounds and banksman areas, including welfare facilities, for the works will be completed.
- 3.50 Site tracks will then be built. Where possible, cables or cable conduits may be laid down and reinstated during construction of access tracks or other adjacent infrastructure in order to avoid disturbing freshly reinstated ground.

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- 3.51 Once access has been gained to the turbine locations, excavation and construction of the turbine foundations can take place. The crane hardstandings may be formed at this stage to create a working platform for foundation works.
- 3.52 The switchgear and metering building will be constructed in parallel with turbine foundation works, once access tracks have been constructed to its location, and, building detailed design has been completed. The electrical installations within the building will take place once the building is watertight.
- 3.53 The HV compound external to the switchgear and metering building will be constructed in parallel with the building. Electrical equipment will be installed following completion of the building and HV compound civil works, and upon availability of long lead time electrical equipment.
- 3.54 Upon completion of the turbine foundation, the site tracks and crane hardstanding will be surfaced to a suitable standard for turbine delivery vehicles. Following substantial completion of the civil infrastructure works, the turbines will be delivered and erected, and the electrical fit out of the turbine can be progressed. Commissioning of the wind farm will then be undertaken, along with final reinstatement and snagging.

Hours of Construction

- 3.55 The hours of work associated with the development are as specified in condition 18 of the consent:
- Monday to Friday 0730-1930; and
 - Saturday 0800-1300.
- 3.56 Outside these hours, works at the site shall be limited to emergency works, erection of turbines, dust suppression, and the testing and maintenance of plant and equipment, or construction work that is not audible from any noise sensitive property, unless otherwise approved in writing by the Local Planning Authority.

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The Local Planning Authority shall be informed in writing of emergency works within three days of occurrence.

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4 EARTHWORKS

- 4.1 The vegetation and materials holding the seedbank, (300mm of the top soil material) will be stripped, and carefully set aside for re-use in the re-profiling and reinstatement works. Care will be taken to excavate and store any further topsoil and sub-soil separately to avoid contamination.
- 4.2 Excavated materials shall be stored in temporary stockpiles (not more than 3m high) on the site, segregated by soil type as appropriate and located at convenient locations around the site. Storage of materials will not be permitted outside of approved and prepared storage areas to help minimise erosion and water quality issues.
- 4.3 Shallow cut off drains, silt fencing or other pollution prevention measures may be installed to intercept run-off from material stockpiles and storage areas where appropriate. Any floating or settled solids removed from run-off will be stored separately from other soil types before being decontaminated if necessary and reincorporated in to the works.
- 4.4 Disturbed areas such as the compounds will be graded to tie in with the existing topography and reinstated with previously stripped soils and vegetated appropriately. Care will be taken to replace these materials in the original sequence to enhance regeneration of vegetation. Reinstatement will take place within as short a time period as reasonably possible, to give the seed bank and vegetation the best chance of an early regeneration. Where possible, vegetation and topsoil will be matched to the adjacent habitat using purchased seed. The seed mix will be determined by reference to the principal species present in the adjacent habitats and will be seeded at the rate and appropriate season as prescribed by the seed merchant.
- 4.5 Soils will not be spread on verges/disturbed ground too thinly, so as to avoid the tendency for the materials to dry out and crack (particularly during summer months) before the root system has a chance to form and stabilise the

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surrounding soils. To prevent stockpiles drying out, consideration may be given to watering of stockpiled materials and turves.

- 4.6 Limited areas of re-seeding may be required for surfaces where natural re-growth is limited. In the event that re-seeding is necessary, the seed type and mix shall be agreed in consultation with Powys County Council, and the land owners prior to its application.

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5 MATERIALS MANAGEMENT

Material Sourcing & Storage

- 5.1 All aggregates and stone required for construction of foundations, access tracks and hardstandings will be imported by the BoP contractor from approved and certified local sources wherever possible.
- 5.2 Concrete will be batched on site using an on-site batching plant. Concrete batching will be carried out by appropriately qualified operatives in accordance with stringent quality and environmental controls, and will be closely supervised throughout.
- 5.3 The batching plant will be sited at a sufficient distance (minimum 50m) from existing drainage ditches/watercourses. Earth bunding will be placed round the batching compound as appropriate to ensure segregation of the area, and containment of materials. Appropriate drainage and mitigation against siltation/pollution of existing watercourses/drains shall be provided within the batching plant compound. This may include recycling water within the plant and/or interception and treatment of surface and ground water. A lined and bunded concrete washout area will be provided within the batching plant compound to ensure containment of any wash out water. Wash out materials shall be disposed off-site by a licensed waste carrier.
- 5.4 Further pollution mitigation measures will be implemented such as provision of spill kits and plant nappies at the batching plant and other locations as appropriate.
- 5.5 On-site batching of concrete will assist with traffic management on site as delivery of dry materials can be spread over an appropriate time period, and materials stockpiled on site. Transport of concrete between batching plant and turbine foundation locations in mixer waggons can be managed by the contractor to suit the construction programme. This will help in management of site access

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constraints, and ease concentrated peaks in traffic levels on the public highway on concrete pour days.

- 5.6 Concrete loads will be managed and assessed with regards to the size of vehicle and ground conditions whilst keeping at appropriate speed limits to avoid spillage during transport between the batching plant and pour locations.
- 5.7 Construction materials, such as reinforcing steel, timber, bricks and blocks, and other dry materials shall be stored on hard areas, such as the compound or crane pads, prior to use.
- 5.8 Excavated materials such as aggregates, cable sands and excavated soil will be stored in temporary stockpiles on the site during the construction phase of the development. Where materials are to be stored in large piles an assessment will be undertaken by the ECoW and the developer as to whether any protective fencing is required to prevent access to the piles of material by any protected species.
- 5.9 Where required, run-off from storage areas will be intercepted by shallow cut off drains with pollution prevention measures. Any floating or settled solids removed from run-off will be stored separately from other soil types before being decontaminated if necessary and reincorporated in to the works.
- 5.10 Where possible, excavated material will be used as backfill in foundations or stored for reinstatement elsewhere on the site.

Disposal Protocol

- 5.11 The disposal of excavated material off site is unlikely to be required as it will be most likely be used for infill material, spread on improved pastures or removed from site. Should it be necessary to remove excess material from site, then this will be taken to a suitably licensed facility.

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- 5.12 The BoP contractor has prepared a Site Waste Management Plan. Any waste generated from construction activities, for example excess building material, construction material packaging, pallets etc. will be minimised as far as possible and disposed of in accordance with the Site Waste Management Plan.

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6 WATER MANAGEMENT PROPOSALS

Surface Water Management

6.1 This chapter follows the principles of Sustainable Drainage Systems ‘SUDS’ in accordance with best practice standards and guidelines. This section of the CEMP will be refined as the wind farm detailed design is developed and finalised.

6.2 The overall design philosophy for surface water management onsite is to:

- Minimise any change to the hydrology and groundwater conditions within the site. Replicate existing hydrology regimes for the site;
- Minimise sediment loads in the run-off through: diversion of clean upstream water to avoid sediment pick-up; and the use of infiltration and silt traps to remove entrained sediments from track run-offs;
- As part of ongoing monitoring of construction activities, the ECoW will identify any additional risk areas and ensure that appropriate silt traps are installed;
- Avoid high flow velocities. Provide multiple outflow structures to avoid the re-suspension of sediment and reduce erosion;
- Reduce erosion potential by stabilising and re-vegetating exposed slopes alongside existing tracks which are to be used for the development. Ensure new tracks have stable banks with the vegetation replaced to minimise erosion potential;
- Introduce measures to ensure livestock do not contribute to erosion of track sides and vegetation in ditches through management, fencing and provision of alternative drinking water locations;
- Ensure that any run-off discharged from the site is in compliance with approved standards; and
- Initiate and maintain a programme of water quality monitoring and testing.

6.3 The water management infrastructure installed during the works will minimise impacts on sensitive water features and other local receptors.

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- 6.4 Included in the access tracks design will be stabilisation and re-vegetation of the slopes on embankments to control erosion and sediment potential. It is proposed to minimise extensive areas of exposed soils where possible, and vegetation cover will be rapidly established in the first planting season following construction, to reduce erosion and sediment entrainment in water run-off.
- 6.5 Natural surface run-off water will be allowed to percolate back into the vegetation adjacent to construction areas.
- 6.6 Down slope of construction features silt fences will be installed and drainage existing ditches will have straw bale check dams inserted where appropriate to reduce water velocity and to filter drainage water.
- 6.7 The intended function of these drainage features will be to:
- Control run-off velocity during intense rainfall events, hence mitigating erosion;
 - Reduce erosion rates by re-vegetating trackside slopes and ditches and to keep livestock from causing further damage;
 - Remove entrained sediments from track run-off;
 - Minimise sediment release to receiving watercourses; and
 - Remove any potential for increase in flood risk.
- 6.8 The construction phase is the primary period of concern for the SUDS system. However, these features will remain in perpetuity to ensure that the areas of hardstanding and new tracks associated with the development do not fundamentally change the hydrological regime. In order to ensure long-term efficiency of the drainage system, regular maintenance will be undertaken to remove any blockages and build-up of sediment to make certain that the system is working as planned.

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Weather Impacts

- 6.9 Potential effects on the hydrological environment are significantly influenced by rainfall. This is an important consideration as it increases the risk of pollution and damage to the surface and groundwater hydrological environments.
- 6.10 Rainfall and associated surface water runoff during construction works can mobilise and transport pollutants such as sediment, oils, chemicals and other building materials into the water environment causing harm to plants and animals.
- 6.11 The BoP contractor will utilise weather information provided by the Met Office or other available sources to predict periods of heavy rainfall, and revise works or contingency plans appropriately. It is also important to ensure that all machinery and materials are stored correctly at the end of each day in case the weather conditions should change unexpectedly. Areas of exposed ground will be kept to a minimum to prevent sediment movement.
- 6.12 Prior to and following periods of heavy rainfall additional checks will be made of the sediment management, drainage and construction management measures employed on site, and these will be maintained or replaced as appropriate.

Water Management Summary

- 6.13 The proposed wind farm access tracks will use a range of SUDS techniques to minimise erosion and control run-off. Stabilisation and re-vegetation of the slopes on the sides of new and upgraded tracks will be incorporated into the engineering design to control erosion and sediment potential. Hydrological regimes will be maintained and sediment control improved. The wind farm construction will have no detrimental effect on any of the rivers downstream of the site.

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7 POLLUTION CONTROL & MITIGATION

CEMP Evolution and ECOW Overview

7.1 An independent ECOW will oversee activities onsite and ensure the contractors comply with their own environmental plans and best practice guidelines.

7.2 The ECOW will be appointed by the client to ensure effective control. Their responsibilities will include:

- Ensuring appropriate procedures and documentation are in place and followed for all work activities where there is a risk of environmental damage;
- Carrying out regular documented inspections/audits of the site to ensure that all work is being carried out in accordance with the CEMP;
- Monitoring, auditing, reporting and communication of environmental management on site and with the client, planning authority, contractors and other relevant parties;
- Ensuring all environmental commitments and requirements are followed;
- Ensuring that all relevant works are being carried out in accordance with the required permits, licenses, certificates, planning permissions and bringing to the attention of the project team any timing and legal constraints that may be imposed on the carrying out of certain tasks;
- Keeping up to date with changes in environmental legislation that may affect environmental management during the construction phase;
- Ensuring that specialist environmental contractors are competent and have sufficient expertise to co-ordinate and manage environmental issues, and managing their activities on site;
- Liaise with the BoP Environmental Representative/Manager to ensure that Environmental Induction Training is carried out for all site personnel under the Contractor;

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- Ensuring the RWFL Project Manager is notified of all incidents where there has been a breach of agreed environmental management procedures; where there has been a spillage of a potentially environmentally harmful substance; where there has been an unauthorised discharge to ground, water or air and where there has been damage to a protected habitat, etc.;
- Be ready to assist in implementing at all times an Emergency Response Plan;
- Be responsible for notifying the relevant statutory authority of environmental incidents; and
- For carrying out an investigation and producing a report regarding environmental incidents and non-conformances.

7.3 The approved CEMP will be referenced by the Employers Requirements, which will form part of the contract between the Employer and the BoP contractor. This will oblige the BoP contractor to comply with the CEMP under their contract. Any proposed amendments to the approved CEMP shall be submitted for review and approval by the Local Planning Authority.

7.4 The BoP contractor will be required to monitor any other contractors and sub-contractors to ensure their compliance with the approved CEMP and any other planning conditions.

Pollution Control – General

7.5 Throughout the construction and operation of the wind farm a number of oils and chemicals will be used. It is imperative that these are used and stored in a safe and ecologically sound manner to ensure that the surface and groundwater environment is not adversely affected.

7.6 The following measures can be adopted to protect the surface and groundwater environment:

- All equipment, materials and chemicals to be stored away from any watercourses. Chemicals, fuel and oil will be stored in tanks of sufficient

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strength and integrity to ensure that it is unlikely to burst or leak in ordinary use. Oil and lubricants shall be stored within bunded containers. Waste oils will be stored in the construction compound in an aboveground tank within a sealed bund. The bund will be 115% of the storage tank capacity, and will be emptied by a specialist company;

- Only nominated personnel will be able to undertake and oversee refuelling and delivery and to ensure there are no spillages. Locked tanks will help enforce this and such activities will be restricted to a specific impermeable area within the site compound;
- Refuelling will not take place within 50m of a watercourse (HRA Table 5.6);
- In areas of potential risk, emergency procedures shall be prepared and pollution control equipment provided, such as “spill kits” and absorbent granules. These shall also be carried by appropriate vehicles on site. Drip trays will be provided for static machinery at appropriate points;
- All plant used during the construction and operational phases of the development shall be in suitable condition and fit for purpose to carry out the works and shall be maintained as per manufacturers guidelines. Machinery shall be properly stored at all times to minimise rain wash off of oils etc.; and
- Maintenance of construction plant to be carried out in designated areas on an impermeable surface away from any watercourse or drainage.

7.7 The BoP contractor shall be aware of any relevant regulations including, but not limited to the Environmental Permitting (England & Wales) Regulations 2010, and The Control of Pollution (Oil Storage)(England) Regulations 2001, and ensure compliance with all applicable regulations.

7.8 The cleaning of tools and other site equipment will not be permitted in onsite watercourses. Should it be necessary to clean tools and equipment on site, this will be done in the predetermined wash-out areas at the site compound.

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7.9 Wash out areas shall be continually monitored and findings recorded to ensure effluent levels do not spill over into the environment. The wash out area shall be emptied regularly and the waste contents disposed off-site by a licensed waste carrier.

Pollution Response Plan

7.10 The following emergency procedures can be implemented to ensure that the surface and groundwater environment is protected during wind farm construction and operation:

- At induction and at regular tool box talks, all relevant on-site staff will be trained in both normal operating and emergency procedures, and be made aware of highly sensitive areas on site. The staff training and implementation of site procedures will be overseen by the BoP contractor to minimise the risk of a pollution incident;
- Contingency plans will be developed by the BoP contractor, that ensure that emergency equipment is available on and that advice is provided on actions to be taken and who should be informed, in the event of a pollution incident;
- Contingency planning procedures will be regularly reviewed to include changes to site operations that were not foreseen during design;
- The emergency procedures would include the following:
 - Containment measures;
 - Emergency discharge routes;
 - List of appropriate equipment and clean-up materials;
 - Maintenance schedule for equipment;
 - Details of trained staff, location, and provision for 24-hour cover;
 - Details of staff responsibilities;
 - Notification procedures to inform the relevant environment protection authority;

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- Audit and review schedule;
- Emergency contact numbers and telephone numbers of statutory and local water company; and
- List of specialist pollution clean-up companies and their telephone numbers.

7.11 The BoP contractor has provided, and will implement if required, a Pollution Incident Response Plan to cover all potential pollution risks associated with construction activities. All pollution incidents shall be logged and reported to the designated responsible person.

Pollution Issues & Mitigation

Dust Issues & Management

7.12 Dust generated through construction has the potential to cause significant nuisance unless appropriate mitigation measures are undertaken. In contrast to other forms of onsite pollution / nuisance such as noise, there are no direct legal provisions for the control of dust from construction activities. The Contractor will be required under the Contract to follow the recommendations for dust control given in Health and Safety Report 73/1995: Dust and Noise in the Construction Process.

7.13 Significant quantities of atmospheric dust can arise from the mechanical disturbance of granular material exposed to air. Dust generation from these open sources is termed 'fugitive' because it is not discharged to atmosphere in a confined stream. A number of potential sources of such fugitive emissions from construction wind farm are outlined as follows:

- Vehicle movements over site tracks in dry conditions;
- On-site earth-moving operations during construction;

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- Blow-off and spillage from vehicles and the carrying of mud onto public roads during import of aggregate and any export of surplus soil material; and
- Wind blowing across bare dry construction areas and stock piles.

7.14 The potential for dust generation can be significantly reduced through the adoption of appropriate and simple preventative measures to control dust emissions both on and off-site. Implementation of these measures, such as sheeting over dry materials on vehicles and keep site access roads clean will help to minimise the number of complaints relating to dust nuisance.

7.15 The BoP appointed Health, Safety and Environmental Officer will have day-to-day responsibility for ensuring that dust mitigation measures are implemented and monitored.

7.16 The following practices and procedures will be adhered to:

- Maintain a clean stoned running surface on all access tracks so that delivery vehicles do not collect mud while on site;
- A vacuum sweeper is proposed to ensure the A44 is kept clear of debris and dust as required, and as appropriate;
- All construction vehicles leaving the site with loads likely to generate dust will be adequately sheeted to prevent dust emissions;
- Unsurfaced site tracks will be regularly damped down as required using bowsers provided by the Contractor and shall be adequately maintained to prevent ponding and accumulation of dirt. These spray bowsers will be deployed as a regular routine circuit of the site tracks as required to avoid dust generation;
- All materials stockpiles will be damped down using suitable and sufficient water sprays during dry weather;

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- All handling areas will be maintained in a dust free state as far as is practicable. Bowsers and hand-held hoses/sprinklers will be employed to prevent dust escape;
- Procedures will be established so that the site is regularly inspected for spillage or dusty or potentially dusty materials and any such spillage dealt with promptly;
- Cutting and grinding operations on site will be conducted using equipment and techniques which reduce dust emissions to a minimum, incorporating any dust suppression measures where practicable;
- A telephone number for complaints regarding dust will be published local to the site. The Site Health, Safety and Environmental Officer will have the appropriate authority to act to resolve any problems that may occur. The Health, Safety and Environmental officer and the site managers 'out of hours' telephone numbers will be available;
- Completed earthworks will be sealed and/or re-vegetated as soon as reasonably possible; and
- The site may be monitored by the local authority for compliance with these conditions, both through visual inspection and analytical monitoring. The main contractor will set up its own monitoring programme to evaluate compliance with the measures outlined above.

Sewerage & Waste

- 7.17 Foul sewage from the development during construction will be stored in tanks for offsite disposal. The tanks will be sized to suit the site and emptied at intervals as required for disposal at an approved treatment works.
- 7.18 Any surplus materials arising during the construction of the development will be disposed of in accordance with the Site Waste Management Plan.
- 7.19 The Contractor will be required to make provision for the disposal from the works and temporary works of all waste products and litter.

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- 7.20 Metal containers for inflammable waste will be used by the Contractor and arrangements made for regular collection and disposal off the site. The Contractor shall ensure that all such waste arising from site activities is promptly disposed of into these containers and not left lying on the site.
- 7.21 All waste products shall be removed off site to a suitable location for disposal to the approval of the Engineer and the relevant authority.
- 7.22 Contaminated or hazardous material, uncovered during construction or brought onto site, will be disposed of by the BoP Contractor.

Lighting

- 7.23 Artificial lighting used during construction has the potential to cause nuisance to nearby residences and sensitive receptors, unless appropriate mitigation measures are undertaken. To minimise obtrusive lighting the general principles of the Institute of Lighting Engineers, Guidance Notes for the Reduction of Light Pollution, Bats and Lighting in the UK, Bats and the Built Environment Series by the Bat Conservation Trust and Guide for Lighting Exterior Working Areas, (CIE, 1998) have been referred to.
- 7.24 The guidance notes above outlines practice to reduce the problems of unnecessary, obtrusive light. This includes:
- Do not 'over' light. The guidelines outline that this is a major cause of light pollution;
 - Switch off lights when not required for safety, security or enhancement of the night time scene;
 - Use specifically designed lighting equipment that minimises the upward spread of light near to, or above the horizontal. Care will be taken when selecting luminaires to ensure that the units chosen will reduce spill light and glare to a minimum;

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- Keep glare to a minimum by ensuring that the main beam angle of all lights directed towards any potential observer is kept below 70 degrees. Higher mounting heights allow lower main beam angles, which can assist in reducing glare;
- In areas with low ambient lighting levels, glare can be very obtrusive and extra care will be taken when positioning and aiming lighting equipment. However, if there is no alternative to up lighting, then the use of shields, baffles and louvers will help reduce spill light around and over the structure to a minimum;
- Bats are particularly sensitive to UV light emitted by certain types of lamp and these will not be used on site, wherever possible; and
- Lighting can be particularly harmful if used along river corridors, near woodland edges and near hedgerows used by bats.

7.25 The area for development comprises of upland farmland situated on rolling hills. Sensitive receptors are considered to be adjacent properties but due to the topography and distance of the site nuisance from artificial light is considered to be minimal.

7.26 The potential for pollution from artificial lighting can be significantly reduced through the adoption of appropriate preventative measures to control light emissions both on and off site which will be detailed in the final CEMP and reviewed by the ECOW.

Noise

7.27 The noise assessment suggests, due to the distance of most construction activities from sensitive noise receptors, noise during construction should not be a significant hazard. Contact will be made with neighbours to agree a process for notification where an event which will raise normal noise levels is planned or expected in the interests of best practice and good site management.

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- 7.28 During the construction phase of the works, the Contractor shall employ machinery and methods of work to limit (where possible and practical) the disturbance to residences caused by construction noise.
- 7.29 All noise measurements will be made under normal environmental conditions, with equipment and at positions that comply with a protocol agreed with PCC unless otherwise stated.
- 7.30 No HGV traffic, plant machinery or earth moving equipment associated with the construction of the Development shall enter or leave the site outside of normal working hours unless one of the following exceptions is applicable:
- An abnormal load delivery; or
 - The movement is associated with an emergency on the Site; or
 - The work is in accordance with Condition 18 of the consent.
- 7.31 It may be necessary to limit the use of certain items of plant which give rise to high noise levels to certain times during the normal working hours.
- 7.32 Work outside normal working hours will be required for certain activities. Where work is required outside these hours, the BoP will immediately advise the Local Planning Authority in advance of the details of the work that will be carried out. This information will include:
- Anticipated noise levels;
 - Plant details;
 - Proposed working hours and duration; and
 - The type of activity and reasons for variation to working hours.
- 7.33 The above discussion will only apply where the activity may be audible at the sensitive receptors. To assist, it will be a requirement that all plant brought onto site within these periods is silenced using equipment that meets the appropriate British Standards.

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- 7.34 In particular, static plant in continuous use will be monitored immediately after installation to determine if further mitigation is required to reduce noise levels from the site.
- 7.35 A noise monitoring programme will be developed. The final programme will be developed when construction methods have been finalised. It is proposed to establish a noise monitoring system to demonstrate and ensure that noise levels fall below the agreed levels.
- 7.36 Sound levels will be monitored by the Contractor according to the methods set out in Appendix 'B' of BS 5228: Part 1. Measurements will include samples after significant changes in the works.
- 7.37 The BoP Contractor's Health, Safety and Environmental Officer will be responsible for day-to-day monitoring activities and will complete a Noise Survey Report at suitable intervals, giving an account of recorded noise levels, where of agreed limits have been breached and the corrective actions taken.
- 7.38 In the event of a complaint being made by a local resident an investigation will be carried out by the BoP Contractor's Health, Safety and Environmental Officer to establish the justification, or otherwise, of the complaint, the likely cause and possible remedial measures. A report will be written and filed with the noise monitoring reports, and will be made available to the Local Planning Authority and placed on the project web site.

8 COMPLIANCE WITH ECOLOGICAL CONDITIONS

- 8.1 This sections details: the measures to be taken to avoid harm to protected species and minimise damage to species and habitats; the timing of vegetation removal to avoid the potential for effects on reptiles, amphibians and nesting birds; and, details of the mitigation measures to be adopted as set out in chapter 7 of the Environmental Statement and the Habitats Regulation Assessment. Any necessary environmental monitoring will be made publicly available on an annual basis.
- 8.2 No significant construction period effects are anticipated for habitats as all infrastructure is proposed for areas of low ecological value (i.e. improved and poor semi-improved grasslands and arable areas). Potential effects from drifting of dust on to higher quality habitats will be counteracted through normal working practices as set out above.

Timing of vegetation removal

- 8.3 All trees and hedges that need to be removed to allow the construction of the track network will be removed outside the bird nesting season where possible. Any trees and hedges which require removal within the bird breeding season will be inspected by the ECoW prior to removal to ensure there are no signs of bird nesting. As a last resort, and only where deemed absolutely necessary, sections of hedgerow may be netted to prevent birds nesting. This technique will only be used in accordance with guidance issued by CIEEM and RSPB.
- 8.4 Key bat flight line areas (i.e. boundaries showing high usage by bats) have largely been avoided. In general, hedgerow removal should be kept to a minimum. If hedges or other flight lines are to be removed for the construction of tracks, and this takes place during the active bat season, gaps should be temporarily ‘closed’ before dusk each day. This can be achieved through the use of suitable fencing such as ‘Heras’. At the conclusion of construction works, as much of the gap area as possible (allowing for access by construction traffic) should be replanted and

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the remaining entrance should be gated. Any remaining gaps (i.e. those where the track passes through the hedgerow) will to be filled with gates (kept closed at night) to allow continuation of flight lines. This will ensure that boundaries are continuous and can continue to function as flight lines for foraging bats.

8.5 Pre-construction surveys will take place with respect to dormouse. These will include checks for nests should any hedgerow clearance take place during the hibernation period. If dormouse are found to be present in hedgerows at the development, appropriate vegetation clearance methods will be instigated. An EPS licence will be obtained for hedgerow removal. The use of licensed surveyors with a high degree of experience in working with dormice, will ensure that there will be no residual impact to this species.

8.6 It is estimated that approximately 100m of hedgerow will need to be removed as part of the construction activity. RWFL will plant an additional 175m of hedgerow to provide a positive net biodiversity impact. The additional planting will initially attempt to replace the hedgerows that have been removed and then to also 'gap up' existing hedgerows where gaps exist. This will ensure that bat flight lines are maintained and enhanced.

Objectives of the Ecological Compliance Audit

8.7 The purpose of the ecological compliance audit is to assess whether the ecological mitigation and compensation is being implemented in accordance with the planning conditions (and any licence conditions if relevant) and the method statements / management plans.

8.8 A number of performance indicators will be developed based on the above which will be used as the basis for the compliance audits.

Ecological Compliance Auditor

8.9 A suitably qualified and experienced ecological compliance auditor will be commissioned. The compliance auditor will have working knowledge of:

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- The protected species which are subject to the mitigation and/or compensation scheme;
- Species protection legislation; and
- Construction design and its implementation.

8.10 The ECoW may undertake the ecological compliance audit provided they are not assessing their own work.

8.11 The compliance auditor will be supplied with copies of the planning conditions (and any licence conditions), mitigation and compensation proposals, Construction Environmental Management Plan (CEMP), Protected Species Protection Plan (SPP), Bat Protection Plan (BPP) and any other relevant method statements.

Timings

8.12 The ecological compliance audits will be carried out at critical points during the works depending on the specific requirements of the planning and licence conditions. The audits are likely to take place pre-construction and during construction as well as post-construction to check the implementation of the monitoring programme.

Table 8-1: Example Indicators

No	Performance Indicator	Evidence Required	Pass (Yes/No)
1	Licence available for inspection by any police constable, employee of the Welsh Assembly Government or employee of the Countryside Council for Wales or authorised persons on demand.	Licence is available for inspection on site.	
2	Before starting work the licensee will advise NRW Species Officer of the date the works will start.	Written or electronic documentation of notification of start of works.	
3	No agent of the licensee shall act under licence unless they are in possession of a letter signed by the licensee appointing them by name as the duly accredited agent	All relevant accredited agents have copies of licence holder's letter of authorization. Licence	

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No	Performance Indicator	Evidence Required	Pass (Yes/No)
	of the licensee for the purposes of this licence, and shall carry with them the said letter and a copy of this licence and shall produce them to any police constable or employee of the Countryside Council for Wales or other authorised person on demand.	holder's letter is available for inspection.	
4	A suitably experienced licensed ecologist will be appointed and retained during the life time of this licence to provide on-site advice.	Letter, contract or other document outlining the appointment of an Ecologist Log (end of project) shows that Ecologist has been retained during lifetime of licence.	
5	Prior to the start of any works on site, all site workers will be inducted by the Project Ecologist. This induction will cover the legal status of the species, the method of working, and action to be taken if protected species are encountered.	Copy of documents from ecological induction, showing content of induction. List of induction attendees.	
6	Preparation and implementation of the bio-security risk assessment	Bio-security risk assessment is available for inspection. Log of implementation of bio security measures is available for inspection. Log shows that bio security measures have been implemented Field observation shows that physical evidence of bio security measures is available e.g. foot washes	
7	Implementation of mitigation and compensation measures including:	Log of implementation of mitigation and	

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No	Performance Indicator	Evidence Required	Pass (Yes/No)
	<ul style="list-style-type: none"> • Installation and correct setting of the curtailment system for T5 (and any other turbines fitted with SMART curtailment) to protect bats. • Records of periodic inspections for otters and badgers as required by the relevant species protection plans. 	<p>compensation measures is available for inspection.</p> <p>Log shows that mitigation and compensation measures have been implemented</p> <p>Field observation shows that physical evidence of mitigation and compensation measures is available e.g. presence of bat roost features</p>	

Audit Reports

8.13 The compliance auditor will produce a report following each inspection. The compliance audit reports will include information on:

- The background to the site and project;
- The scale of the project (e.g. extent);
- An indication of compliance/non-compliance with proposed mitigation and compensation;
- A table of performance indicators based on the proposed mitigation and compensation; and
- A series of recommendations as regards the findings of the compliance audit.

8.14 In addition to the client, the report will be distributed to:

- Natural Resources Wales (NRW);
- Pembrokeshire County Council; and,

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- The project web site.

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9 PROJECT BIOSECURITY

- 9.1 At the beginning of the project the ECOW will carry out a risk assessment to ensure that adequate controls are in place to manage the risks associated with plant and animal diseases, invasive and alien species. The risk assessment will consider those threats that are deemed to present a risk at the time.
- 9.2 Risk assessments shall be carried out monthly or whenever a new threat is identified.
- 9.3 Compliance with the control measures will be subject to the ecological compliance audit.
- 9.4 Relevant guidance from Defra and NRW will be followed. In particular, all plant and equipment to be used on site will be washed and disinfected before arriving on site to remove all soil. On arrival there will be a visual inspection of the machine to verify it has been cleaned effectively. Any plant or equipment failing the inspection will be returned to the hirer for proper cleaning.

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10 POST CONSTRUCTION REMEDIATION

- 10.1 The construction compound areas and soil stockpiling areas will be fully reinstated upon completion of the construction phase.
- 10.2 Where practicable, all disturbed areas will be reinstated with the same vegetation types noted on site currently to minimise disruption to the surrounding landscape.
- 10.3 It is not considered necessary or desirable to plant areas of the site with additional trees or woodland areas for landscape purposes, other than any areas of hedgerow that have been removed as part of construction. This is because most of the on-site habitats of value (wet and dry heath, ponds and marshy grassland) are not woodland and it would not be appropriate to plant in or close to these areas. Planting of landscaping trees would not be in keeping with the current on-site mix of habitats.
- 10.4 Following the construction phase, all temporary site offices and containers will be removed. Reinstatement will involve removing the imported material and any underlying geotextile. The area will then be backfilled and top soil applied. Limited reseeded may be required.
- 10.5 As described previously, where appropriate turbine foundations, and any exposed batters will be covered with previously stripped and stored soils and vegetation as described above.
- 10.6 Reinstatement works will be undertaken in as short a time period as reasonably possible, to give the vegetation the best chance of an early regeneration.

