Invergordon Service Base Phase 4 Development

Construction Environmental Management Document

Document History		
Issue	**Date**	**Reason for Change**
1	15/05/18	Issued for Marine Licence Application
2	02/08/18	Updated in line with MS-LOT comments taking account of consultee responses.
3	07/08/18	Section 11.2.4.1 updated in line with RSPB comments.

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1 Introduction

This Construction Environmental Management Document (CEMD) has been developed to facilitate the Phase 4 Development of Invergordon Service Base. It sets out the various mitigation, guidance and policy requirements of the project, both from the Schedule of Mitigation and with reference to and incorporation of the Principal Contractor's environmental management systems.

Specific mitigation protocols designed for the Phase 4 Development include:

- The Dust Management Plan (DMP);
- The Protocol for Archaeological Discoveries (PAD);
- The Dredging for Sea Disposal Protocol;
- The Breeding Bird Species Protection Plan (BBSPP);
- The Marine Mammal Species Protection Plan (MMSPP)
- The Otter Species Protection Plan (OSPP); and
- The Diadromous Fish Species Protection Plan (DFSPP).

1.1 Implementation

The implementation of the CEMD will be through risk assessed method statements (RAMS), the construction contractor's environmental management system, and the direct application of Construction Environmental Management Plans (CEMPs) identified within this document.

1.2 Updates

The CEMD is a live document and will be regularly updated as discussed in Section 4. There will be a review prior to the start of each new phase of construction.

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Section Number		2
Section Title		Background
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2 Background

2.1 Licensing

The Phase 4 Development is subject to two Marine Licences under the Marine (Scotland) Act 2010 these are for:

- Dredging and sea disposal of spoil; supported by a Best Practicable Environmental Option (BPEO) study.
- The construction of the Phase 4 Development; supported by an Environmental Impact Assessment Report (EIAR) as required by the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

The following licence is required Marine Scotland, and an application will be submitted in due course:

- European Protected Species (EPS) licence for disturbance to cetaceans.

The following licence will be required from SEPA. This licence will be applied for once an appropriate level of detail in the design is available:

- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR), licence for the discharge of surface water from the completed works.

The following licences may be required pending further investigation, and will be applied for through SNH and SEPA respectively if necessary:

- An EPS licence for disturbance to otters.
- CAR licence or registration for the discharge or abstraction of water during construction.

2.2 Basis

The main aspects of the CEMD have been extracted from the Invergordon Service Base Phase 4 Development EIAR, prepared by Affric Limited (2018) to support the Marine Licence Applications. Further detail, including the basis behind the mitigation outlined in this document is provided in the EIAR.

Mitigation to avoid and minimise potential environmental impacts associated with the Phase 4 Development aligns to current industry best practice, and the following guidance documents:

1. Construction Environmental Management Process for Large Scale Projects [The Highland Council, 2010];
2. PPG 1: Understanding your Environmental Responsibilities – Good Environmental Practice [NIEA et al., 2013];
3. GPP 5: Works and Maintenance In or Near Water [Environment and Heritage Service et al., 2017];
4. PPG 6: Working at Construction and Demolition Sites [Environment Agency et al., 2012];
5. PPG 7: Safe Storage – The Safe Operation of Refuelling Facilities [NIEA, SEPA, et al., 2011b];
6. PGG 18: Managing Fire Water and Major Spillages [SEPA et al., 2000];
7. GPP 21: Pollution Incident Planning [NIEA et al., 2017];
8. PPG 22: Incident Response – Dealing with Spills [NIEA, SEPA, & Natural Resources Wales, 2011];
9. PPG 26: Safe Storage – Drums and Intermediate Bulk Containers [NIEA, SEPA, et al., 2011a];
10. Alien invasive Species and the Oil and Gas Industry Guidance for Prevention and Management [IPIECA & OGP, 2010];
11. Joint Nature Conservation Committee (JNCC), Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise [Joint Nature Conservation Committee, 2010];
12. BS EN 5228- 1:3009 + A1 2014: Code of Practice for Noise and Vibration Control on Construction and Open Sites [British Standards Institute, 2014];
13. Guidance on the Assessment of Dust from Demolition and Construction [IAQM, 2014];
14. Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites [IAQM, 2012];
15. CIRIA: Coastal and Marine Environmental Site Guide [CIRIA, 2015];
16. Guidance Note: Controlling Light Pollution and Reducing Lightning Energy Consumption [Scottish Executive, 2007];
17. Ecology of the European Otter, conserving Natura 2000 Rivers Ecology Series [Chanin, 2003];
18. Scottish Wildlife Series: Otters and Development [SNH, 2010];
19. Roads and Transport Guidelines for New Developments [The Highland Council, 2013]; and
20. Planning for Transport: Planning Advice Note – PAN 75 [Scottish Executive, 2005].

2.3 References

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Manap, N., & Voulvoulis, N. (2016). Data analysis for environmental impact of dredging. *Journal of Cleaner Production, 137*, 394-404. doi:https://doi.org/10.1016/j.jclepro.2016.07.109

NIEA, SEPA, & Environment Agency. (2011a). PPG 26: Deums and intermediate bulk containers. In (pp. 20).

NIEA, SEPA, & Environment Agency. (2011b). The safe operation of refuelling facilities: PPG7. In (pp. 1-30): NIEA, SEPA and Environment Agency.

NIEA, SEPA, & Environment Agency. (2013). Pollution Prevention Guidelines: PPG1 - Understanding your Environmental Responsibilities - Good Environmental Practices. In (pp. 1-10): NIEA, SEPA and Environment Agency.

NIEA, SEPA, & Natrual Resources Wales. (2011). PPG 22: Dealing with spills. In (pp. 31).

NIEA, SEPA, & Wales, N. R. (2017). GPP 21: Pollution Incident Response Plans. In (pp. 25).

Scottish Executive. (2005). Planning for Transport - Planning Advice Note - PAN 75. In (pp. 42): Scottish Executive.

Scottish Executive. (2007). Controlling light pollution and reducing lighting energy consumption. In (pp. 38): Scottish Executive.

SEPA, Environment Agency, & Environment and Heritage Service. (2000). PGG 18: Managing fire water and major spillages. In (pp. 6).

SNH. (2010). Scotlands Wildlife: Otters and Development. In (pp. 6): SNH.

The Highland Council. (2010). Construction environmental managment process for large scale projects. In (pp. 1-22): The Highland Council.

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Contents

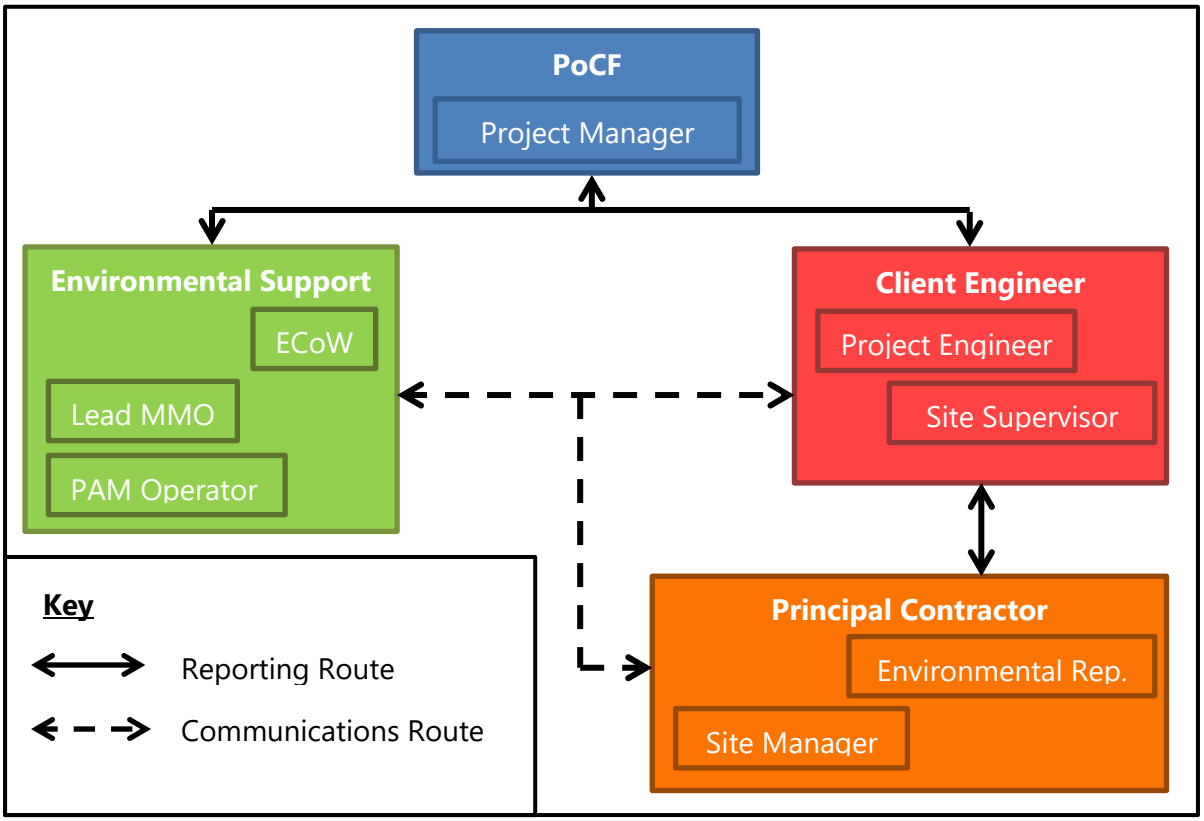
3 Roles and Responsibilities

3.1 Environmental Management Structure

It is important to define roles with regard to environmental management to ensure that it is clear to all involved who is responsible for what, and that all issues are covered. Figure 3.1 provides an overview of the interactions between the various parties involved in the construction of the Phase 4 Development. The ECoW will be employed by Port of Cromarty Firth (PoCF) and will work closely with PoCF's Project Manager (PM), Consultant Engineer's Site Supervisor (SS), as well as the Principal Contractor's Site Manager (SM) and Environmental Representative; to ensure that all the elements of the CEMD are being appropriately implemented. Descriptions of the various roles with regard to environmental management and training requirements are provided below.

Due to the timescale of this project it is likely that there will be changes of personnel before the completion of the build. As such this chapter will refer to job titles only, a list of personnel and contact details can be found in Appendix 3.A which will be updated as necessary throughout the project.

Figure 3.1: Organogram of Main Environmental Roles



3.2 Key Environmental Roles and Responsibilities

3.2.1 PoCF Project Manager

3.2.1.1 Responsibility

The PoCF PM is in overall control of work and as such is responsible for ensuring legal and regulatory commitments are met. They have the ability to stop work on environmental grounds.

3.2.1.2 Duties

Specific environmental duties:

- To appoint the ECoW and ensure they are suitably empowered and resourced to carry out works required.
- Work with ECoW to ensure the CEMD is kept up to date.
- Have overall responsibility for ensuring that all licences are in place and their requirements are being met.
- Ensure appropriate cumulative working agreements are in place with Global's Nigg Energy Park, if simultaneous dredging and disposal operations are ongoing.

3.2.1.3 Qualification

The PoCF PM should have an appropriate understanding of the licences, legal requirements and the CEMD.

3.2.2 Consultant Engineer Project Engineer/Site Supervisor

3.2.2.1 Responsibility

The Consultant Engineer's Project Engineer (PE) and Site Supervisor are the main link between PoCF and the ECoW, to the Principal Contractor as such they will be responsible for ensuring that the Principal Contractor implements appropriate mitigation, Risk Assessed Method Statements (RAMS), and other requirements as detailed within the CEMD and as requested by the ECoW.

3.2.2.2 Duties

Specific environmental duties include:

- To work with ECoW to update the CEMD as required.
- Ensure environmental matters are included within all regular progress and contract meetings, with minutes distributed to appropriate parties.
- On agreement with ECoW, instruct the Principal Contractor to carry out environmental related tasks as deemed appropriate to implement the CEMD and to address any issues arising.
- To ensure environmental instructions are implemented appropriately by the Principal Contractor.

3.2.2.3 Qualification

The Consultant Engineer's PE and SS should have an appropriate understanding of the licences, legal requirements, the CEMD, and mitigation measures for proposed construction.

3.2.3 Environmental Clerk of Works (ECoW)

3.2.3.1 Responsibility

The ECoW is responsible for ensuring appropriate steps are taken to minimise environmental impacts and risks.

The ECoW will have the authority to stop works on environmental grounds, until appropriate corrective actions/mitigation/remediation or controls have been put in place to their satisfaction to allow works to continue.

3.2.3.2 Duties

The ECoW duties will include:

- Ensuring the PoCF's interests are looked after with regard to environmental performance and commitments.
- Working closely with the PoCF PM, Consultant Engineer's PE/SS and Principal Contractor's Environmental Representative to:
    - Ensure that the CEMD is kept up to date.
    - Ensure the requirements of the CEMD are implemented appropriately.
    - Liaise with regulators, stakeholders and other developments in the surrounding area, as appropriate.
- Reviewing RAMS produced by the Principal Contractor to ensure they identify and manage environmental impacts and risks in alignment with the CEMD.
- Ensure that all permits, licences and certificates are in place in advance of any works commencing, with required periodic reviews.
- Ensure that any licensing requirements are appropriately adhered to, implemented and/or closed out.
- Keep up to date in changes in environmental legislation that may affect environmental management during the construction phase.
- Carrying out regular documented inspections/audits of the site to ensure that all work is being carried out in accordance with the CEMD and RAMS.
- To carry out at least daily, checks to ensure that no environmental issues are arising, including but not limited to signs of water pollution, fugitive dust, and littering.
- Ensure appropriate inductions, environmental tool box talks, and drills are being implemented by the Principal Contractor.
- Recognise when a topic specific expert is required and call upon them to provide support, ensure their competence, and manage their activities on site.
- Manage the Marine Mammal Observers (MMO)/Passive Acoustic Monitoring (PAM) operators.
- Carry out MMO/PAM operator duties as required.
- Be ready to assist in implementing the Principal Contractors emergency response plan.
- Ensure the PoCF PM and the Consultant Engineer PE/SS are notified of any environmental incidents.
- Where appropriate, notify statutory authorities of any environmental incident in association with the Principal Contractor.
- Be the Nominated Contact for any archaeological discoveries made during construction.

- Carry out investigations and produce reports regarding any environmental incidents, ensure appropriate corrective/remedial actions are taken, and Learning from Experience (LFE) information is disseminated.
- In conjunction with the Principal Contractor prepare formal monthly report for progress meetings, recording significant events, issues, audits, and forthcoming workloads.
- To maintain an environmental site diary.

3.2.3.3 Qualifications & Experience

The ECoW should be qualified to degree level (or equivalent) in an appropriate environmental science or engineering discipline; and be a member of an appropriate Institute. They should have attended a Joint Nature Conservation Committee (JNCC) Marine Mammal Observers course and PAM training and have an appropriate experience in a range of environmental disciplines.

3.2.4 Lead Marine Mammal Observer (MMO)

3.2.4.1 Responsibility

Responsible for conducting visual watches for marine mammals and assist in the implementation of the Marine Mammal Mitigation Protocols (Section 11). All MMO activities and reporting will be co-ordinated through the ECoW.

3.2.4.2 Duties

- Conduct pre, during, and post noisy activity searches for marine mammals.
- Work with the Principal Contractor, PAM operator and ECoW to agree when works can be started in line with the Marine Mammal Mitigation Protocols.
- Record and report findings of observations.
- Ensure all marine mammal reporting is appropriately completed, including that of the PAM operator.

3.2.4.3 Qualifications

Joint Nature Conservation Committee (JNCC) Marine Mammal Observers course. They should have a minimum of 3 years' field experience observing marine mammals, and practical experience of implementing the JNCC guidelines.

3.2.5 Passive Acoustic Monitoring (PAM) Operator

3.2.5.1 Responsibility

To operate the PAM and assist in the implementation of the Marine Mammal Mitigation Protocols (Section 11.3.4). All PAM activities and reporting will be co-ordinated through the ECoW.

3.2.5.2 Duties

- Conduct pre, during and post noisy activity PAM searches for marine mammals.
- Ensure PAM equipment is installed correctly, calibrated, maintained and operational.
- Review historic data and produce reports as required.
- Work with the MMO and ECoW to agree when works can be started in line with the Marine Mammal Mitigation Protocols.

- Ensure all marine mammal reporting is appropriately completed.

3.2.5.3 Qualifications

Attend Joint Nature Conservation Committee (JNCC) Marine Mammal Observers course and be trained and experienced in the use of PAM software and hardware and have a detailed understanding of marine mammal acoustics.

3.2.6 Principal Contractor's Contract Manager

3.2.6.1 Responsibility

To act as the main point of contact on behalf of the Principal Contractor.

3.2.6.2 Duties

- Organise construction of the Phase 4 Development to the specified requirements, particularly standards of workmanship.
- Ensure that all construction personnel work to the current revisions of technical information and drawings.
- Clarify specified requirements if necessary.
- Ensure the Contract Programme allows adequate time for the installation of materials and services and is properly sequenced to achieve quality standards and requirements.
- Ensure interim inspections of measuring equipment are carried out and appropriate action taken as required.
- Ensure subcontractors' receive and provide information as required.
- Ensure that all construction personnel have the necessary information to recognise conforming material, to understand the marking of non-conforming material, to handle material without damage and to select correct equipment and tools.
- Make recommendations to the Contracts Director regarding the training of personnel.
- Liaise with the Client via the Professional Team (Architect, Engineer etc.) using minute'd meetings, letter or fax as appropriate.
- Liaise with the Subcontractors via minute'd meetings, letters or fax as appropriate.
- Make periodic on-site inspections where appropriate.
- Handle complaints, initiate appropriate action to deal with the complaint, monitor that action and follow up with a confirmation in writing of action taken to the complainant.
- Ensure adequate resources are in place to meet the requirements of the CEMD.

3.2.6.3 Qualifications

The Principal Contractors Contract/Project Manager should be qualified to at least Degree level in an appropriate engineering discipline and have 10 years practical construction experience.

3.2.7 Principal Contractor's Environmental Representative

3.2.7.1 Responsibility

To act as the main point of contact with regard to environmental issues on behalf of the Principal Contractor.

3.2.7.2 Duties

The Principal Contractor's Environmental Representative's duties will include:

- Working with the ECoW to ensure the CEMD is up to date, and relevant to proposed construction techniques.
- Ensuring RAMS for all works and sections of works include environmental considerations and are agreed with ECoW.
- Support the ECoW in the implementation of all environmental matters.
- Producing, agreeing with the ECoW:
    - Procedures required to implement the CEMD.
    - Emergency Response Procedures.
- Awareness of all potential impacts and associated mitigation detailed in the EIAR.
- Ensure the necessary protection of onsite ecology and biodiversity.
- Ensure environmental mitigation measures are site specific and are complied with.
- Conduct regular environmental audits of the site:
    - Findings should be reported promptly to the project management team including the PM, SS, SM, and ECoW.
    - Work with the ECoW to ensure that any actions identified to improve environmental performance are implemented.
- Ensure the construction site waste management measures are compliment with Site Waste Management Plan (Section 8).
    - Monthly reports of wastes arising from the site including nature of material, volumes, and fate (reuse, recycling, disposal, etc).
- Ensure environmental licensing/permits are applied for promptly.

3.2.7.3 Qualifications

The Principal Contractor's Environmental Representative should be qualified to at least HND level in an appropriate environmental science or engineering discipline. In addition, they should have a minimum of 5 years construction experience and a sound understanding of a range of environmental issues.

3.2.8 Principal Contractor Site Manager

3.2.8.1 Responsibility

To act as the main point of contact on site, on behalf of the Principal Contractor.

3.2.8.2 Duties

- Ensuring Principal Contractor's staff and resources including sub-contractors and suppliers are briefed in advance of their arrival to site of relevant logistics, parking, access protocols, in addition to other general environmental requirements.
- Ensuring RAMS are provided to PoCF for review in a timely fashion, prior to the start of the relevant works.
- Liaise with and support ECoW in all environmental matters.
- Ensuring implementation of with agreement from the ECoW:
    - Procedures required to implement the CEMD,
    - Emergency response procedures,
    - Environmental site induction training,
    - Environmental Tool Box Talks, and
    - Environmental incident response drills.

- Attendance, participation, and reporting at regular management meetings, including the monthly progress meetings and all associated reporting.
- Organise the supervision of the works to the specified requirements and in particular a good standard of workmanship.
- Ensure all materials are received and inspected.
- Ensure subcontractors comply with the requirements of CEMD.
- Notify the Contracts Manager of non-conforming material.
- Make all necessary arrangements for the correct storage and handling of materials.
- Ensure all necessary walkovers, checks, inspections and tests etc. required by the CEMD are carried out, completed and recorded.
- Ensure that any queries from construction personnel about the quality of work are properly answered.
- Ensure that construction personnel allocated for tasks are those with suitable skills and experience, and recommend operatives for additional training to the Contracts Manager.

3.2.8.3 Qualifications

The Principal Contractors Site Manager should be qualified to at least HND level in an appropriate engineering discipline and have a minimum of 5 years of practical construction experience.

3.2.9 All Workers

3.2.9.1 Responsibility

Everyone on site should be empowered to raise concerns and if appropriate stop works on environmental grounds until the ECoW can review the situation.

3.2.9.2 Duties

All workers are expected to:

- Read, sign and understand the appropriate RAMS, for the work they are undertaking,
- Raise any queries or concerns with methods or mitigation measures prior to commencing tasks,
- Carry out works in line with the RAMS,
- Report all environmental incidents including spills to the site management team, and
- Ensure good housekeeping is maintain on site, especially with regard to prevention of littering.

3.2.9.3 Qualifications

All workers must attend site induction, briefings and tool box talks relevant to the works they are undertaking to ensure understanding of environmental as well as health and safety issues.

3.3 Implementation

In reality there is likely to be more than one person performing the ECoW duties, to ensure appropriate presence on site during environmentally sensitive activities and for holiday cover etc. This will be appropriately managed with a lead ECoW identified with overall responsibility and the use of a handover system, likely to take the format of a short report and/or face to face briefing to ensure that there is awareness of recent activities and any issues arising.

Similarly, with PAM and MMO's, they may be interchangeable if appropriately trained, however at least one person will be carrying out MMO activities and one PAM operator during relevant activities.

Similarly, for other roles any changes will be managed, to ensure consistency.

Appendix 3A – Details of Key Project Personnel

Role	Company	Name	Phone	Email
PoCF Project Manager	PoCF	Calum Slater	07747 805567	calum@cfpa.co.uk
Consultant Engineer	TBC	TBC	TBC	TBC
Consultant Engineer Project Engineer	TBC	TBC	TBC	TBC
Consultant Engineer Site Supervisor	TBC	TBC	TBC	TBC
ECoW	TBC	TBC	TBC	TBC
Lead MMO	TBC	TBC	TBC	TBC
PAM Operator	TBC	TBC	TBC	TBC
Principal Contractor Contract Director	TBC	TBC	TBC	TBC
Principal Contractor Contract Manager	TBC	TBC	TBC	TBC
Principal Contractor Asst Contract Manager	TBC	TBC	TBC	TBC
Principal Contractor Site Manager	TBC	TBC	TBC	TBC
Principal Contractor Environmental Rep.	TBC	TBC	TBC	TBC

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4 Document Control Process

Each Section of the CEMD includes an issue number and the date of update along with the reason for update on the front of the section. The ECoW will have overall responsibility for the document and will ensure that the most current version is provided in electronic form to:

- CFPA Project Manager
- Consultant Engineer Project Manager
- Consultant Engineer Site Supervisor
- Principal Contractor Project/Contract Manager
- Principal Contractor Environmental Representative
- Principal Contractor Site Manager
- The Construction site office
- The Port Manager

The CEMD, will be updated during the construction phases to take account of additional detail as it becomes available as well as learning from experience. Specifically, updates will be made at the following points:

- Receipt of Marine Licence;
- Appointment of Principal Contractor;
- Receipt of EPS Licence(s);
- Following completion of ecological pre-construction surveys; and
- As required following lessons learned during the construction works.

Any material changes to the content of the CEMD will be discussed and agreed with Marine Scotland, and relevant Statutory Consultees prior to implementation on site.

Construction Environmental Management Document		
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5 Auditing

5.1 Introduction

Audits will be carried out by the ECoW to ensure that all tasks are being carried out in line with procedures, the CEMD, Risk Assessed Method Statements, and environmental best practice as identified within the Schedule of Mitigation. The audits will also verify if the mitigation is effective in minimising environmental impacts and risks.

5.2 Audit Programme

The frequency of audits is provided in Table 5.1, the aspects audited align to the aspects identified for each phase of work as discussed in CEMD Section 6. Where two tones are shown in Table 5.1, it indicates that the audit frequency will be reduced with time as the procedures becomes embedded, the reduction in frequency will be determined by the ECoW based on audit performance results.

Audits associated with pollution and waste regulations, will be carried out throughout the construction period irrespective of what tasks are being completed on the site.

It is noted that there will also be a health and safety audit programme; any environmental issues identified during which will be reported to the ECoW.

Table 5.1: Audit Frequency

Aspects	Audit	Tasks									
		Site Set Up	Revetment Toe Dredge	Revetment Construction	Rock Armour Removal	Quay Wall and Anchor Piling	Tie Rod Installation	Berth Dredging	Infilling	Surfacing	Furniture
In Air Acoustics	Monitoring at Receptors										
	Working Hours										
Air Quality: Dust	Dust Management Plan										
	Roads Check										
Ornithology	Breeding Bird Checks										
	Exclusion Zones										
Marine Mammals	Protocols Implemented										
	Observation Logs										
Otters	Otter Checks										
	Exclusion Zones										
Diadromous Fish	Timing of Works										
Archaeology	Protocol Implementation										
Traffic	Delivery Audit										
Water Quality & Pollution	Monitoring										
	Fuel Storage and										
	Concrete Washout										
	Material/ Waste Storage										
	Spill kits and Procedures										
Waste	Dredging Logs										
	Littering										
	Waste Regulations										

Audit Frequency Key	
	Not required
	Daily
	Weekly
	Monthly
	If Utilised

5.3 Implementation

Audit forms including checklists will be utilised for each audit type to ensure that all items are appropriately checked and that audits are recorded in a systematic manner.

Where audits identify areas of improvement, appropriate steps will be taken to implement these. Improvements requiring immediate action will be immediately raised with the Consultant Engineer's Site Supervisor (SS), to allow for actions to be arranged. If immediate action is not required, then the audit report will be submitted within 24 hours of the audit, to the SS, and actions agreed at the next site management meeting.

In addition to identifying areas for improvement, areas of good practice will be highlighted and fed back to allow appropriate recognition to be given.

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Contents

6 Construction Environment Management Plans

6.1 Introduction

PoCF take their environmental responsibilities very seriously and as such will select the Principal Contractors, in part based on the strength of their environmental credentials detailed during the tendering process. PoCF have worked closely with Affric Limited from the concept design stage to ensure environmental impacts have been minimised and will appoint an Environmental Clerk of Works (ECoW) to support the construction. Atkins, the Consultant Engineers will continue to ensure that all environmental mitigation measures required within the design and construction engineering are incorporated. The Principal Contractor will have an ISO14001 (or equivalent) approved Environmental Management System (EMS), and all works associated with the construction of the Phase 4 Development will be conducted under the provisions of this system.

Table 6.1 provides a summary of the aspects associated with each of the construction tasks. Aspects that will certainly occur and require mitigation and/or monitoring to minimise impacts are shown in red. Aspects that could have an impact are highlighted in yellow, preventative measures or monitoring have been identified for these.

Within this section, each stage of the Phase 4 Development construction is discussed in turn, with respect to each relevant aspect; where appropriate, references to other sections are provided to avoid the duplication of information. All construction activities other than berth dredging will be carried out between 7am and 7pm seven days a week, to minimise noise impacts on local residents.

The input required by the Environmental Clerk of Works (ECoW), Marine Mammal Observer (MMO) and Passive Acoustic Monitoring (PAM) operator is detailed for each task, proportionate to the risk involved at that stage of the project. It should be noted however that all staff have environmental and health and safety responsibilities and will undergo site induction training and task specific environmental training. Risk Assessed Method Statements (RAMS) will be in place for specific activities to ensure that appropriate environmental protection measures are in place throughout. As discussed in Section 3.2.3, the ECoW role is to ensure appropriate measures are in place and are being adequately implemented.

Table 6.1: Aspects Associated with Each Task

Aspects	Tasks											
	Site Set Up	Revetment Toe Dredge	Revetment Construction	Rock Armour Removal	Quay Wall and Anchor Piling	Tie Rods	Berth Dredging	Infilling	Surfacing	Concrete Works	Drainage	Furniture
In-Air Acoustics												
Air Quality: Dust												
Ornithology												
Marine Mammals												
Otters												
Diadromous Fish												
Archaeology												
Materials and waste												
Traffic												
Navigation												
Water Quality: Sedimentation												
Pollution												

Key

No Issue
Potential Aspect
Aspect

6.2 Site Set-Up

6.2.1 Water Quality

The operations of the site will give rise to domestic waste waters/sewage which will require management throughout the construction phase.

There are no local connections to the public sewer in the vicinity of the construction site and the area for the site welfare facilities is all block paved, hence it does not lend itself to the use of a septic tank and soak away. The current plan is to store domestic waste waters in tanks, which will be regularly collected and disposed of by a licenced waste contractor.

6.2.2 Traffic

The 6 approx. accommodation containers and other materials including fencing will be delivered by road to the site, the number of vehicle movements associated with this phase of works is not deemed significant, however they will be managed in line with the Framework Construction Traffic Management Plan (FCTMP).

6.2.3 Pollution

A litter sweep of all existing areas to become part of the construction site and associated welfare areas, will be completed by PoCF prior to the site being handed over to the Principal Contractor. This will minimise the chance of litter being dropped into the sea during construction activities.

The site set up includes the establishment of various facilities including: COSHH stores, Concrete Wash Out Areas and Refuelling Points. Although not all of the facilities will be utilised immediately it is important to ensure that their establishment is appropriate to minimise future pollution risks. All these areas will be established at least 10m from a water course or drain. Appropriate secondary containment will be incorporated, and spill kits provided in alignment with guidance as identified in the Schedule of Mitigation (Section 14). Materials will be managed as per Section 10.

6.2.4 Waste

The accommodation area will give rise to waste throughout the project, in the form of domestic wastes such as food and packaging, and office wastes such as paper and printer cartridges. In addition, there will be wastes associated with deliveries to the site such as packaging, there may also be excess materials which require disposal. Wastes will be segregated and where possible reused or recycled as detailed in the Waste Management Plan (Section 8). During site set up appropriate waste receptacles will be placed in the accommodation area to facilitate recycling.

6.2.5 Environmental Input

During the Accommodation Works the ECoW will be onsite for at least part of each day Monday to Friday, to carry out checks to ensure that the site set up is appropriate and aligns with the relevant guidance and mitigation measures, as identified in the Schedule of Mitigation (Section 14) and to allow any matters arising to be discussed. When not onsite, the ECoW will be contactable during site working hours to give advice as required.

6.3 Revetment Toe Dredge

Dredging will be carried out at the construction site and may be disposed of at the Sutors spoil ground if not suitable for reuse. Dredging and sea disposal operations are consented under a separate Marine Licence and supported by a Best Practicable Environmental Options (BPEO) assessment. The Dredging for Sea Disposal protocol is provided in Appendix 6A.

6.3.1 Marine Mammals

Injury to marine mammals from spoil disposals are only expected if they are directly under the boat when it discharges and are struck, by larger sediments/stones. A Spoil Disposal Marine Mammal Protocol will be implemented during all disposal operations, to ensure animals are not under the vessel at the time of disposal. The protocol is provided in Section 11.3.4.2.

6.3.2 Diadromous Fish

The EIAR has identified that diadromous fish species are most sensitive to water sediment loading resulting from dredging and disposal operations during the month of May. This is because May is the peak of the Atlantic salmon outward smolt migration and conducting dredging or disposal during this time could result in significant impacts on the species.

As such no dredging or sea disposal operations will be conducted from the 1st to the 31st May (inclusive) in any year. Further detail is provided in Section 11.4.4.1. In addition, the ECoW will remain vigilant for signs of mass mortality in diadromous fish species, as detailed in Section 11.4.4.2.

6.3.3 Archaeology

No archaeological artefacts are expected to be present in the revetment toe dredge pocket. If an item of potential archaeological significance is identified is found during the revetment toe dredge, the Protocol for Archaeological Discoveries will be implemented, as described in Section 9.

6.3.4 Materials and Waste

Dredging will give rise to 10,000m^3/ 20,000 wet tonnes of dredging, some or all of which requiring disposal (depending on suitability for reuse). Disposal will be to the Sutors disposal site as per the dredging and disposal licence.

6.3.5 Navigation

The disposal of dredged spoil requires the use of a tug boat to tow the spoil barges to the Sutors Spoil ground for disposal. All vessel movements will be discussed and agreed with the PoCF Port Manager. All vessels will display appropriate lights and shapes as per the International Regulations for Prevention of Collisions at Sea (IRPCS). PoCF will issue Notices to Mariners and Navigation Warnings as appropriate.

6.3.6 Water Quality: Sedimentation

Backhoe dredging to be used, as a low energy technique in shallow waters, the creation of sediment plumes should be minimal during the revetment toe dredging operations. Material maybe side swiped into the infill area if suitable for reuse. If this is to occur material will be

released as close to the seabed as possible to minimise the increase in sediments in the water column.

The disposal of dredging in the disposal area at the Sutors, will have short term localised impacts on water quality.

If all materials were to be disposed of to the dredge disposal ground, then this would be conducted over approximately 4 disposals using bottom opening or split hopper barges.

Experience from maintenance dredging, and the construction of the Phase 3 Development is that the sediments normally settles out of the water column in less than 30 minutes following disposal using a bottom opening barge. In this instance approximately 3,000m^3 will be discharged at a time.

The ECoW will carry out visual checks of the dredging and disposal activities to ensure that sediment plumes are as expected: localised and short lived.

6.3.7 Pollution

Samples of the seabed have been taken and as discussed in the EIAR and BPEO, this confirmed that soils targeted for disposal at sea do not represent a source of contamination. Validation sampling and chemical testing will be carried out on dredge samples as per Marine Scotland's standard procedures.

If at any point throughout the dredging campaign contamination is suspected in dredged material; visual or odours indications; the material will not be disposed of until appropriate checks can be made by the ECoW; if necessary samples will be analysed; to ensure suitability prior to disposal.

All equipment utilised will be well maintained and regularly inspected to ensure that it isn't leaking, fuel, oils or hydraulic fluids. Where practicable hydraulic fluids utilised will be biodegradable.

Refuelling will be carried out following site procedures. Fuel will be managed as per CEMD Section 10.

6.3.8 Environmental Input

During the first 2 days of the dredging works an ECoW will be present onsite, to ensure all mitigation is in place and that there are no issues arising. For the duration of the dredging works an ECoW will be available to provide advice by phone 24 hours a day and on site at least 37.5 hours a week, and where required environmental tasks will be delegated to appropriately trained individuals to provide cover when the ECoW is not on site.

MMO (and PAM if required) support will be available for the disposal operations associated with the revetment toe dredge as discussed in CEMD Section 11.3.4.2.

6.4 Revetment Construction

The revetment will be constructed by placing various grades of rock onto the seabed within the footprint previously dredged. Rock armour protection will be placed on the exposed frontage of the revetment along both western and northern extents. It is assumed that the rock and geotextile membrane will be delivered by road, with the materials deposited on site for placement by machinery including long reach excavators.

6.4.1 In-Air Acoustics

The use of dump trucks, and excavators, to form the revetments, together with the end tipping of the stone will give rise to in-air noise. All machinery will be well maintained, in order to minimise noise emissions, and vehicles and plant will be fitted with white noise reversing alarms.

The predictive noise modelling did not indicate that revetment construction will give rise to nuisance effects, but it is one of the noisier activities. As discussed in Section 12 the ECoW will visit noise sensitive receptors during operations to qualitatively assess the potential to cause a nuisance noise effect. Quantitative noise monitoring at the noise sensitive receptors during the revetment construction operations may be required at the ECoW's discretion, in order to verify the results of the predictive noise model.

6.4.2 Air Quality: Dust

All vehicles delivering materials to the site will be covered to minimise the spread of dust. In order to meet engineering requirements, the rock used for the revetment construction will be clean, free of debris, and low fines and as such has limited potential for dust emissions. If materials are being stockpiled, and the weather is particularly dry then it may be dampened to minimise fugitive dust emissions.

Road sweepers will be utilised to minimise the spread of mud and dust on the construction site and surrounding roads.

Further detail is provided in the Dust Management Plan (DMP), Appendix 6B.

6.4.3 Ornithology

Regular checks for nesting birds will be conducted by the ECoW during the breeding season. If nests are found, exclusion zones will be established to protect nests from damage and disturbance. Further detail is provided in Section 11.2.4.

6.4.4 Otters

Experience gained during the Phase 3 Development construction showed that otters quickly began to utilise the new habitat created by the revetment construction, although they are unlikely to establish holts, layups, or couches during the construction phase, due to the levels of disturbance. As such, plant operators and banksmen will maintain a watching brief for otters, particularly when recommencing works in the morning, or after a weekend. Further details are provided in Section 11.5.4.

6.4.5 Traffic

Approximately 194,000 tonnes of materials will be delivered by road, requiring 540 lorry movements per week over 36 weeks period, with peak movement of 108 lorries a day. Quantities to be finalised when design is completed. Deliveries may be staggered as per the programme.

As discussed in the FCTMP, deliveries will come from the west along the B817, to minimise the distance travelled through the town.

Delivery lorries will be checked for stones trapped between double wheels and in treads prior to departure from the quarry or the development site.

6.4.6 Water Quality: Sedimentation

In order to meet engineering requirements, the rock used for the revetment construction will be clean, free of debris, and low fines. This will also reduce the potential to increase water column sediment loading. The ECoW will monitor operations and take appropriate action if excessive sediment plumes are observed.

6.4.7 Pollution

All equipment utilised will be well maintained and regularly inspected to ensure that it isn't leaking, fuel, oils or hydraulic fluids. Where practicable hydraulic fluids utilised will be biodegradable.

Refuelling will be carried out in the designated areas, following site procedures. Materials will be managed as per CEMD Section 10.

6.4.8 Environmental Input

The ECoW will be on site during the revetment construction works, to a carry out ecological watching briefs, and sedimentation observations. The ECoW will be onsite approximately 37.5 hours a week for the first 2 weeks to ensure all mitigation measures are being appropriately implemented and are effective.

As the task is repetitive once all procedures have been established the ECoW support level will be reduced, however the ECoW will be onsite at least three times a week to carry out appropriate audits and monitoring and be available to provide advice by phone as required.

6.5 Rock Armour Removal

The rock armour currently in place along the western edge of the existing Phase 3 Development will need to be removed where the new and existing structures interface. The rock armour will be removed using long reach excavators which will work from land but may require to be deployed on a barge.

6.5.1 In-Air Acoustics

The use of excavators and dump trucks on the site to remove rock armour, and the movements of rock will give rise to in-air noise. Rocks will be placed as opposed to dropped as much as practicable to minimise the energy and associated sound pressure levels of rock on rock

interactions. All machinery will be well maintained, in order to minimise noise emissions, and vehicles and plant will be fitted with white noise reversing alarms.

The predictive noise monitoring did not indicate that this will give rise to nuisance effects.

6.5.2 Ornithology

The existing rock armour is known be utilised as a nesting area for breeding birds, including eider ducks, gulls, and oyster catchers. As such there is the potential for the rock armour removal works to disturb breeding birds, as well damage or destroy their nests.

Rock armour removal will ideally be scheduled to avoid the breeding bird season of March to August in so far as possible. Where it is not possible to completely avoid the breeding season, operations will aim to commence before the start of the season. Pre-construction breeding bird surveys will take place no more than 48hr prior to the start of rock armour removal works.

If there is a need to stockpile rock armour during the bird breeding season, the stockpiles will be fenced off to dissuade birds from nesting in the stored material.

Further detail is provided in Section 11.2.4.

6.5.3 Otters

If otters are utilising the existing rock armour, then there is the potential for them to be disturbed or injured during its removal. Section 11.5 of the CEMD provides full details of the work being undertaken to establish an understanding of the otter use of the area. If required a European Protected Species (EPS) licence will be sought and full mitigation plan developed.

Regardless of the survey findings, the ECoW will carry out visual checks of the rock armour immediately prior to its removal to check that there are not otters present to avoid potential injury. Plant operators and banksmen will conduct a watching brief for otters during the operations. Further details are provided in Section 11.5.4.

6.5.4 Materials and Waste

The rock armour removed from the existing revetment will be re-used as rock armour for the new Phase 4 Development revetments.

6.5.5 Pollution

A litter sweep of the rock armour will be completed by the Principal Contractor prior to rock armour removal, to minimise the chance of litter being dropped into the sea when the rock armour is removed.

All equipment utilised will be well maintained and regularly inspected to ensure that it isn't leaking, fuel, oils or hydraulic fluids. Where practicable hydraulic fluids utilised will be biodegradable.

Refuelling will be carried out in the designated areas, following site procedures. Materials will be managed as per CEMD Section 10.

6.5.6 Environmental Input

The ECoW will be on site during the rock armour removal works, to a carry out ecological surveys and watching briefs. An ornithologist and otter specialist will conduct pre-construction surveys. The ECoW will be onsite approximately 37.5 hours a week for the first 2 weeks to ensure all mitigation measures are being appropriately implemented and are effective.

As the task is repetitive once all procedures have been established the ECoW support level will be reduced, however the ECoW will be onsite at least three times a week to carry out appropriate audits and monitoring and be available to provide advice by phone as required.

6.6 Quay Wall and Anchor Piling

The Phase 4 Development quay wall will be of combi-wall formation and comprise of around 82, 24mm thick tubular piles of circa 2.032m diameter, with double AZ-18 infill sheet piles between the tubular sections. Marine piling works will be conducted using a vibro hammer where ever possible. However, ground conditions are such that an impact hammer will also be required to drive the piles to their design depth.

6.6.1 In-Air Acoustics

The use of vibro and impact hammers will give rise to intermittent in-air noise emissions. Noise modelling predicted that this will not result in nuisance effects. However, in line with best practice guidance, the modelling utilised sound level equivalent calculations (which in effect are an average noise level over a given time period), and as such don't indicate the scale of the intermittent peak sound pressure levels.

Hence, the ECoW will visit noise sensitive receptors during piling operations, in order to make a qualitative assessment of whether piling noise has the potential to cause a nuisance effect. Quantitative noise monitoring at the noise sensitive receptors during the piling operations may be required at the ECoW's discretion, in order to verify the results of the predictive noise model and to understand the peak sound pressure levels. Further detail is provided in Section 12.

All plant and equipment will be well maintained in line with industry best practice, to ensure noise emissions are minimised.

6.6.2 Marine Mammals

The piling will give rise to underwater noise, which could cause disturbance and injury to marine mammals. In order to mitigate this risk, marine mammal observations and passive acoustic monitoring will be employed to ensure marine mammals are not in the within 500m of the piling barge when the operations commence. Further detail is provided in Section 11.3.4.1: Piling Marine Mammal Protocol.

Underwater noise monitoring of vibro piling operations may be conducted, in order to ascertain whether the noise levels are low enough to reduce the level of marine mammal mitigation from that provided for the impact piling operations. Any amendments to the Piling Marine Mammal Protocol will be agreed with Marine Scotland and SNH prior to implementation.

6.6.3 Navigation

Vessel movements will include the delivery of piles and tie rods on bulk cargo vessels, and a spud-leg piling barge which will be manoeuvred by tugs. All vessel movements will be discussed and agreed with the PoCF Port Manager. All vessels will display appropriate lights and shapes as per the International Regulations for Prevention of Collisions at Sea (IRPCS). PoCF will issue Notices to Mariners as and Navigation Warnings as appropriate.

6.6.4 Pollution

All equipment utilised will be well maintained and regularly inspected to ensure that it isn't leaking, fuel, oils or hydraulic fluids. Where practicable hydraulic fluids utilised will be biodegradable.

Refuelling will be carried out in the designated areas, following site procedures. Materials will be managed as per CEMD Section 10.

6.6.5 Environmental Input

During the first 2 weeks of the piling works, an ECoW will be present onsite, to carry out noise monitoring, ensure appropriate mitigation is in place, and that there are no issues arising. For the duration of the piling works an ECoW will be available to provide advice by phone at all times and it is anticipated to be onsite 37.5 hours a week, where required environmental tasks will be delegated to appropriately trained individuals to provide cover when the ECoW is not on site.

MMO/PAM support will be in place for the duration of the piling works to implement the Piling Marine Mammal Protocol appropriately (CEMD Section 11.3.4.1).

6.7 Tie Rod Installation

Where technically feasible the design will utilise one row of tie rods to connect the quay wall combi-wall formation to the anchor wall. These tie rods are anticipated to be installed above low water and will be buried with engineering fill.

6.7.1 Pollution

All equipment utilised will be well maintained and regularly inspected to ensure that it isn't leaking, fuel, oils or hydraulic fluids. Where practicable hydraulic fluids utilised will be biodegradable.

Refuelling will be carried out in the designated areas, following site procedures. Materials will be managed as per CEMD Section 10.

6.7.2 Environmental Input

For the duration of the piling works an ECoW will be available to provide advice by phone at all times and it is anticipated to be onsite 37.5 hours a week, where required environmental tasks will be delegated to appropriately trained individuals to provide cover when the ECoW is not on site.

6.8 Berth Dredging

Dredging of the berth and associated navigational areas will be carried out to -12m Chart Datum. The volume of material to be dredged is approximately 100,000m^3. This is anticipated to utilise a cutter-suction hopper dredger. It is planned that arisings from the berth dredge will be used as infill material, provided that the material is structurally suitable. It is predicted that 40-60% of the arisings will be suitable for re-use. The remaining 40,000 to 60,000m^3 of spoil will be sent for sea disposal at the Sutors spoil ground.

It is noted that aspects associated with the reuse of dredged spoil for infilling are considered in Section 6.9; this section only considers the dredging and disposal aspects.

Dredging for sea disposal operations are consented under a separate Marine Licence and supported by a Best Practicable Environmental Options (BPEO) assessment. The Dredging for Sea Disposal Protocol is provided in Appendix 6A.

6.8.1 In-Air Acoustics

The use of cutter suction dredger ships, together with associated vessel movements will give rise to in-air noise. Due to the scale of the berth dredging and expense of the equipment utilised, the works are anticipated to operate on a 24/7 basis.

The predictive noise modelling did not indicate that this will give rise to nuisance effects. This is due to the distances between the noise source and the sensitive receptors.

All vessels and machinery will be well maintained, in order to minimise noise emissions.

6.8.2 Marine Mammals

Injury to marine mammals from spoil disposals are only expected if they are directly under the boat when it discharges and are struck, by larger sediments/stones. A Spoil Disposal Marine Mammal Protocol will be implemented during all disposal operations, to ensure animals are not under the vessel at the time of disposal. The protocol is provided in Section 11.3.4.2.

6.8.3 Diadromous Fish

The EIAR has identified that diadromous fish species are most sensitive to water sediment loading resulting from dredging and disposal operations during the month of May. This is because May is the peak of the Atlantic salmon outward smolt migration and conducting dredging or disposal during this time could result in significant impacts on the species.

As such no dredging or sea disposal operations will be conducted from the 1st to the 31st May (inclusive) in any year. Further detail is provided in Section 11.4.4.1. In addition, the ECoW will remain vigilant for signs of mass mortality in diadromous fish species, as detailed in Section 11.4.4.2.

6.8.4 Archaeology

No archaeological artefacts are expected to be present in the berth dredge pocket. If an item of potential archaeological significance is identified is found during the revetment toe dredge, the Protocol for Archaeological Discoveries will be implemented, as described in Section 9.

6.8.5 Materials and Waste

Dredging will give rise to 40,000-60,000m^3/80,000-120,000 wet tonnes of dredging requiring disposal. Disposal will be to the Sutors disposal site as per the dredging and disposal licence. The decision to dispose of the dredging's is documented in the BPEO which accompanied the dredging licence. The possibility to reuse all the material was ruled out due to its material consistency giving rise to settlement issues for the Phase 4 Development land reclamation area.

6.8.6 Navigation

The disposal of dredged spoil requires the vessel to transit to and from the Sutors Spoil ground for disposal. Where a cutter suction dredge is used, the vessel will be restricted in ability to manoeuvre during dredging operations. All vessel movements will be discussed and agreed with the PoCF Port Manager. All vessels will display appropriate lights and shapes as per the International Regulations for Prevention of Collisions at Sea (IRPCS). PoCF will issue Notices to Mariners and Navigation Warnings as appropriate.

6.8.7 Water Quality: Sedimentation

Suction dredgers extract water with the dredged sediment, and as such a degree of overflow is necessary to fill the hoppers, resulting in localised increases in water column sediment loading. Previous observations of such activities indicate that the resulting sediment plumes dispersed quickly and remained in close proximity to the works. This notwithstanding, dredger masters will be encouraged to optimise their equipment to minimise the requirement for overflowing. The ECoW will monitor sediment plumes during initial dredging works.

The disposal of spoil in the disposal area at the Sutors, will have short term localised impacts on water quality. It is estimated that between 40,000 – 60,000m^3 of spoil from the berth dredge will require sea disposal at the Sutors spoil ground. This will be conducted over approximately 9 disposals using bottom opening doors.

Experience from maintenance dredging, and the construction of the Phase 3 Development is that the sediments normally settles out of the water column in less than 30 minutes following disposal using a bottom opening barge. In this instance approximately 7,000m^3 will be discharged at a time. The ECoW will monitor the resulting plumes during the initial disposals.

6.8.8 Pollution

Samples of the seabed have been taken and as discussed in the EIAR and BPEO, this confirmed that soils targeted for disposal at sea do not represent a significant source of contamination. Validation sampling and chemical testing will be carried out on dredge samples as per Marine Scotland's standard procedures.

If at any point throughout the dredging campaign contamination is suspected in dredged material; visual or odours indications; the material will not be disposed of until appropriate checks can be made by the ECoW; if necessary samples will be analysed; to ensure suitability prior to disposal.

All equipment utilised will be well maintained and regularly inspected to ensure that it isn't leaking, fuel, oils or hydraulic fluids. Where practicable hydraulic fluids utilised will be biodegradable. Refuelling will be carried out in the designated areas, following site procedures. Fuel will be managed as per CEMD Section 10.

6.8.9 Environmental Input

During the first 2 days of the dredging works an ECoW will be present onsite, to ensure all mitigation is in place, and monitor sediment plumes during dredging and disposal works. For the duration of the dredging works an ECoW will be available to provide advice by phone 24 hours a day and on site at least 37.5 hours a week, and where required environmental tasks will be delegated to appropriately trained individuals to provide cover when the ECoW is not on site.

MMO (and PAM if required) support will be available for the disposal operations associated with the revetment toe dredge as discussed in CEMD Section 11.3.4.2.

6.9 Infilling

Infill material will be placed within the area formed by the bounding revetment structures, and the combi-piled wall to the south. This infill will form the main reclamation and will provide the laydown area of the Phase 4 Development. The material utilised will include dredge arisings which are suitable for inclusion within the structure, in addition to appropriately sourced engineering grade fill materials either of marine or terrestrial origin.

Infill materials from marine sources (including dredged spoil) will be pumped directly from a ship into the reclamation area as a slurry with a high-water content. Materials from terrestrial sources may be delivered from the ship dry, using conveyor belts.

6.9.1 In-Air Acoustics

The use of dump trucks, excavators, bulldozers, and rollers to place and compact the fill material, together the vessel noise from the delivery vessel will result in increased in-air noise emissions. All machinery will be well maintained, in order to minimise noise emissions, and vehicles and plant will be fitted with white noise reversing alarms.

The predictive noise modelling did not indicate that infilling will give rise to nuisance effects, but it is one of the noisier activities. As discussed in Section 12 the ECoW will visit noise sensitive receptors during operations to qualitatively assess the potential to cause a nuisance noise effect. Quantitative noise monitoring at the noise sensitive receptors during the infilling operations may be required at the ECoW's discretion, in order to verify the results of the predictive noise model.

6.9.2 Air Quality: Dust

The infilling process may result in large surfaces of unconsolidated fine grained fill materials being exposed for extended periods. It is also possible that large volumes of fill material will need to be temporarily stockpiled on site, in order to facilitate the construction phasing. During periods of dry windy weather, the surface of the exposed fill materials and stockpiles dry rapidly, potentially releasing significant fugitive dust emissions. In order to mitigate this,

any exposed fill material and stock stockpiles will be kept damp using mobile sprayers or sprinkler systems as appropriate.

Road sweepers will be utilised to minimise the spread of mud and dust on the construction site and surrounding roads.

The ECoW will provide a qualitative assessment of fugitive dust emissions during infilling operations, in order to ascertain the effectiveness of the dust mitigation measures. At the ECoW's discretion, the principal contractor may be requested to install dust monitoring stations at the northern and eastern site construction site boundaries, and at the access gate onto the B817, to provide a quantitative assessment of the dust mitigation.

Further detail is provided in the Dust Management Plan (DMP), Appendix 6B.

6.9.3 Water Quality

The reclamation process has been designed so as to minimise sedimentation issues in the surrounding waters. The infill material will be discharged directly into the reclamation area which will be segregated from the surrounding waters by the revetment and the quay wall. The construction phasing may require that infilling commences prior to the revetment or quay wall being completed. In this event temporary revetments will be constructed to isolate the delivery area, for marine fill material delivered as a slurry. If the dry fill is to be utilised prior to the revetment or quay wall being completed, silt curtains may be used to isolate the area.

If the fill material is delivered as a slurry, it is necessary to ensure that sufficient residence time in the reclamation area is provided, to allow the material to drop out of the slurry, before the excess water is released. This will be achieved through a series of bunds, and a weir system, designed to slow the water as it travels from the delivery point to the water discharge point.

The ECoW will maintain a watching brief of the water discharge and monitor any sediment plumes in the waters surrounding the development. If deemed necessary, the ECoW will stop works, and ensure the arrangements are improved before infilling resumes.

6.9.4 Pollution

All fill materials will be tested to ensure they are not contaminated prior to acceptance at the site.

All equipment utilised will be well maintained and regularly inspected to ensure that it isn't leaking, fuel, oils or hydraulic fluids. Where practicable hydraulic fluids utilised will be biodegradable.

Refuelling will be carried out in the designated areas, following site procedures. Materials will be managed as per CEMD Section 10.

6.9.5 Environmental Input

The ECoW will be onsite approximately 37.5 hours a week for the first 2 weeks to ensure appropriate mitigation measures are being appropriately implemented and are effective. As the task is repetitive once all procedures have been established the ECoW support level will

be reduced, however the ECoW will be onsite at least two times a week to carry out appropriate audits and monitoring and be available to provide advice by phone as required.

6.10 Surfacing

A 30m wide reinforced concrete apron slab to the rear of the quay wall will provide one continuous surfacing between Berth 5 and Berth 6 with the aim of facilitating loading and unloading of cargo. Geotextile membranes and potentially shallow material containment products will be utilised to minimise material movement over the rest of Phase 4. It will then be finished with crushed stone.

Aspects associated with installation of the concrete slab are considered in Section 6.11; this section only refers to the crushed stone finish.

6.10.1 In-Air Acoustics

The use of dump trucks, excavators, and rollers to form the revetments, together with the end tipping of the stone will give rise to in-air noise. All machinery will be well maintained, in order to minimise noise emissions, and vehicles and plant will be fitted with white noise reversing alarms.

The predictive noise modelling did not indicate that surfacing will give rise to nuisance effects, but it was the activity identified as resulting in the highest noise levels at the receptors. As discussed in Section 12 the ECoW will visit noise sensitive receptors during operations to qualitatively assess the potential to cause a nuisance noise effect. Quantitative noise monitoring at the noise sensitive receptors during the surfacing operations may be required at the ECoW's discretion, in order to verify the results of the predictive noise model.

6.10.2 Air Quality: Dust

All vehicles delivering materials to the site will be covered to minimise the spread of dust. Due to the material specification required to minimise sedimentation issues, the material will have a low fines/dust content. If materials are being stockpiled, and the weather is particularly dry then it may be dampened to minimise fugitive dust emissions.

Road sweepers will be utilised to minimise the spread of mud and dust on the construction site and surrounding roads.

Further detail is provided in the Dust Management Plan (DMP), Appendix 6B.

6.10.3 Traffic

As discussed in the FCTMP, deliveries will come from the west along the B817, to minimise the distance travelled through the town.

The delivery lorries will be checked for stones trapped between double wheels and in treads prior to departure from the quarry or the development site.

6.10.4 Pollution

All equipment utilised will be well maintained and regularly inspected to ensure that it isn't leaking, fuel, oils or hydraulic fluids. Where practicable hydraulic fluids utilised will be biodegradable.

Refuelling will be carried out in the designated areas, following site procedures. Materials will be managed as per CEMD Section 10.

6.10.5 Environmental Input

The ECoW will be onsite approximately 37.5 hours a week for the first 2 weeks to ensure all mitigation measures are being appropriately implemented and are effective.

As the task is repetitive once all procedures have been established the ECoW support level will be reduced, however the ECoW will be onsite at least three times a week to carry out appropriate audits and modelling and be available to provide advice by phone as required.

6.11 Concrete Works

Concrete will be used in numerous aspects of the Phase 4 Development, including installation of the four large bollard bases, the cope beam, the quayside slab, and other foundations for utilities.

Concrete will be delivered to site as ready mix and either mass poured directly or utilised to pre-cast components for later installation.

6.11.1 Traffic

As discussed in the FCTMP, deliveries will come from the west along the B817, to minimise the distance travelled through the town.

The delivery lorries will be checked for stones trapped between double wheels prior to departure from the development site.

6.11.2 Pollution

Equipment utilised in the placing of concrete will require washing, including excavator buckets, concrete pumps, and gravity fed hoppers. Concrete wash water is highly alkaline, and hence needs to be contained. As such concrete washout will only be carried out in a dedicated area. The concrete washout area will be at least 10m from the water nearest watercourse or drain and include appropriate containment to prevent release to the environment.

Concrete wash water will be settled to remove solids and if practicable, the water will be reused. If it is not possible to reuse the wash water; an appropriate treatment route will be identified.

Concrete lorries will only be permitted to wash their shoots on the site.

Appropriate shuttering and edge protection will be in place to ensure that concrete works in close proximity to the quay edge does not seep into the water column. The ECoW and Site

Supervisor will inspect all shuttering to be used during 'over-water' pours of concrete such as the cope beam, to ensure it is adequately sealed prior to the pour commencing.

All equipment utilised will be well maintained and regularly inspected to ensure that it isn't leaking, fuel, oils or hydraulic fluids. Where practicable hydraulic fluids utilised will be biodegradable.

6.11.3 Environmental Input

The ECoW will be onsite for the first week of all major concrete works to ensure that the appropriate mitigation and procedures are in place. After which they will be onsite twice a week to carry out audits and checks. The ECoW will be contactable by phone for the duration of the works, and available to conduct shuttering inspections as required.

6.12 Drainage

The Phase 4 Development laydown area will be drained utilising a French drainage system in conjunction with the quayside apron slab runoff, captured via channel drains installed to the rear of the slab. Both systems will connect into the one drainage discharge system, anticipated to be through appropriately sized oil and silt interceptors with penstock control, thus permitting cessation of flow into the Firth if required.

6.12.1 Air Quality: Dust

Excavations for the installation of drainage infrastructure may lead to fugitive dust emissions, particularly with regard track out from the site. Road sweepers will be utilised to minimise the spread of concrete dusts on the construction site and surrounding roads.

6.12.2 Traffic

As discussed in the FCTMP, deliveries will come from the west along the B817, to minimise the distance travelled through the town.

The delivery lorries will be checked for stones trapped between double wheels prior to departure from the development site.

6.12.3 Water Quality: Sedimentation

The surface water drains and associated outfalls will require a licence under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR). This will be applied for before the drains are installed. The provision of the oil and silt interceptor will prevent sediment loading effects.

6.12.4 Pollution

As detailed above, the drainage system will be CAR Licenced and include an oil interceptor. The provision of the penstock valve allows the system to be isolated, preventing oils and other contaminants which enter the drains from entering the marine environment.

All equipment utilised will be well maintained and regularly inspected to ensure that it isn't leaking, fuel, oils or hydraulic fluids. Where practicable hydraulic fluids utilised will be biodegradable.

Refuelling will be carried out in the designated areas, following site procedures. Materials will be managed as per CEMD Section 10.

6.12.5 Environmental Input

The ECoW will be involved in reviewing the suitability of the drainage design and will carry out audits and checks during the installation works as required. The ECoW will be contactable by phone for the duration of the works.

6.13 Furnishings

Furnishings cover a range of activities which will be conducted toward the end of the construction phase, such as the installation of bollards, fendering, lighting and other services not mentioned in previous sections. These activities carry a relatively low environmental risk; however, the following general provisions will be made.

6.13.1 Air Quality: Dust

Excavations for the installation of services and other furnishings may lead to fugitive dust emissions, particularly with regard track out from the site. Road sweepers will be utilised to minimise the spread of concrete dusts on the construction site and surrounding roads.

6.13.2 Traffic

As discussed in the FCTMP, deliveries will come from the west along the B817, to minimise the distance travelled through the town.

The delivery lorries will be checked for stones trapped between double wheels prior to departure from the development site.

6.13.3 Otter

If otters are utilising the potential layup at the south east corner of Phase 3, then there is the potential for them to be disturbed during the fender installation. Section 11.5 of the CEMD provides full details of the work being undertaken to establish an understanding of the otter use of the area. If required a European Protected Species (EPS) licence will be sought and full mitigation plan developed.

6.13.4 Pollution

All equipment utilised will be well maintained a regularly inspected to ensure that it isn't leaking, fuel, oils or hydraulic fluids. Where practicable hydraulic fluids utilised will be biodegradable.

Refuelling will be carried out in the designated areas, following site procedures. Materials will be managed as per CEMD Section 10.

6.13.5 Environmental Input

Due to the low risks the Environment the ECoW will be onsite only twice a week to carry out checks and audits. The ECoW will be contactable by phone for the duration of the works.

6.14 Vessel Traffic Management

The construction vessel traffic movements expected to be required to facilitate the development are detailed in Table 6.2. It is noted that the number of movements are estimated, as they are dependent on the nature of the vessels supplied by the principal contractor. The timings of the vessel movements cannot be accurately predicted until the principal contractor is appointed, and the final construction schedule is better understood. As such the timings are currently to be confirmed, and will be provided in an updated CEMD following the appointment of the principal contractor.

Construction vessel traffic will abide by the following provisions, which unless otherwise stated apply only to vessels exceeding 10m in length:

- Upon entering PoCF's Port Limits, vessels will transit to the Phase 4 Development using the main navigational channel, unless otherwise required for reasons of safe navigation.
- Vessels will maintain constant speed and direction when transiting between the Phase 4 Development and the spoil disposal ground, unless otherwise required for reasons of safe navigation.
- Vessels will adhere to set routes (in accordance with the general requirements of PoCF) between the Phase 4 Development and the spoil disposal ground.
- All vessels, including vessels under 10m in length, will adhere to the general principles in the Scottish Marine Wildlife Watching Code when undertaking their activities.

Table 6.2: Construction Vessels

Construction Step	Vessels	Location Description	Movements Through Firth	Timing	Assumptions/Comments
Revetment Toe Dredge	Barge for Backhoe Digger and Associated Tug	Revetment area of Phase 4. Tying up at a suitable berth when not in use (at nights).	2	TBC	Mobilisation and demobilisation movements.
	Tug and Barge for Dredging Disposal.	Filling at Phase 4 then travelling to the Sutors disposal ground for disposals. Tying up at a suitable berth when not in use (at nights).	10	TBC	Assumes barges can take 3,000m^3 of material. Includes mobilisation and demobilisation movements.
Quay Wall Piling	Pile Delivery Vessel	Travelling from source port, through the Moray Firth and Cromarty Firth to deliver piles to an available existing berth.	4	TBC	Piles and tie rods assumed to be delivered on two vessels.
Quay Wall Piling	Piling Vessel or Barge and Tug.	Berth 6 quay wall area. Tying up at a suitable berth when not in use (at nights).	2	TBC	Mobilisation and demobilisation movements.
Berth Dredging	Barge for Backhoe Digger and Associated Tug	In the Berth 6 dredging area. Tying up at a suitable berth when not in use (at nights).	2	TBC	Mobilisation and demobilisation movements.
	Suction Dredger or Equivalent.	In the Berth 6 dredging area. Travelling to/from the Sutors disposal ground for dredge disposal. Likely to carry out the works 24/7.	18	TBC	Assumes 60% of dredge material not suitable for reuse 60,000m^3 of material requires disposal and the dredger can hold 7,000m^3, a larger vessel would give rise to less movements.
Infilling	Material Delivery Vessel	Travelling from material source, through the Moray Firth and Cromarty Firth to deliver infill material direct to Phase 4.	112	TBC	A total of 320,000m^3 of material is required (dry volume), and that 40% of dredge material can be reused~40,000m^3. 280,000m^3 of material to be delivered. Assume deliver vessel has 5,000m^3 capacity (dry volume).
Various	Safety Boat	Phase 4 construction area, Tying up at a suitable berth when not in use (at nights).	0	TBC	Small boat likely to be delivered by road and launched locally.

Construction Environmental Management Document		
Section Number		Appendix 6A
Section Title		Dredging for Sea Disposal Protocol
Issue		1
Issue Date		15/05/18
Author		Jon Ashburner
Approved		Fiona Henderson
Document History		
Issue	**Date**	**Reason for Change**
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Introduction

110,000m^3 of material are to be dredged to construct the Phase 4 Development. Following analysis of the GI results, it is anticipated that 40-60% of the total dredged spoil volume will not be suitable for reuse and will require sea disposal at the Sutors spoil ground. This document lays out the steps to be taken prior to, during and after dredging.

Prior to Dredging

Prior to dredging the following should be completed/ in place:

- A meeting is to take place between the dredging vessel master and the Port Manager to discuss/agree:
  - Transportation routes and timing, to and from the Sutors;
  - Communication/Radio Protocols; and
  - Harbour General Directions.
- Notices to Mariners, and/or Navigation Warnings issued as appropriate.
- Marine Scotland to be notified of the date of commencement.
- Vessel master to be provided with a copy of all relevant licences.
- Vessel Master and MMO/PAM operators to be provided with copies of the Spoil Disposal Marine Mammal Protocols (Section 11.3.4.2).

During Dredging for Sea Disposal

During dredging operations, the following should be implemented:

- Marine mammal observations to be carried out as detailed in CEMD Section 11.3.4.2.
- No disposals to be made if marine mammals are within 200m of the dredging barge.
- Transportation to utilise routes agreed with the Port Manager.
- All sea disposals to be made at the Sutors Spoil Ground (CRO19).

- Samples to be taken in accordance with Marine Scotland instructions.
- If contamination is suspected material will not be disposed of until appropriate checks have been made.
- All dredging and disposal works to be carried out as detailed within the CEMP.
- Persons authorised by Marine Scotland will be permitted to inspect works.
- The dredger, barges and tugs will exhibit the required lights/shapes at all times.
- Form FEP6 to be completed for each disposal

Disposals will not be carried out in hours of darkness, or when weather or sea conditions are unsuitable for visual observations, unless PAM is provided at the spoil ground as detailed in Section 11.3.4.2.

No dredging or sea disposals of dredged spoil will be conducted in the period between the 1st and the 31st May (inclusive) of any year.

Post Dredging

The following will be completed post dredging:

- A written marine mammal report and associated MMO forms shall be submitted to Marine Scotland.
- Spoil samples and completed FEP 6 forms will be provided to Marine Scotland.

Construction Environmental Management Document		
Section Number		Appendix 6B
Section Title		Dust Management Plan
Issue		1
Issue Date		15/05/18
Author		Fiona Henderson
Approved		Jon Ashburner
Document History		
Issue	**Date**	**Reason for Change**
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Introduction

Revetment construction, infilling and surfacing all have the potential to give rise to dust, which can become a nuisance and potentially a health hazard, especially in dry and windy conditions. Steps to be taken to minimise and monitor dust effects are detailed within this Dust Management Plan which accompanies the Construction Environmental Management Plans (CEMPs) provided in Section 6.

Dust Prevention

Revetment construction and surfacing materials will be specified as being low in fines, in order to meet engineering requirements; this will also reduce the potential for fugitive dust emissions. All delivery vehicles entering and leaving the site will be covered to prevent dust being an issue on the public roads.

Infilling materials will have a relatively high fines content and may be delivered to the site in wet or dry states; wet materials may be piled above the water level and as such can dry out. Not matter what the source of infill material there will be a need to keep the material damp in order to prevent fugitive dust emissions.

Mobile sprayers or static sprinkler systems will be utilised during periods of dry weather to keep stockpiles and other exposed surfaces of infill material wet. The ECoW will take note of weather forecasts to ensure that measures are in place prior to periods of dry or windy weather.

Infill materials will be covered with geotextiles and surfacing as soon as practicably possible, to cover up the potential dust source.

Delivery vehicles will follow designated routes, designed to minimise exposure to dusty materials; this will be achieved by routing vehicles over lock block, hard standing, newly

constructed revetment, and surfaced reclamation area such that their wheels do not pick up materials that could lead to track out.

Minimising Spread and Track-Out

Road sweepers will be employed as required to minimise the spread of materials through the Invergordon Service Base, and if need be onto the public road.

Dust Monitoring

The ECoW will carry out regular checks of materials which have the potential to give rise to dust, to ensure that they are kept damp. In addition, inspections of the adjacent areas of the service base, the site entrance, and the B817 will be carried out to identify if dust is becoming an issue. The ECoW will carry out spot checks on delivery vehicles to ensure that they are utilising their covers. If required, appropriate remedial steps shall be taken these may include:

- Wetting of material;
- Increasing resource levels for material damping;
- Additional road sweeping; and
- Reminders to drivers to utilise their vehicle covers.

In event of repeat issues, quantitative dust monitoring techniques will be employed, to monitor the effectiveness of the dust mitigation provided at the site. This would most likely take the form of directional passive monitoring, as detailed in the Institute of Air Quality Managements, Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites. If used, dust monitoring stations will be positioned on the northern and eastern boundaries of the site, proximal to the nearest sensitive receptors, as well as at the site entrance.

Construction Environmental Management Document		
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Section Title		Site Emergency Response
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7 Site Emergency Response

7.1 Introduction

Pollution prevention measures have been developed to minimise the risk of an environmental incident occurring during the Invergordon Service Base Phase 4 Development. These measures combine both the current UK best practice and guidance from the following documents.

- Construction Environmental Management Process for Large Scale Projects, The Highland Council (2010).
- PPG 1: Understanding your environmental responsibilities – good environmental practices [NIEA et al., 2013];
- GPP 5: Works and maintenance in or near water [NIEA et al., 2018];
- PPG 6: Working at construction and demolition sites [NIEA et al., 2012];
- PPG 7: Safe storage – The safe operation of refuelling facilities [NIEA, SEPA, & Environment Agency, 2011];
- PGG 18: Managing Fire Water and Major Spillages [SEPA et al., 2000];
- GPP 21: Pollution Incident Planning [NIEA et al., 2017];
- PPG 22: Incident Response – Dealing with Spills [NIEA, SEPA, & Natrual Resources Wales, 2011];
- PPG 26: Safe Storage – Drums and Intermediate Bulk Containers [NIEA et al 2011]; and
- Alien invasive Species and the Oil and Gas Industry Guidance for Prevention and Management [IPIECA & OGP, 2010].

However, in the unlikely event of an environmental incident occurring, it is important to have a comprehensive emergency response plan in place in order to minimise the potential impacts.

7.2 Outline of Procedures

The emergency response plan follows the 'Source – Pathway – Receptor' model as described in PPG1. In the event of an environmental incident the following will be prioritised:

- Stop the source of the pollution.
- Interrupt any pathways to the environment.
- Report the incident in as much detail as possible to site management and the ECoW.
- Clean the contaminated area and recover pollutants.
- Analyse the event to prevent further incidents.

The detailed Emergency Response Plan (ERP) can be found in Appendix 7A.

The site manager and ECoW will ensure all site personnel are trained in the ERP through regular toolbox talks, drills, and safety briefs.

7.3 References

IPIECA, & OGP. (2010). *Alien invasive species and the oil and gas industry: Guidance for prevention and management*. Retrieved from London, UK:

NIEA, Environment Agency, & SEPA. (2012). *PPG 6: Work at Construction and Demolition Sites*. Retrieved from http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/.

NIEA, Environment and Heritage Service, SEPA, & Environment Agency. (2018). *GPP5: Works and Maintenance in or Near Water*. Retrieved from http://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm_source=website&utm_medium=social&utm_campaign=GPP5%2027112017.

NIEA, SEPA, & Environment Agency. (2011). PPG 7: The safe operation of refuelling facilities. In (pp. 30): NIEA, SEPA and Environment Agency.

NIEA, SEPA, & Environment Agency. (2013). PPG 1: Understanding Your Environmental Responsibilities - Good Environmental Practices. In (pp. 10): NIEA, SEPA and Environment Agency.

NIEA, SEPA, & Natrual Resources Wales. (2011). PPG 22: Dealing with spills. In (pp. 31).

NIEA, SEPA, & Wales, N. R. (2017). GPP 21: Pollution Incident Response Plans

SEPA, Environment Agency, & Environment and Heritage Service. (2000). PGG 18: Managing fire water and major spillages. In (pp. 6).

Appendix 7A – Emergency Response Plan

PROCEDURE TO BE FOLLOWED IN THE EVENT OF A SPILLAGE:

The following procedures are intended as a guide to dealing with incidents. Staff shall act in accordance with these procedures whilst applying common sense and ensuring their own health & safety and those of others.

1. **If possible, identify the source of the spillage and cut off source, e.g. by closing valve, righting container etc.**
2. **Call of help* - Port Radio on 01349 852308 or VHF Ch11**
    - **Key Information to be provided in a clear and concise manner:**
        - **What substance was spilled;**
        - **Approximate volume and time of spillage;**
        - **Accurate location of spill;**
        - **Help required i.e. manpower, machinery, expert advice, disposal, etc; and,**
        - **Whether the spill has reached a drain or watercourse.**
3. **Identify where spillage has gone to and/or where it may go to. Contain the spillage using appropriate spill management equipment and absorbents (spill kit); cover any drains which spills could reach.**
4. **If there is a risk of the spill reaching a drain, cover or block drain.**
5. **If spills have or are at risk of entering a drain, then close the appropriate drain isolation valve.**
6. **If a spill has reached a watercourse the following measures should be applied-**
    - Place flexible absorbent booms around the spillage to minimise the spread;
    - Place absorbent cushions in the affected area inside the booms.
    - Call the SEPA Emergency Hotline Number – 0800 80 70 60
7. **Clean any contaminated surfaces as soon as possible / immediately. All contaminated materials should be placed in sealed polythene bags/containers and store within the designated waste storage area. For spills that have entered the drainage system arrange for the to be pumped out promptly.**
8. **Dispose of contaminated materials appropriately in accordance with the site waste management protocols;**
9. **Fully complete an Incident Report.**

Key Information to be provided in a clear and concise manner (as soon as possible, but within 30 minutes of incident):

- What substance was spilled;
- Approximate volume and time of spillage;
- Accurate location of spill;
- All measures taken;
- Help required i.e. manpower, machinery, expert advice, disposal, etc; and
- Whether the spill has reached a watercourse.

Key Contact Information

Construction contractor (TBC) using the emergency procedures; contact details located at the back of the Site Card issued to everyone of site. Contact details are as follows:-

Name	Role	Contact
TBC	TBC	TBC
TBC	TBC	TBC
TBC	TBC	TBC
TBC	TBC	TBC
TBC	TBC	TBC

If the spillage is likely to cause pollution, then the ECoW or a Construction contractor staff member will contact the Scottish Environmental Protection Agency (SEPA) using the emergency hotline number

(0800 80 70 60)

Construction Environmental Management Document		
Section Number		8
Section Title		Site Waste Management Plan
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8 Site Waste Management Plan

8.1 Introduction

The main source of waste during construction works is dredged material, the management of which is covered in Section 6 and as such will not be covered here. Other wastes including: cement washings, wood utilised for shuttering, off-cuts of rebar metals and packaging materials associated with both construction works, and the welfare facilities will also arise during construction.

The waste hierarchy will be employed throughout the construction works.

8.2 Waste Hierarchy Implementation

8.2.1 Reducing Waste

Where practicable steps will be taken to avoid the production of waste. For example, the use of reusable water bottles, crockery and cutlery in the welfare facilities, will prevent the need for single use plastics.

The bulk of material will be delivered in HGV's without packaging, where practical requests should be made to suppliers to minimise packaging.

Similarly ordering the correct quantity and types of materials will prevent excess materials not utilised being disposed of as waste.

8.2.2 Reuse

Where possible materials can be reutilised. For example, wood utilised in shuttering can be utilised more than once. Cement wash water can be reutilised to wash equipment once it has been settled out.

8.2.3 Recycle

Recycling will be facilitated by the segregation of wastes. Clearly marked and labelled waste receptacles will be provided in designated areas. Wastes suitable for recycling are likely to include wood, metals, glass, paper, plastics and oils.

8.2.4 Dispose

Solid waste not suitable for recycling will be sent to landfill as waste, or special waste, depending on its constitution. A suitable licensed waste contractor will be employed to collect wastes for recycling and disposal.

8.3 Cement Washing

Cement washings will be carried out in a dedicated area. Washing arisings will be collected for onsite treatment. This will include settlement and, if required, pH correction. The liquids will be reused on site as grey water if suitable, or disposed of via a consented discharge onsite route, if available. Alternatively, they will be tanker'd off site for disposal. The solids will be disposed of as solid waste.

8.4 Waste Management

Waste receptacles (bins and skips) will incorporate lids or covers to protect against vermin gaining access and wind blowing wastes out of skips.

The principle contractor will put in place procedures for ensuring that appropriate records are kept for all waste arisings including volumes, categories and waste carriers used, and that waste transfer notes are retained.

8.5 Monitoring

The Environmental Clerk of Works (ECoW) will carry out regular waste compliance audits and review details of waste arisings to identify areas for opportunity to reduce or recycle more wastes in conjunction with the Principle Contractor.

Construction Environmental Management Document		
Section Number		9
Section Title		Protocol for Archaeological Discoveries
Issue		1
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Author		Jon Ashburner
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Issue	**Date**	**Reason for Change**
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9 Protocol for Archaeological Discoveries

9.1 Introduction

Underwater archaeology was scoped out of the EIA process as there was no evidence of archaeological remains being present in the area. However, if artefacts are present, the activities associated with the Invergordon Service Base Phase 4 Development, particularly dredging, could impact the historic environment. As such this procedure based on the Protocol for Archaeological Discoveries (PAD) as established by Wessex Archaeology on behalf of The Crown Estate, will be implemented on site as a precautionary measure.

9.2 Terms

The PAD defines two types of Archaeological discovery:

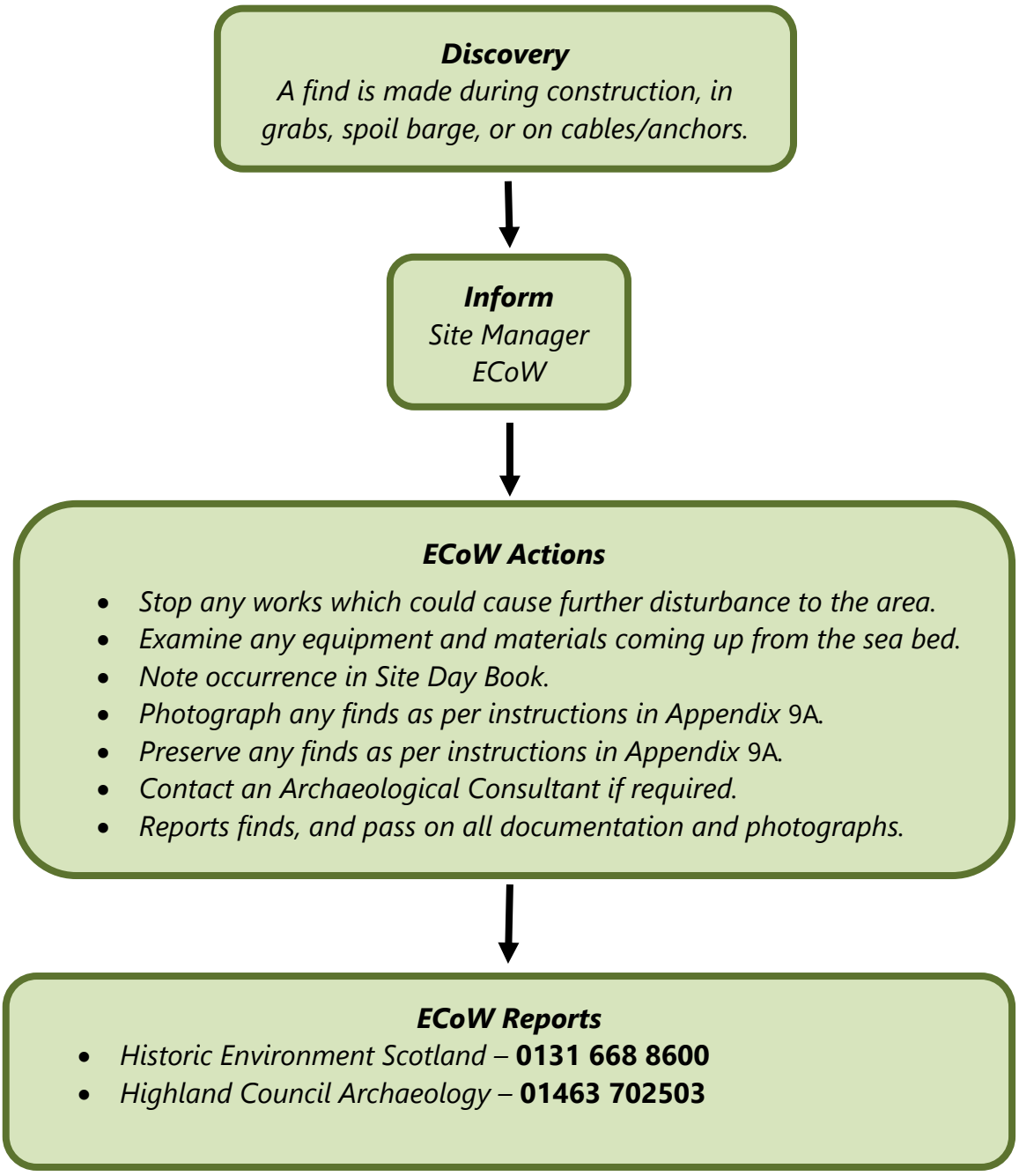
- *'Finds'* – an object of archaeological potential; this means it has been impacted by people and may reveal something of past lives. Eco-artefacts such as animal and plant remains are also included in finds as they help us to understand the past human landscape. Finds can either be objects on the sea floor or those brought to the surface.
- *'Anomalies'* – are differences in the sea bed (either digital or visual) which could be of archaeological significance, and need further investigation. Anomalies should always be treated as significant until determined otherwise.

9.3 Protocol

The bathymetric survey and benthic transects conducted during EIA revealed no archaeological anomalies. No further bathymetry will be conducted during construction so this protocol will only cover archaeological finds brought to the surface during construction works.

All site personnel will be briefed on the significance of archaeological finds, and will be instructed to report any discoveries to the Site Manager and ECoW. In the event of a find, any works which may cause further disturbance to the area will be ceased, the find will be documented, photographed and preserved by the ECoW as per instructions in PAD (Appendix 9A). Advice will be sought from an archaeological consultant if required and reports made to Historic Environment Scotland and The Highland Council.

Figure 9.1 Protocol for Archaeological Discovery



Appendix 9A – Protocol for Archaeological Discoveries

Offshore Renewables Protocol

for Archaeological Discoveries

Handout 1: Introduction

Protocol for Reporting Archaeological Discoveries
Implementation Service and Awareness Programme

The Crown Estate owns around half the foreshore and nearly the entire seabed out to the 12 nautical mile limit, and has the rights to licence areas up to 200 nautical miles offshore for renewable energy. It is anticipated that by 2020 approximately one-third of all UK energy will be produced from offshore renewables.

Following the success of the British Marine Aggregate Producers Association (BMAPA) Protocol for Reporting Finds of Archaeological Interest, The Crown Estate commissioned Wessex Archaeology to establish and implement a protocol for the offshore renewables industry.

The aim of the Protocol for Archaeological Discoveries (PAD) is to provide a system for reporting and investigating archaeological finds encountered during construction and installation work. Activities associated with renewable energy such as: placement of turbines, cable-laying, geophysical surveys and seabed sampling all have the potential to impact on the historic environment.

Process
Under the Protocol, staff who make a discovery report it to a local 'Site Champion' onboard the vessel or on site. The Site Champion then passes this report to the company's 'Nominated Contact', the person identified to deal with PAD within each developer.

Once a find is reported through the secure web-based reporting system, Wessex Archaeology's 'Implementation Service' is automatically alerted to the presence of a new find. Staff investigate every find with the help of specialists from around the country and compile detailed reports. The reports are then sent to the finder and all relevant authorities.

Awareness
To support the Protocol, Wessex Archaeology is conducting an Awareness Programme which includes visits to sites and companies as well as regular newsletters. This programme aims to raise awareness of, and confidence in, the use of the Protocol amongst staff.

This pack contains advice and guidance in support of the Protocol Implementation Service.

It includes:
Handout 1 – Introduction
Handout 2 – What are 'finds'?
Handout 3 – Reporting
Handout 4 – Photographing finds
Handout 5 – Conservation & Storage
Handout 6 – Prehistoric Finds
Handout 7 – Metalwork & Concretions
Handout 8 – Munitions & Ordnance

If any of these are missing, or you would like further copies, please contact the Protocol Team at Wessex Archaeology.

For further information please contact:
Toby Gane (Project Manager)

Wessex Archaeology
Portway House
Old Sarum Park
Salisbury, SP4 6EB
Tel: 01722 326867
Fax: 01722 337562
info@wessexarch.co.uk

Or visit Wessex Archaeology's Protocol pages on the website:
http://www.wessexarch.co.uk/projects/marine/tcerenewables

Nominated Contacts should report discoveries through the secure reporting website:
http://net.wessexarch.co.uk/orpad

THE CROWN ESTATE

Offshore Renewables Protocol

for Archaeological Discoveries

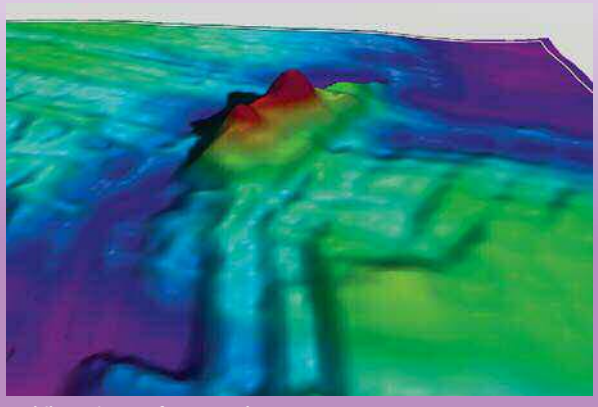
What are finds? Why should they be reported?

Finds

A 'find' is an object with archaeological potential; this means that it has been impacted by people and may be able to tell us about their past lives. A find can include objects on the seafloor as well as those brought to the surface. We include eco-artefacts as finds; these are remains of animals and plants, such as mammoth and peat, which help us to understand the past human landscape.

Anomalies

Anomalies are a little different from finds in that they are not automatically recognised as archaeological. Instead, anomalies are visual or digital differences that need to be further investigated. Anomalies should always be considered as possibly important archaeological sites until it has been determined otherwise.



Multibeam image of an anomaly

Importance

Archaeological finds are important because they can shed light on past human use of the landscape, sea and seabed. The information that discoveries provide can help archaeologists to understand the human past and protect it for future generations.

Example

The discovery of 28 handaxes with other flint implements and mammoth teeth from the seabed was described as the 'single most important find of Ice Age material from below the North Sea'. The handaxes are between 200,000-300,000 years old and their discovery is incredibly important as they indicate areas where prehistoric humans lived and worked. This example proved that evidence from the last Ice Age has survived underwater and can be found intact.

Selection of handaxes, mammoth teeth and tusk

Offshore Renewables Protocol

for Archaeological Discoveries

The reporting process

On land

Discoveries found in the intertidal zone
A find is made during construction

Discoveries found after work on site
A find or anomaly is discovered during sample analysis or while reviewing geophysical data

At sea

Discoveries made on board a vessel
A find is made on board the vessel, in grabs or attached to anchors and cables

Discoveries found on the seabed
An anomaly indicates that an object or structure has been encountered on the seabed

Project Staff
Inform Site Champion

Site Champion

Avoid further disturbance work in this area (if found during works)

Note the occurrence, in a daybook, or site log

Photograph any find(s) recovered (see Handout 4)

Arrange for any recovered find to be immersed in seawater (if waterlogged) or in a suitable, clean, covered container as appropriate (see Handout 5)

Inform the Nominated Contact and pass on all available information, including a copy of the Preliminary Record and copies of any photographs, drawings or data files

Site Champion

Cease work that may impact the seabed in that area, or move to a new location

Examine any gear, such as grapnels or ploughs, coming up from the seafloor

Note the occurrence in the vessel's log

Mark the area on navigational/survey software

Photograph any find(s) recovered (see Handout 4)

Arrange for any recovered find to be immersed in seawater (if waterlogged) or in a suitable, clean, covered container as appropriate (see Handout 5)

Inform the Nominated Contact and pass on all available information, including a copy of the Preliminary Record and copies of any photographs, drawings or data files

Report to
Nominated Contact

Photographing finds

What is the photograph for?

The photographs that we receive of new discoveries are very important. They provide a lot of information about each object and can be sent to specialists around the country.

Tips

Make sure there is a scale in the photo – if you do not have the scale sheet provided you can use a ruler or known object, such as a coin or biro, to help show the size of the find.

Biro scale

To avoid light spots in the photo make sure any excess water is wiped off.

Make sure the photo is sharp.

Do not include too many objects in one shot.

Take photographs at different angles; the more photographs and views, the easier it is to interpret the artefact.

Take additional close-up pictures of markings or features that you think are unusual.


Detail shot

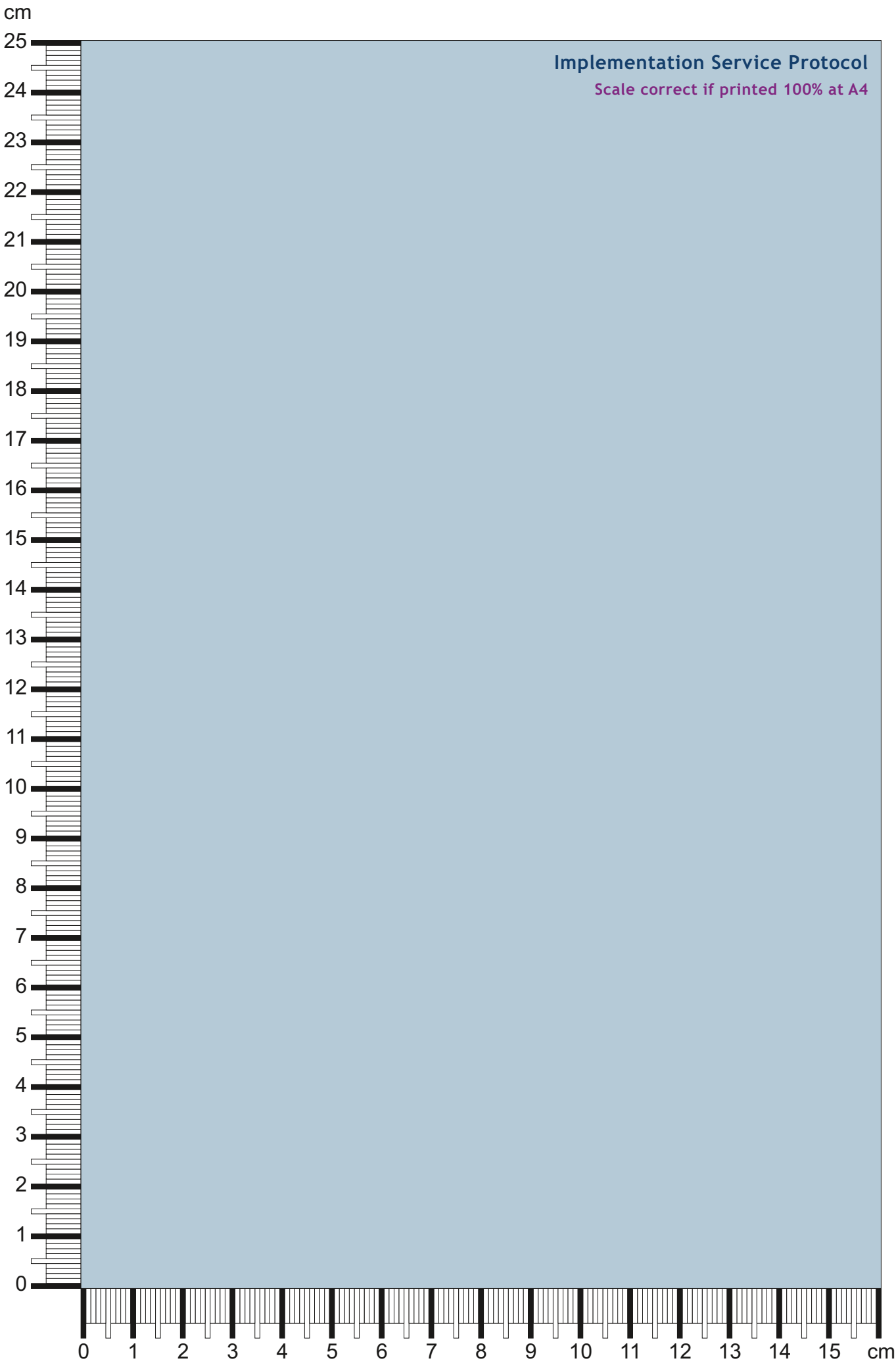
Checklist

Can someone tell from the photos:

What size the object is.
What shape it is.
What type of object it is.
What it is made of.
Whether it has any unusual markings.


Good use of scale sheet


Take photos from different angles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Offshore Renewables Protocol

for Archaeological Discoveries

Conservation and Storage

Marine finds are very fragile and can dry out quickly. Don't be fooled; even seemingly robust objects such as cannonballs can quickly degrade if they are not treated correctly.

What do I do with a wet find?

1 – Place the find into a plastic container and completely cover with seawater. If the find is large, cover as much as possible with seawater and wrap the rest in wet fabric or polythene.

2 – Label the container or wrapping and store in a cool dark area.

Example: ***Developer_0001 Nail from [Name] Offshore Windfarm Zone Discovered by J.Bloggs 01/12/2010***

3 – Check the condition of the find regularly. Change the seawater when necessary and note any cracks or flaking.

The detrimental effects of rapid drying on iron shot

What do I do with a dry find?

If a find is dry do not to place it back into water. But it is still important to label it and place in a dark, cool place.

Further advice

Advice on conservation can be sought from the Portable Antiquities Scheme (PAS) which has a network of regional archaeologists (Finds Liaison Officers or FLOs). FLOs are responsible for recording finds reported by the public and providing advice. Contact details for your local officer can be found on the PAS website:

http://www.finds.org.uk/involved/contacts.php

Three rules

- Wet – Keep the object wet by covering with water in an appropriately sized container.
- Cool – The hotter something is the more likely it will corrode so place the artefact somewhere cool.
- Dark – Place the artefact away from direct contact with light, such as in a drawer or cupboard.

Things to avoid

- Supermarket bags – they contain harmful chemicals
- Drying – when wet finds dry quickly they crack and disintegrate
- Tissue paper – tissue will degrade in water
- Bubblewrap – textured wrapping can leave impressions on soft finds
- Placing different finds together – some types of material can be affected by contact with others
- Metal containers – metal can cause problems such as corrosion
- Glue – Some glues are harmful; if a find breaks don't fix it

Offshore Renewables Protocol

for Archaeological Discoveries

Prehistoric finds

Some of the first things that spring to mind when you think of underwater archaeology are shipwrecks and aircraft wrecks. Whilst shipwrecks are important, there is a huge range of other exciting and significant artefacts that can be found under the sea.

Some of the most important finds from the seabed are stone tools. Stone tools are the oldest known technology used by man. These implements were first used in Africa 2.5 million years ago and until metal was discovered, stone was the primary resource for making tools.

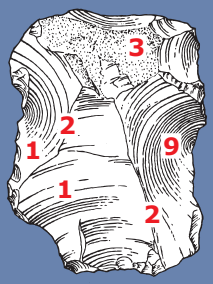
Whilst a large majority of tools are made from flint, in places where this was not available other stones were used instead.

It is not only the tools which are of interest to archaeologists, flint-knapping produces piles of waste flakes. Archaeologists examine the flakes to see what sort of tools were being made.

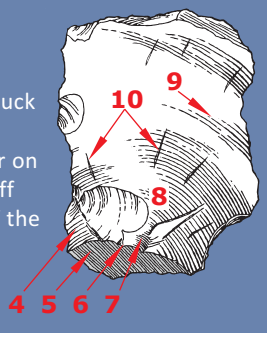
See below for some examples of handaxes, arrowheads and flakes.

How to recognise stone tools and flakes

Stone tools and flakes have recognisable features and shapes that indicate they were made by humans. The **negative flake scars** and **bulb of percussion** are some of the easiest to find.



The **bulb of percussion** is a curved raised lump left behind when a flake is struck off. The **negative scar** is a concave cone-shaped scar on the flake where it came off the core - the opposite of the bulb of percussion.



1 Negative Flake Scars
2 Ridges
3 Cortex
4 Bulb Scar
5 Butt
6 Point of Percussion
7 Cone of Percusion
8 Bulb of Percussion
9 Conical Ripples
10 Fissures

Offshore Renewables Protocol

for Archaeological Discoveries

Metalwork and Concretions

What is a concretion?

Concretions are dense clumps of hard material that develop on the surface of iron or other ferrous metals as they corrode. A concretion can form one clump around an object or become large sections on iron shipwrecks. Within a concretion the object gradually corrodes away, sometimes leaving only a hollow space. It is easy to see if a concretion has been freshly pulled off an iron object as it has a bright orange rust colour.

Why are concretions important?

Concretions can easily hide the shape of an object, making them impossible to identify. However you should not assume that concretions are unimportant; x-rays can sometimes reveal what lies underneath the concretion, or injecting filler can make a mould of the hollow shape.

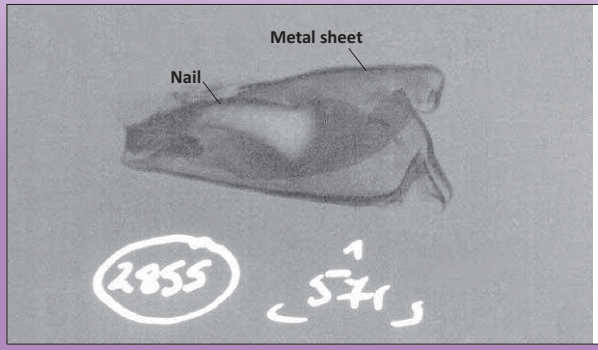
Recording

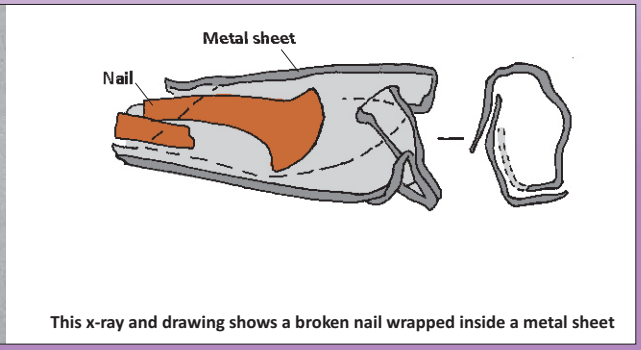
As with other types of artefacts, the more information we have the better. When recording concretions useful information includes length, width, diameter and thickness of concretion, where possible.

Keep your eyes peeled

Some people miss concretions as they can look like rocks from the seafloor. If you find something you're not sure about, report it.

A concretion can look like a rock





This x-ray and drawing shows a broken nail wrapped inside a metal sheet

Offshore Renewables Protocol

for Archaeological Discoveries

Munitions and Ordnance

Always follow Company Guidelines on the
SAFE TREATMENT OF MUNITIONS
when they are discovered

Despite long periods spent underwater munitions can still be extremely dangerous and should always be treated with caution. The appropriate response when dealing with munitions is to report them to the police, coastguard or Ministry of Defence in line with your company policy.

How common are munitions?

Up to 10% of the bombs that fell on and around the UK during WWII failed to function and so far only a fraction of these have been recovered. In addition to these 'blind' munitions, ordnance from both world wars was dumped at sea and munitions on board sunken vessels are rarely salvaged.

Fuse cap

Reporting munitions

Always follow safe working procedures when dealing with munitions. Before reporting munitions via the PAD they must be made safe or identified as inert by the police or a military Explosive Ordnance Disposal Officer (EOD). Once the items have been confirmed as safe and suitable for handling they should be reported as normal through the protocol. If you have any queries regarding the reporting of munitions please contact a member of the Implementation Service team.

Vis or Random pistol

German WWII machine gun

Ammunition

Construction Environmental Management Document		
Section Number		10
Section Title		Materials Management Plan
Issue		1
Issue Date		15/05/18
Author		Jon Ashburner
Approved		Fiona Henderson
Document History		
Issue	**Date**	**Reason for Change**
1	15/05/18	Issued for Marine Licence Application

10 Introduction

10.1 Introduction

Due to the scale of the area being reclaimed there is a need for large volumes of material to be utilised in the construction of Phase 4. Hence it is essential that they are appropriately stored and managed. Once the Principal Contractor is appointed, a site map will be developed, to determine appropriate storage locations for each material type, in accordance with industry best practice and relevant environmental guidance. The site map will be approved by the ECoW, and provided as Appendix 10A to the CEMD.

The transport of material by road is considered in the Framework Construction Traffic Management Plan (FCTMP), as such they are not discussed in this section. Waste management is discussed in Section 8.

10.2 Material Requirements

The estimated quantities of the main materials associated with the construction of the Phase 4 project are provided below:

- Revetment materials (62,000m^3) – rock to be delivered by road and positioned, hence it will not require storage.
- Rock (23,000m^3) for Rock armour – delivered by road.
- Stone fill for surfacing (12,000m^3) – delivered by road.
- Piles (5,200 tonnes) – which will be delivered by sea to site and stored either on the piling barge or in the laydown area until required.
- Infill material (320,000m^3) – to be delivered by sea, discharged into the infill area and moved into place.
- Concrete (3,500m^3) – Local ready-mix supplier which is delivered by road.
- Fuel (81,600 gallons/370m^3) – required for vehicle and plant.

- Miscellaneous inert materials – including furnishings, electrical cabling, drainage pipes etc, delivered and stored on site till required.
- Miscellaneous hazardous materials – resins etc which will be delivered and stored in the COSHH Storage area.

10.3 Fuel Storage

Where fuel is stored and plant is fuelled the following will apply.

- The fuel point is to be sited at least 10m away from drains and watercourses.
- A suitable double skinned or bunded tank and stand will be provided.
- The fuel tank will be protected from accidental damage, collision or vandalism.
- The distribution hose will be fitted with a shut off type filling nozzle.
- The filling nozzle will be fitted with a security lock to prevent unauthorised use.
- A drip tray will be provided below the distribution hose and nozzle when not in use.
- A fuel accountancy system will be employed.
- Refuelling will be carried out in accordance with site procedures by trained personnel.
- Filling of the fuel store will be carried out in accordance with site procedures by trained personnel.

10.4 Hazardous Material Storage

All hazardous material will be stored in accordance with COSHH data in the COSHH storage area. The COSHH store will be locked and access controlled, an inventory of materials stored will be maintained.

10.5 Material Quality

Materials will be sourced from reputable suppliers and will be subject to the appropriate quality checks to ensure that it is fit for purpose.

Appendix 10A – Site Map

NOT CURRENTLY USED:

To be developed in conjunction with the Principal Contractor once appointed

Construction Environmental Management Document		
Section Number		11
Section Title		Habitat and Species Protection Plan's
Issue		1
Issue Date		15/05/18
Author		Jon Ashburner, Lucy Quinn & Innes Beaton
Approved		Fiona Henderson
Document History		
Issue	**Date**	**Reason for Change**
1	15/05/18	Issued for Marine Licence Application.
2	26/07/18	Added 11.3.4.3 in line with SNH comments.
3	07/08/18	Updated 11.2.4.1 in line with RSPB comments.

Contents

11 Habitat and Species Protection Plans

11.1 Introduction

There are a number of ecologically designated areas in and around the Cromarty Firth as detailed in Table 11.1.

Table 11.1 – List of Protected Areas

Designation	Name	Location relative to Invergordon	Description
Site of Special Scientific Interest (SSSI)	Cromarty Firth	Adjacent	Birds & Littoral Sediment
Special Protection Areas (SPA)	Cromarty Firth	Adjacent	Birds
RAMSAR	Cromarty Firth	Adjacent	Birds
Special Area of Conservation (SAC)	Moray Firth	5km East	Sub-tidal sandbanks & marine mammals
Proposed Special Protection Area (pSPA)	Moray Firth	10km East	Birds
Special Area of Conservation (SAC)	Dornoch Firth & Morrich More	20km North East	Marine mammals & seals

Habitat and Species Protection Plans have been identified for breeding birds, marine mammals, diadromous fish and, otters to ensure that all concerned are aware of the specific issues associated with the species of concern. All mitigation is included within Section 14: Schedule of Mitigation, to aid implementation within the CEMPs detailed in Section 6.

In addition to the protection of specific species, the management of Marine Non-Native Species has been included in Section 11.6.

11.2 Breeding Birds Species Protection Plan (BBSPP)

11.2.1 Introduction

The Phase 4 construction site is immediately adjacent to the Cromarty Firth Special Site of Scientific Interest (SSSI) and Special Protection Area (SPA), designated for their non-breeding and breeding birds (11.1).

A number of bird species have the potential to be affected by construction activities. During the rock armour removal, it is possible that breeding birds may be using the rock armour for nesting habitat or may be in the close vicinity to where construction vehicles will have to be. The species most likely to be using the rock revetment will be eider ducks, but it is possible other species may use the rock revetment, such as Arctic or common terns, oyster catchers, or common gulls. To avoid the accidental destruction of any nests, mitigation is required to protect the bird species.

11.2.2 Protection

All wild birds in the UK are protected under the Wildlife and Countryside Act 1981 (as amended). Directive 2009/147/EC of the European Parliament and of the Council, on the conservation of wild birds, commonly known as the Birds Directive, protects all wild birds, their nests, eggs and habitats within the European Community. It gives member states of the European Union, the power and responsibility to classify Special Protection Areas (SPAs), to protect birds which are rare or vulnerable in Europe, as well as all migratory birds which are regular visitors. The 2009 Directive is the consolidated (or 'codified') version of Council Directive 79/409/EEC which originally came into force in 1979 and was amended many times before being replaced by the current version. The level of protection for the likely species are shown below.

Eiders and common terns are designated species under the Cromarty Firth SPA. Both Arctic and common terns are Annex 1 species on the Birds Directive.

11.2.3 Offences

It is an offence to intentionally or recklessly:

- Kill, injure or take a wild bird;
- Take, damage, destroy or interfere with a nest of any wild bird whilst it is in use or being built (or at any time for a nest habitually used by any bird listed in Schedule A1;
- Obstruct or prevent any wild bird from using its nest;
- Take or destroy an egg of any wild bird;
- Disturb any wild bird listed on Schedule 1 whilst it is building a nest or is in, on, or near a nest containing eggs or young, or whilst lekking (undertaking mating rituals);
- Disturb the dependent young of any wild bird listed on Schedule 1; and harass any wild bird listed on Schedule 1A.

It is also an offence to possess or control a live or dead wild bird, an egg of a wild bird (or any such derivatives), or to knowingly cause or permit any of the above acts to be carried out. There are additional offences in relation to use of prohibited methods of killing or taking wild birds, for the sale of live and dead wild birds (listed on Schedule 3) and for registration and keeping of captive wild birds (Schedule 4). There are a number of exceptions to these offences including shooting outside of the closed season for certain species (on Schedule 2).

11.2.4 Mitigation

11.2.4.1 Pre-construction surveys

Pre-construction surveys will take place for breeding birds before any rock armour on the west side of Phase 3 is removed. The pre-construction surveys must take place no more than 48 hours before the rock armour removal is due to take place. If rock armour has been stockpiled and left undisturbed for a period exceeding seven days during the bird breeding season (March-August), the stock piles will be surveyed prior to use.

11.2.4.2 Fencing

Once the rock revetment has been removed, if it needs to be stockpiled during the bird breeding season (March – August) then suitable fencing will be placed around the pile to dissuade eiders from nesting amongst the rocks. It should be noted that no form of netting is to be used directly on top of the rocks themselves, as this can entrap birds.

11.2.4.3 Construction timings

It will not be possible to schedule all disturbing works to occur outside the breeding season. However, construction activities will aim to start outside the most sensitive months of the breeding season (i.e. between September-March). Ideally, the rock armour removal would occur out with the bird breeding season (i.e. outwith March-August).

11.2.4.4 Light regime

Lights will be required to facilitate construction work during hours of darkness and provide a safe environment for site personnel. Lighting will be directional and local to works, as such it is not predicted to impact upon birds utilising the intertidal area north and west of the construction area. Lights will be switched off when not in use.

11.2.4.5 ECoW

The ECoW will ensure that the breeding bird protection plan is implemented and reviewed throughout the construction process.

11.2.5 Survey and Monitoring

As mentioned in Section 11.2.4.1 pre-construction surveys will take place prior to the rock armour removal. During construction there will be ongoing activities which would disturb birds and hence deter them from nesting however, the ECoW will have a watching brief for nesting birds during the breeding season, particularly in peak breeding season (April to July).

In event of a nest being found, in the first instance an avoidance area will be de-marked to prevent damage to the nest. The specific buffer zone required will depend on the species, and will be decided by a suitably qualified ecology, however it is expected to be a minimum of 5m. Where for construction or safety reasons it is not practicable to continue to avoid the area for the duration of the nesting season; then RSPB and SNH will be contacted for advice.

During the Operation of the Phase 4 Development, PoCF will remain vigilant for signs of breeding terns utilising the Phase 4 facilities. If terns are observed utilising the area, PoCF will consult with SNH and RSPB to develop appropriate mitigation measures to minimise potential impacts on terns, which may result from the operation of the Phase 4 facilities.

11.3 Marine Mammal Species Protection Plan (MMSPP)

11.3.1 Introduction

Evidence suggests that common seals, harbour porpoises and bottlenose dolphins are resident within the zone of influence associated with the Phase 4 Development area. These species will also be present in the vicinity of the Sutors spoil ground, along with minke whales and grey seals which are considered occasional visitors. The spoil ground is located within the Moray Firth SAC, which is in part designated for bottlenose dolphins.

Marine Mammals can be affected by changes in water quality, disturbance and injury from underwater noise, and physical injury though interactions with spoil disposal operations. Water quality will be managed through the CEMPs (Section 6), aligned to the schedule of mitigation (Section 14) and as such is not considered further in this section.

11.3.2 Protection

Whales and dolphins are classed as European Protected Species (EPS) and are fully protected under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).

The main legislation with regard the protection of seals is The Marine (Scotland) Act 2010, which provides for Scottish Ministers to designate 'seal conservation areas'.

Common seals using the Cromarty Firth also afforded protection under the Conservation (Natural Habitats, &c.) Regulations 1994, due to connectivity with the Dornoch Firth and Morrich More SACs.

11.3.3 Offences

The following provides a summary of the offences in the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) in relation to whales, dolphins and porpoises in Scottish territorial waters (within 12 nautical miles of land). It is an offence to intentionally or recklessly:

- Kill, injure or capture whales, dolphins or porpoises; and
- Disturb or harass them.

On the 1st February 2011 it became an offence to intentionally or recklessly kill, injure or take a seal at any time of year, except to alleviate suffering or where a licence has been issued to do so by Marine Scotland under the Marine (Scotland) Act 2010. Under the Marine (Scotland) Act 2010 it is also an offence to intentionally or recklessly harass seals at significant haul-out sites. The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) prohibits certain methods of catching or killing seals.

11.3.4 Mitigation

During construction a number of noisy activities will be undertaken the most notable of which is piling, which has the potential to cause injury and disturbance to marine mammals. As such a Piling Marine Mammal Protocol has been developed, to reduce the risk of injury to marine mammals (Section 11.3.4.1).

There is also the potential for marine mammals to be injured through interactions with falling debris during dredged spoil disposal operations. In order to mitigate this a Spoil Disposal

Marine Mammal Protocol has been developed, to reduce the risk of a marine mammal being underneath the disposal vessel when the spoil is released (Section 11.3.4.2).

11.3.4.1 Piling Marine Mammal Protocol

General Provisions

All marine mammal observers (MMOs) and passive acoustic monitoring (PAM) technicians will be trained to Joint Nature Conservation Committee (JNCC) standards. Both MMOs and PAM technicians shall have the power to delay piling operations should marine mammals be present in the mitigation zone. The mitigation zone for piling operations shall extend 500m from the piling barge.

A formal log shall be maintained by the MMOs and PAM technicians whether marine mammals are present or not. The forms used will be the standard JNCC MMO forms, modified to suit piling driving operations (Appendix 11A). Paper forms should be provided to the ECoW for collation on a regular basis. All data will be stored electronically and provided to Marine Scotland at the end of the dredging campaign. The details recorded will include but are not limited to:

- Time and location of the disposal operations;
- Mobilisation and demobilisation times of MMO/PAM team;
- Start time of piling;
- Duration of piling;
- Breaks in operations, or times spent at reduced hammer energy;
- Conditions affecting observations including sea state and visibility, throughout surveillance;
- Records of any sightings/ acoustic detections and actions taken;
- Records will also be kept of sightings of other marine species including otters.

Visual MMO watches will be conducted during daylight hours, when sea state is ≤3, and when visibility permits (clear visibility ≥600m). Unless PAM is available, piling operations will not take place during hours of darkness, or if conditions are unsuitable for visual observations.

If available, PAM will be used during hours of darkness, when sea state is ≥4, or if visibility prohibits visual observation. Summaries of both visual and acoustic observation protocols are provided below.

Visual Observation Protocols

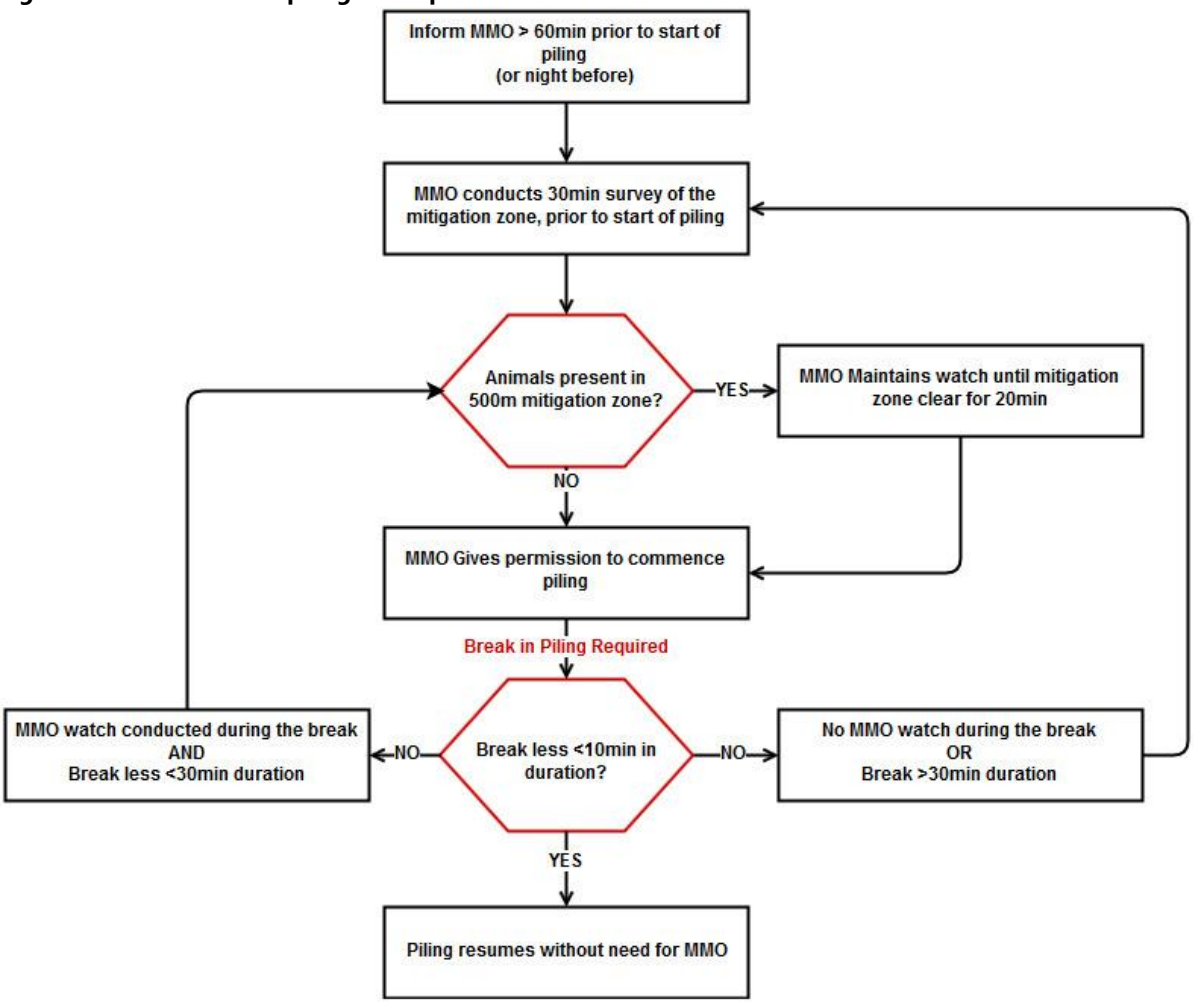
Visual marine mammal observations will be conducted by an MMO at a set onshore observation post, providing good visibility of the mitigation zone. The observation post will be elevated, in order to maximise marine mammal detection probability:

1. The MMO should be informed by the site manager or piling foreman of proposed piling start times as soon as possible (at least 1hours notice), or the night before for a morning start.
2. The MMO will commence the watch using binoculars (minimum characteristics of 8x42) so that at least a 30-minute watch has been conducted prior to the anticipated start time. The MMO should focus their effort on the mitigation zone and advise the site piling foreman if marine mammals are present.

3. If the 500m mitigation zone remains clear of marine mammals during the watch, the MMO will give permission to commence piling.
    - If animals are sighted in the zone the MMO will track the animals visually, and the start will be delayed until the zone has been clear for 20min. The MMO will keep the site team up to date with progress.
4. Once piling has commenced, the MMO should be notified. The MMO does not need to continue watching. If marine mammals are observed during piling operations, details should be noted on a recording form.
    - There is no requirement to stop works for marine mammals entering the zone once piling has commenced, provided piling is continuous.
    - Continuous is defined as without a break in operations exceeding 10min in duration.
5. The MMO should be notified of any planned breaks in piling which may exceed 10min in duration, in order to minimise restart time:
    - If a break is greater than 10min in duration, a full 30min pre-watch followed by a 20min soft start will be required, unless an MMO is on watch for the duration of the break.
    - If MMO cover is in place, and the mitigation zone remains clear of marine mammals for the entirety of a break up to 30min in duration, piling can recommence at full power with permission from the MMO.
    - If animals are present within the mitigation zone during a break exceeding 10min in duration, then the restart will be delayed by the MMO until the zone is clear for 20min.
    - If the break in operations exceeds 30min, a 30min pre-watch (observations conducted during the down time will be included) is required before piling can recommence.
6. Visibility Limits:
    - Must have clear visibility to ≥600m, sufficient light (i.e. daylight hours) and sea state must be ≤3.

A simple flow chart summarising the visual MMO protocols is provided in Figure 11.1.

Figure 11.1. Flowchart of piling MMO protocol.



Acoustic Monitoring Protocols

During hours of darkness, sea states ≥4, or if visibility falls to below 600m, marine mammal detection will be conducted acoustically using Passive Acoustic Monitoring (PAM). This system will be able to detect vocalising harbour porpoises to a range of up to 300m and bottlenose dolphins to a range of up to 2km. The PAM system will be deployed in a location where the detection ranges outlined above provide sufficient coverage of the piling mitigation zone, allowing detection of vocalising cetaceans in the area. The following protocol will be used for PAM:

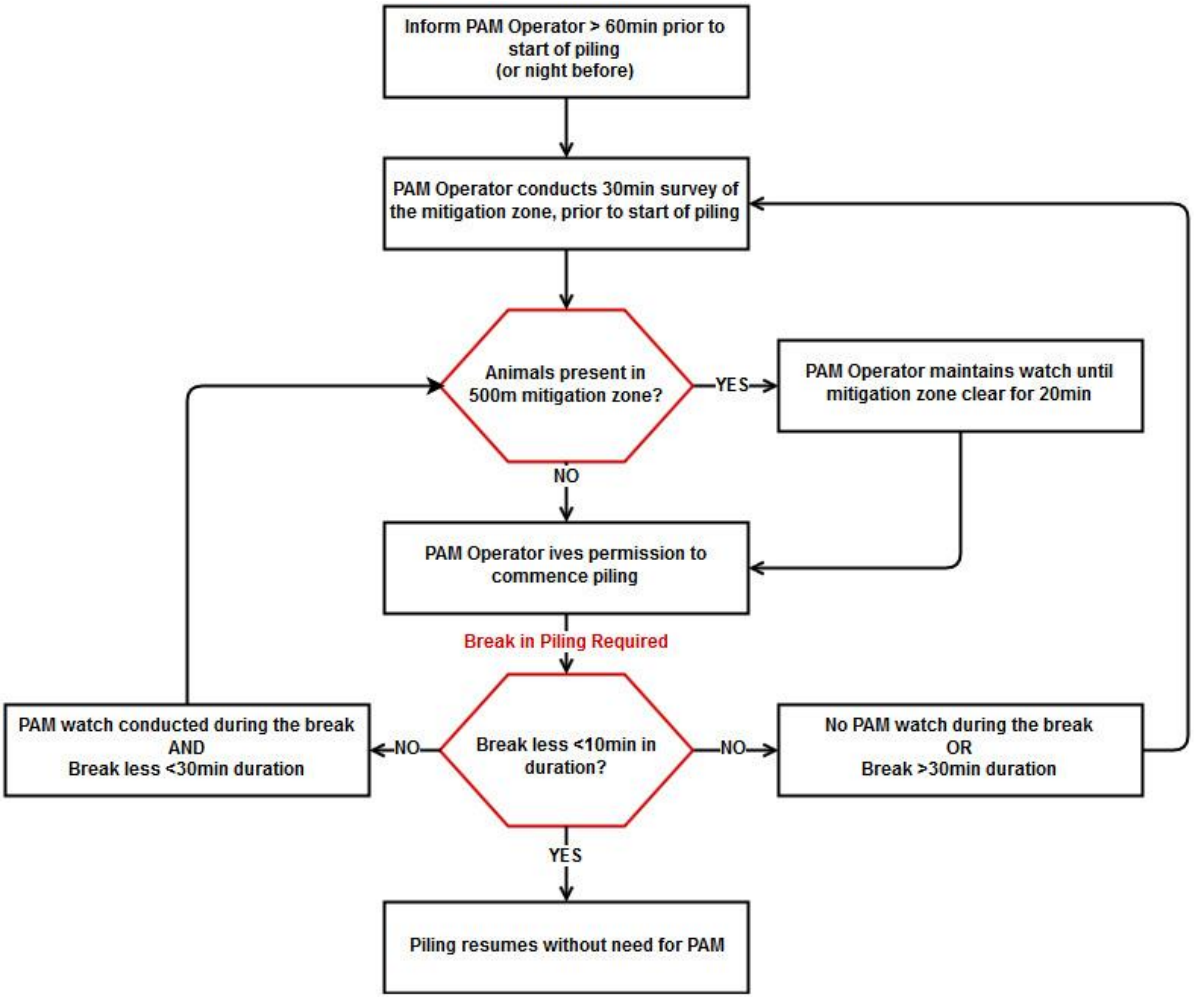
1. The PAM operator should be informed by the site manager or piling foreman of proposed piling start times as soon as possible (at least 1hours notice), or the night before for a morning start.
2. The PAM operator will commence the watch using so that at least a 30-minute watch has been conducted prior to the anticipated start time. The PAM operator should advise the site piling foreman if marine mammals are present.
3. If the not marine mammal detections are made within the 500m mitigation zone, the MMO will give permission to commence piling.

- If animals are detected in the zone the PAM operator will continue to monitor, and the start will be delayed until the zone has been clear for 20min. The PAM operator will keep the site team up to date with progress.

4. Once piling has commenced, the PAM operator should be notified. The PAM watch does not need to continue. If marine mammals are detected during piling operations, details should be noted on a recording form.
    - There is no requirement to stop works for marine mammals entering the zone once piling has commenced, provided piling is continuous.
    - Continuous is defined as without a break in operations exceeding 10min in duration.
5. The PAM operator should be notified of any planned breaks in piling which may exceed 10min in duration, in order to minimise restart time:
    - If a break is greater than 10min in duration, a full 30min pre-watch followed by a 20min soft start will be required, unless a PAM watch is conducted for the duration of the break.
    - If a PAM watch is conducted, and the mitigation zone remains clear of marine mammals for the entirety of a break up to 30min in duration, piling can recommence at full power with permission from the PAM operator.
    - If animals are present within the mitigation zone during a break exceeding 10min in duration, then the restart will be delayed by the PAM operator until the zone is clear for 20min.
    - If the break in operations exceeds 30min, a 30min pre-watch (PAM watches conducted during the down time will be included) is required before piling can recommence.

A simple flow chart summarising the acoustic piling protocols is provided in Figure 11.2.

Figure 11.2. Flowchart of piling PAM protocol.



11.3.4.2 Spoil Disposal Marine Mammal Protocol

General Provisions

All marine mammal observers (MMOs) and passive acoustic monitoring (PAM) technicians will be trained to Joint Nature Conservation Committee (JNCC) standards. Both MMOs and PAM technicians shall have the power to delay disposals should marine mammals be present in the mitigation zone. The mitigation zone for spoil disposals shall extend 200m from the disposal vessel.

A formal log shall be maintained by the MMOs and PAM technicians whether marine mammals are present or not. The forms used will be the standard JNCC MMO forms, modified to suit spoil disposal operations (Appendix 11B). Paper forms should be provided to the ECoW for collation on a regular basis. All data will be stored electronically and provided to Marine Scotland at the end of the dredging campaign. The details recorded will include but are not limited to:

- Time and location of the disposal operations;
- Mobilisation and demobilisation times of MMO/PAM team;
- Start time of disposal;
- Duration of disposal;

- Conditions affecting observations including sea state and visibility, throughout surveillance;
- Records of any sightings/ acoustic detections and actions taken;
- Records will also be kept of sightings of other marine species including otters.

Visual MMO watches will be conducted during daylight hours, when sea state is ≤3, and when visibility permits (clear visibility past the spoil ground for land-based observations, and ≥300m for vessel based). Unless PAM is available, spoil disposal operations will not take place during hours of darkness, or if conditions are unsuitable for visual observations.

If available, PAM will be used during hours of darkness, when sea state is ≥4, or if visibility prohibits visual observation. Summaries of both visual and acoustic observation protocols are provided below.

It is vital that sufficient advance notice is provided for MMO call out, to allow for early check on sea state and visibility at the Spoil Ground, so that PAM operators may be called out in time to conduct 30-minute PAM survey prior to vessel arrival at the Spoil Ground if conditions require.

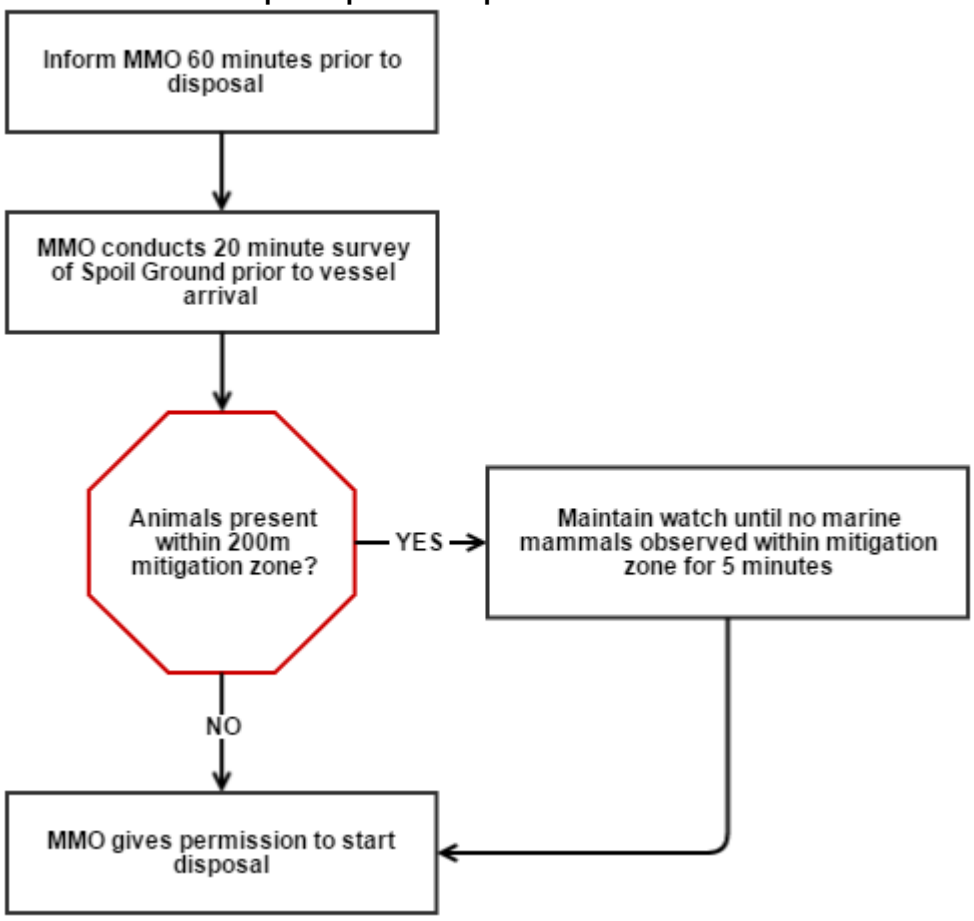
Visual Observation Protocols

Visual marine mammal observations will generally be conducted by an MMO at set observation locations at either North or South Sutor. Directions to the shore observation points are found in Appendix 11C. The MMO may also be based on the disposal vessel or separate observation vessel if required. The following protocol will be followed regardless of the MMO location:

1. The MMO should be informed by the dredger via VHF radio or phone once dredging is complete and that the ship is en route to the spoil ground. The vessel must give suitable warning to the MMO observer to allow them to get into position and start a watch at least 20 minutes before the anticipated arrival time.
2. The MMO will commence the watch using binoculars (minimum characteristics of 8x42) so that at least a 20-minute watch has been conducted by the time the ship reaches the spoil ground. The MMO should focus their effort on the spoil ground and advise the ship if marine mammals are present in order to avoid them if possible.
3. Once in the spoil ground the ships officers will ask the MMO if they are clear to commence the disposal. If the 200m mitigation zone is clear, then MMO will give permission to proceed. If marine mammals are present within the mitigation zone, disposal will be delayed until the marine mammals have left the mitigation zone and 5 minutes have passed since an animal was last sighted within the zone.
4. Visibility Limits:
    - Shore based – Must have clear visibility past the Spoil Ground, sufficient light (i.e. daylight hours), and sea state must be ≤3.
    - Vessel based – Must have clear visibility to 300m from the disposal vessel, sufficient light (i.e. daylight hours) and sea state must be ≤3.

A simple flow chart summarising the daytime MMO protocols is provided in Figure 11.3.

Figure 11.3. Flowchart of spoil disposal MMO protocol.



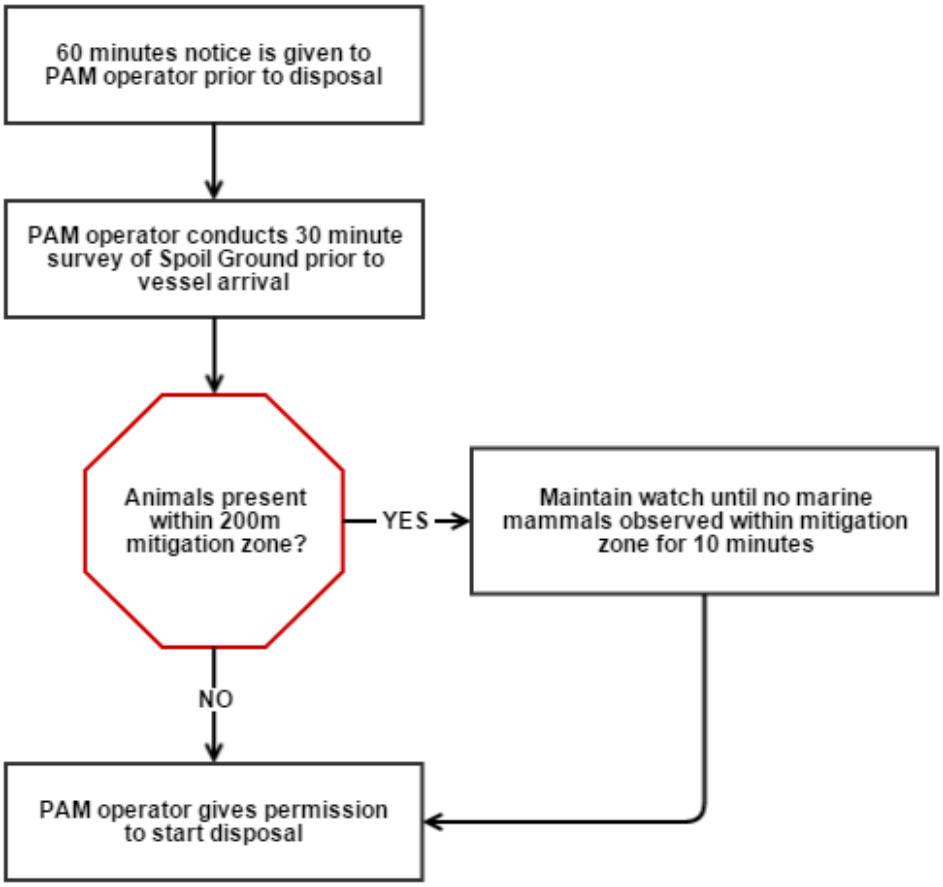
Acoustic Monitoring Protocols

During hours of darkness, sea states ≥4, or if visibility falls to below 300m for vessel-based observation or visibility is not clear past the spoil ground for shore-based observation, marine mammal detection will be conducted acoustically using Passive Acoustic Monitoring (PAM). This system will be able to detect vocalising harbour porpoises to a range of up to 300m and bottlenose dolphins to a range of up to 2km. The PAM system will be deployed in a location where the detection ranges outlined above provide sufficient coverage of the spoil ground to allow detection of vocalising cetaceans in the area. The following protocol will be used for PAM:

1. The PAM technician shall be given a minimum warning of 60 minutes ahead of the intended disposal time, in order to prepare for the watch. VHF radio or phone contact will inform the PAM operator when the vessel is en route. The operator will work from the PAM base station where the laptop will receive the signal from the PAM buoy.
2. The PAM technician should perform a minimum of a 30-minute watch before the vessel reaches the Spoil Ground.
3. Once the PAM technician is satisfied no marine mammals are present within the 200m mitigation zone, they may advise the crew to commence the disposal. If mammals are detected within the zone, the disposal will be delayed until 10 minutes have passed since last detection within the zone.

A simple flow chart summarising the PAM protocols is provided in Figure 11.4.

Figure 11.4. Flowchart of spoil disposal PAM protocol.



11.3.4.3 Underwater Noise Monitoring

Underwater noise monitoring will be conducted in order to verify the predictions made by the underwater noise model, and ascertain whether the Piling Marine Mammal Protocol provides an appropriate degree of mitigation. A portable dipping hydrophone system will be utilised to measure underwater noise emissions from marine piling operations at the following points:

- Source (as close as safely possible to the piling works);
- 500m from the piling works; and
- 700m from the piling works.

Noise monitoring will be conducted for impact piling of each different pile type. The results of the noise monitoring will be provided to MS-LOT and SNH.

11.4 Diadromous Fish Species Protection Plan (DFSPP)

11.4.1 Introduction

Diadromous fish migrate/emigrate past the site and could be disturbed or injured by changes in water quality. The EIAR identified that the most sensitive period with regards to diadromous fish is the Atlantic salmon outward smolt run. Disturbance of this migration event has the potential to result in significant impacts on the species. Migrating salmon smolt are considered to be very sensitive to increased sediment loading in the water column, and as such dredging or dredged spoil disposal operations have the potential to interrupt the outward smolt run.

It has been identified that the Atlantic salmon outward smolt run occurs between later April, and early June, with a peak in May.

11.4.2 Protection

Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, known as the 'Habitats Directive' was adopted in 1992. The Directive is the means by which the European Union meets its obligations under the Bern Convention.

Species listed in Annex II of the Habitats Directive, which are native to the UK should be conserved through the designation of Special Areas of Conservation (SACs). Atlantic salmon (*Salmo salar)* present in UK waters are listed in Annexe II. Since 1994 all SACs, in combination with Special Protection Areas (SPAs), comprise the UK contribution to the Natura 2000 ecological network of protected sites.

Atlantic salmon are also listed in Annex V of the Habitats Directive. As such they are defined as a species of community interest. Therefore, taking in the wild may be subject to management measures.

The UK Biodiversity Action Plan (UKBAP) lists priority species and habitats, which have been identified as the most threatened and requiring conservation action under the plan. Numerous diadromous fish species are included in the list of UKBAP priority species, including:

- The multi-sea winter component of the Atlantic salmon population;
- Sea trout (brown trout) (*Salmo trutta);* and
- European eel.

11.4.3 Offences

The Salmon and Freshwater Fisheries Act 1975 makes it an offence to knowingly take, kill or injure, or attempt to take, kill or injure, any salmon, trout or freshwater fish, which is unclean

or immature. The Act also makes it an offence to cause or knowingly permit to flow, or put or knowingly permit to be put, into any waters containing fish or into any tributaries of waters containing fish, any liquid or solid matter to such an extent as to cause the waters to be poisonous or injurious to fish or the spawning grounds, spawn or food of fish.

11.4.4 Mitigation

Mitigation with regard to minimising disruption of the Atlantic salmon outward smolt run is provided below.

11.4.4.1 Sensitive Timing of Activities

In order to minimise potential impacts on diadromous fish from the construction of the Phase 4 Development, no dredging or dredged spoil disposal operations will be conducted from the 1st to the 31st May (inclusive) during any year. This avoids the peak outward smolt migration.

11.4.4.2 Environmental Clerk of Works

An ECoW will be appointed to oversee and ensure environmental best practice and mitigation strategies to minimise degradation of water quality resulting from increased sediment loading of the water column, associated to dredging and dredge spoil disposal operations. The ECoW will have the power to stop works if required till appropriate investigations or/and action are taken.

11.4.5 Monitoring

The ECoW will remain vigilant for dead diadromous fish in the vicinity of the working areas during the construction of the Phase 4 Development. Any signs of mass mortality will be reported to Marine Scotland and SNH.

11.5 Otter Species Protection Plan (OSPP)

11.5.1 Introduction

A Post construction Survey of the Phase 3 Development was carried out during September 2016 to inform the baseline for the Phase 4 EIA. This included the Queen's Dock, Phase 3 and up to 1km west of the Invergordon Service Base along the shore (Provided in Appendix M.1) [Affric Limited, 2016].

11.5.2 Protection

Otters are classed as EPS and are fully protected under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). This lists a number of offences in relation to otters and the places in which they live.

11.5.3 Offences

The under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) in relation to wild otters, it is an offence to deliberately or recklessly:

- Capture, injure or kill an otter;
- Harass an otter or group of otters;
- Disturb an otter in a holt or any other structure or place it uses for shelter or protection;
- Disturb an otter while it is rearing or otherwise caring for its young;
- Obstruct access to a holt or other structure or place otters use for shelter or protection or to otherwise deny the animal use of that place;
- Disturb an otter in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species; and
- Disturb an otter in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

It is also an offence to:

- damage or destroy a breeding site or resting place of such an animal (note that this does not need to be deliberate or reckless to constitute an offence); and
- keep, transport, sell or exchange or offer for sale or exchange any wild otter or any part or derivative of one (if obtained after 10 June 1994).

11.5.4 Mitigation

To mitigate against the potential to damage holts or layups the following mitigation will be implemented. Prior to construction works being undertaken a pre-construction otter survey will be carried out to understand the current activity levels in the area and potential for holts and layups within 200m of the construction site. Prior to the installation of fenders on Berth 5 a further survey will be carried out and thereafter if required discussed with Scottish Natural Heritage (SNH). These surveys will inform the need for additional surveys (camera trapping) and the development of additional mitigation. An EPS licence will be applied for if required, depending on the outcome of the surveys.

Immediately prior to rock armour being removed it will be visually checked to ensure that otters are not present. Rock armour will only be removed on the agreement of the ECoW. There may be some flexibility in the construction programme as to when the rock armour is

removed, hence if a natal holt is found during the surveys or visual checks, works will be delayed until an appropriate way forward has been agreed with SNH.

Mitigation identified in the CEMPs (Section 6) with regard to water quality should be implemented to protect otters from a release of hazardous substances.

11.5.5 Monitoring

The ECoW will remain vigilant for otters in the vicinity of the working areas during the construction of the Phase 4 Development. Furthermore, the workforce shall be informed through toolbox talks on to recognise and report sightings of otters. Any otter mortality will be reported to SNH.

11.6 Marine Non-Native Species

11.6.1 Introduction

The consequences of introducing non-native species into the local marine ecosystem include;

- Damage or displacement of indigenous species;
- Disruption of sensitive ecosystem balance;
- The spread of foreign diseases which severely affect native species;
- Interference with river processes with potential of increased flood/drought potential;
- Damage to buildings and marine infrastructure; and
- Significant economic costs associated with the control and management of invasive species.

11.6.2 Mitigation

All works will be carried out in accordance with The Code of Practice on Non-Native Species (approved by Scottish Parliament 28 June 2012), adopting a precautionary approach to minimise the risk of releasing non-native species, using risk assessments relevant to planned activities and seeking advice on best practice whenever necessary, including reporting the presence of non-native species.

The following guidance will be adopted during the Phase 4 Development works to minimise the risks of introducing Marine Non-Native Species (MNNS) into the Cromarty Firth during any in water works and/or barge landing activities.

The implementation of this guidance will be facilitated during induction, Toolbox Talks, the weekly environmental checklist and internal Environmental & Quality audits.

Appropriate planning should help prevent the introduction of MNNS. This will include

- All equipment is to be received at 'as new' standard;
- Local vessels within biogeographic boundaries will be utilised wherever possible i.e. within the North Sea ecosystem; and
- All vessels will be International Maritime Organisation (IMO) compliant, including the Ballast Water Management Convention.

For road transportable boats, plant and equipment, the following mitigation techniques will be employed as applicable;

- Salt water will be drained from every part of the plant, or boat and any other equipment that transport water from the marine environment, prior to being mobilised to site or demobilised from it;
- All parts of plant, equipment or boats that come into contact with the water will be thoroughly cleaned before being mobilised to or demobilised from the Phase 4 Development. Removing any visible plant, fish, animal matter and soils;
- Dispose of any plant and animal materials in a secure and suitable bin or skip;
- Ensure hulls are cleaned regularly to avoid the risk of transporting MNNS and apply adequate anti-fouling where appropriate.
- Avoid travelling through marine plants and weed where possible. If organic matter becomes entangled in tracks, propellers etc; MNNS can be transferred to others areas.

In event that invasive species are suspected the relevant authorities will be contacted by the ECoW or PoCF Project Manager.

- SEARS (Scottish Environment & Rural Services): (08452) 302050
- SNH: non_native_species@snh.gov.uk
- Marine Scotland: marinescotland@scotland.gsi.gov.uk - 01224 876544
- SEPA: http://www.sepa.org.uk/about_us/contacting_sepa.aspx

Appendix 11A – Piling Marine Mammal Observation Forms

PILING OPERATIONS

MARINE MAMMAL RECORDING FORM - OPERATIONS

Regulatory reference number: **Ship/ platform name:**

Complete this form every time piling (vibro and impact) operations commences or ends.
Times should be in UTC, using the 24-hour clock.

Date	**Activity Type** **pv** = vibro piling **pi** = impact piling	**Time soft start/ ramp-up began**	**Start Time of full power**	**Time of reduced output** (if relevant)	**Time Activity Stopped**	**Time pre-activity search began**	**Time search ended**	**Time PAM observation began**	**Time PAM observation ended**	**Was any mitigating action required?** (yes/ no)

PILING OPERATIONS

MARINE MAMMAL RECORDING FORM - EFFORT

Regulatory reference number: **Ship/ platform name**:

Record the following for all watches, even if no marine mammals are seen.

START A NEW LINE IF SOURCE ACTIVITY OR WEATHER CHANGES. ENTER DATA AT LEAST EVERY HOUR.

Date	**Visual watch or PAM** (v/ p)	**Observer's/ operator's name(s)**	**Time of start of section of watch** (UTC, 24hr clock)	**Time of end of section of watch** (UTC, 24hr clock)	**Activity Type** (pv /pi)	**Activity level** (f/ s/ r/ n/ v)	**Position** (latitude and longitude)	**Depth** (m)	**Wind dir'n**	**Wind force** (B'fort scale)	**Sea state** (g/ s/ c/ r)	**Swell** (o/ m/ l)	**Vis.** (visual watch only) (p/ m/ g)	**Sun glare** (visual watch only) (n/ wf/ sf/ vf/ wb/ sb/ vb)	**Precip.** (n/ l/ m/ h/ s)

Visual watch or PAM: v = visual watch; p = PAM
Activity type: pi = impact piling, pv = vibro piling
Activity level: f = full power; s = soft start; r = reduced power (not soft start); n = not active; v = variable (e.g. tests)
Sea state: g = glassy (like mirror); s = slight (no/ few white caps); c = choppy (many white caps); r = rough (big waves, foam, spray)
Swell: o = low (< 2 m); m = medium (2-4 m); l = large (> 4 m)
Visibility: p = poor (< 1 km); m = moderate (1-5 km); g = good (> 5 km)
Sun glare: n = none; wf = weak forward; sf = strong forward; vf = variable forward; wb = weak behind; sb = strong behind; vb = variable behind
Precipitation: n = none; l = light rain; m = moderate rain; h = heavy rain; s = snow

PILING OPERATIONS

MARINE MAMMAL RECORDING FORM - SIGHTINGS

Regulatory reference number	**Ship/ platform name**	**Sighting number** (start at 1 for first sighting of survey)	**Acoustic detection number** (start at 500 for first detection of survey)
Date:		**Time at start of encounter** (UTC, 24hr clock)	**Time at end of encounter** (UTC, 24hr clock)

Were animals detected visually and/ or acoustically?	**How were the animals first detected?**
□ visual □ acoustic □ both	□ visually detected by observer keeping a continuous watch □ visually spotted incidentally by observer or someone else □ acoustically detected by PAM □ both visually and acoustically before operators/ observers informed each other

Observer's/ operator's name	**Position** (latitude and longitude)	**Water depth** (metres)

Species/ species group	**Description** (include features such as overall size; shape of head; colour and pattern; size, shape and position of dorsal fin; height, direction and shape of blow; characteristics of whistles/ clicks)
Bearing to animal (when first seen or heard) (bearing from true north)	**Range to animal** (when first seen or heard) (metres)

Total number	**Number of adults** (visual sightings only)	**Number of juveniles** (visual sightings only)	**Number of calves** (visual sightings only)	**Photograph taken**
				□ yes □ no

Behaviour (visual sightings only)

Direction of travel (relative to site)		**Direction of travel** (compass points)	
□ towards source	□ variable	□ N	□ W
□ away from source	□ milling	□ NE	□ NW
□ crossing perpendicular (in channel swimming E↔W)	□ stationary	□ E	□ variable
	□ other	□ SE	□ stationary
□ unknown		□ S	□ unknown
		□ SW	
Activity Type (pi, pv):			

Activity level when animals first detected	**Activity level when animals last detected**	**Time animals entered 500m mitigation zone** (UTC, 24hr clock)	**Time animals left 500m mitigation zone** (UTC, 24hr clock)
□ full power □ not active □ soft start □ reduced power (other than soft start)	□ full power □ not active □ soft start □ reduced power (other than soft start)	**Closest distance of animals from source activity** (metres)	**Time of closest approach** (UTC, 24hr clock)

If seen during soft start give:	**What action was taken?** (according to requirements of guidelines/ regulations in country concerned)	**Length of power-down and/ or shut-down** (if relevant) (length of time until subsequent soft start, in minutes)
First distance **Closest distance** **Last distance** during soft start (metres)	□ none required □ delay start □ shut-down of active source □ power-down of active source □ power-down then shut-down of active source	

Appendix 11B – Spoil Disposal Marine Mammal Observation Forms

SPOIL DISPOSAL OPERATIONS

MARINE MAMMAL RECORDING FORM - OPERATIONS

Regulatory reference number **Ship/ platform name**

Complete this form every time dredging, piling (vibro and impact), revetment removal or revetment construction commences/ends.
Times should be in UTC, using the 24-hour clock.

Date	**Activity Type**	**Time Disposal Start**	**Time Disposal End**	**Time pre-disposal search began**	**Time search ended**	**Was any mitigating action required?** (yes/ no)
	Dredge Disposal					
	Dredge Disposal					
	Dredge Disposal					
	Dredge Disposal					
	Dredge Disposal					
	Dredge Disposal					
	Dredge Disposal					
	Dredge Disposal					
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	Dredge Disposal					
	Dredge Disposal					
	Dredge Disposal					
	Dredge Disposal					
	Dredge Disposal					
	Dredge Disposal					

SPOIL DISPOSAL OPERATIONS

Regulatory reference number **Ship/ platform name**

Record the following for all watches, even if no marine mammals are seen.

START A NEW LINE IF DISPOSAL ACTIVITY OR WEATHER CHANGES. ENTER DATA AT LEAST EVERY HOUR.

Date	**Observer's name(s)**	**Time of start of section of watch** (UTC, 24hr clock)	**Time of end of section of watch** (UTC, 24hr clock)	**Activity Type**	**Disposal in Progress** (Y/N)	**Start Position** (latitude and longitude)	**Start Depth** (m)	**End Position** (latitude and longitude)	**End Depth** (m)	**Vessel Speed** (knots)	**Wind dir'n**	**Wind force** (B'fort scale)	**Sea state** (g/ s/ c/ r)	**Swell** (o/ m/ l)	**Vis.** (visual watch only) (p/ m/ g)	**Sun glare** (visual watch only) (n/ wf/ sf/ vf/ wb/ sb/ vb)	**Precip.** (n/ l/ m/ h/ s)
				Dredge disposal													
				Dredge disposal													
				Dredge disposal													
				Dredge disposal													
				Dredge disposal													
				Dredge disposal													
				Dredge disposal													
				Dredge disposal													
				Dredge disposal													
				Dredge disposal													
				Dredge disposal													
				Dredge disposal													
				Dredge disposal													

Sea state: g = glassy (like mirror); s = slight (no/ few white caps); c = choppy (many white caps); r = rough (big waves, foam, spray)
Swell: o = low (< 2 m); m = medium (2-4 m); l = large (> 4 m)
Visibility: p = poor (< 1 km); m = moderate (1-5 km); g = good (> 5 km)
Sun glare: n = none; wf = weak forward; sf = strong forward; vf = variable forward; wb = weak behind; sb = strong behind; vb = variable behind
Precipitation: n = none; l = light rain; m = moderate rain; h = heavy rain; s = snow

SPOIL DISPOSAL OPERATIONS

MARINE MAMMAL RECORDING FORM - SIGHTINGS

Regulatory reference number	**Ship/ platform name**	**Sighting number** (start at 1 for first sighting of survey)	
Date:		**Time at start of encounter** (UTC, 24hr clock)	**Time at end of encounter** (UTC, 24hr clock)

How were animals detected?

- ☐ Visually
- ☐ Acoustically
- ☐ Both

How were the animals first detected?

- ☐ visually detected by observer keeping a continuous watch
- ☐ visually spotted incidentally by observer or someone else
- ☐ acoustically detected by PAM
- ☐ detected both visually and acoustically before MMO/PAM warned each other.

Observer's name	**Position** (latitude and longitude)	**Water depth** (metres)

Species/ species group	**Description** (include features such as overall size; shape of head; colour and pattern; size, shape and position of dorsal fin; height, direction and shape of blow)
Bearing to animal (when first seen bearing from true north) / **Range to animal** (when first seen metres)	

Total number	**Number of adults**	**Number of juveniles**	**Number of calves**	**Photograph taken**
				☐ yes ☐ no

Behaviour

Direction of travel (relative to vessel)

- ☐ towards ship
- ☐ away from ship
- ☐ parallel to ship in same direction as ship
- ☐ parallel to opposite direction to ship
- ☐ crossing perpendicular ahead of ship
- ☐ variable
- ☐ milling
- ☐ stationary
- ☐ other
- ☐ unknown

Direction of travel (ANIMAL) (compass points)

- ☐ N
- ☐ NE
- ☐ E
- ☐ SE
- ☐ S
- ☐ SW
- ☐ W
- ☐ NW
- ☐ variable
- ☐ stationary
- ☐ unknown

Activity Type: *Dredging Disposal*

Was the barge disposing when animals first seen?	**Was the barge disposing when animals last seen?**	**Time animals entered 200m mitigation zone** (UTC, 24hr clock)	**Time animals left 200m mitigation zone** (UTC, 24hr clock)
☐ Y ☐ N	☐ Y ☐ N	**Closest distance of animals from vessel** (metres)	**Time of closest approach** (UTC, 24hr clock)

What action was taken?
(according to requirements of guidelines/ regulations in country concerned)

- ☐ None required
- ☐ Delay disposal

Length of delay in disposal? (if relevant)
(length of time until subsequent disposal)

Appendix 11C – Spoil Disposal MMO Lookout Locations

Invergordon Service Base Phase 4 Development

MMO Observation from South Sutor: 5 minute walk from the top South Sutor carpark.

1. Park in the carpark at the top of the South Sutor.

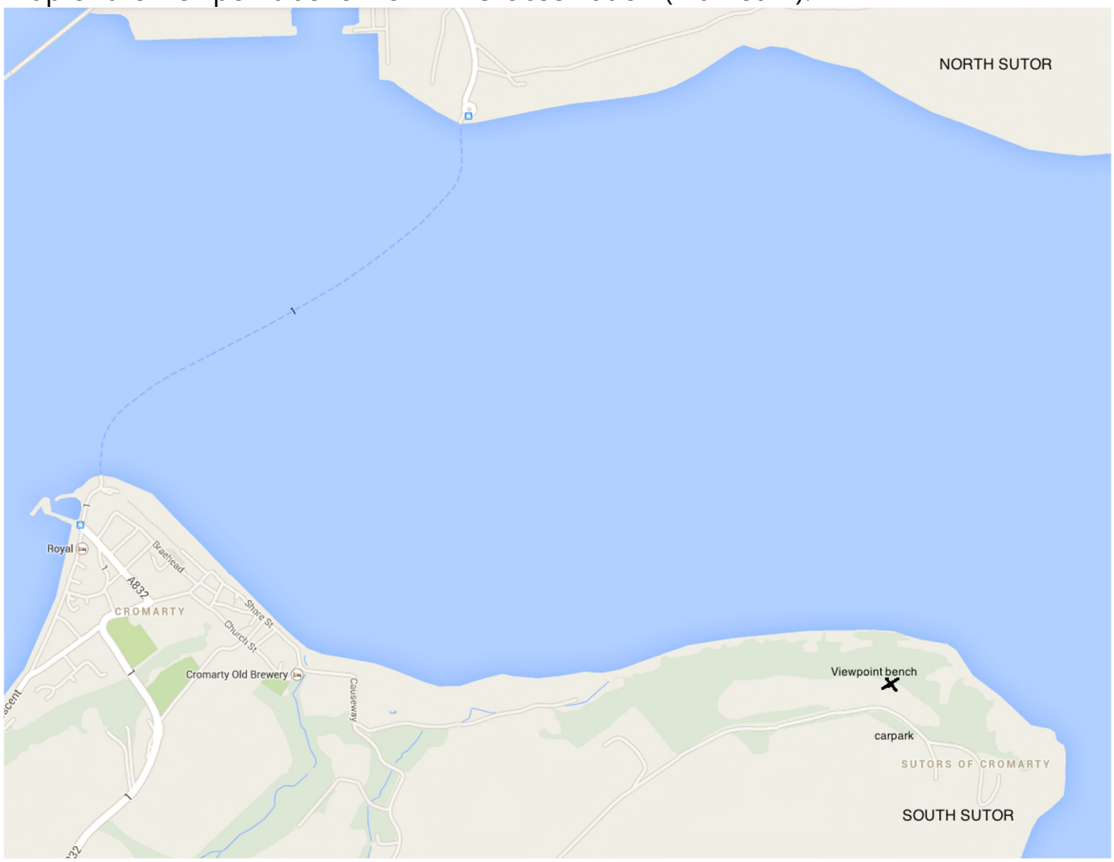
2. Take the path, signposted 'Cromarty'

3. Walk approx. 300m down the hill until you reach this bench.

Invergordon Service Base Phase 4 Development

4. This is the MMO viewpoint.

5. Map of the viewpoint bench for MMO observation (marked X).



Invergordon Service Base Phase 4 Development

MMO NORTH SUTOR OBSERVATION POINT: ~1.8km, ~20min walk from bottom to top.

1. Take the road to NIGG, before you reach the Nigg Ferry terminal roundabout, you'll see a LEFT-HAND TURN with this signage.

2. Carry along this road for a short while, but it will soon turn into a Private road so PARK somewhere near the bottom of the road, there are some wide bays to do so.

3. As you walk part way up the hill, you will see a signpost for the CASTLECRAIG CIRCULAR PATH on your RIGHT. CROSS-OVER the style, being careful of the electric fence

Invergordon Service Base Phase 4 Development

4. Follow the high fence line around two sides of the field, following these PATH SIGNS. The first sign is this one at the corner of the field. The second one is by a gate. CROSS-OVER the style, being careful of the electric fence again.

5. Follow a grassy, SHEEP TRACK for a short distance, walking as if you are reaching the end of the point. Before you reach the end (where there is various bits of rubbish and concrete structure), you will see this NOBBLED POST on your right. From this point, you will get a clear lookout of the dumping area.

6. This is the look-out vista.

7. Map location of Observation Point at North Sutor.

Construction Environmental Management Document		
Section Number		12
Section Title		In-Air Acoustics
Issue		1
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Author		Fiona Henderson
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1	15/05/18	Issued for Marine Licence Application

12 In-Air Acoustics

12.1 Introduction

The Invergordon Service Base is close to residential areas and operates 24 hours a day, 7 days a week. The proximity to residential areas makes nuisance noise a concern, hence the construction of Phase 4 Development must be carried out in a sympathetic manner to minimise nuisance noise impacts. The Phase 4 Development if further from residential receptors than previous construction phases. The construction noise modelling completed as part of the EIA process doesn't predict any significant effects. However, that does not negate the need to minimise noise.

12.2 Mitigation

Timing of construction activities will be such that it will ensure noise levels detailed in Table 12.1 are not exceeded at the boundary of any noise sensitive locations. These align with BS5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites.

Table 12.1: Noise Limits at Nearest Receptors at Various Times of Day

Period	Times (Hrs)	Noise Limits dB $L_{Aeq,t}$
Daytime	07:00 – 19:00 Weekdays 07:00 – 13:00 Saturdays Excluding Bank Holidays	65
Evenings and Weekends	19:00 – 23:00 Weekdays 13:00 – 23:00 Saturdays 07:00 – 23:00 Sundays Bank Holidays	55
Night-time	23:00 – 07:00	50

All noise construction stage noise levels were predicted to result in noise levels of below 55dB at the nearest noise sensitive receptors, and as such evening and weekend work is acceptable. The majority of construction activities will be carried out between 7am and 7pm 7 days a week. With berth dredging being carried out 24 hours a day when required.

Noise levels exceeding these limits shall only take place to deal with emergencies and in exceptional circumstances. The Principal Contractor may make the decision to apply to the Highland Council under Section 61 of the Control of Pollution Act 1974 (as amended) with regard to noise levels from the construction activities.

To minimise noise levels generated, all equipment to be utilised on the site will be appropriately maintained and switched off when not in use. Good working practices will be employed to keep noise levels down throughout the construction process.

For each phase of the works, a review of plant requirements will be made against those assumed in the EIA report. If the actual plant requirements are significantly different to those predicted, a new assessment will be completed to identify any particular issues and associated requirements for mitigation.

12.3 Monitoring

At the start of each new phase of potentially noisy work activity, noise checks will be completed as discussed in Section 6. Initial checks will be qualitative, with the ECoW visiting noise sensitive receptors to identify if noise that can be related to construction activities is audible at the location. If construction noise is clearly audible, then noise monitoring will be undertaken.

If a noise complaint is received, then noise checks as described above will also be completed.

In event of noise levels exceeding the criteria defined in Table 12.1, an investigation will be carried out to identify whether the noise source is associated with the construction site, and if so the reason behind the breach. This will allow additional targeted mitigation to be identified and implemented.

All noise measurements will be taken in accordance with BS7445 Description and Measurement of Environmental Noise. The following measurements will be recorded:

- LAeq,5 min – equivalent continuous A –weighted sound pressure level in decibels measured over 5 minutes.
- LA10 - A-weighted sound pressure level that is exceeded for 10% of the measurement period.
- LA90 - A-weighted sound pressure level that is exceeded for 90% of the measurement time.
- LAmax – A weighted highest sound pressure level measured.

Construction Environmental Management Document		
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13 Programming

13.1 Introduction

This section lays out both the construction programme and the reporting programme for the development of Phase 4.

13.2 Construction Programme

The initial construction programme has now been defined and is provided in Appendix 13A. The programme is currently high level but will be refined and updated once the Principal Contractor has been appointed.

13.3 Reporting Programme

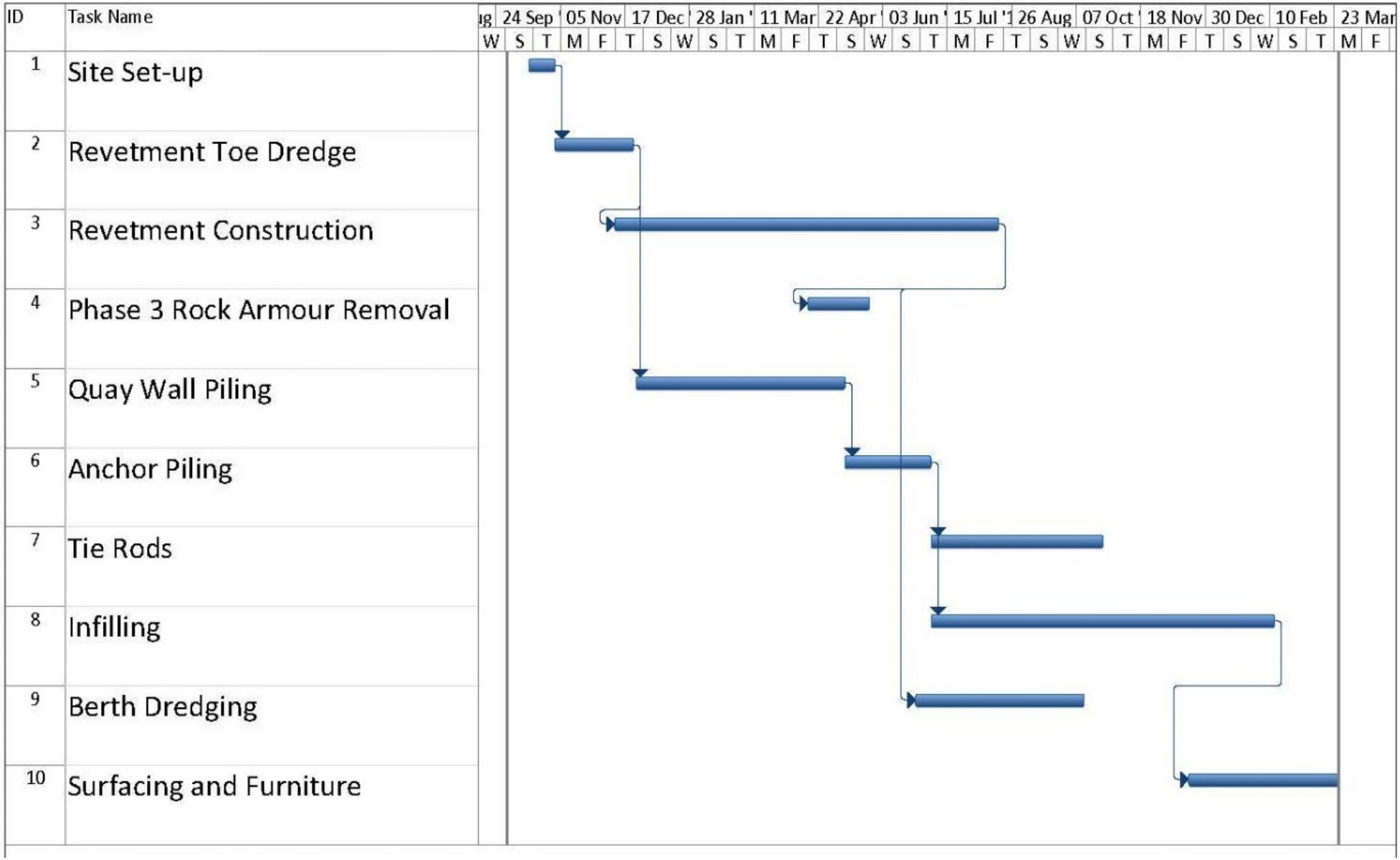
Table 13.1 details the environmental reports expected to be produced throughout the project, their timing, who is responsible and the regular distribution. The Project Team includes PoCF, PoCF's Consultant Engineers, PoCF's Environmental Consultant, and the Principal Contractor. It is acknowledged that Marine Scotland can request copies of any report during the project, however they would not routinely be sent all reports.

Table 13.1: Environmental Reporting Programme

Report	Timing/Frequency	Responsibility	Distribution
Incident / Non-conformance Reports	In event of an incident.	Project Team	Project Team and if relevant Marine Scotland/ SEPA/SNH
Investigation Reports	After and event or incident requiring further investigation.	ECoW	Project Team and if relevant Marine Scotland/ SEPA/SNH
Environmental Audits	Daily/Weekly/ Monthly as per Section 5.	ECoW	Project Team
Dredging Report	Within 28 days of completing dredging.	Principal Contractor Site Supervisor	Project Team Marine Scotland
Waste Management Report	Monthly	Principal Contractor	Project Team
In-air Noise Monitoring Reports.	As completed Section 12.	ECoW	Project Team
Impact Piling Report	Weekly when Impact Piling	ECoW/ Principal Contractor	Project Team Marine Scotland
Marine Mammal Observation Reports	End of Works	ECoW	JNCC, Marine Scotland Science, SNH

Appendix 13A – Construction Programme

Invergordon Service Base Phase 4 Development



Construction Environmental Management Document		
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Section Title		Schedule of Mitigation
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2	26/07/18	Updated in line with MS-LOT comments taking account of consultee responses.

14 Schedule of Mitigation

A summary of the proposed mitigation measures and monitoring for the Phase 4 Development is provided in Tables 14.1 and 14.2 respectively. In addition, the following best practice guidance will be adhered to where relevant, applicable and practicable:

- BSI: BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise.
- CIRIA: Coastal and Marine Environmental Site Guide;
- Ecology of the European Otter, Conserving Natura 2000 Rivers Ecology Series;
- GPP 21: Pollution Incident Response Planning;
- GPP 5: Works and Maintenance in or Near Water;
- IAQM: Guidance on the Assessment of dust from demolition and construction;
- IMO: International Regulations for Prevention of Collisions at Sea (IRPCS);
- JNCC: Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise;
- PPG 26: Safe Storage - Drums and Intermediate Bulk Containers;
- PPG 6: Working at Construction and Demolition Sites;
- Scottish Government: Guidance Note: Controlling Light Pollution and Reducing Lightning Energy Consumption;
- Scottish Government: The Water Environment (Oil Storage) (Scotland) Regulations;
- SNH: Scottish Wildlife Series: Otters and Development;
- Scottish Government: Planning Advice Note (PAN) 75: Planning for Transport; and
- The Highland Council: The Roads and Transport Guidelines for New Development.

Table 14.1: Draft Mitigation Measures

Topic	Measure	Reference
In-Air Acoustics	Site working hours are 07:00 to 19:00.	EIAR section 6.6.1, p. 6-24 – 6-25 EIAR table 6.9.1, p. 6-27
	Keep local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern.	
	Ensure that haulage vehicles do not arrive at or leave the site between 19:00 and 07:00 hours.	
	Ensure all vehicles and mechanical plant are fitted with effective exhaust silencers and 'smart' reversing alarms and are subject to programmed maintenance.	
	Select inherently quiet plant where appropriate – all major compressors, pumps and generators should be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use.	
	Ensure all ancillary pneumatic percussive tools are fitted with mufflers or silencers of the type recommended by the manufacturers.	
	Instruct that machines are shut down between work periods or throttled down to a minimum.	
	Ensure regular maintenance of all equipment used on site, including maintenance related to noise emissions.	
	Ensure that vehicles are loaded carefully to ensure minimal drop heights so as to minimise noise during this operation.	
	Ensure all ancillary plant such as generators and pumps are positioned so as to cause minimum noise disturbance and, if necessary, temporary acoustic screens or enclosures are provided.	
	Best practice measures to be employed as detailed in BS5228.	
Air Quality	Appropriate planning to minimise the number of times material is moved and the time material is stored.	EIAR section 8.6.1, p. 8-10 – 8-11 EIAR table 8.9.1, p. 8-13 – 8-14
	Materials stored on site will be minimised where practicable, by utilising a just in time delivery system.	
	Revetment materials will be supplied as fines free as practicable and placed promptly.	
	Infill materials will be kept moist, to avoid dust arisings until they have been covered by geotextiles or surfacing. This is likely to require the use of mobile water bowsers or water jets in dry weather conditions to damp down infill material.	
	Geotextiles and surfacing will be applied promptly.	
	Good housekeeping across the site.	
	Vehicles entering and leaving the site will be covered to prevent escape of materials during transport.	
	Delivery vehicles will follow designated routes over lock block, hard standing, newly constructed revetment, and surfaced reclamation area.	
	Road sweepers will be employed as required to minimise the spread of material through the Invergordon Service Base, and if need be onto the public road.	
	Optimisation of material usage through the design process, helping to avoid unnecessary CO_2e.	
	Locally sourcing materials where practicable to help minimise carbon costs of transportation.	
	Efficient working practices, for example the minimisation of material movements, and switching off machinery when not in use, will help to minimise the fuel consumption of site machinery.	
	Dust Management Plan	CEMD appendix 6B
Ecology - Ornithology	Breeding Bird Protection Plan	CEMD section 11.2, p. 11-3
	During the construction works, all lighting will be directional and local to the works. Lights will be switched off when not in use.	
	Once the rock revetment has been removed, if it needs to be stockpiled, fencing will be placed around it to dissuade eiders from nesting among the rocks.	EIAR section 11.6.1, p. 11-47 EIAR table 11.9.1, p. 11-50 – 11-60
	Immediately prior to and during the construction phase, surveys will be undertaken to locate nesting birds. Active nest sites will be protected by imposing construction appropriate exclusion zones, which may vary in size depending on the species of bird.	
	Construction activities will aim to start outside the most sensitive months of the breeding season (i.e. construction starting between September – March).	

Topic	Measure	Reference
Ecology - Ornithology	An ECoW will be appointed to oversee construction and to ensure that good practice measures with regards to the protection of breeding birds are implemented.	EIAR section 11.6.1, p. 11-47 EIAR table 11.9.1, p. 11-50 – 11-60
	Bird deterrent spikes fitted to lighting towers to prevent use by predators.	EIAR section 3.4.9.5, p.3-5.
	During the Operation of the Phase 4 Development, PoCF will remain vigilant for signs of breeding terns utilising the Phase 4 facilities. If terns are observed utilising the area, PoCF will consult with SNH and RSPB to develop appropriate mitigation measures to minimise potential impacts on terns, which may result from the operation of the Phase 4 facilities.	CEMD section 11.2.5, p. 11-4
Ecology – Marine Mammals	Adherence to the Marine Mammal Species Protection Plan including Piling Marine Mammal protocol and Dredged Spoil Disposal Marine Mammal protocol.	EIAR section 12.5, p. 12-36 – 12-38 EIAR table 12.9.1, p. 12-40 – 12-54 CEMD section 11.3, p. 11-5
	All vessels will be required to follow the guidance set out in SNH's 'Scottish Marine Wildlife Watching Code'	CEMD section 6.14, p. 6-20
Ecology - Otters	Otter Species Protection Plan	CEMD section 11.5, p. 11-16
	Prior to construction works being undertaken a pre-construction otter survey will be carried out to understand the current activity levels in the area and potential for holts and layups within 200m of the construction site.	EIAR section 13.6, p. 13-6 – 13-7 EIAR table 13.9.1, p. 13-8
	Prior to the installation of fenders on Berth 5 a further survey will be carried out and thereafter discussed with Scottish Natural Heritage (SNH).	
	Immediately prior to rock armour being removed it will be visually checked to ensure that otters are not present. Rock armour will only be removed on the agreement of the ECoW.	
	If a natal holt is found during the surveys or visual checks, works will be delayed until an appropriate way forward has been agreed with SNH.	
	Mitigation identified in for water quality will be implemented to protect otters from a release of hazardous substances.	
Ecology – Diadromous Fish	Dredging and dredged spoil deposit operations will be prohibited during the month of May.	EIAR section 14.6, p. 14-17 EIAR table 14.9.1, p. 14-19 – 14-23
Landscape and Visual	Equipment and materials no longer required on site during construction or operations will be removed promptly.	EIAR section 16.7, p. 16-41 – 16-42
	Crane arms will be lowered when not in use.	
	Good housekeeping practices will be employed in both the construction and operational phases.	
	Waste receptacles will be covered and littering will not be tolerated.	
	Good communications with local residents.	EIAR section 17.6, p. 17-14 – 17-15
Local Community and Economics	Encouraging local content through procurement to help to maximise the local and Scottish benefits of the construction works.	EIAR section 17.6, p. 17-14 – 17-15 EIAR table 17.9.1, p. 17-16
	Good communications with local residents and recreational users of Linear Park and the Invergordon Boat Club.	
Materials and Waste	Where practicable a high recycled content will be sought, this is applicable primarily to steel material, however the appropriate engineering standards will also need to be met.	EIAR section 18.5, p. 18-7 – 18-9. CEMD section 6
	Reuse of dredged spoil for land reclamation where suitable.	
	Rock, stone and infill material will be delivered on a 'just in time' basis as far as practicable. If rock or stone needs to be stored it will be on an appropriate area, such that surface water arising will not flow directly to the sea.	
	Potential utilisation of fencing to prevent use of stored materials by ground nesting birds or otters.	
	The fuel bowser will be under strict management controls to prevent pollution incidents, keep it secure and protected from oil thefts, and to comply with the requirements of the Oils Storage Regulations. The fuel bowser will be double skinned, stored in an appropriate area away from watercourses and drains where it cannot be 'crashed into'. It will be locked when not in use.	
	Refuelling will be carried out in designated areas, by trained operatives following site refuelling procedures. The refuelling procedure will take into account requirements under the oil storage regulations and best practice laid out in GPP2 and PPG6.	

Topic	Measure	Reference
Materials and Waste	Where practicable, bio-degradable hydraulic fluids will be utilised in machinery during construction. All oils and chemicals will be subject to Control of Substances Hazardous to Health (COSHH) assessments under the COSHH Regulations 2002. All COSHH assessments will include a section on the environment to highlight any precaution or mitigation requirements.	EIAR section 18.5, p. 18-7 – 18-9. CEMD section 6
	Appropriately bunded oil and chemical storage cabinets will be provided on site. These will be kept locked, with the key under management control to ensure appropriate use and accountability. Spill kits and procedures will be in place	
	An appropriate Site Waste Management System (SWMS) will be put in place by the construction contractor. It will ensure that appropriate records are kept for all waste arisings including volumes, categories and waste carriers used, and that waste transfer notes will be retained.	
	The SWMS will be based around the waste hierarchy and, as such, every effort will be made to minimise waste arisings, and to reuse materials on site. Where this is not practicable, the next step down the waste hierarchy is recycling. Recycling will be facilitated by the segregation of wastes. Clearly marked and labelled waste receptacles will be provided in designated areas. Waste receptacles (bins and skips) will incorporate lids or covers to protect against vermin gaining access and wind blowing wastes out of skips. Wastes suitable for recycling are likely to include wood, metals, paper, plastics and oils.	
	A suitable licensed waste contractor will be employed to collect wastes for recycling and disposal.	
	The Environmental Clerk of Works (ECoW) will carry out regular audits of the SWMS and review details of waste arisings to identify areas for opportunity to reduce or recycle more wastes.	
	Cement washings will be carried out in a dedicated area >10m from the nearest watercourse or drain. Washing arisings will be collected for onsite treatment. This will include settlement and, if required, pH correction. The liquids will be reused on site as grey water if suitable, or disposed of via a consented discharge onsite route, if available. Alternatively, they will be taken off site for disposal. The solids will be disposed of as solid waste.	
	Appropriate shuttering and edge protection will be in place to contain concrete pours.	
	The ECoW and site supervisor will inspect all shuttering to be used during 'over-water' pours of concrete such as the cope beam, to ensure it is adequately sealed prior to the pour commencing.	
	Prior to works commencing a litter sweep will be carried out on the west revetment of the Phase 3 development to ensure that any litter present does not escape to the marine environment during construction works.	
	Litter on the Phase 4 construction site or any of the vessels associated with the works has the potential to give rise to marine litter. All personnel working on the project will need to undertake site induction; this will include a section on waste management and the use of the waste receptacles provided. It will be made clear that littering will not be tolerated. The use of single use plastics will be discouraged, reusable water bottles supplied to all personnel and reusable crockery and cutlery will be provided in the welfare facilities. ECoW walk rounds will identify if littering is becoming an issue on the construction site or vessels, allowing corrective action to be taken.	
	Appropriate shuttering and edge protection will be in place to contain concrete pours.	
	The ECoW and site supervisor will inspect all shuttering to be used during 'over-water' pours of concrete such as the cope beam, to ensure it is adequately sealed prior to the pour commencing.	
Traffic and Transport	HGV's wheels will be checked prior to leaving the quarry and prior to leaving the Invergordon Service Base.	EIAR section 19.6, p. 19-9 – 19-20 EIAR table 19.9.1, p. 19-23 – 19-25
	HGV movements are anticipated to occur outside of weekday peak hours and arrangements will be made with suppliers and vendors for construction vehicles to limit or minimise peak morning and evening travel hours in the locality.	
	Compliance with the Framework Travel Plan	Transport Assessment Appendix E - Framework Travel Plan, section 7.2, p. 27-28.
	Compliance with Framework Construction Traffic Management Plan	Transport Assessment, Appendix F.
Water Quality	The Environmental Clerk of Works (ECoW) will observe the start of each activity that could give rise to increased sediment in the water column to ensure that any plumes arising are localised and disperse quickly as they occur. If increases in sediments are not as predicted, the construction technique will be reviewed to identify areas for improvement to prevent reoccurrence.	EIAR section 21.6, p. 21-18 – 21-19 EIAR table 21.9.1, p. 21-21 – 21-23

Topic	Measure	Reference
Water Quality	With regard to the dredge infill, appropriate isolation of the area will be ensured prior to infilling being permitted. Arrangements will continue to be reviewed as the area infilling works progress, to ensure an appropriate residence time is maintained to allow materials to drop out. The ECoW will maintain a watching brief on the activities and monitor any sediment plumes in the waters surrounding the Phase 4 Development. If deemed necessary, the ECoW will stop works, and ensure the arrangements are improved before infilling resumes.	EIAR section 21.6, p. 21-18 – 21-19 EIAR table 21.9.1, p. 21-21 – 21-23
	Appropriate spill plans aligned to the pollution control hierarchy and spill kits will be in place, construction operatives will be trained in the plans and in the use of spill kits, to ensure that loss of containment incidents can be dealt with promptly to prevent or minimise pollution.	
Navigation	Construction vessel traffic will abide by the following provisions, which unless otherwise stated apply only to vessels exceeding 10m in length: • Upon entering PoCF's Port Limits, vessels will transit to the Phase 4 Development using the main navigational channel, unless otherwise required for reasons of safe navigation. • Vessels will maintain constant speed and direction when transiting between the Phase 4 Development and the spoil disposal ground, unless otherwise required for reasons of safe navigation. • Vessels will adhere to set routes (in accordance with the general requirements of PoCF) between the Phase 4 Development and the spoil disposal ground. • All vessels, including vessels under 10m in length, will adhere to the general principles in the Scottish Marine Wildlife Watching Code when undertaking their activities.	EIAR section 20.5 p. 20-7 CEMD section 6.14, p. 6-20.
	Prior to any construction works commencing there will be a meeting between the construction contractors and the Port Manager or designate to discuss the project and associated construction navigational issues. The Port Manager or designate will review Risk Assessed Method Statements (RAMS) where navigation is a factor prior to works being undertaken.	
	During construction there will be meetings at least weekly with the construction team and the Port Manager or designate to ensure that the construction activities planned for the coming week and planned Port activities are fully understood and any potential clashes resolved.	
	Marine safety information, including local Notices to Mariners and radio navigation warnings will be issued as deemed appropriate during the marine works.	
	Information will be provided to the UK Hydrographic Office to allow them to update nautical charts and associated publications.	
	All vessels will comply with the International Regulations for Preventing Collisions at Sea as amended.	
	PoCF will liaise with the Northern Lighthouse Board to agree the navigational lighting requirements of the new Berth 6. This is likely to include moving the existing green lights on the west of Phase 3 onto the western corner of Phase 4.	
	Dredging will be completed as per the design informed by the Navigational Study to ensure that vessels can berth safely without running aground.	
	Compulsory pilotage of vessels over 60m within the Cromarty Firth reduces the risk of navigation incidents for vessels transiting the construction area of Berth 6, i.e. those visiting Highland Deephaven/Evanton Spool base.	
	The dredged berth pocket will be surveyed at least once every 4 years and dredged as required to maintain safe operational draft depths.	
	The use of Anchorage No. 4 will need to be carefully managed to prevent potential collision issues associated with the swing area required by larger vessels to berth alongside Berths 5 and 6.	
Marine Non-Native Species	All works will be carried out in accordance with the Code of Practice on Non-Native Species, adopting a precautionary approach to minimise the risk of releasing non-native species, using risk assessments relevant to planned activities and seeking advice on best practice whenever necessary, including reporting the presence of non-native species.	CEMD section 11.6, p. 11-18
	All equipment is to be received at 'as new' standard.	
	Local vessels within biogeographic boundaries will be utilised wherever possible i.e. within the North Sea ecoregion.	
	All vessels will be International Maritime Organisation ("IMO") compliant, including the Ballast Water Management Convention.	
	Salt water will be drained from every part of the plant, or boat and any other equipment that may transport water from the marine environment, prior to being mobilised to site or demobilised from it.	
	All parts of plant, equipment or boats that come into contact with the water will be thoroughly cleaned before being mobilised to or demobilised from the Phase 4 development; removing any visible plant, fish, animal matter and soils.	

Topic	Measure	Reference
Marine Non-Native Species	Dispose of any plant and animal materials in a secure and suitable bin or skip.	CEMD section 11.6, p. 6-18
	Ensure hulls are cleaned regularly to avoid the risk of transporting MNNS and apply adequate anti-fouling where appropriate.	
	Avoid travelling through marine plants and weed where possible. If organic matter becomes entangled in tracks, propellers etc, MNNS can be transferred to other areas.	

Table 14.2: Draft Monitoring Measures

Topic	Measure	Reference
In-Air Acoustics	Noise monitoring to be carried out as described in the CEMD.	CEMD section 12, p. 12-1
Underwater Piling Noise.	Underwater Noise monitoring to be conducted, as described in the CEMD.	CEMD Section 11.3.4.3 p. 11-14.
Air Quality	Visual checks will be carried out by the Environmental Clerk of Works throughout the construction works, to ensure that dust is not accumulating outwith the construction site and that track-out is not becoming an issue,	EIAR section 8.6.1, p. 8-11