Appendix 10-1: Good Practice Methods

Calderdale Energy Park

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Calderdale energy park

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Table of Contents

1 Introduction

There are many embedded and good practice techniques that will be employed at the Proposed Development during construction, operation and maintenance and decommissioning phases. The most important aspects with respect to the water environment are summarised here. These techniques are considered the standard techniques that will be applied by default by the appointed contractors and are an essential feature of the Proposed Development. This list is not exhaustive and guidance and good practice literature will be used to further develop these methods in the ES which will inform the final Construction Environmental Management Plan (CEMP) (an outline of which is included as the **Outline Construction Environmental Management Plan** (oCEMP)) and for method statements for each type of work that will be prepared post-consent. Mitigation measures are over and above these good practice methods and will be specific to the source-pathway-receptor identified at risk are described within **Chapter 10: Hydrology, Hydrogeology, Geology and Peat** of the PEIR under 'Additional Mitigation' sections and are specific to the identified effects where these could be significant.

2 Procedures

Specific good practice procedures will be required for activities such as:

- Fuel handling and storage, including the locations of both periodic and regular fuelling points and emergency spill response. These should be agreed with the Environmental Clerk of Works (ECoW);
- Management of concrete batching and wash out areas, including pollution prevention measures and drainage controls;
- Responsibilities and details for monitoring and training in relation to pollution prevention measures;
- Design, management and mitigation measures for surface water drainage; and
- Design, management and mitigation measures for watercourse crossings.

3 Good Practice Methods to Reduce Impact on Peat Hydrology

In order to reduce the impact on peat hydrology, the following methods should be taken into account in the construction, operation and maintenance and decommissioning phases of the Proposed Development:

Tracks:

- On slopes above tracks, the cut off ditch should be positioned close to the track to minimise the impact on the upgradient peat.
- Regular discharge of water from the track and from the upgradient diversion channel to the down gradient land is required. This process will allow the water to infiltrate a short distance from the track and can help counter potential down gradient dewatering effects.

- Dressing the cut slopes alongside the tracks with low permeability material can potentially help reduce flow rates from more permeable sections as it will act as a barrier to groundwater flow.

Turbine Bases and Other Infrastructure:

- Dewatering of the turbine bases may be required depending on the permeability of the surrounding geology as well as precipitation; however, given the low permeability of the formations onsite (refer to **Chapter 10: Hydrology, Hydrogeology, Geology and Peat**) this is unlikely. If required, this will be limited to as short duration as possible to keep the excavation dry until the concrete is poured, cured and the void space backfilled.
- Any water from dewatering excavations should be discharged to any peat areas surrounding the turbine base excavation during this period to promote recharge and reduce the impact of dewatering. This is a recognised method of mitigating the environmental impact of an abstraction[1]. If there are no peat areas immediately surrounding the infrastructure but they are close by then the water should be discharged between the excavation and the peat to reduce the extent of drawdown in the other formations that may extend to the peat.
- Cut off ditches on upgradient slopes should also be as close to the excavated areas as is practical to allow water to recharge the surrounding peat.
- Excavations should be left open for as short a duration as practical to reduce the impact of dewatering on the surrounding peat.

Peat Habitat and Deep Peat Avoidance:

- The layout has been designed to avoid good quality peat habitats and areas of peat (>0.3m)[2] where possible. This has been conducted, and through probing and coring to establish the spatial distribution of peat across the PEIR Boundary as discussed in **Appendix 10-2: Peat Survey Report** and presented in **Figure 10-10: Depth of Penetration and Probe Locations** and **Figure 10-11: Estimated Peat Depth**.
- Areas of disturbed peat will be reinstated, with examples of how this will be achieved described in **Appendix 10-3: Outline Peat Management Plan**.

Contractor Awareness

Contractors will be made aware through the induction process of:

- The location of existing peat habitats and areas that are part of the restoration programme so that they can be particularly vigilant in avoiding these areas.

[1] Forestry Commission. (2011) Guidance on Road Construction and Maintenance (Forests and Water Guidelines Fifth Edition)

[2] Natural England (2010). Investigating the impacts of windfarm development on peatlands in England: Part 1 – Final Report. Natural England Commissioned Report NECR003. Available at: https://publications.naturalengland.org.uk/file/75032

- That the programme of peat restoration is complex and will be undertaken concurrently with the construction period so that additional care with handling of peat and construction machinery is required.
- That peat storage is being considered so that direct translocation can be undertaken where possible which will improve the likely success of peat restoration.

4 Good Practice Methods to Protect the Water Environment

Good practice methods undertaken at the construction phase will involve both management and monitoring. As there are some significant onsite and nearby hydrological and water receptors, measures will be applied that at least meet those required within current good practice guidelines.

Contractor Tendering Process

During the tendering process for the works, management plans, environmental specifications and objectives will be included in the tender documents so that all contractors can allow for good practice measures in their tender costs. All contractors and their sub-contractors will be required to adhere to the environmental management procedures set out in tender documentation.

Site Induction

During the induction of contractors, a specific session on good practice to control water pollution from construction activities will be included. The responsibility for protecting the water environment will be shared with all staff onsite with an appropriate level of support from construction managers to achieve this. The site induction process will be based on the Pollution Prevention Guidance, although it is recognised these have been withdrawn in England, and good practice documents and highlight the receptors indicated within **Chapter 10: Hydrology, Hydrogeology Geology and Peat**.

Construction Methodology Statement (CMS)

The tender procedures for construction contracts will include the requirement to produce a CMS.

Following the more detailed design of tracks and drainage, the CMS will set out the construction planning and procedures to be followed. The CMS will demonstrate, to the satisfaction of the Environment Agency (EA), that construction will comply with relevant water regulations. This document will be produced to work alongside the final CEMP.

In all construction designs Sustainable Drainage Systems (SuDS) will be incorporated to maintain current hydrological systems and to minimise effects of the Proposed Development on the hydrological environment.

Watercourse Crossings

The layout of the infrastructure has been designed to reduce the number of crossings of watercourses where possible and using and replacing existing crossings appropriately.

As detailed in **Appendix 10-5: Watercourse Crossing Inventory**, it is anticipated that approximately 41 watercourse crossings will be constructed onsite for the Proposed

Development. 23 of these are of a watercourse shown on the 1:50,000 scale Ordnance Survey (OS) mapping, the others are shown on a 1:25,000 scale mapping. Potentially further crossings of minor, man-made or ephemeral drain crossings will also be required.

Watercourse crossings will be the subject of detailed design and submitted to the EA prior to commencement of construction. A monitoring programme for maintenance of crossings (to prevent blockages and flooding) will be provided within final CEMP.

Where it is necessary to cross watercourses or flowing drains, appropriately designed crossings and culverts will be installed, and licensed where appropriate, in consultation with the EA.

Maintaining Hydrological Connectivity Across Peatland

To maintain hydrological connectivity across peatland and avoid disruption to natural water movement, the following good practice methods will be applied during construction:

- Cross drains will be installed frequently along access tracks and internal site access tracks to enable lateral surface and shallow groundwater flow beneath and across the track footprint.
- Longitudinal drainage will be avoided, where possible. Where required for surface water management, drainage will be directed into cross drains at regular intervals to prevent interception of water movement.
- In areas where diffuse seepage or saturation zones are encountered, multiple small culverts or perforated pipes will be installed to allow even distribution of flows and reduce the risk of localised drying.
- Final locations of track alignments will be avoid areas of visible groundwater emergence, shallow hydrological pathways, or peatland features likely to be sensitive to interruption.

These measures are designed to preserve the existing hydrological regime across the peatland, reduce the risk of drying, and support the ecological and functional integrity of peatland habitats during and after construction.

Setback Distances

Another form of avoidance is locating turbines, tracks, and other construction disturbance a minimum buffer distance from water features. A set-back distance of 50m from main watercourses is routinely recommended as a form of embedded mitigation for wind farm sites. This more than complies with the Forests and Water Guidelines[1] that requires setback distances of between 5m and 20m.

The proposed infrastructure has therefore been located, in so far as possible, over 50m from watercourses (see **Appendix 10-5**).

Track and Cable Trenching Design

Tracks which are orientated at 90 degrees to the slope contours may act to create rapid surface flows resulting in erosion of the tracks and provide a direct pathway for discharge to watercourses. Tracks have been oriented along contours where possible; however, some sections of onsite access track are at 90 degrees to the slope, particularly when approaching water crossings.

Accordingly, these will require standard design features, such as cut off drains, spoon drains or water bars, etc. for tracks, and internal plugs for cables, to be installed such that water flow and sedimentation is minimised.

All tracks that will be excavated will have the material removed and replaced in the same manner, particularly the peat and the topsoil layer, in accordance with the Outline Peat Management Plan in **Appendix 10-3.**

Water Abstraction and Dewatering Activities

All dewatering activities will be managed through dewatering permits and method statements, and the ECoW must be consulted and agree pumping and associated mitigation measures prior to commencement of works.

Suitable mitigation measures will be installed to minimise the volume of silt contained within pumped waters and to avoid or minimise the impact of the pumped water discharge on the water environment, including:

- Installation of upgradient cut off drains to reduce the volume of water entering excavations.
- In order to prevent disturbance from the base of excavations or from the bed of watercourses during abstraction, any pump intakes will be protected from sediment by raising the intake using a floating rose and a geotextile filter.
- The discharge of abstracted water through sediment control structures and over natural vegetation to filter and infiltrate.

5 Good Practice Management of Sedimentation

Management of Track Construction

Where possible, tracks are located at least 50m away from any watercourse mapped on the 1:50,000 scale, 1:25,000 scale and 1:10,000 scale OS mapping, with the exception of watercourse crossings.

Loose track material generated during the use of access tracks and internal site access tracks will be prevented from reaching watercourses by adequate maintenance of the track. In dry weather, dust suppression methods will be employed.

Standard erosion control techniques and sediment control structures will be used during the construction period.

Drainage will be installed on either side of tracks to enable appropriate management, capture and discharge of clean, and potentially sediment laden runoff. Regular discharge of upgradient water to down gradient vegetation will be installed and appropriate sediment control structures to manage contact water.

Roadside drains likely to carry high sediment loads will not be allowed to discharge directly into watercourses but will discharge into sediment control structures or buffer areas of adequate width. The purpose of these drainage ditches is to collect track drainage, control run-off during intense rainfall events and mitigate erosion. These ditches will have filter check dams at intervals along their length to encourage infiltration and reduce velocity of flow within the

channels. The drainage design will encourage run-off to leave access tracks quickly and prevent their acting as flow pathways and will also protect the onsite soils from erosion. Sediment control structures will be located at the end of all cross drains and cut off drains.

Watercourse Crossings

The locations of watercourse crossings are presented in **Figure 10-9** of the PEIR and within **Appendix 10-5**. Watercourse crossings will be sized sufficiently to avoid overloading, blocking or washout, and will be protected and well bedded to avoid settlement.

Where reasonably practicable, any engineered watercourse crossings will be designed to minimise erosion and to use soft engineering measures, rather than hard where erosion cannot be avoided (i.e. riprap rather than gabion baskets). All watercourse crossings will aim to leave the watercourse in as natural a condition as possible.

Main watercourse crossings will be either closed pipe culvert, bottomless arch culvert or bridge structures, in accordance with environmental requirements.

Minor ephemeral drains will be twin wall UPVC or precast concrete pipe culverts or half-moon culverts, where reasonably practicable to retain the natural stream bed.

All watercourse crossings will be subject to appropriate EA licencing and will be designed to allow the conveyance of a 0.5% AP (Annual Probability 200 year) flow event plus an allowance for climate change and freeboard. Additionally, methods will be put in place to control and attenuate runoff during all stages of the development and crossings will be regularly checked and maintained during operation. Where required, designs appropriate for fish migration and otter passage will be used.

Excavation of Turbine Foundations and Cable Trenches

Where possible, turbine bases are located at least 50m away from any watercourse mapped on the 1:50,000 scale, 1:25,000 scale and 1:10,000 scale OS mapping.

Soil movement will be undertaken with reference to good practice guidelines[3,4]. Subsoil from the foundation excavations would be primarily replaced around the foundations following pour and curing. Any remaining soil would be used to spread in areas that are not environmentally sensitive as agreed by landowners and relevant consultees. Topsoil and turfs will be stored so as to maintain their vitality and used to re-cover the foundation. This will help to maintain surface hydrological characteristics in terms of near surface infiltration and run-off regimes.

The installation of the electrical cables are anticipated to be within trenches, though trenchless techniques may also be used. Where trenches are dug on steep slopes they will be dug in sections or plugs of soil may be left in place at intervals to prevent them acting as preferential drainage pathways and increasing soil erosion. As indicated above, the adoption of good practice methods for cable installation means that the trenches will not remain open for long periods of time and will be restored by replacing the subsoil and topsoil removed earlier.

[3] DEFRA. (2008) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites
[4] The Institute of Quarrying. (2021) Good Practice Guide for Handling Soils in Mineral Workings.

Run-off and discharge water from excavations will be discharged into sumps where sediment will be allowed to settle, and the drainage waters will be pumped out and discharged via vegetated soakaways to a vegetated area or infiltration trench down gradient of the excavation site. The exact method of site discharge will be consulted on with the EA prior to the commencement of construction. These measures are also designed to reduce soil erosion by controlling discharges from the excavations.

In the event of shuttering collapse during a concrete pour it is unlikely that material will escape as the excavation required to erect the shuttering will be below ground and of a larger volume than the shuttering capacity. However, in this unlikely event, actions as defined below would be put in place. When the concrete has solidified, it would be dug out and disposed of appropriately.

Management of Soil Stockpiles

Careful consideration will be given to the location of topsoil and subsoil storage areas for all facilities during construction, either by siting in a flat dry area away from watercourses or by the addition of cut-off drains above the storage, which will help to maintain a buffer from streams. The areas will be regularly inspected to ensure that erosion of the material is not taking place.

Settlement lagoons and silt traps will be inspected regularly especially after periods of heavy rainfall. This inspection period will be agreed with the EA during the development of the CMS. Maintenance will be carried out in periods of dry weather where practicable.

6 Good Practice Methods for Oils, Fuels and Chemicals

Fuel, oil and chemical spillages are potential sources of contaminants. Access tracks, internal site access tracks, the compounds, the car park and areas where oils, chemicals and fuel are stored, are potential sites of contamination. The construction compounds will have provision for the storage of fuel, oil and chemicals in designated areas, together with areas for vehicle compounds, waste depots and on-site sewage systems.

Good Practice will be based on GPP1, GPP2, GPP4, GPP5, PPG6, GPP8, GPP21 and GPP26., although it is recognised that these are withdrawn in England. Good practice will be adopted for handling potentially polluting substances (such as fuel, oil, cement and concrete additives), including:

- Designated facilities designed and used for storage, located away from watercourses;
- Fuel, oils and chemicals will be stored on an impervious base within a bund able to contain at least 110% of the volume stored. Rainwater will not be allowed to accumulate within the bund and in any way compromise the required 110% volume capacity;
- Interceptor drip trays will be positioned under any stationary mobile plant to prevent oil contamination of the ground surface or water;
- A site oil, chemical and product inventory;
- A site drainage plan, including notations of areas of highest sensitivity;
- A list of emergency procedures, responsive to a risk assessment of areas of high sensitivity;

- Site induction of all personnel on emergency spillage procedures and staff trained in emergency procedures;
- A contact list for emergency services, the relevant environmental regulators, the local water supply and sewerage undertakers, the Health and Safety Executive and specialist clean up contractors, if required; and
- Emergency response equipment will be available at appropriate locations.

In the event of an accidental spillage, a predefined 'Procedure in the event of a contaminant spillage' will become effective.

The Management and Movement of Liquid Concrete

Concrete foundations will adhere to a specific code of practice for concrete design to ensure that the concrete mix is designed to withstand concrete attack. Concrete for the turbine bases will be batched onsite.

A discharge licence from the EA may be required in respect of this activity, and this possible requirement will be monitored.

Within the emergency spillage procedure actions and contingency measures are described which would address major events such as a concrete spill. Machine operators will carry a supply of absorbent material in their cabs, and there would be a central stock of material stored within the construction compounds.

Disposal of Waste Materials

Onsite engine and hydraulic oil waste will be stored in an appropriately constructed compound and storage bund (the Control of Substances Hazardous to Health store).

Waste oils will be stored in the construction compounds in an above ground tank within a concrete bunded area to prevent oil escaping to the environment in the event of leakage from the main tank. The bund will be 110% of the storage tank capacity. The bund will be emptied by a specialist company. Procedure for storage, removal and accidental spillage will be defined in the 'Pollution Incident Response Plan' with spill kits available adjacent to the bunded area.

The following additional measures will also be implemented:

- Drip trays will be provided for machinery;
- Machinery will be repaired and maintained, where practicable, in suitable designated locations;
- Facilities will be provided to ensure appropriate waste management;
- Wheel washing facilities where required will be located away from watercourses; and
- Should dewatering be required pumped water will be discharged via settlement ponds or filter strips prior to direct discharge into a watercourse.

7 Design Optimisation

Subsequent to consent, if approved, further detailed ground investigations will be undertaken to support the detailed design of the Proposed Development. Further micro-siting will be

undertaken for the ES, permitting the optimum orientation of crane hard standings, turbine bases and adjustment of other infrastructure including track alignments; marrying the best line for engineering purposes with the maximum avoidance of sensitive receptors where possible.

Further investigations will include sub surface drilling to obtain further information on the formations across the infrastructure, additional detailed habitat mapping and further baseline surveys.

8 Monitoring

Baseline Monitoring

In order to monitor for any changes during the construction, operational and maintenance and decommissioning phases of the Proposed Development, baseline information on the existing conditions will be required.

Prior to commencement of any invasive investigations or site works, a strategic set of water sampling locations will be identified. The locations will be considered within the choice of sampling locations as well as any upgradient works on other developments. Any samples taken will be analysed for a suite of typical parameters used by the EA for their water quality assessments in freshwater rivers and updated to include any requirements arising from the Water Framework Directive requirements. These will also be agreed with United Utilities and Yorkshire Water due to the sensitivity of, and connectivity of the Proposed Development to, the reservoirs that they operate in the area.

Monitoring During Construction

Monitoring will be required, as determined through consultation with the EA, United Utilities and Yorkshire Water. Water samples during construction will be collected from the same locations as during baseline sampling and taken at intervals agreed with the EA. Sampling locations will include some control points outside the influence of the Proposed Development and sampled during the baseline period to allow comparison of trends. These will be analysed for all parameters used during baseline monitoring to allow understanding of baseline conditions and comparison during construction.

In addition, temporary drainage features, access track drainage channels, drainage crossings on tracks, silt traps, sediment lagoons etc. will be inspected on a regular basis to ensure they are clear and capable of performing their functions.

Monitoring During Operation

Periodic inspection of the river beds and banks will be undertaken during the operational stage of the works. Streams, drains and watercourse crossings will be inspected to ensure they are operating correctly and they will be cleaned of silt, vegetation or obstructions if required.

Monitoring During Decommissioning

In the decommissioning stage, monitoring will be undertaken to the same level and frequency as for the construction phase, as activities and risks to receptors are similar.

9 References

Key Legislation:

- Control of Pollution Act 1974;
- Environmental Protection Act 1990;
- Environment Act 1995;
- Groundwater Regulations 1998;
- Water Act 2003;
- Water Resources Act 1991 (as amended);
- The Private Water Supplies (England) Regulations 2016 (as amended);
- The Water Supply (Water Quality) Regulations 2016 (as amended);
- The Environmental Damage (Prevention and Remediation) (England) Regulations 2015;
- Land Drainage Act 1991;
- Flood and Water Management Act 2010;
- Waste Management Licensing Regulations 2011;
- The Environmental Permitting (England and Wales) Regulations 2016 (as amended);

The Pollution Prevention Guidelines (PPGs) and Guidance for Pollution Prevention (GPPs) (noting these are withdrawn in England):

- GPP1: Understanding your Environmental Responsibilities – Good Environmental Practices version 1.2 (SEPA, DAERA, NRW & NIEA, June 2021) replaces PPG1: General guide to the prevention of pollution (EA, SEPA & EHSNI, published 2013, withdrawn December 2015);
- GPP2: Above ground oil storage tanks (SEPA, NIEA & NRW, January 2018);
- GPP4: Treatment and disposal of sewage where no foul sewer is available (SEPA, DAERA, NRW & NIEA, 2021);
- GPP5: Works and maintenance in or near water (SEPA, DAERA, NRW & NIEA, January 2017);
- PPG6: Working at construction and demolition sites, second edition (EA, SEPA & NIEA, 2012);
- GPP8: Safe storage and disposal of used oils (SEPA, DAERA, NRW & NIEA, July 2017);

- GPP21: Pollution incidence response planning, version 1.1 (SEPA, DAERA, NRW & NIEAEA, June 2021); and

- GPP26: Storage and handling of drums and intermediate bulk containers, version 1.2 (SEPA, DAERA, NRW & NIEA, June 2021)

Other Relevant Guidance

- Control of water pollution from constructions sites. Guidance for consultants and contractors C532 (CIRIA, 2001);

- Environmental good practice on site C650 2nd Edition (CIRIA, 2005);

- Control of water pollution from linear construction projects: technical guidance C648 (CIRIA, 2006);

- The SuDS Manual C753F (CIRIA, 2015) replaces C697 (CIRIA, 2007);

- Groundwater Control – design and practice second edition C750 (CIRIA, 2016) replaces C515 (CIRIA 2001);

- Good practice during windfarm construction (Scottish Renewables, SNH, SEPA & Forestry Commission Scotland, July 2024);

- Natural England (2010). Investigating the impacts of windfarm development on peatlands in England: Part 1 – Final Report. Natural England Commissioned Report NECR003. Available at: https://publications.naturalengland.org.uk/file/75032;

- Planning Advice Note 50 Controlling the Environmental Effects of Surface Mineral Workings (1996);

- Construction Code of Practice for the sustainable use of soils on construction sites (DEFRA, 2009);

- Guidance on Road Construction and Maintenance (Forests and Water Guidelines Fifth Edition 2011, Forestry Commission);

- Peatland Survey. Guidance on Developments on Peatland. Scottish Government, Scottish Natural Heritage (SEPA ,2017);

- Peat Landslide Hazard and Risk Assessments: Good practice Guide for Proposed Electricity Generation Developments (Scottish Government, Second Edition, 2017); and

- UK Technical Advisory Group on the WFD, UK Environmental Standards and Conditions (Phase 2), Final (March 2008).