Technical Appendix 3.1: Outline Construction Environmental Management Plan (CEMP)

Windburn Wind Farm

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Acronyms and Abbreviations

CAR Regulations	The Water Environment (Controlled Activities) (Scotland) Regulations 2011 as amended
CDM	Construction (Design and Management)
CEMP	Construction Environmental Management Plan
ECoW	Ecological Clerk of Works
EnvCoW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EPPP	Emergency Pollution Prevention Plan
EPS	European Protected Species
LOLER	Lifting Operations & Lifting Equipment Regulations
PPE	Personal Protective Equipment
QA	Quality Assurance
CC	Clackmannanshire Council
PKC	Perth and Kinross Council
SEPA	Scottish Environment Protection Agency
NatureScot	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
TCC	Temporary Construction Compound
C/TMP	Construction /Traffic Management Plan
SuDS	Sustainable Drainage System
WQMP	Water Quality Monitoring Plan
EQS	Environmental Quality Standards
PWS	Private Water Supply
SHPP	Species & Habitat Protection Plan
HMP	Habitat Management Plan

1.0 Introduction

1.1 Background

This document presents an outline Construction Environmental Management Plan (CEMP) for Windburn Wind Farm Limited which sets out the principles and procedures for environmental management during construction of Windburn Wind Farm (hereafter referred to as the proposed development).

Should consent be granted, this outline CEMP would be revised and updated to a CEMP, the content of which would be agreed with both Clackmannanshire Council and Perth and Kinross Council through consultation and enforced via a planning condition. The CEMP would be used by the Contractor to ensure appropriate environmental management is implemented throughout the construction phase of the proposed development.

The outline CEMP has been prepared to take account of Good Practice during Windfarm Construction (NatureScot, 2019), Guidelines for Onshore and Offshore Windfarms (2010) and Research and guidance on restoration and decommissioning of onshore windfarms (NatureScot 2013) and provides the construction activities methodology pertinent to the Environmental Impact Assessment (EIA).

The document should be read in conjunction with **Chapter 2: Site Description and Design Evolution** and **Chapter 3: Description of Development**, of the EIA Report and the required mitigation measures set out in **Chapter 15: Schedule of Commitments**.

The CEMP is a fluid document that would evolve during the different phases of the project. As such it would be subject to constant review to address:

- any conditions required in the consent;
- to ensure it reflects best practice at the time of construction;
- to ensure it incorporates the findings of pre-construction site investigations;
- changes resulting from the construction methods used by the contractor(s); and
- unforeseen conditions encountered during construction.

1.2 Aims and Objectives

The CEMP would be maintained and updated on site and would be augmented by associated design specifications and Construction (Design and Management) (CDM) 2015 Regulations documentation such as the Principal Contractor's Construction Phase Plan.

Where appropriate, the CEMP, or plans within the CEMP, would form part of the site induction which would be mandatory for all employees, contractors and visitors attending the site. All employees and contractors would need to familiarise themselves with the relevant contents of the CEMP and supporting appendices as directed.

Management practices and mitigation measures have been developed for those aspects of the construction works that could potentially affect the environment.

The objectives of the CEMP are to:

- outline the proposed mechanisms for ensuring the delivery of environmental measures to avoid or reduce environmental effects identified;
- ensure procedures are in place so that there is a prompt response to effects requiring remediation, including reporting and any additional mitigation measures required to prevent a recurrence;

- provide an outline of the content that would be supplied in the construction method statements and strategies that would be prepared in order to secure mitigation measures in relation to different design aspects of the proposed development;
- ensure compliance with legislation and identify where it would be necessary to obtain authorisation from relevant statutory bodies;
- ensure that appropriate proposed development monitoring and reporting would be in place;
- provide a framework for reporting, compliance auditing and inspection to ensure environmental aims would be met; and
- set out the applicant's expectations to guide contractors on their requirements with regards to environmental commitments and environmental management.

1.3 Site Setting

The proposed project site is situated in the Ochil hills, approximately 2.9km north of the Alva settlement. The site spans across the boundaries of both Clackmannanshire and Perth & Kinross Councils, with its centre located at National Grid Reference (NGR) NN 87783 02833.

The site is surrounded by rural areas and consists of sloping expanses of moorland with elevations ranging from 142m-677m Above Ordnance Datum (AOD). The site has several hills, with Ben Buck being the tallest at 677m AOD. The area is used for livestock grazing, small amounts of forestry plantation and recreational activities such as hill walking, running, and cycling.

The site also includes a section of the Sheriffmuir road (C468) to facilitate abnormal loads and other HGVs using it to access the main part of the site. The site boundary does not include any statutory designated sites. It is located within the Ochil Hills Local Landscape Area (LLA) designation. The site is intersected by a number of small tributaries several of which flow to the Allan Water and the River Devon (via the Upper Glendevon Reservoir).

1.4 Project Description

It is anticipated that the proposed development would consist of the following main components:

- The proposed development would comprise the following principal components:
- 13 wind turbines, with a maximum blade tip height of up to 149.9m;
- 13 wind turbine foundations;
- Hard standings adjacent to each wind turbine, including crane pads;
- Underground electrical cabling;
- A substation control building and compound (including up to 35MW of battery energy storage);
- New internal tracks (including watercourse crossings and floated track) and upgrading of an existing road (a section of the Sheriffmuir road);
- Two borrow pits; and
- Three temporary construction compounds.

2.0 Schedule of Mitigation and Implementation

2.1 Schedule of Mitigation

Chapter 15: Schedule of Commitments within the EIA Report summarises the various mitigation measures that have been proposed to offset the potential impacts of the proposed development.

Alongside each mitigation measure identified, the proposed mechanism by which it would be adopted, implemented or enforced has been provided as well as the period by which the mitigation measure would be undertaken.

These mitigation measures would be required to be implemented prior to or during construction of the proposed development.

2.2 Implementation and Control

Compliance with the CEMP is the key control measure required during construction to ensure mitigation is appropriately addressed. It documents the principles and processes to be followed to implement all relevant agreed environmental mitigation.

The Principal Contractor would be required to prepare a series of method statements in accordance with the Schedule of Mitigation. These method statements would detail how the contractor intends to implement the mitigation set out in the CEMP and would be integrated with their detailed Construction Method Statements.

If any significant changes are required to the Schedule of Commitments due to changing environmental sensitivities, results of pre-construction surveys, unforeseen events or for any other reason, these would be discussed and agreed with statutory bodies in advance of any amended works being carried out. The Schedule of Commitments would be revised with any approved changes required resulting from the discussions with the relevant statutory bodies.

3.0 Roles and Responsibilities

During construction there would be key responsibilities for the applicant, the Principal Contractor and their teams. Establishing roles and responsibilities in relation to construction would be important in order to ensure the successful construction of the proposed development, including the implementation of the CEMP. The personnel, who would implement, monitor and respond to the CEMP, would be the applicant construction team and the Principal Contractor.

3.1 Health and Safety

The construction works would be undertaken in accordance with primary health and safety legislation, namely:

- Health and Safety at Work Act 1974; and
- Construction (Design and Management) (CDM) Regulations 2015.

The construction works for the proposed development would fall under the CDM Regulations 2015. As such, the Principal Contractor would provide a Construction Phase (Health & Safety) Plan in accordance with the CDM regulations. This plan would include (but not be limited to) a construction programme, emergency procedures, site layouts and fire plans, method statements and details of the proposed induction programme. This induction programme would include both the Principal Contractor's site specific rules as well as the Client's requirements, and would include instructions to all staff regarding the Emergency Pollution Prevention Plan (EPPP) and relevant procedures.

An induction would be required for all workers (permanent / temporary / contractor / subcontractor), site visitors, applicant representatives or other 3rd parties. Inductions would be documented.

All site activities will follow a safe system of work, with specific tasks having Risk Assessment Method Statements (RAMS) detailing:

- how the task will be carried out;
- identifying potential hazards and evaluating the risk on the basis of how likely hazards are to occur and what the consequences there could be in the event of an incident;
- Mitigation measures to be implemented to reduce the risks of the task, which will follow the Hierarchy of Controls in the following order, with elimination being the most effective and PPE being the least effective:
  - Elimination – physically remove the hazard;
  - Substitution – replace the hazard;
  - Engineering controls – isolate people from the hazard;
  - Administrative controls – change the way people work;
  - PPE – protect the worker with equipment;

RAMS will be recorded, monitored and reviewed at appropriate intervals. If works change in a manner not anticipated by the RAMS, works would be stopped until the risk can be appropriately evaluated.

Plant operators and construction staff would be trained by the Principal Contractor with regard to spill prevention/mitigation measures and procedures and in the use of relevant mitigation material (e.g. spill kits).

Staff and subcontractors employed by the Principal Contractor would be trained and have to prove certification for any plant, vehicle or use of specialist equipment such as electrical and hot works.

3.2 Construction Management Team

The applicant would appoint a Construction Management Team, led by a Construction Site Manager. The team would include, as a minimum, a Resident Engineer and a subcontracted Environmental Clerk of Works (EnvCoW).

Prior to appointment of a Principal Contractor, the applicant would own the CEMP and the document would become uncontrolled when printed.

It would be the team's responsibility to ensure that the Principal Contractor adheres to and complies with the principles of the CEMP and their Method Statements. This would likely be the responsibility of the Resident Engineer, the EnvCoW and the applicant Construction Manager. The team would also be responsible for:

- regular liaison with the Principal Contractor's Site Manager;
- maintaining environmental risk registers;
- communicating with regulators and consultees such as SEPA, NatureScot and Clackmannanshire Council (CC) and Perth and Kinross Council (PKC) regarding any changes that need to be made to the CEMP including the Schedule of Mitigation; and
- ensuring that any required changes are approved and updated within the CEMP.

The applicant Construction Manager, Resident Engineer and EnvCoW would have the power to stop works at any stage should it be deemed necessary, i.e. if there were risks posed to environmental receptors from construction that could not be mitigated immediately.

3.2.1 Environmental Clerk of Works (EnvCoW)

An Environmental Clerk of Works (EnvCoW), which would incorporate the role of the Ecological Clerk of Works (ECoW), would be appointed during the period of construction and post-construction restoration. The appointment of the EnvCoW would be approved by CC and PKC.

The purpose of the EnvCoW would be to provide environmental advice and monitor compliance, not implement measures. The EnvCoW would have a number of different tasks to carry out during construction and prior to the outset of each construction phase. They would be required to keep an active register of all issues that arise during the works and report as required to CC, PKC, NatureScot and SEPA.

The EnvCoW would have sufficient powers to:

- oversee construction work and identify where mitigation measures are required;
- authorise temporary stoppage of works if required; and
- to review working methods and advise whether alternative or more appropriate working methods require to be adopted.

The EnvCoW would undertake the following activities:

- to work with the Principal Contractor to induct all site personnel with regards to key environmental sensitivities and mitigation measures to be applied during construction. Toolbox talks shall be given by the EnvCoW throughout the construction period in the event that additional unforeseen issues arise that require alternative working methods;
- undertaking site walkovers, ensuring implementation of the water management plan with reference to water quality protection and appropriate locations for fuel and oil stores;
- liaising with contractors during the construction phase;
- inspecting working areas and ensuring compliance with the CEMP;

- undertaking water quality monitoring;
- providing advice on sediment and drainage management;
- communicating with all site personnel regarding any environmental issues and mitigation measures;
- oversee the need for all necessary licenses regarding protected species are obtained, if required and facilitating with the support of suitably qualified and experienced Ecologists; and
- documenting and reporting any environmental issues and incidents as required to the applicant, CC and PKC, NatureScot, and SEPA.

All works would be undertaken in accordance with the SEPA guidance documents (Pollution Prevention Guidelines and Guidance for Pollution Prevention) and Prevention of Pollution from Civil Engineering Contracts [SEPA, Version 2, June 2006]. In addition, the appointed contractor would be familiar with and take due regard to the other related guidance documents as listed in Section 12.

3.2.2 Resident Engineer

The applicant would appoint a Resident Engineer for the construction of the proposed development. The Resident Engineer would provide support to the applicant Construction Management Team and would have day to day responsibility for monitoring the proposed development onsite on behalf of the Construction Manager.

The Resident Engineer would have a wide range of duties including but not limited to:

- overseeing construction works to ensure conformance with the specification, monitoring quality and progress and most importantly ensure that health, safety and the environment is given a high priority at all times. The Resident Engineer would effectively be the Developer’s eyes and ears on the site and would report directly to the applicant Construction Manager;
- authority to stop the construction works in the case of a health and safety, environmental or quality issue. This would be applicable where to delay would cause additional or prolonged risk or damage;
- daily visual inspections of working areas to identify possible construction issues from a quality, environmental, programme and safety perspective. Any issues would be raised directly with the contractor;
- working closely with the EnvCoW to ensure that ecological and environmental requirements dictated by the CEMP, best practice and the planning conditions were adhered to by the works contractors;
- reviewing construction related documents from all contractors – including method statements and risk assessments and providing comments directly onsite to the Principal Contractor; and
- reporting all environmental or health and safety incidents and near misses to the Construction Manager in a form and timescale required by the Construction Management Team.

3.3 Principal Contractor

The Principal Contractor would be required to comply with and regularly review the CEMP throughout the construction period. This would include being aware of any changes or updates to the CEMP following the identification or any new environmental sensitivity or any proposed development changes. These changes would be controlled and implemented by the applicant Construction Management Team, as required.

The Principal Contractor and their team (including any sub-contractors) would be responsible for:

- undertaking their duties in accordance with CDM 2015;
- liaising with the applicant's Construction Management Team;
- completing the construction of the proposed development in a manner which complies with all relevant laws, rules and regulations;
- acquiring licenses and permits as necessary for their works;
- ensuring that all method statements in line with the principals set out in the CEMP have been provided;
- planning, managing, monitoring and coordinating all pertinent activities relating to construction;
- liaising with and providing justification to the regulators and consultees such as SEPA, NatureScot and CC and PKC if any significant changes are required from the Schedule of Mitigations;
- developing and implementing an Environmental Incident Response Plan and ensuring that all personnel (including sub-consultants and sub-contractors) understand and are aware of procedures to be undertaken should an environmental incident occur. This would sit as an additional appendix in the final CEMP;
- ensuring that all personnel receive training and are aware of the potential to damage to sensitive environmental receptors and procedures required to be implemented to avoid, minimise and mitigate against such damage;
- verifying the competence and resources of all personnel working on the proposed development and any sub-consultants and sub-contractors that were engaged on the proposed development; and
- implementing the Schedule of Mitigation.

3.4 All Site Personnel

All site personnel, including all members of the applicant and Principal Contractor's teams, all sub-contractors and sub-consultants would be required to:

- attend all inductions and site specific training including toolbox talks carried out by the EnvCoW; and
- implement control measures throughout the site, as required.

3.5 Communication

Prior to the commencement of construction, the applicant would set up a community liaison strategy. The objective of the community liaison activity would be to keep the relevant communities informed of progress of construction of the proposed development. The community liaison strategy would be designed to establish processes to keep the relevant communities informed, reviewing incidents that have occurred and how these have been resolved and discussing the forthcoming programme of work. The applicant would start to liaise through the Community Councils prior to any construction starting on site and communication would be maintained on a regular basis (i.e. monthly) until construction is complete and the proposed development is operational. The applicant would provide contact details to the Community Councils of:

- the Resident Engineer – who would be on site for the majority of the construction phase.
- the applicant's Construction Project Manager; and
- the applicant's PR Officer.

Any resident who has a question regarding the construction of the proposed development would be directed to one of these contacts. All questions would be logged and responded to within a specified number of days.

Once construction has started, the applicant should provide information about any construction activity that would affect the local communities, such as deliveries.

Careful monitoring of any complaints received, including recording details of the location of the affected party, time of the disturbance and nature of the issue would assist with managing the works to reduce the likelihood of further incidents.

4.0 Phasing

4.1 Construction

The construction works are scheduled to be completed in about 24 months. Construction activity will take place between 07:00hrs and 19:00hrs from Monday to Friday and between 07:00hrs and 16:00hrs on Saturdays. Although Sunday working is not generally expected, some activities such as abnormal load deliveries, concrete deliveries during foundation pours, and lifting of turbine components may occur outside the specified hours. However, these activities will not take place without prior approval from CC and PKC. The principal contractor will keep local residents informed about the proposed working schedule, including the times and duration of any abnormally noisy activity that may cause concern. This will be done under the terms of a traffic management plan as set out in **Chapter 12: Site Access, Traffic and Transport**.

The following phases would be taken into consideration for the construction works:

- Phase 1 – Site set-up:
- access road improvements and reinstatement
- construction of site entrance, including works to the junction at Carim Lodge;
- site compound set-up, including installation of welfare facilities;
- Phase 2 – Construction:
- construction of access tracks;
- construction of turbine foundations and crane hardstandings;
- construction of substation, including all civil and electrical works;
- installation of wind farm cabling;
- Phase 3 – Commissioning:
- turbine delivery and construction;
- wind farm commissioning;
- turbine and wind farm reliability run;
- Phase 4 – Demobilisation:
- take over;
- snagging; and
- decommissioning of temporary compounds / structures and restoration of the site.

Table 4-1: Indicative Construction Programme

Construction Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Access Road Improvements																								
Site Establishment																								
Tree Clearance																								
Construction of Tracks, Crane Pads and Compounds																								
Turbine Foundation Construction																								
Substation - Civil & Electrical works																								
Turbine Delivery and Erection																								
Cable Laying and Cable Bedding																								
Site Restoration																								

The majority of forest felling (to facilitate habitat improvements) would be carried out post construction (approximately four months following energisation) of the proposed development.

A detailed construction programme would be provided by the Principal Contractor as part of the final CEMP and the Construction Phase Plan.

4.2 Post Construction Reinstatement

Good practice techniques for vegetation and habitat reinstatement would be adopted and implemented on areas subject to disturbance during construction as soon as practicable.

The following reinstatement works would be considered:

- re-use of turves;
- re-use of topsoil/peat where appropriate; and
- reseeding with appropriate species.

For clarity, the following are definitions for the different soil make-up of the natural ground between the surface and rockhead (from top down):

(a) Vegetation:

This is typically plant matter that can be removed/stripped above the ground level (i.e. does not include roots/topsoil). This can vary depending on the nature of the vegetation encountered on site.

(b) Turf/Turves:

This is typically a layer of matted earth formed by grass and plant roots. The matted earth layer would normally be 30-50mm thick.

(c) Topsoil:

The upper layer of soil usually containing significantly more organic matter than is found in lower layers. This can vary in depth but is typically 200mm thick. This can be excavated with the turf and depends on whether the turf is required elsewhere, or the topsoil needs to exclude the turf.

(d) Superficial Soils:

This is a generic term used for all material between topsoil and rockhead. This can vary in depth and content throughout the depth profile at any location.

(e) Weathered Rock:

This is a layer that may exist above rockhead that is neither rock nor superficial material but a mixture of both. It can be mostly fractured rockhead as a result of physical and chemical weathering processes. When excavated it may have elements of fractured rock and superficial material as the boundary can be difficult to distinguish.

In some cases, this can provide suitable engineering material for the construction of foundations, embankments, tracks, etc.

(f) Rockhead:

This is a naturally occurring solid aggregate of minerals which lies beneath the superficial soils.

5.0 General Construction Good Practice

5.1 Handling of Excavated Materials

The construction of tracks, turbine foundations and crane hardstanding areas, as well as the establishment of the construction compound and control building compound, would require the stripping and excavation of soil and its reuse or temporary storage. Excavations would generate material comprising peat, soil and rock. Management of soils and peat during the construction phase is discussed in **Technical Appendix 10.2: Peat Management Plan**. Soils and peat would be used for reinstatement works associated with access tracks, cable trenches, turbine foundations, crane hardstandings and the temporary construction area. The upper vegetated turves would be used to dress infrastructure edges and to replace stripped and stored turves.

Excavated material would be used as soon as practicable and as close as possible to the area it was excavated from. However, some temporary storage would be required. Soils in areas taken for temporary use will ideally be stockpiled close to the excavation location.

5.2 Materials Storage

Granular, non-organic material required to be stored temporarily would be compacted, to reduce the potential for erosion and transfer of sediment and stockpiled in designated areas at least 50m from a watercourse. Temporary stockpiles would need to be appropriately sited away from marshy grassland, bog or heath where possible, with the locations agreed in advance with the EnvCoW.

Where soils could not be transferred immediately to an appropriate restoration area, short term storage would be required. In this case, the following good practice would apply:

- soil would be stored around the turbine perimeters at a sufficient distance from the cut face to prevent overburden induced failure;
- local gullies, diffuse drainage lines (or very wet ground) and locally steep slopes would be avoided for storage;
- stored upper turves (incorporating vegetation) would be reinstated adjacent to similar habitats as advised by the EnvCoW;
- monitoring of stockpiles/excavation areas would occur during and following rainfall events; and
- if material is stockpiled on a slope, silt fences shall be utilised to reduce sediment transport in accordance with CIRA guidance C532. Additional measures may also be necessary to control flow of water and sediment transport on site in accordance with this guidance.

Material excavated during new and upgraded access track construction would be stored adjacent to the track and Granular, non-organic material compacted in order to limit instability and erosion potential. Peat would not be allowed to dry out, through rewetting and monitored irrigation.

Silt fences shall be employed in combination with the measures described in ‘CIRA Control of water pollution from construction sites. Guidance for consultants and contractors (C532)’ where required to minimise sediment levels in run-off.

All soils stripped from the borrow pit(s) would be retained in clearly demarcated stockpiles of no greater than 3m height in locations immediately around the edges of borrow pit excavation.

5.3 The Management and Movement of Concrete

5.3.1 Accidental Spillage

An appropriately sized spill kit(s) would be provided and maintained onsite, consideration would be given to suitable locations across the active areas of the site and to having vehicles including plant carry a spill kit. This kit would contain materials, such as absorbent granules and pads, absorbent booms and collection bags. These are designed to halt the spread of spillages and would be deployed, as necessary, should a spillage occur elsewhere within the construction compound.

A speed limit of 15mph would apply for vehicles onsite and would be monitored and enforced by the Principal Contractor. Maximum vehicle load capacities would not be exceeded.

5.3.2 Vehicle Washing

There would be a wash-out facility within the construction compound consisting of a sump overlain with a geosynthetic membrane. The geosynthetic membrane would filter out the concrete fines leaving water to pass through to the sump. The sump water would either be pumped to a licenced carrier and taken offsite for approved disposal, or it would be discharged to surrounding vegetated surfaces where such discharge meets the requirements of NatureScot and SEPA. No washing of concrete-associated vehicles would be undertaken outside the wash out facility, and the area would be signposted, with all site contractors informed of the locations. Vehicle washing would be carried out outwith the Danny Burn and Burn of Ogilvie catchments.

5.3.3 Concrete Pouring for Turbine Foundations

To prevent pollution it is important that all concrete pours are planned and specific procedures would be adopted in accordance with Construction Industry Research and Information Association (CIRIA) C532 Control of water pollution from construction sites: guidance for consultants and contractors. These procedures would include:

- ensuring that all excavations are sufficiently dewatered before concrete pours begin and that dewatering continues while the concrete cures. Construction good practice would be followed to ensure that fresh concrete is isolated from the dewatering system;
- ensuring that covers are available for freshly placed concrete to avoid the surface of the concrete washing away during heavy precipitation; and
- Perimeter drains with silt traps.

The excavated area would be back-filled with compacted layers of graded material from the original excavation, where this is suitable, and capped with peat or soil. The finished surface around the base of the turbine, would be capped with crushed aggregate providing a walkway to allow for safe personnel access.

No concrete pouring or activities relating to concreting will take place within the Danny Burn and Burn of Ogilvie catchments.

5.4 Surplus and Waste Material

5.4.1 Introduction

Initiated as part of the Defra Red Tape Challenge, aiming to reduce bureaucracy for business, the Site Waste Management Plans Regulations 2008 (SWMP) were repealed on 01 December 2013. However, it has been adopted as good practice to produce a Waste

Management Plan (WMP) for large-scale construction sites and to append planning applications and, as such, are recommended to be adopted in this project.

The SWMP would detail how all waste materials would be managed, including the management and definition of excavated mate rials.

The Principal Contractor would take all reasonable steps to ensure that all waste from the site is dealt with in accordance with the requirements under the Environmental Protection (Duty of Care) Regulations 1991 (and amendments) and that materials would be handled efficiently and waste managed appropriately.

Appropriate waste management, disposal and waste carrier documentation and licences would be obtained (e.g. complete waste transfer notes prior to waste leaving site, ensure all waste carriers have a valid waste carrier's registration certificate, ensure wastes are disposed of at a correctly licensed site, complete notification for hazardous waste to SEPA).

Waste streams would include wastes generated by plant, machinery and construction workers over the period of the works, for example waste oils, sewage, refuse (paper, carton, plastic etc.), wooden pallets, waste batteries, fluorescent tubes etc.

5.4.2 Soils and Spoils

It is planned that any materials excavated on site in the course of the construction works would be stored on site ideally close to the excavation location and re-used where it is appropriate to do so. As such, offsite disposal of this material is not anticipated.

5.4.3 Hazardous and Other Wastes

Table 5-1 lists some of the waste types that may be generated during the construction works. Although some waste types may be generated in locations other than the construction compounds such waste materials would be stored within the construction compounds only. Waste materials generated outside the construction compounds would be taken to the compounds on a daily basis to be managed thereafter.

Table 5-1: Common Construction Wastes

EWC Code	Description
13 01 10*	Used mineral hydraulic oil (non-chlorinated)
13 02 08*	Other waste engine, gear or lube oil
13 02 05*	Waste engine, gear or lube oil (non-chlorinated)
13 02 08*	Other waste engine, gear or lube oil
16 01 07*	Oil filters
20 01 23*	Discarded equipment containing CFCs e.g. waste fridges & freezers
16 06 01*	Lead batteries
16 07 08*	Oily waste from transport and storage tanks
16 10 01*	Hazardous liquid wastes to be treated off-site
20 01 21*	Fluorescent tubes and other mercury-containing waste
20 01 33*	Hazardous batteries and accumulators that are collected separately
15 02 02*	Absorbents, filter materials, wiping cloths, clothing contaminated by dangerous substances
15 01 01	Cardboard or paper packaging

EWC Code	Description
15 01 02	Plastic packaging e.g. toner & ink cartridges, polythene sheeting
15 01 03	Wooden packaging e.g. timber pallets
15 01 04	Metallic packaging e.g. drink cans, paint tins
16 01 03	Tyres
16 01 15	Antifreeze fluids that do not contain dangerous substances e.g. Coolants
16 01 17	Ferrous metal from vehicles e.g. car parts
16 02 14	Non-hazardous waste electricals e.g. washing machines, power tools
16 05 05	Gases in pressure containers i.e. gas cylinders
17 01 01	Concrete
17 02 01	Wood from construction or demolition e.g. timber trusses, supports, frames, doors
17 04 11	Cables that do not contain dangerous substances e.g. electric cabling
20 01 01	Paper & card similar to that from households e.g. office paper, junk mail
20 01 30	Non-hazardous detergent e.g. flushing agent/universal cleaner
20 01 39	Separately collected plastics e.g. plastic containers, bottles
20 03 01	Mixed waste similar to that from households e.g. mixed office, kitchen & general waste
20 03 04	Septic tank sludge

*Denotes Hazardous Waste, as categorised by the European Waste Catalogue.

Foul water from the onsite facilities at the construction works compound would be removed from site by an appropriately licensed contractor (see also Section 7.4.4).

5.4.4 Regulatory Compliance

Waste would need to be transferred to a licensed waste management site or site with a waste exemption. The Principal Contractor would need to check that the site is licensed and that the licence permits the site to take the type and quantity of waste involved. Copies of the waste management licence or waste exemption license would need to be held on file.

A 'Waste Transfer Note' must be completed by all parties involved and must be retained for a period of two years. Sub-contractors excavating and hauling waste offsite must complete their own Waste Transfer Notes and copy them to the Principal Contractor. It is not necessary to have a Waste Transfer Note for each load of waste and a Waste Transfer Note can be issued weekly or monthly as a season ticket.

It would be the responsibility of the Principal Contractor to ensure that other parties involved in the transport, storage and disposal of waste were legally entitled to carry out their duties.

5.5 Dust Mitigation

Good practice measures as listed in **Table 5-2** would be adopted during construction to control the generation and dispersion of dust such that significant impacts on neighbouring habitats should not occur. The hierarchy for mitigation would be prevention – suppression – containment.

Table 5-2: Dust Mitigation Measures

Task	Mitigation Measures
Excavation and Earthworks	- working areas would be stripped as required in order to minimise exposed areas; - during excavation works drop heights would be minimised to control the fall of materials reducing dust escape; and - temporary cover may be provided for earthworks if necessary, and completed earthworks and other exposed areas would be covered with topsoil and re-vegetated as soon as it is practical in order to stabilise surfaces.
Stockpiling of loose materials	- ensure that stockpiles exist for the shortest possible time; - material stockpiles would be low mounds without steep sides or sharp changes in shape; - material stockpiles would be located from the site boundary, sensitive receptors, watercourses and surface drains; and - material stockpiles would be sited to account for the predominant wind direction and the location of sensitive receptors.
Track works/ traffic movements	- water bowsers would be available onsite and utilised for dust suppression where required; - daily visual inspections would be undertaken to assess need for use of water bowsers; and - daily visual inspections would be undertaken to assess the condition of the junction of the site track with the B6368 and its approaches.

5.6 Noise Management

The sources of construction noise are temporary and vary both in location and their duration as the different elements of the proposed development are constructed, and arise primarily through the operation of large items of plant and equipment such as bulldozers, diesel generators, vibration plates, concrete mixer trucks, rollers etc. Noise also arises due to the temporary increase in construction traffic near the site. The level of noise varies depending on the different elements of the proposed development being constructed.

BS 5228-1:2009 'Noise control on construction and open sites; Part 1 – Noise' is identified as being suitable for the purpose of giving guidance on appropriate methods for minimising noise from construction activities.

For all activities, measures shall be taken to reduce noise levels with due regard to practicality and cost as per the concept of 'best practicable means' as defined in Section 72 of the Control of Pollution Act 1974.

5.7 Site Lighting

Temporary site lighting may be occasionally required for specific activities to ensure safe working conditions, during periods of limited natural light but would be carried out within the limits of the permissible working hours. It is intended the type of lighting would be non-intrusive and specifically designed to negate or minimise any effect to local properties and any other environmental considerations.

Given the proposed size and scope of the development, and location in Scotland, it is most likely that the construction timetable would require elements of the works to be undertaken during periods of the year when natural daylight is limited.

The use of artificial lighting may therefore be required in order to facilitate the works, such as vehicle and plant headlights; construction and compound lighting; office complex lighting; and localised floodlights/mobile lighting units. There would be fewer requirements for artificial lighting in the summer months when natural lighting would be present during normal working hours. There are no known issues with regards to the limit of lighting levels in this area, but lighting would be provided to meet the required lighting levels for the respective works which are being undertaken, especially where there is plant and machinery involved. Any issues identified with regards to limiting the lighting levels, either the lux values, or the time/duration of the lighting would be taken into consideration as part of the developed construction method statement.

5.8 Vehicle Storage

Appropriate areas would be provided adjacent to or within the site compound to allow staff and visitor vehicles to be parked. In addition, appropriate provision would be made for the layover of HGV traffic, to ensure that the adjacent road remains clear and available for use at all times. The track design incorporates spurs and crane pads which from time to time could be required to temporarily store vehicles i.e. as waiting areas.

6.0 Pollution Prevention Measures

6.1 Environmental Incident Response Plan

The Principal Contractor would be responsible for developing and implementing an Environmental Incident Response Plan. The plan would provide reference to procedures to be followed in the event of a specific incident. In general, if an environmental incident was to occur, the following would take place immediately:

- mitigation would be implemented to stop or reduce impacts from the incident;
- if these were ineffective, work in the area would cease immediately;
- if necessary, monitoring would be undertaken to identify the source of the incident;
- work would only recommence once it is considered that it would not continue to adversely impact sensitive environmental receptors; and
- provision of a full report by the Principal Contractor and separately by the EnvCoW to the applicant following an incident occurring.

The Environmental Incident Response Plan would reflect site-specific conditions/issues. The Principal Contractor would submit the detailed Plan to the applicant for approval prior to any construction works commencing onsite. The Plan would provide:

- a summary of local environmental sensitivities, e.g. environmentally designated areas, specific surface water catchment areas, protected species or habitats and high amenity areas;
- a specific response plan to the Danny Burn and Burn of Ogilvie catchments will be prepared along with agreed reporting timelines, control measures and actions to take;
- an outline of the construction works and appropriate references to other environmental plans and construction method statements;
- an inventory of stored materials and emergency response spill kits;
- details on training requirements, evidence of training of site staff/plant operators in emergency response procedures including inclusion of Environmental Incident and Response training in site inductions and toolbox talks; and key staff contacts for environmental management and emergency response;
- detailed procedures to be taken in the event of an incident or emergency (including procedures for positioning and movement of plant) and identification of relevant personnel who would be responsible for implementing such procedures; and
- contact telephone numbers for the emergency services and SEPA Pollution Hotline (0800 80 70 60).

A plan of the site would also be provided, detailing:

- all areas of potential pollution sources including the locations of car parks, delivery and fuel / chemical storage areas, oil separator equipment, excavations, and any other high risk areas that could give rise to pollution;
- the location of potential sensitive environmental receptors, including sensitive habitats or species, surface watercourses, drains or culverts where pollution may travel to;
- the location of spill kits and other pollution control or emergency response equipment; and
- The procedures for responding to a major pollution incident would be a regular topic at onsite toolbox talks and management meetings in order to ensure that the incident response plan is fully understood by all personnel, and that all involved know their role in

it. Any lessons learnt from any response to real incidents would be fed back into the plan to ensure that best practice is followed.

6.2 Re-Fuelling of Vehicles, Plant and Machinery

Generally, re-fuelling of mobile plant and machinery would be carried out at a designated location within the site compound only.

Vehicle re-fuelling would take place either within the compound at a dedicated impermeable refuelling pad or by mobile double bunded bowsers at their place of work. The refuelling pad would have an impermeable base and bund with a capacity of 110% with sumps provided such that they do not drain directly into the surface water drains. Where practicable, drainage from storage compounds will be passed through oil interceptors prior to discharge. Refuelling would be carried out using an approved mobile fuel bowser with a suitable pump and hose. Absorbent material (spill kits) would be available onsite and would be deployed to contain drips and small spillages.

All other fuels, oils and potential contaminants, as well as waste oils, would be stored within the site compound in secure, fit for purpose containers within bunded containment as appropriate and in accordance with SEPA guidance (GPP 2: Above ground oil storage tanks, January 2018). The bunded containment would have a capacity of 110% of the volume to be stored and would have impervious, secured walls and base. Maintenance of mobile plant would take place within the construction compounds only and would comply with SEPA PPG 7 (The safe operation of refuelling facilities, July 2011).

There would be no fuel storage outside the compounds. Plant would be maintained in good operational order and any fuel/oil leaks recorded for attention. Absorbent pads/granules in the case of an accidental leak/spillage would be available at the temporary construction compounds.

6.3 Spillage

Spillage of fuel, oil and chemicals would be minimised by implementation of an Emergency Pollution Prevention Plan (EPPP) which would be prepared by the Principal Contractor. In the event of any spillage or pollution of any watercourse the emergency spill procedures as described in the EPPP would be implemented immediately. Procedures will be adhered to for storage of fuels and other potentially contaminative materials in line with the Water Environment (Oil Storage) (Scotland) Regulations 2006, to minimise the potential for accidental spillage.

6.4 Other Storage

Track stone material stockpiles would generally be limited to the compounds, borrow pits or within work areas. This material would be transported and deposited directly to the point of use from the storage point. Therefore track stone would generally not be stockpiled around the site.

Stripped topsoil/superficial soil would be stockpiled in a suitable location away from the area of movement of heavy vehicles, machinery and equipment, to minimise compaction of soil. Stockpiling of excavated material would be managed such that the potential contamination of down slope water supplies and/or natural drainage systems is mitigated / minimised.

Low mound stockpiles would be formed from excavated material, adjacent to access tracks, turbine areas and compound areas, away from open drains.

Waste storage and raw material would be at the construction works compounds as detailed in Section 5.4.

6.5 Prevention of Mud and Debris on Public Roads

Plant and wheel washing facilities and road sweepers would be provided as required to prevent mud and deposits from being transferred from site onto the public highway.

Plant and wheel washing, where provided, would be located within the designated hard standings at least 10m from the nearest watercourse or surface water drain. Runoff from the facilities would be captured within a purpose designed system for recycling and re-use where possible within the site. Settled solids would be regularly removed and disposed of by an appropriately licensed contractor. This facility would be located and designed in consultation with SEPA.

6.6 Cement

Where the quality of the *in-situ* rock is deemed suitable for concrete, then onsite concrete batching would be proposed. Cement for concrete production would be appropriately stored in sealed silos and its use controlled as part of the batching process. This would be protected from the elements.

Any bagged cement would be stored within a soil bunded area on pallets above the ground and covered with secured plastic sheeting to minimise the risk of wind-blown cement and uncontrolled washout occurring.

Any spilled cement would be removed by shovelling/excavator and suitably disposed offsite.

If the rock is found to be unsuitable for concrete batching then ready-mixed concrete would be brought onto the construction site from an offsite source for use as required.

6.7 Silt

Silt laden runoff could be expected from any areas of recently exposed soil or rock and from access tracks in regular use. There would be no discharge or disposal of any material directly into any river, stream or drainage ditch. Further detail on control of silt entrained in surface water runoff is contained within the Water Management Plan.

6.8 Waste and Litter

Waste storage/recycling materials would be stored at the construction compound. Section 5.4 details principles for waste minimisation, recycling and disposal of waste streams. A separate Waste Management Plan would be prepared by the Principal Contractor in order to document waste movement and amounts of different waste streams generated. Further detail on this plan is found under Section 5.4.

With respect to the control of litter on site, all such waste would be collected and stored within sealed containers within the site compound and serviced by a registered waste carrier. No disposal of litter would be permitted at other locations.

6.9 Hydrocarbon Contamination

6.9.1 Vehicle Maintenance

As noted in Section 5.0, plant and machinery would be regularly maintained to ensure that the potential for fuel or oil leaks/spillages is minimised. All maintenance would be conducted on suitable absorbent spill pads to minimise the potential for groundwater and surface water pollution. All machinery would be equipped with drip pans to contain minor fuel spillage or equipment leakages.

6.9.2 Chemical Storage

All fuels, oils and other chemicals would be stored in the construction compound in secure, fit for purpose containers within bunded containment as appropriate and in accordance with SEPA guidance. The bunded containment would have a capacity of 110% of the volume to be stored and would have impervious, secured walls and base.

The bunded area would be within the construction compound and would be underlain by an impermeable ground membrane layer to reduce the potential pathways for contaminants to enter watercourses and groundwater.

7.0 Drainage and Surface Water Management

7.1 Introduction

Control of water is of great importance during construction to prevent exposed soils eroding and silting up surrounding drainage channels and downstream watercourses. It is essential that the works have as little impact as possible on the existing hydrology, to minimise potential impacts on ecology and the environmental quality of the surrounding countryside.

The following principles are intended to demonstrate measures that could be used across the site to adequately protect hydrological, and related, resources. Detailed proposals for such measures would be documented prior to construction and would provide the same or greater protection for the water environment as those described in this document. The measures are proportionate to the risk and, where greater risk is highlighted at specific locations prior to construction, specific measures would be agreed for those locations.

7.2 Site Induction and Training

All employees and contractors would undergo a site induction to ensure that they were familiar with the site rules prior to any work commencing on site. In addition, the Principal Contractor would ensure that all operatives and contractors responsible for handling fuel, oil, concrete or cement or other potential pollutants undergo a thorough induction programme with respect to the relevant proposed pollution control measures. The relevant programme would include, as a minimum, the following:

- waste management;
- emergency response procedures;
- materials management;
- habitat and species protection,
- surface water management;
- potential sources of pollution and their effects on the environment;
- requirements of the contract and legislation with respect to pollution;
- the Principal Contractor’s pollution avoidance plan;
- traffic management and routing, including areas where access is not permitted; and
- training in the use of pollution control equipment.

7.3 Site Drainage

During the construction phase of the proposed development, measures would be adopted, in order to prevent silt, chemicals and/or other contaminants from being washed into existing watercourses. Areas exposed due to the removal of vegetation are more susceptible to erosion during heavy rainfall so areas would be reinstated as soon as possible to minimise this effect.

This would include specific guidance in relation to drainage (and control of pollution to the water environment) around the following aspects of site infrastructure:

- access tracks;
- turbine foundations;
- borrow pit(s);

- watercourse crossing; and
- hardstanding areas and buildings (including crane hardstandings, construction compound and associated infrastructure).

The appropriate methodologies to cover water control and the means of drainage from all hard surfaces and structures within the site are described in the following sections.

Ditches would remain in place to convey surface water flows during the operational life of the Energy Park.

7.4 Management of Sediment and Surface Waters

Good practice construction techniques would be adopted for the management of sediment and surface water run-off generated during the construction phase of the proposed development. Sustainable Drainage Systems (SuDS) would be used where applicable.

Drainage from the site would include elements of SuDS design. SuDS replicate natural drainage patterns and have a number of benefits:

- SuDS would attenuate run-off, thus reducing peak flow and any flooding issues that might arise downstream; and
- SuDS would treat run-off, which can reduce sediment and pollutant volumes in run-off before discharging back into the water environment; and
- SuDS measures, such as lagoons or retention ponds, correctly implemented would produce suitable environments for wildlife.

In addition, a wet weather protocol would be implemented to manage activities during periods of heavy and prolonged precipitation to be approved by CC and PKC in consultation with SEPA.

Heavy or prolonged rainfall during construction and operation may lead to sediment transport or vegetation causing blockage to infrastructure drainage channels or watercourse crossing structures. Regular monitoring and prompt maintenance of these assets will ensure that the drainage system continues to function as designed.

7.4.1 Track construction methodology

Tracks will be constructed so that camber/crossfall does not lead to direct discharge into existing watercourses. The outline methodology relating to water management and main concerns are as follows:

- Site personnel will be informed about required 50-metre watercourse buffer zones during site inductions and targeted toolbox talks.
- Excavated crushed rock from designated borrow pits will provide the final running surface should it be suitable regarding silt run-off. It will be applied after civil works completion to ensure optimal conditions for turbine delivery vehicles.
- Track verge reinstatement will occur progressively as sections are completed to reduce time where soils are open to the elements, utilising stored subsoil and topsoil from original stockpiles, with grass reseeding implemented where necessary.
- Original vegetation and topsoil containing seed banks shall be carefully preserved during removal for subsequent reinstatement purposes.
- Construction material will primarily come from onsite roadway excavation and local borrow pits, with provision for imported capping material if required.

- Excavated subsoil will be stored alongside the road corridor for future use in landscaping and verge restoration work with silt run-off control measures in-place.

Maintenance will be required to prevent tracks and the drainage system in general causing contamination to enter the watercourses. This may include:

- Remove accumulated sediment from lagoons, ditches and silt traps using mechanical equipment, ensuring the removed material is stored where it cannot flow back into waterways.
- Construct additional lagoons for sediment settlement.
- Build additional cross-drains to channel surface water from access roads into proper drainage channels.
- Modify road cambers at stream crossings to divert contaminated runoff away from watercourses.
- Install new silt traps at strategic locations.
- Expand existing settlement lagoons to handle greater volumes.

7.4.2 Location of Silt Traps

Silt traps would be utilised to trap and filter sediment-laden run-off from excavation works at the proposed development. Silt traps consist of rock or straw bales and are used to slow down flow on slopes to ensure silt is deposited in designated areas. They would be installed in drainage ditches but would be sited to prevent ditches running at slopes with a gradient greater than 1 in 20. Silt traps would also be installed on the down-slope side of tracks adjacent to watercourse crossings to ensure sediment is not transferred into the wider hydrological system. They will be periodically emptied of deposited silt and the silt disposed of in accordance with the soil management plan.

If it is unavoidable for track ditches to enter a watercourse then additional silt traps and settlement lagoons will be added prior to the discharge point to treat the water and prevent pollution.

7.4.3 Location of Settlement Lagoons

All settlement lagoons would be actively managed to control water levels and ensure that any run-off is contained, especially during times of rainfall. If required to achieve the necessary quality of the final run-off, further measures could include the use of flocculent to further facilitate the settlement of suspended solids. Water from lagoons will pass through a silt fence or rock apron for final treatment prior to discharge onto vegetated surfaces away from watercourses.

7.4.4 Outflow Monitoring from Settlement Lagoons

Settlement lagoon outflow would be regularly inspected, and discharge may be pumped, when required, for maintenance purposes. Any pumping activities would be supervised and authorised by the Principal Contractor and site EnvCoW.

Treated water would be discharged onto vegetated surfaces (buffer zones) and directed away from surface watercourses. The buffer zones act as a filtration system which will remove silt or sediment prior to water entering watercourses or the ground. Irrigation techniques, which may include the use of perforated discharge hoses, or similar, would be employed to rapidly distribute discharge across a vegetated slope.

7.4.5 Emergency procedures.

Water management infrastructure on site will be constructed and maintained to account for average flow rates with some built in additional capacity to be defined. During or in advance of heavy rainfall (or snowfall) personnel will be briefed on actions to take to prevent overwhelming of the existing infrastructure leading to untreated discharge. These may include:

- Excavate an interceptor drainage ditch to direct contaminated water away from a watercourse
- Construct and enlarge settlement lagoons where appropriate.
- Reinforce filtration weirs with additional straw bales etc.
- Deepen drainage ditches to create system storage
- Cover stockpiled materials and surround with interceptor ditches
- Notify SEPA depending on the nature and size of discharge

7.4.6 Foul Drainage

Sewage waste would be either be tankered offsite by a licensed approved waste contractor or treated onsite. If Effluent and waste from onsite construction personnel is to be treated at a package sewage treatment plant or a septic tank and discharged into a properly designed and sized drainage field, in accordance with Guidance for Pollution Prevention (GPP) 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer). The system would be designed for approval by SEPA prior to the construction phase of the proposed development.

8.0 Water Quality Monitoring and Contingency

8.1 Water Quality Monitoring

Water quality monitoring during the construction phase would be undertaken for the surface water catchments that serve the site, to ensure that none of the tributaries of the main channels are carrying pollutants or suspended solids. Monitoring would be carried out at a specified frequency on these catchments.

Regarding the protection of the water environment the following risks would be addressed:

- siltation of watercourses;
- discolouration of raw water;
- potential pollution from construction traffic due to diesel spillage or similar;
- alteration of raw water quality resulting from imported track construction material;
- excavation and earthworks
- use of large quantities of concrete;
- site compound and associated drainage/foul drainage and diesel spill issues; and
- the Principal Contractor would compile a monitoring and maintenance plan for the drainage system and surface water runs which would as a minimum include:
    - visual monitoring/inspections
    - during site works including and water crossing construction works, the relevant drainage/surface water runs potentially being impacted by these works would be inspected on a daily basis by the EnvCoW while works are ongoing in this area.

A Water Quality Monitoring Plan (WQMP) will be developed to form part of the Construction Method Statement (CMS), which would be submitted to the appropriate planning authorities and bodies such as SEPA prior to construction and development. The WQMP will be implemented to monitor surface water quality, fish populations and macroinvertebrate community prior to, during and post-construction. A robust baseline of water quality in surface watercourses / drainage channels downstream of construction works will be established prior to construction commencing and used a benchmark of water quality for the construction phase monitoring.

The purpose of the WQMP is to:

- ensure that the commitments put forward in the EIA Report are fulfilled with regards to identified ground and surface water receptors;
- provide a specification for monitoring prior to, during and after construction;
- provide a record of water quality across the site that can be compared to rainfall and site activities;
- provide reassurance of the effectiveness of pollution prevention measures installed to protect surface watercourses throughout the construction period; and
- provide data to identify any potential pollution incidents, and to inform a structured approach to manage and control such incidences.

The WQMP will outline details for the monitoring of surface watercourses down gradient of works areas including watercourse crossings, access tracks, turbine foundations and borrow pits and at control sites (up gradient of works areas), and will include:

- indicative monitoring locations;

- frequency of monitoring prior to, during and after construction;
- parameters for field hydrochemistry testing and laboratory analysis including as a minimum pH, electrical conductivity, suspended solids, dissolved metals, nutrients and hydrocarbons;
- sampling and analysis protocols;
- relevant environmental quality standards (EQS);
- responsibilities for monitoring – it is expected that the EnvCoW will be responsible for daily monitoring of watercourses particularly around active works areas and watercourse crossings. Further monitoring on a less frequent basis (i.e. monthly) may be done by an external party;
- procedures to be followed in the event of an environmental incident; and
- recording and communication of results.

A Private Water Supply (PWS) Action Plan would be developed and would include details regarding all water monitoring and reporting, pollution incident reporting and emergency mitigation measures to address a temporary or permanent material change in either the quality or quantity of an existing private water supply. The PWS Action plan shall include as a minimum:

- the provision of an emergency hotline telephone number for householders so that they can contact the project with any concern regarding water quality or quantity;
- the contact details of householders downgradient of work areas to alert in the event of a pollution incident;
- the provision of an alternative water supply, if required, during any periods of PWS disruption; and/or
- to supply affected properties with filters for particulate removal.

8.2 Laboratory Analysis

This monitoring would involve laboratory analysis of water samples taken at agreed locations across the site and would continue throughout the construction phase and immediately following construction. Monitoring would be used to allow a rapid response to any pollution incident as well as assess the impact of good practice or remedial measures. Monitoring frequency would increase during the construction phase if remedial measures to improve water quality would be required. Detailed water quality monitoring plans would be developed during detailed design in consultation with CC, PKC and SEPA.

The performance of the good practice measures would be kept under constant review by the water monitoring schedule, based on a comparison of data taken during the construction phase with a baseline data set, sampled prior to the construction period and through the observance of any trends in water quality change over time.

8.3 EnvCoW WQMP Duties

In addition to the monitoring and analysis, it is proposed that daily watercourse inspections would be undertaken by the EnvCoW in areas selected in the field by the EnvCoW determined by where construction is taking place. As daily inspection points they would need to be readily accessible points close to infrastructure.

The daily inspections would include, but not be limited to:

- regular visual inspection of the sediment control structures and oil interceptors;

- investigation of problem areas (e.g. those causing silty run-off) to try to establish the cause and locate the source;
- management of the Principal Contractor to comply with method statement activities;
- development of a clear line of communication with site staff to address issues promptly;
- prioritisation of issues so that site staff know how to react to incidents; and
- regular hydrological reporting - daily records and monthly reports

8.4 Incident Response

Drainage networks provide a conduit for rapid transport of silty water and potential contamination from surface spills of fuels / oils, concrete or chemicals. A pollution incident would include any discharge to the drainage network that could potentially cause environmental damage. Examples of pollution incidents include:

- fuel drips or spills during refuelling;
- leaking plant or equipment;
- leaks from fuel or chemical containers;
- contaminated water or sediment / silt entering a watercourse or drainage network;
- windblown dust and waste;
- excess silt deposition in drainage ditches, channels, culverts following heavy rainfall events;
- operational failures of pumps and pipelines; and
- failures of treatment or sediment controls.

The Principal Contractor would be required to prepare an Environmental Incident Response Plan (Section 6.1) which would provide emergency response contacts, reporting procedures, and procedures for dealing with all potential pollution incidents during the construction of the proposed development.

8.5 Specific Measures for Protecting Groundwater Receptors

Areas of potential Groundwater Dependent Terrestrial Ecosystems (GWDTE) will be protected from development by using buffer zones or contingency plans to secure groundwater supply. Specific risk assessments will be undertaken if buffer zones cannot be maintained in accordance with the relevant planning conditions and legislation.

9.0 Construction Phase

9.1 Introduction

This section describes in more detail the key components of construction and the impact they may have on the environment.

The overall site design has been developed in accordance with recommendations adopted from the EIA Report and to reflect the requirements and specifications for transporting wind turbine components to the proposed turbine locations.

9.2 Temporary Compound

The construction project involves building three Temporary Construction Compounds (TCCs). TCC1 is located next to the existing track on the west side of the substation compound location. TCC2 is west of Turbine 6, and TCC3 is situated between Turbine 6 and Turbine 7.

The first TCC will have a 0.55ha footprint. The second TCC will have a 0.67ha footprint. The third TCC will have a 0.56ha footprint. All the TCCs are likely to contain the following:

- temporary modular building(s) to be used as a site office;
- welfare facilities;
- parking for construction staff and visitors;
- reception area;
- fuelling point or mobile fuel bowser;
- secure storage areas for tools; and
- waste storage facilities.

Welfare facilities would be provided for the duration of the construction period in accordance with the Construction (Design and Management) Regulations 2015. Facilities for waste management, refuelling, power, water supply and chemical/material storage would be provided.

Where and when compound lighting is required, it would be designed to minimise light pollution to the surrounding area. All lights would face inwards.

The compounds would also be used as a storage compound for various components, fuels and materials required for construction.

The compounds would be built by stripping topsoil and regrading, then laying geotextile and an imported stone layer. The stripped topsoil would be stored adjacent to the compound in a linear bund typically no greater than 2m in elevation. Superficial soil would be stripped and stored separately from the topsoil. This would be stored in a similar manner to the topsoil, but would depend on the volume which is required to be excavated.

It is proposed that uncontaminated surface run-off from the compounds is accommodated in a swale or soakaway which would be constructed as a perimeter ditch to avoid contamination of watercourses should there be a spillage and from fines washout. All other run-off from the site would follow natural drainage patterns and newly installed drainage routes.

The compound areas would be reinstated at the end of the construction period. Reinstatement would involve removal of the imported material and underlying geotextile. The exposed substrate would be gently ripped and the stored superficial soil and topsoil replaced. The surface would be re-seeded as required using the same seed mix as that used for the reinstatement of track verges and batter (in consultation with NatureScot).

Alternatively, if the ground conditions permit, all inert materials such as the imported stone could be retained, and the stored superficial soil and topsoil replaced. This area would be kept on record and could be used as the temporary construction compound during the decommissioning phase.

9.3 Welfare Facilities and Services

Welfare facilities would be provided in accordance with the Construction (Design and Management) Regulations 2015 during the construction period and would include mobile toilets with provision for sealed waste storage and removal. Sewage waste would be either be tankered offsite by a licensed approved waste contractor or, a septic tank could be installed and maintained for the duration of the works in accordance with SEPA's GPP 4 (Section 7.4.4), including regular emptying by an approved contractor.

Potable water would be imported as bottled water. The water would be used for messing purposes during the construction phase.

The welfare facilities will most likely have in-built water bowsers to provide a water supply for sanitation etc.

Electricity would be provided by onsite generators. All electrical equipment and its installation and maintenance would be undertaken by a qualified and competent person.

9.4 Transport Routes

Both construction workers and materials needed for the construction works would be delivered to site using the public road network, larger vehicles will require to pass the site and turn to the north, two potential sites for this have been identified, one would be selected ahead of construction. A Construction Traffic Management Plan (CTMP) would be developed following appointment of the Principal Contractor and identification of the material supply points and included in the final CEMP.

Chapter 12: Traffic and Transport of the EIA Report describes the transport route in full.

Once consent has been received and prior to construction, the route would be further inspected by suitable engineers, in conjunction with the police and the relevant highway authorities, with a view to finalising the TMP and to obtaining a suitable licence for the movement of abnormal loads.

The TMP would include (but not be limited to):

- a delivery schedule to ensure impacts on the road network are minimised;
- detailed design of temporary and permanent road improvements; and
- assessment of existing street furniture and bridge classifications and preparation of a schedule of temporary works along the access route.

9.5 Borrow Pits

9.5.1 General

In order to construct the access tracks, passing places and formation of new hardstanding areas such as crane pads, site construction compounds and laydown areas, crushed rock is required. It is proposed to source some of this material from two onsite borrow pits, to reduce the need to import materials, potentially yielding approximately 75,136m^3 of material.

The Quarry Regulations 1999 state that any excavations undertaken for the sole purpose of supplying materials for use on site are excluded from the Regulations. Therefore, the development of the borrow pits and their reinstatement would be agreed through the planning process.

Two borrow pits are proposed as part of this project. These are located as follows:

Table 9-1: Proposed Borrow Pit Yields and Locations

Borrow Pit	Volume of gravel/rock m^3	Area of pit (m^2)	Location
1	41,492	5,091	NN 87682, 01510
2	33,644	3,737	NN 87930, 03306
Total	**75,136**	**8,828**	

In general, these borrow pits would be stripped back of topsoil which would be stored adjacent to the respective borrow pit site for future reinstatement.

9.5.2 Material Storage

Prior to the excavation of the borrow pit(s) and following construction of appropriate SuDS measures, vegetation and soils would be removed and stored in overburden stockpiles. Overburden stockpiles would be located adjacent to the borrow pit(s) and compacted in order to limit instability and erosion potential. Silt fences would be employed to minimise sediment levels in runoff from the stockpiles.

Rock stockpiles would be stored in already-worked areas of the borrow pit(s) or, before these are available, stockpiles would be located on safe and stable designated areas approved by a qualified engineer, identified on a plan of the working area of the borrow pit(s) and agreed with the EnvCoW.

Overburden or rock stockpiles would be stored at least 50m from watercourses in order to reduce the potential for sediment to be transferred into the wider hydrological system.

9.5.3 Surface Water Management

Temporary interception bunds and drainage ditches would be constructed upslope of the borrow pit(s) to prevent surface water runoff from entering the excavation. Swales would also be implemented to convey and attenuate excess surface water flow away from borrow pit(s). These methods would be kept to a minimal depth and gradient, with check dams, silt traps and buffer strips also utilised where possible to minimise erosion and sedimentation at peak flows.

Infiltration trenches would also be placed downslope of the borrow pit(s) and overburden and rock stockpiles and would be designed to treat run-off before discharging back into the drainage network. Silt fences would be used to intercept sediment-laden surface run-off in addition to infiltration trenches.

9.5.4 Borrow Pit Dewatering

Limited dewatering of the borrow pit(s) may be necessary. Water would be treated by a settlement lagoon(s) and by discharge onto vegetated surfaces.

Outflow from settlement lagoon(s) in proximity to the borrow pit(s) would discharge to surface water drains.

It is unlikely that groundwater ingress would be significant. However, the floors of the borrow pit(s) would have a gravity drain design. All floor water would drain to an adequately sized sump to allow sediment to settle out before discharge to surrounding vegetated surfaces.

Excavation machinery would be regularly maintained to ensure that there is minimal potential for fuel or oil leaks/spillages to occur. All maintenance would be conducted on suitable absorbent spill pads to minimise the potential for groundwater and surface water pollution.

9.6 Access Tracks

9.6.1 General

The extent of construction disturbance would be limited to around the perimeter of, and adjacent to, access track alignments, including associated earthworks, and would be monitored by the EnvCoW as required.

As part of the design mitigation, all proposed access track infrastructure has been sited at least 50m away from any watercourse, including where tracks cross a watercourse. This has been done in response to the constraints identified on site, such as landscape, ecology and access. The proposed substation compound and temporary construction compounds have also been located at a safe distance from the nearest watercourse.

It is anticipated that access tracks would largely be constructed from aggregate won from onsite borrow pits and would be constructed to the best practices for wind farm access tracks.

Access tracks would be constructed to a minimum running width of 5.0m, plus shoulders of approximately 1m on either side, to accommodate the maximum transport requirements. Track shoulders may be up to a width of 2-3m to accommodate cabling along the access track alignment.

The access tracks for the proposed development have been carefully designed. The tracks have been designed to follow the existing contours to minimise the requirement for cut and fill and would be formed to minimise the gradient. The access tracks would be a minimum of 5.0m wide (straight sections) with appropriate widening on bends with additional provision of inter-visible passing places at track junctions and crane hardstandings. The average working corridor for the construction of access tracks (and where relevant cable trenches) would be 14m.

For the construction of tracks topsoil would be stored beside the track for use in reinstatement of shoulders at the end of the construction period where appropriate. The material would be stored/stockpiled in accordance with good practice so that it would be reused for reinstatement.

Track restoration works would be undertaken in accordance with NatureScot good practice guide *Constructed tracks in the Scottish Uplands 2nd Edition* [Scottish National Heritage, updated September 2016].

9.6.2 Existing Tracks

There are approximately 4.6 km of existing access tracks within the site, which would be upgraded and utilised as part of the proposed development.

9.6.3 New Tracks

There is approximately 14.54km of new track required within the site.

Access tracks would be formed on suitable underlying material (superficial soil or rock with sufficient bearing capacity) in the following manner:

- stripping of surface vegetation (turves) and careful stockpiling of this material;
- excavating the remaining superficial soil materials and stockpiling this material;
- where different superficial materials are present these would be stored according to type. This material would be monitored and watered (as appropriate) to be retained for reinstatement purposes;
- the exposed suitable track formation would have rock fill material tipped from dumper trucks directly onto the proposed access track alignment; and
- this material would then be either spread by a dozer or placed by a hydraulic excavator and compacted in layers, typically using vibratory rollers.

Access tracks would be formed from a sub-base of general fill, and finished off with a cap-stone / wearing course of graded crushed rock to provide a nominal Type-2 (Series 800) finish. Wearing course stone would be of a suitable material that is not susceptible to breaking down / weathering to a high fines content material.

Maintenance of the running surface would be carried out on a regular basis, as required, to prevent undue deterioration. Loose track material generated during the use of access tracks would be prevented from reaching watercourses by maintaining an adequate cross fall on the tracks. Periodic maintenance of tracks by way of brushing or scraping would be carried out to minimise the generation of wheel ruts, which could lead to some track material being washed away. In dry weather, dust suppression methods may be required for track and hardstanding areas. The site access tracks, hardstandings and trackside drains would be inspected on a regular basis by the Contractor.

9.6.4 Cut Tracks and Drainage

In areas where the soil is wet the track formation would be created by a cut (and fill) or by a cut operation where the side slope is severe. A lateral drain would be established on the uphill side of the track to drain water from the slopes and cross drains would be established at intervals of no less than 30m, or to suit the profile of the track/ditch to facilitate drainage. Topsoil, where present, would be stored beside the track for use in re-instatement of track shoulders where appropriate. Consideration would be given to the potential for entrapment of snow and water in their placement.

9.6.5 Management of Surface Water

New access tracks would be designed to have adequate cross fall or camber to avoid ponding of rainwater and surface run-off. Run-off from the access tracks and drainage ditches would be directed into swales that would be designed to intercept, filtrate and convey the runoff.

Check dams would be installed within the swales and drainage ditches where required to increase the attenuation of run-off and allow sediment to drop out.

Permanent swales and drainage ditches adjacent to access tracks would have outlets at required intervals to reduce the volume of water collected in a single channel and, therefore, reduce the potential for erosion. Outfall pipes would drain into a bunded section of the drainage ditch to allow suspended solids to settle. Further measures would include the use of flocculent to further facilitate the settlement of suspended solids, if required.

The Principal Contractor would be responsible for the management of all surface water runoff, including the design and management of a drainage scheme compliant with SuDS principles.

9.6.6 Protection of Watercourse Crossings

Upgraded watercourse crossings would be appropriately designed so that they do not alter the natural drainage and can accommodate flow. Authorisation from SEPA under Controlled Activities Regulations (CAR) would be obtained prior to construction of the watercourse crossings. They would have a conveyance capacity of at least a 200 year flood.

9.6.7 Loose Track Material

Loose material from the use of access tracks would be prevented from entering watercourses by utilising the following measures:

- silt fences would be erected between areas at risk of erosion and watercourses;
- silt fences and swales would be inspected daily and cleaned out as required to ensure their continued effectiveness;
- excess silt would be disposed of in designated areas at least 50m away from any watercourses or drainage ditches;
- water bars would be implemented on slopes greater than 1 in 20;
- culverts, swales and drains would be checked after periods of heavy precipitation;
- the inlets and outlets of settlement lagoons, retention basins and extended detention basins would be checked on a daily basis for blockages; and
- the access tracks would be inspected on a daily basis for areas where water collects and ponds.

9.6.8 Floating Tracks and Drainage

If floating track were to be required, e.g. where consistent peat depths of 1-1.5m or greater are identified, the tracks would follow topography in the area (below 5%), to ensure that the risk of failure due to landslip is mitigated.

Floating track construction essentially comprises the laying of a geosynthetic (geotextile mat or geogrid reinforcement) across the superficial soils prior to constructing the track. Where necessary, risk from run-off would be mitigated by directing drainage to settlement ponds. Erosion processes on the track side embankments and cuttings would be mitigated by ensuring that gradients are below stability thresholds, which would also enable effective regeneration of vegetation or reseeding with appropriate species. Sediment traps would be required in the early years following construction until natural regeneration/ reseeding is established. Should significant erosion or sedimentation, (which is not expected) take place at any location it would be addressed by re-grading of slopes.

9.6.9 Onsite Vehicle Movements

Access tracks would be designed to be single track, a minimum of 5.0m wide including the provision of intervisible passing places (if required) at appropriate locations taking account of horizontal and vertical track alignments. Additional widening would be provided on bends to facilitate the movement of the large delivery vehicles associated with turbine tower and blade delivery, and these would double as passing places where appropriate.

During the periods of delivery of the large components, the Contractor would use appropriate site communications and access control techniques to enable safe one way operation of the tracks.

The presence of crane pads within the construction compound would facilitate traffic movement onsite. Internal track junctions would also be used to facilitate multiple options for construction traffic movement. This would allow vehicle to move more direct between construction locations and double as passing places.

9.6.10 Unstable Ground

Unstable ground is herein considered to be any ground conditions encountered along the proposed alignment, or within the immediate vicinity and influence, of the access tracks that has insufficient strength in its existing state to support the proposed load conditions.

If any unstable ground is encountered during access track construction, the following procedure would be adopted:

- access track construction in the immediate area of the unstable ground would cease with immediate effect;
- the Principal Contractor would immediately assess the situation and develop a solution; and
- if relocation within the approved 50m micrositing allowance of the proposed access track alignment is possible and acceptable to the EnvCoW, without potential for further ground instability to occur, then construction may recommence along the newly agreed alignment, and any stabilisation / mitigation measures that may be required of the unstable ground would occur in parallel.

9.6.11 Signage

Sufficient signage would be employed onsite, for both site personnel and the public, to clearly define the boundary of the works where they coincide with areas accessible to the public.

9.7 Turbine Foundations

9.7.1 General

A total of 13 turbines would be erected on reinforced concrete gravity foundations.

Proposed turbine foundation locations would be inspected by the EnvCoW to ensure that all potential environmental constraints have been identified, demarcated and/or mitigated for prior to the on-set of construction in that area. The final location of the turbines would be within approved micrositing allowances of the consented positions in accordance with Planning Conditions. The regularity of inspections (daily, weekly, as appropriate) during construction would be determined in advance for each particular section, based on anticipated ground conditions, known environmental sensitive receptors, prevailing weather conditions, and anticipated rate of progress.

9.7.2 Construction of Turbine Foundations

Construction of the turbine foundations would be the responsibility of the Contractor.

The limits of each of the foundation excavations would be surveyed and pegged out in advance of any proposed works, and the EnvCoW would be consulted to ensure all necessary pre-construction checks have been completed.

The volume of concrete required for each turbine foundation would be approximately 400m^3 and would be batched onsite using imported cement and aggregates, either imported or sourced from the borrow pits. Each turbine would also require steel reinforcement which would be delivered to site on a flatbed vehicle and then connected together to provide the reinforcing cage (see **Figure 3.3**).

The turbines require reinforced concrete foundations that measure approximately 22.4m in diameter.

Depending on the stability of the material being excavated for the turbine bases, an additional area may be graded back from the foundation working area to ensure that the excavation remains stable during construction.

EIA Report **Figure 3.3** shows a typical turbine foundation design.

The typical construction activities associated with the turbine foundations are detailed as follows:

- stripping of surface vegetation (turves) and careful stockpiling of this material as per CEMP requirements;
- excavating the remaining superficial soil and rock materials and stockpiling of this material as per CEMP requirements;
- the stockpiled materials are to be retained for restoration purposes;
- soil would be excavated until a suitable formation can be achieved. Where rock is encountered this would most likely be removed by mechanical excavation to the required depth and material stockpiled as described above. The potential impacts associated with the use of hydraulic breakers or other such vibratory equipment in the vicinity of sensitive ecological receptors or watercourses would be assessed, and appropriate mitigation measures implemented where required in consultation with the EnvCoW;
- the foundation design is based on the most efficient use of materials and local ground conditions;
- temporary fencing would be erected at locations where there are safety implications for any persons likely to be present on the site e.g. around open excavations. Signage would be displayed clearly to indicate deep excavations and any other relevant hazards associated with the foundation excavation works;
- cut-off ditches would be used at the perimeter of foundation excavations to divert the clean water away from the work areas thereby reducing the volume of water potentially requiring pumping/treatment in silt traps/settlement lagoons. It is not anticipated that large scale dewatering would be required during the excavations. Water from dewatering of excavations would be pumped via surface silt traps to ensure that sediment does not enter surrounding watercourses. Settlement lagoons would be employed in areas where the level of runoff is likely to exceed levels normally contained within a silt trap, however it is considered unlikely that these would be required. Wash-out areas at each base, (if required) would be lined and contained to prevent wash-out water entering drainage/surface waters. The material from the wash-out would be disposed of appropriately offsite;
- following excavation, levels would be set to allow the blinding concrete to be placed and finished to the required line and level;

- the steel reinforcement would then be finished to the required design specification. The steel reinforcement would then be delivered to site and stockpiled adjacent to the respective turbine base;
- the formwork would be prefabricated of sufficient quality and robustness to allow repeated use. Formwork would be cleaned after each use and re-sprayed or painted with mould oil within the blinded foundation excavation prior to being fixed in place. The placement of containers with mould oil would be strictly monitored to ensure that storage is only in bunded areas (i.e. in the TCC) on sealed hardstanding. Spraying of mould oil and storage of such sprayed materials would be undertaken in such a way as to avoid pollution;
- sulphate resistant concrete or other suitable concrete, as appropriate for the prevailing ground conditions, would be used in the turbine base. Prior to pouring the base concrete, the overall quality of the steel fixing would be checked to ensure there is sufficient rigidity to cope with the weight of personnel and small plant during the pour. The quantity, size and spacing of the reinforcement bars would be checked against the construction drawings to ensure compliance with the design detail. The position of the foundation insert, or other appropriately designed foundation mechanism supplied by the turbine manufacturer would be checked to ensure that the level is within the prescribed tolerances. A check would also be carried out to make sure the correct cover from edge of reinforcement to edge of concrete is maintained throughout the structure. A splay would be formed on all external corners;
- cable ducts would be checked so as not to leave sharp corners that would cause cable snagging and that all bend radii comply with the design illustrated on the construction drawing. All earthing cable or strip connections would also be examined to prove their adequacy to withstand the rigors of the concrete placing process;
- concrete would be batched onsite. As with all concrete deliveries, a record would be kept against each turbine to indicate the source of supply, type and consistency of the mix. A record would also be kept of the personnel involved, the time and date the pour commenced and finished;
- the concrete pour would commence after the blinding concrete has been cleaned of debris and other loose material. Vibrating pokers would have been checked to ensure they are fuelled by compressed air and in good working order. The pour would proceed under the control of the Contractor. Personal Protective Equipment (PPE) would be worn by the site operatives and as detailed in the Construction Phase Plan. Pouring would follow best working practice procedures and fresh concrete would be protected from hot and cold weather as required;
- shutters would be carefully loosened, removed and cleaned no earlier than 24 hours from the finish of the pour; and
- backfilling to the turbine base would proceed in layers of approximately 0.3m with compaction as necessary. Further layers of material would be laid until the original till level is attained. Soil would be replaced from the appropriate storage area until the original ground level is reached, or a shallow mound (up to 500mm above existing ground level) is formed. In the event that there is limited onsite material to compact above the turbine foundation, then imported material may be required. This would typically be a well graded granular product.

A checklist for each foundation would be prepared to show compliance with the documents of each step of the installation process. These lists, once completed, would be stored in the contractor's QA file along with relevant cube test results, and be available for inspection at all times.

Following the completion of all construction activities, the area surrounding the base would be reinstated.

9.8 Crane Pads

Crane pads would be required to allow installation and removal of the turbine components. Location and orientation would be optimised to make best use of the existing topography, prevailing wind conditions (to enable safe lifting) and the chosen erection procedure. Additionally, the crane pad orientation would take account of environmental constraints. As with access tracks, topsoil and superficial soil would be removed wherever possible and stored separately adjacent to the removal area for later reinstatement up to the edge of the hardstanding.

The area would be set out to the required dimensions and excavated to a suitable formation. Coarse rock fill would then be placed and compacted in layers using compaction equipment. Geotextile may be used depending on the suitability of the underlying strata. The final surface would be formed from selected granular material and trimmed to allow surface water run-off to drainage ditches. The crane pad would remain *in-situ* for the operational life of the proposed development.

EIA report **Figure 3.5a-b** shows an indicative crane hardstanding layout.

9.9 Substation and Control Building

9.9.1 Substation

The main substation compound would include an area for car parking and High Voltage (HV) equipment, such as transformers and circuit breakers and a control building, measuring approximately 75m x 100m. It is proposed that the buildings would have a rendered finish; the final external finishes would be agreed with CC and PKC. The main control building would be used as a control room for the electrical switchgear.

The substation will incorporate up to 35MW of battery storage, the battery units would be of modular construction, similar in appearance to shipping containers. The batteries would comprise a number of units typically measuring approximately 12m (l) x 5m (w) x 4m (h) and would be installed with ancillary equipment such as inverters.

9.9.2 Control Building

A typical control building elevation is shown on EIA report **Figure 3.8**.

The main control building would likely be a single storey blockwork structure or prefabricated panels, built on a pre-cast concrete base. The building would measure approximately 16m x 30m and typically 8m high.

Welfare facilities including a toilet would be provided in the control building for the duration of the operation of the proposed development. Sewage waste would be tankered offsite by a licensed approved waste contractor. Alternatively, a septic tank could be installed and maintained for the duration of the works in accordance with SEPA's GPP 4 (see Section 4), including regular emptying by an approved contractor.

A rainwater collection and purification system would be installed to service the welfare room, and electricity would be provided from a local electricity connection or a back-up diesel generator.

Lighting would be limited within the compound and would be limited to emergency flood lights around the switchgear, security/motion sensor lights to building, and then any internal lighting within the building.

9.10 Cable Layout

The grid connection point for the proposed development is subject to confirmation by the network operator. The anticipated connection point to the electrical grid system is the Braco West Substation. The precise route of the connection between the proposed onsite substation and Braco West Substation has not yet been determined.

Underground power cables would run from each turbine location to the onsite substation. The cables would typically be buried in the track verges. Cables would be laid in a trenching operation. Single cable trenches would likely be 450mm wide; whilst double cable trenches could extend to 1300-1640mm wide. Trenches would be 1075-1205mm deep. Indicative cable trench arrangements are shown on EIA report **Figure 3.6**.

Electrical cabling is typically buried or ducted adjacent to the access track network. Cable trenches would either be excavated into existing ground, made ground (such as access track verges) or areas consisting of shallow peat. Irrespective, the cable trenches would require excavation, laying of the cables and backfilling with original material from the point of origin.

The position of trenches would be marked out and the line stripped of turves and superficial soils and set aside for reinstatement. Ecologically sensitive areas would be avoided by construction plant or vehicles. The majority of cable run installation would be undertaken adjacent to and within the track construction zone, to minimise intrusion into the surrounding areas. Where topography or environmental constraints dictate (over limited sections), the cables would be installed in ducts within the existing track corridor. In areas of trenching, the vegetation layer and topsoil would be removed and segregated from the removed superficial soil for use in reinstatement. If necessary where depth allows, further segregation of the vegetation layer and topsoil would be undertaken to prevent burying of the upper vegetation layers in deeper soil upon replacement.

Where the depth of the original topsoil layer is very thin there may be insufficient material for reinstatement.

Where cables cross open gullies and ditches they would be installed in ducts. Alternatively, they would be incorporated in the access track crossing points. During installation operations, these would be temporarily dammed, and a filter placed downstream to avoid pollution of the downstream watercourse by suspended solids.

Following testing, the trench would be backfilled and compacted in layers with suitable material and reinstated with previously excavated superficial soils (from which stones would have been removed). Sand would be imported to site and would be placed around the cables as protection. Suitable duct marker tape would be installed in the trench prior to backfilling.

Clay bunds would be placed at intervals to prevent longitudinal drainage.

9.11 Soil Storage

Superficial soils would be excavated and stored temporarily. It is anticipated that most of the soil resources within areas directly affected by construction activities would be able to be stored and reinstated as close as possible to where they were excavated in accordance with best practice; so that the site would be restored with minimal movement of material from its original location.

At turbine foundations topsoil would be stripped keeping the top 200mm of turf intact. This material would be stored adjacent to the base working area and would be limited in height to 2m to minimise the risk of overheating. Superficial soil would then be stripped and stored, keeping this material separate from the topsoil.

Following excavation of the turbine foundation area and construction of the foundation (concrete/reinforced steel) the area would be backfilled with spoil. The area would be reinstated using the retained topsoil/turf where appropriate materials are available. Where required a gravel area would be left around the tower base for access. Reinstatement at turbine foundations would begin as soon as possible after foundation and plinth installation is complete.

The risk of water pollution from excavation works in terms of sediment loss would be prevented / mitigated by the following measures:

- careful location of turbine bases and track line to minimise excavation where applicable;
- stripped topsoil/superficial soil would not be stored adjacent or in close proximity to watercourses, where a construction area requiring soil stripping is close to a watercourse the soil would be stored a suitable distance from the watercourse;
- soil would be stored in accordance with best practice in order to remain intact as the soil would be essential to the site reinstatement;
- where turf requires excavation for track construction an excavator would lift turf and place it to the side leaving space between the edge of the track and the embankment to be constructed. The excavator would then lift out the soil and would place it to the side of the proposed track. The soil stored by the side of the access track would be graded by an excavator and the turves would be replaced by the excavator over the graded soil beside the track. The timescale for this operation is short and the methodology has been successfully applied at other wind farms; and
- excavated soil would not be placed onto water reservoirs or placed where it would block established surface or drainage channels.

9.12 Watercourses

9.12.1 General

As part of the design mitigation, all wind turbines and associated infrastructure have been sited outside the 50m watercourse buffer zone, wherever possible. This has been done in response to several site constraints, including but not limited to landscape, ecology, and access. The aim is to ensure that all proposed development remains at a safe distance from nearby watercourses.

Tracks have been routed to minimise any crossing of watercourses, where possible. However, if track crossings are required, then these would be designed and constructed appropriately.

Chapter 10: Hydrology, Hydrogeology and Geology of the EIA Report has confirmed that there are two new onsite water crossing points.

The Contractor is required to produce a detailed Watercourse Crossing Plan prior to commencement of the works. This plan would be submitted to the EnvCoW and SEPA for review and approval where appropriate.

The Contractor is responsible for liaising with and obtaining from SEPA all relevant consents, licenses and authorisations relating to construction of the watercourse crossing at the site.

All construction works on the site, and specifically construction works to be undertaken within and in the vicinity of the watercourse, would be completed in compliance with current legislation and best practice as detailed within this document.

The EnvCoW would be consulted on all watercourse crossing works. Surveys by the EnvCoW would be carried out immediately prior to construction of the crossing to identify areas of ecological interest and more specifically, mammal and fish activity in watercourses to ensure that adequate mitigation is built into the design.

9.12.2 Design Philosophy

The Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended (CAR Regulations) require that all new river, loch and wetland engineering activities, including river crossings and culverting for the watercourse shown on the Ordnance Survey 1:50,000 scale map, would require authorisation by SEPA, which may include (depending on the nature of the works) Registration with, or a Licence from, SEPA. Even if a proposed crossing does not require a Registration or Licence, due to its compliance with a General Binding Rule (GBR), as defined in the CAR, SEPA are still required to be notified.

General good practice in watercourse crossing design is detailed below:

- where appropriate, the watercourse would be routed through culverts appropriately sized and designed not to impede the flow of water and would allow safe passage for wildlife, such as fish, water voles, otters etc. (i.e. the crossings would have a capacity well in excess of the design flow);
- when installing culverts, care would be taken to ensure that the construction does not pose a permanent obstruction to migrating species of fish, or riparian mammals (i.e. the crossing would make provision for fish and wildlife migration);
- culverts would be sized so that they do not interfere with the bed of the stream during construction, (i.e. the crossing would leave the watercourse in as natural condition as possible);
- culverts with a single orifice would be used in preference to a series of smaller culverts that may be more likely to become blocked with flotsam and create erosion (i.e. the crossing would not constrict the channel);
- ease and speed of construction are important to minimise disruption to the watercourse and surrounding habitat;
- designed for the life of the project;
- low maintenance; and
- visually in keeping with the surroundings.

In accordance with CAR guidance, the watercourse crossing would be designed on a case-by-case basis to be appropriate for the width of watercourse being crossed, and the prevailing ecological and hydrological situation (i.e. the "sensitivity" of the watercourse). A number of factors, both environmental and engineering would influence the selection of structure type and the design of the crossing.

The river crossing would be designed to convey a minimum 1 in 200 years plus climate change return period flood event, and individually sized and designed to suit the specific requirements and constraints of its location.

The watercourse crossing would include splash boards and run-off diversion measures to prevent direct siltation of watercourses.

9.12.3 Structural Design

Design of a watercourse crossing needs to consider:

- bearing capacity of foundations (and variability of capacity);

- design loadings – likely to be larger during construction and decommissioning of the Energy Park; and
- design options such as bridges or culverts.

9.12.4 Culverts

Medium to large culverts or large Armco culverts would be used where a culverted solution is desirable or where a small, piped culvert is not appropriate for environmental or capacity reasons.

Depending on size, a natural stone headwall would be provided upstream and downstream to protect the track embankment where necessary. Further protection would be provided to the banks using soft engineering techniques as much as possible.

9.12.5 Relevant Mitigation

The following is a summary of the relevant mitigation measures and general good practice associated with the development of watercourse crossing:

- appropriate care would be given to the construction of the crossing and all loose materials left from construction would be collected and disposed accordingly;
- site track crossings would be constructed with granular materials, which would limit the production of surface runoff and the direct discharge of sediment into the watercourse;
- the methods of drainage proposed for the site tracks prevent the significant discharge of surface runoff and suspended solids into the watercourse adjacent to the tracks. This is owing to the runoff being collected within the upslope ditch, the presence of peat dams and culverts at appropriate intervals so as to limit longitudinal flow and the discharging of water to the downslope ground. There would therefore be no long runs of ditches that directly discharge into watercourse;
- the watercourse crossing would be designed to avoid disruption and / or habitat loss to aquatic systems or to affect free passage of fish; and
- minimum buffer strip of 50m should be kept free from development from the top of the banks of any watercourse/waterbody.

10.0 Pre-Construction Surveys, Protected Species and Monitoring

10.1 Pre-Construction Surveys

Prior to the commencement of the construction of the proposed development, detailed site investigations would be undertaken to inform the designers/engineers of the development components. Preconstruction habitat and protected/ notable mammal surveys would be required to inform appropriate management and protection plans. Additional survey for protected species will be undertaken by the EnvCoW in tune with the locations and programme of works. Survey outcomes will inform the designers/engineers in selecting appropriate working methods

10.1.1 Water Quality Monitoring

Prior to the works commencing, baseline water quality monitoring would be undertaken by an appropriately qualified and experienced independent consultant to establish the water quality prior to any interference from the works.

This would be undertaken in accordance with the proposed water quality monitoring developed by the Principal Contractor and as detailed within Section 8.0.

This water quality monitoring is to be agreed and reviewed by the applicant in advance of the works commencing to ensure that the conditions during the monitoring and the testing undertaken are representative and allow a suitable benchmark to be established.

10.1.2 Archaeology

Where necessary, in the vicinity of identified features of interest, an archaeologist would be employed as a watching brief to look over the marked-out infrastructure to identify potential additional mitigation (if necessary), fence off archaeological sites where required and supervise construction works in the vicinity of known assets. The precise scope of works would be agreed with CC and PKC.

10.1.3 Ecology

Chapter 8.2: Ecology of the EIA Report provides details of protected species surveys that have been undertaken to date.

The results of the pre-construction surveys would inform the need for further survey and potential mitigation measures in respect of good working practices, or consultation with NatureScot.

All site personnel shall be briefed upon the presence of sensitive habitats and potential/confirmed presence of protected species as well as agreed appropriate working methods. An emergency response procedure will be communicated in the event of site personnel suspecting or detecting the presence of a protected species during works. In the event that a protected species is encountered within or near the working area, works will cease and the EnvCoW be contacted immediately for advice on appropriate working methods and when works can safely proceed.

10.2 During and Post Construction

10.2.1 Species and Habitat Protection Plan

A Species and Habitat Protection Plan (SHPP) would be produced, to ensure all reasonable protection measures are undertaken with regard to protected species and the habitat which they rely upon for the proposed development.

The aim of the SHPP is to ensure all reasonable precautions are taken to safeguard protected species from disturbance, injury and death and to protect any structure, place or habitat, which any such protected species uses for growth, breeding, resting, shelter or protection during the construction and operation of the proposed development (with emphasis on the construction phase).

Good practice measures to protect sensitive ecological receptors during the construction phase shall be implemented, including the erection of temporary protective fencing demarcating the working footprint, to be monitored and supervised by the EnvCoW with advice on remedial actions where necessary.

The aim of the SHPP shall be fulfilled by adopting the following objectives throughout the construction of the proposed development:

- objective A – Implement a monitoring and protection plan for protected species;
- objective B – Follow an approved procedure if a sensitive ecological receptor is suspected/identified; and
- objective C – Ensure adequate education and awareness of site personnel.

The EnvCoW shall have the specific remit of monitoring compliance with the SHPP during the construction phase and report any breaches to the Construction Project Management Team. The EnvCoW's role shall involve direct monitoring of all activities on the site to the extent the EnvCoW considers this to be required, and/or training of nominated personnel to carry these out in a manner likely to minimise the potential for impact on the protected species. The EnvCoW shall also agree changes to construction operations to prevent breaches of the SHPP.

10.2.2 Breeding Bird Protection Plan

A Bird Protection Plan would be produced as part of the SHPP for agreement with NatureScot to ensure that damage to and/or disturbance of nesting Important Ornithological Features (IOFs) and any disturbance to Schedule 1 breeding birds is avoided. The SHPP would provide Generic and specific measures to be followed.

10.2.3 Habitat Management Plan

A Habitat Management Plan (HMP) would be produced, based on the outline Habitat Management Plan with the aim of maintaining important habitats and enhancing habitat quality within the site. Habitat monitoring, conducted by suitably qualified and experienced ecologists, shall evaluate the success of the goals and objectives. Good practice techniques for vegetation and habitat reinstatement shall be adopted and implemented on areas subject to disturbance during construction as soon as is practicable.

11.0 Reinstatement

During construction of the infrastructure elements (detailed in Section 9), the vegetated layer will be stripped over the area of the excavation and stored locally with the growing side up. The remaining organic topsoil and subsoils will be excavated down to formation level, or a suitable stratum, and again will be stored local to the point of excavation but shall remain segregated to avoid mixing of materials.

For all reinstated areas, immediate aftercare provision would include an inspection of reinstated areas after completion of the reinstatement work at each location. In addition, the operator would make regular maintenance visits to the site and would visually monitor the success of re-vegetation.

Erosion processes on embankments and cuttings would be mitigated by appropriate design, including suitable gradients and stabilization measures, which would also enable effective regeneration of vegetation or establishment of areas which are reseeded. Sediment traps would be required in the early years following construction until natural regeneration is / reseeding areas are established. Should significant erosion or sedimentation, which is not expected, take place at any location it would be addressed by re-grading. Any disturbed ground situated along the edges of tracks would be reinstated to match adjoining ground as soon as practicable to avoid unsightly scarring of the landscape, particularly along the main access track.

Reinstatement would be undertaken either by re-use of onsite vegetation and soil using turf/ clodding methods, by natural regeneration, or by reseeding with appropriate species, which may include heather in moorland areas. Proposed methods would be finally agreed and confirmed with CC and PKC/NatureScot following appointment of the Principal Contractor. If seeding is required, this would be via cutting and strewing of heather brash or via the use of treated heather seeds only.

The progression of vegetation recovery and survival on restored areas would be monitored to ensure satisfactory development and to allow early identification of any remedial measures required, in accordance with the HMP.

12.0 References

12.1 Reference Documents

Table 12-1: Reference Documents

Doc. Ref.	Reference Documents
1	Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, CIRIA, 532, 2001
2	Control of Water Pollution from Linear Construction Projects, technical guidance, CIRIA 648, 2006
3	Non-Statutory Guidance for Site Waste Management Plans, April 2008.
4	Forest & Water, Guidelines, 5th Edition, 2011.
5	Health and Safety at Quarries. Quarries Regulations 1999. Approved code of practice, HSE, 1999
6	River Crossings and Migratory Fish: Design Guidance, 2000 (available from: www.scotland.gov.uk/ consultations/ transport/rcmf-00.asp)
7	Engineering in the Water Environment, Good Practice Guide, Construction of River Crossings, First Edition, April 2008 (WAT-SG-25)
8	Mineral Extraction Code of Practice for the Owners and Operators of Quarries and Other Mineral Extraction Sites, Water Environment (Controlled Activities) (Scotland) Regulations, 2005, Version 1 July 2006
9	Prevention of Pollution from Civil Engineering Contracts: Special Requirements, Version 2 June 2006
10	Prevention of Pollution from Civil Engineering Contracts: Guidelines for the Special Requirements, Version 2 June 2006
11	The Water Environment (Controlled Activities), (Scotland) Regulations 2011, A Practical Guide, Version 6, August 2011
	Guidance for Pollution Prevention (GPPs) http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/
12	PPG1 Understanding your environmental responsibilities – good environmental practices: PPG 1, July 2013
13	GPP2 Above Ground Oil Storage Tanks: GPP 2, January 2018
14	PPG3 Use and design of oil separators in surface water drainage systems: PPG 3, April 2006
15	GPP4 Treatment and disposal of wastewater where there is no connection to the public sewer: GPP 4, November 2017
16	GPP5 Works and maintenance in or near water: GPP 5, January 2017
17	PPG6 Working at Construction and Demolition Sites: PPG6, 2012
18	PPG7 Safe Storage – The safe operation of refuelling facilities: PPG 7, July 2011
19	GPP 8 Safe storage and disposal of used oils: GPP 8, July 2017
20	GPP21 Pollution incident response planning: GPP 21, July 2017
21	PPG26 Safe Storage – drums and intermediate bulk containers: PPG 26, March 2011

Doc. Ref.	Reference Documents
22	Technical Flood Risk Guidance for stakeholders (section 4.3) [SEPA, 24/4/11].
23	Technical Flood Risk Guidance for stakeholders (section 4.3) [SEPA, 24/4/11].
	NatureScot Guidance
24	Good Practice during Windfarm Construction, Version 3, September 2019 Scottish Renewables and Scottish Environment Protection Agency Guidance Development on Peatland: Guidance on the assessment of peat volumes, reuse of excavated Peat and the Minimisation of Waste, Version 1, January 2012
25	Avoiding danger from overhead power lines .Guidance Note GS6 (Fourth Edition), HSE, March 2013.
26	Constructed tracks in the Scottish Uplands, 2nd Edition June 2013, Updated September 2015
27	Guidelines for Onshore and Offshore Windfarms, Health and Safety in the Wind Energy Industry Sector, 2010.
28	Research and Guidance on Restoration and Decommissioning of Onshore Windfarms, Scottish National Heritage, Report No. 591, 2013.

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