



Viking Energy Partnership

Viking Wind Farm




Technical Appendix 14.6 Framework Site Environmental Management Plan / Pollution Prevention Planning

February 2009

Viking Energy Partnership
The Gutters' Hut
North Ness Business Park
Lerwick
Shetland
ZE1 0LZ

Mouchel
Unit 11, Scion House
Stirling University Innovation Park
Stirling
FK9 4NF

Tel. 01786 449 131
Fax. 01786 449 852

DRAFT / FINAL ISSUE	Name	Signature	Date
Prepared by	Stuart Bone		24/02/09
Checked by	Malcolm Macfie		24/02/09
Approved by	Malcolm Macfie		24/02/09

CONTENTS

1	INTRODUCTION.....	1
2	POLLUTION PREVENTION PLANNING	2
3	SURFACE WATER MANAGEMENT	4
4	ABSTRACTIONS.....	5
5	SURFACE WATER MONITORING	6
6	WASTE MANAGEMENT	7
7	RECOMMENDATIONS.....	7
8	REFERENCES.....	7

This report is presented to Viking Energy Partnership in respect of Viking Wind Farm and may not be used or relied on by any other person or by the client in relation to any other matters not covered specifically by the scope of this report.

Notwithstanding anything to the contrary contained in the report, Mouchel Ltd is obliged to exercise reasonable skill, care and diligence in the performance of the services required. Viking Energy and Mouchel shall not be liable except to the extent that they have failed to exercise reasonable skill, care and diligence, and this report shall be read and construed accordingly.

This report has been prepared by Mouchel. No individual is personally liable in connection with the preparation of this report. By receiving this report and acting on it, the client or any other person accepts that no individual is personally liable whether in contract, tort, for breach of statutory duty or otherwise.

1 INTRODUCTION

This report forms a Technical Appendix to Chapter 14 (Soil and Water) of the Environmental Statement for Viking Wind Farm (Mouchel, 2009a) and should be read with reference to this chapter.

Viking Energy Partnership is currently progressing proposals for a wind farm on North Mainland in the Shetland Islands. The proposed wind farm site is located approximately 27km north of Lerwick and is roughly centred on the settlement of Voe (grid reference HU 4077 6320). The area of interest is divided into four quadrants, with two quadrants to either side of the main A970/A968 route which runs north–south across the island. The quadrants are known as; Delting, Collafirth, Kergord and Nesting. All four quadrants of the proposed 150-turbine wind farm comprise areas of open moorland used mainly for rough grazing.

This is a framework document providing a general outline of the contents and matters to be addressed by the plan, as per recognised 'best practice' (Institute of Environmental Management and Assessment, 2008).

This framework Site Environmental Management Plan (SEMP) including Pollution Prevention Planning (PPP) will be made available to those tendering for the construction works, with the appointed principal contractor providing input and methods at the detailed design stage for dealing with the principles identified herein. Furthermore, contract documents will incorporate SEPA's Prevention of Pollution from Civil Engineering Contracts: Special Requirements publication (SEPA, 2006). All appointed sub-contractors will also be fully briefed regarding site-specific concerns and environmental mitigation measures required.

Following detailed design and prior to commencement of wind farm construction a formal SEMP / PPP will be produced. The SEMP / PPP will set out the general mitigation measures that will be used to limit the potential hydrological and hydrogeological impacts of the proposed development. These commitments will include both specific mitigation measures and proposals for monitoring and emergency procedures. The EMP / PPP will include sections detailing:

- Pollution Prevention Planning;
- Surface Water Management;
- Surface Water Monitoring;
- Abstractions.

Additional sections may be included as identified through the planning process or discussions with consultees, including Scottish Environment Protection Agency (SEPA) and Scottish Natural Heritage (SNH). Furthermore, the SEMP / PPP proposals should be read in conjunction with other Environmental Statement chapters and specifically the habitat management plan (Technical Appendix 10.9) outlined separately under the Ecology chapter (Envirocentre, 2009).

To ensure that the SEMP / PPP is adhered to during construction, an Environmental Manager will be appointed to provide staff training and specialist advice and to manage the ongoing environmental monitoring and auditing programme.

2 POLLUTION PREVENTION PLANNING

The Pollution Prevention Planning (PPP) section will detail the general pollution prevention measures to be implemented to limit the potential for contamination of both ground and surface waters, at all stages of the development. These measures will be devised and implemented in line with current technical guidance and codes of practice, including the following:

- SEPA (jointly with Environment Agency and Northern Ireland Environment Agency) Pollution Prevention Guidelines (PPG):
 - PPG01 General guide to the prevention of water pollution
 - PPG02 Above ground oil storage tanks
 - PPG03 Use and design of oil separators in surface water drainage systems
 - PPG04 Treatment and disposal of sewage where no foul sewer is available
 - PPG05 Works and maintenance in or near water
 - PPG06 Working at construction and demolition sites
 - PPG07 Refuelling facilities
 - PPG08 Safe storage and disposal of used oils
 - PPG18 Managing fire water and major spillages
 - PPG21 Pollution incident response planning
 - PPG26 Storage and handling of drums and intermediate bulk containers
- Forestry Commission: The Forests and Water Guidelines, 4th Edition;
- CIRIA: Report C532 Control of Water Pollution from Construction Sites: Guidance for Consultants and Contractors;
- CIRIA Handbook C650 Environmental Good Practice on Site;
- IEMA Practitioner Series No.12: Environmental Management Plans.

The general mitigation measures will include, but are not limited to, the following:

- Construction compounds:
 - to be built with impermeable surfaces
 - located in areas outwith 1:200 year flood risk (or 1:100 year coastal flood risk).
 - at least 10m from watercourses (with objective being 50m where practical)
 - higher pollution risk activities, such as oil storage, wheel wash, refuelling, vehicle maintenance to be conducted at construction compounds
 - runoff from these areas is more likely to be contaminated and require treatment such as oil interception and neutralisation of high alkalinity
 - draining to tanks or lined settlement ponds to prevent infiltration to groundwater
- Storage:
 - wherever possible, materials to be stored within secure construction compounds
 - all equipment, materials and chemicals will be stored at least 10m away from any watercourses (with an objective of 50m buffer wherever practical)
 - chemical, fuel and oil stores will be sited on impervious bases within an appropriately sized secure bund, suitable to contain 110% of the contents (single tank) or 110% of the contents of the largest container (multiple container storage).
 - Oil and chemical storage to meet minimum requirements of SEPA PPG2 and PPG26, i.e. best practice secondary containment (bund) volumes
 - storage of adequate chemical/fuel for immediate need only, to minimise volumes of chemicals stored on site

- Vehicles and refuelling:
 - where practicable, refuelling of vehicles and machinery will be carried out in designated areas (construction compounds or other suitable sites), on an impermeable surface, and at least 10m away from any watercourse (as above with objective buffer distance of 50m wherever practical)
 - standing machinery will have drip trays placed underneath to prevent oil and fuel leaks causing pollution
- Maintenance:
 - only emergency maintenance to construction plant will be carried out on site, in one designated area and on an impermeable surface well away from any watercourse or drainage
 - Exceptionally, vehicles or other equipment which has broken down will require maintenance at the point of breakdown, where special precautions will be taken, including the use of drip trays and spill kits.
- Welfare facilities:
 - disposal of sewage from the site will be carried out by methods recommended in PPG4
 - options for use on a site such as Viking include waterless toilets or septic tank as it is recognised that the conditions on site are likely to be unsuited for the use of a soakaway
 - if a septic tank is used, all sewage will be collected on site in an appropriately designed and located tank and will be tankered from site at an appropriate frequency
 - final disposal from toilets or septic tank will be into the local sewer system
- Cement and concrete:
 - use of wet concrete in the vicinity of watercourses will be minimised and carefully controlled
 - location(s) of batching plants will be carefully chosen, and shall be at least 10m (with a 50m objective where practical) from watercourses, with preferred locations at construction compounds
 - settlement and re-circulation system for water reuse will be considered and the washing out of mixing plant will be carried out in a contained area
 - wash water will be adequately treated to deal with suspended solids and high alkalinity before discharge
 - draining to tanks or lined settlement ponds to prevent infiltration to groundwater
- Silt management:
 - silt fences and mats will be used to minimise sediment levels in runoff from soil/peat stockpiles
 - straw bales used to collect silt and reduce runoff velocity to encourage entrained sediment to be deposited
- Application of chemicals:
 - No application of pesticides or rock salt on access tracks or other infrastructure during any phase of the project
 - Should exceptional circumstances occur, which may necessitate the use of such materials, advice will be sought from SEPA
- Contaminated land:
 - any evidence of historic site contamination (vegetation die-back, leaking chemical stores, etc) will result in immediate cessation of local construction activities pending investigation by the Environmental Manager (or delegated persons)

The PPP will detail specific emergency procedures to be used in the event of an incident, with reference to PPG21. Formal procedures will be agreed with SEPA and are likely to include:

- Details of trained staff to be contacted in the event of an incident, including location, responsibilities, key-holder information and 24 hour cover;
- Contact list and notification procedure for alerting the emergency services, relevant environmental regulators, the Health and Safety Executive (HSE) and specialist clean-up contractors;
- Drainage plan showing site layout and a schematic representation of the site drainage arrangements. This will include:
 - all the watercourses, discharge points and suitable points for installing pollution control booms
 - facilities used for the storage of fuel, oils and wastes (together with information relating to the areas that are bunded and the products stored)
 - potentially sensitive areas, including private water supplies
 - facilities, such as inspection points for the detection of contamination and oil interceptors
- Chemical and waste inventory recording procedure for recording and tracking all substances stored on-site as well as how and where they are stored;
- Emergency Procedures setting out the activities covered, staff responsibilities and procedures for dealing with events such as spillages. Specifically, these could include the following actions where appropriate:
 - appropriate procedures for alerting relevant property and landowners
 - potential consequences of an incident
 - procedures for prevention, containment and recovery of leaks, spills or general contamination. This will include the location and use of sand and sand bags, spill kits containing proprietary absorbents, booms and other pollution control equipment

3 SURFACE WATER MANAGEMENT

The local watercourses on the site of Viking Wind Farm have been identified as having a flashy response to rainfall events, evidenced by rapid response times and high peak flows. In addition, very low flows may be recorded during the summer. Many of the watercourses have been identified as supporting important populations of salmonids and support other sensitive species such as otters. It is recognised that changes in river siltation, land drainage, water quality, the presence of river obstructions and river flow reductions can detrimentally affect populations of fish and other species.

As a consequence, the surface water management section of the SEMP / PPP will detail the principles and techniques that will be employed to ensure the development will not detrimentally impact upon the flood risk or aquatic habitat of the area. The principles on which the surface water management strategy will be devised are:

- Runoff from the developed area should not be significantly different from runoff prior to development;
- Runoff from the developed area should not result in any down grading of downstream watercourses or habitat;

- Any potential contamination in the runoff generated by the development should be treated within the development area prior to discharge (prevention at source) – as discussed in the pollution prevention section above.

To achieve this, the following measures will be considered:

- Access tracks crossing slopes may potentially disrupt surface flow. In mitigation, cross drains will be constructed at regular intervals to conduct this surface flow below the road where it will be discharged from the drainage system. These regular discharge points will limit the concentration of surface runoff and the diversion of flows between hydrological sub-catchments;
- Artificial drainage will only be installed where necessary. The individual lengths, depths and gradients of these drains will be minimised to avoid intercepting large volumes of diffuse overland flow and generating high velocity flows during storm events;
- Sustainable Drainage Systems (SuDS) such as check dams, silt traps, settlement ponds and buffer strips will be incorporated into the drainage system. These features will have the dual purpose of attenuating peak flows and allowing sediment to settle before water is discharged from the drainage system;
- Drainage will not discharge directly to any natural watercourse, but will discharge to buffer strips / trenches, preferably on flat ground. The buffer strips will act as filters, minimising sediment transport, attenuating flows and maximising infiltration. Erosion protection will be installed at discharge points;
- Temporary interception bunds and drainage ditches will be constructed upslope of borrow pits to minimise surface runoff ingress. These cut-off ditches will be of minimal length, depth and gradient, and silt traps and buffer strips will be utilised to minimise erosion, sedimentation and peak flows;
- All structures, including settlement ponds, culverts and stream crossings, will be designed and constructed using best practice techniques and will be of sufficient capacity to receive storm flows, with an allowance for increased flows due to climate change;
- Watercourse crossings will not restrict water flow, hinder the passage of mammals along the banks or form a barrier to fish migration. These will be designed and constructed following guidance given by Scottish Executive (2000) relating to river crossings and migratory fish and engineered in accordance with CIRIA (1997) and SEPA River Crossing (2008) guidelines and the watercourse crossing philosophy set out in Appendix 14.3 of the Viking Windfarm Environmental Statement, (Mouchel, 2009b).

SEPA will be fully consulted regarding the requirements for registration or licensing of elements of the drainage system e.g. discharges and stream crossings, under the *Water Environment (Controlled Activities) Regulations 2005* (known as CAR).

4 ABSTRACTIONS

Construction activities at any development require the use of water for a range of activities. Wind farm construction is no different. The main areas in which water is used are as follows:

- For concrete batching and wash down;
- Wheel wash;
- Dust suppression in periods of dry weather, with agreement from SEPA;
- Domestic uses, including welfare facilities and toilets.

It is generally advantageous to extract water from local sources for use on site. Thus, there will be a requirement to apply for the appropriate abstraction licensing from SEPA as required by CAR. Abstraction will be minimised wherever possible, e.g. recirculation of wheel wash water.

In terms of the impact on the environment, it is likely to be preferable to extract continuously at a low rate, rather than periodically extracting at a higher rates, though there may be storage issues which limit the practicality of this approach. In any case, the optimal solution for extraction strategy will be site dependant and will be achieved through consideration of water availability, storage capability and construction phasing.

5 SURFACE WATER MONITORING

It is proposed that a programme of surface water monitoring will be carried out prior to and during the site's construction, operation and decommissioning. The extent and frequency of the monitoring will be proportionate to the level of activity. Such monitoring will be required in order to:

- Provide a baseline for water quality across the development site;
- provide reassurance that the in-place mitigation measures are effective and that the development is not having a significant impact upon the environment;
- indicate whether further investigation is required and, where pollution is identified, the need for additional mitigation measures to prevent, reduce or remove any impacts on the water environment.

The surface water monitoring programme will be site-specific and tailored so as to provide a meaningful and pragmatic indication of the state of the water environment. Given the nature of the development, it is considered that the surface water monitoring programme will comprise:

- Regular visual inspection of surface water management features, such as culverts and receiving watercourses, in order to establish whether there is increased erosion or deposition and sediment. It is likely that there will be an ongoing need to maintain these structures, for example by removal of debris, to ensure they continue to function as designed;
- Regular visual inspection of watercourses during construction and decommissioning stages, particularly during periods of high rainfall, in order to establish that levels of suspended solids have not been increased by site activities;
- Periodic and ad-hoc sampling and analysis of surface waters and private water supplies in order to complement the programme of visual inspection. Periodic analysis enables monitoring of trends in levels of critical parameters (e.g. pH) so that deviations from the norm can be identified and appropriate action taken;
- Additional monitoring required as a condition of discharge consents, abstraction licences or other environmental regulation.

A baseline monitoring programme based on previous water chemistry sampling (Mouchel, 2009d) and electro-fishing (Waterside Ecology, 2009) surveys of previous sample sites will be undertaken prior to construction works commencing. Water sampling will be undertaken at regular intervals throughout the infrastructure construction works, with the suite of parameters to be sampled discussed with SEPA. All subsequent monitoring results will be compared with the baseline data-set to identify any impacts of the development on the surface water environment and to identify the requirement for any appropriate remedial

measures. It is recognised that the impacts of the development will be deemed acceptable if there is no significant net deviation from the baseline monitoring results.

6 WASTE MANAGEMENT

Technical Appendix 14.7; Framework Site Waste Management Plan (Mouchel, 2009c), provides specific information on site waste management.

7 RECOMMENDATIONS

This framework document provides guidance on the main issues to be dealt with during construction, operation and decommissioning (with decommissioning activities likely to be closely related to construction activities). The principal contractor will create a detailed SEMP/PPP pre-construction, which will incorporate specific methods to ensure the principles within this document are followed. Ensuring that there are environmental obligations within contract documentation will be considered best practice.

8 REFERENCES

Construction Industry Research and Information (CIRIA) (1997), *Culvert Design Guide; Report 168*. Published by CIRIA, London.

Envirocentre (2009), *Viking Farm Environmental Statement - Ecology (Chapter 10); Technical Appendix 10.9 Habitat Management Plan*

Institute of Environmental Management and Assessment (IEMA) (2008) - *Practitioner Series No.12 Environmental Management Plans*. Published by IEMA 2008.

Mouchel (2009a) *Viking Wind Farm Environmental Statement - Soil and Water (Chapter 14)*

Mouchel (2009b) *Viking Wind Farm Environmental Statement - Soil and Water (Chapter 14); Technical Appendix 14.3 Stream Crossing Guidance*.

Mouchel (2009c) *Viking Wind Farm Environmental Statement - Soil and Water (Chapter 14); Technical Appendix 14.7 Framework Site Waste Management Plan*.

Mouchel (2009d) *Viking Wind Farm Environmental Statement - Soil and Water (Chapter 14); Technical Appendix 14.5 Hydrochemistry Survey*.

Scottish Environment Protection Agency (2006), *Prevention of Pollution from Civil Engineering Contracts: Special Requirements* (and related Guidance document) - www.sepa.org.uk/water/water_regulation/guidance/engineering.aspx (accessed January 2009).

Scottish Environment Protection Agency (2008), *Engineering in the Water Environment: Good Practice Guide* – www.sepa.org.uk/water/water_regulation/guidance/engineering.aspx (accessed January 2009).

Scottish Executive (2000), *River Crossings and Migratory Fish: Design Guidance*.

Waterside Ecology (2009) *Viking Wind Farm Environmental Statement - Ecology (Chapter 10); Technical Appendix 10.6 Fish Survey Data*.

We have used our reasonable endeavours to provide information that is correct and accurate and have discussed above the reasonable conclusions that can be reached on the basis of the information available.