

## **Nigg East Quay**

### **Volume 3: Technical Appendices**



**June 2019**



## **Nigg East Quay**

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## **Nigg Energy Park East Quay EIA Scoping Report**



**February 2019**

# Nigg Energy Park East Quay EIA Scoping Report

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# 1 INTRODUCTION

## 1.1 Background

EnviroCentre Ltd has been appointed by Global Energy Nigg Ltd ('the Applicant') in respect of providing a Scoping Request and subsequent Environmental Impact Assessment (EIA) in relation to a proposed new development, comprising the construction and formation of a new East Quay and associated laydown area, situated at Nigg Energy Park approximately 1.5km north of Cromarty (as demonstrated within Figure 1: Site Location within Appendix A). The proposed development is further set out within section 2.

Given the proposed development contains both marine and terrestrial elements, this Scoping Report has been prepared under the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the TCPA EIA Regulations') and The Marine Works (Environmental Impact Assessment (Scotland) Regulations 2017 ('the Marine EIA Regulations'), and accordingly is submitted to both Marine Scotland Licensing Operations Team (MSLOT) and the Highland Council ('the Council').

The proposed development application falls within Schedule 1 of both the TCPA EIA Regulations and the Marine EIA Regulations by virtue of regulation 8(b) which stipulates that *"Trading ports, piers for loading and unloading connected to land and outside ports (excluding ferry piers) which can take vessels over 1350 tonnes"* require an EIA to be undertaken. This was confirmed during a pre-consultation meeting between the Applicant and the Council (18/01549/PREAPP), with a pre-application advice pack issued on 30<sup>th</sup> April 2018.

Accordingly, this Scoping Report has been laid out as follows:

- Section 1 introduces the applicant, and the regulatory background to which this Scoping Request is made;
- Section 2 sets out a description of the proposed development upon which to base potentially significant environmental effects upon. This development description will evolve as engineering design progresses;
- Section 3 sets out the approach to EIA based upon the legislative context introduced within section 1;
- Section 4 discusses potentially significant environmental effects on a topic by topic basis, and offers methodologies for the assessment of those environmental topics;
- Section 5 discusses the content and structure of any potential EIA, based upon the findings of section 4; and
- Section 6 concludes the findings of the Scoping Report.

This Scoping Report is also accompanied by two appendices:

- Appendix A: Figures; and
- Appendix B: Phase 1 Habitat and Protected Species Survey Report.

## 1.2 The Applicant

Global Energy Group is an Inverness and Aberdeen-based energy sector service group who operate worldwide. Global Energy Group Limited acquired Nigg Fabrication Yard and Complex, aiming to be a 'multi-sector, multi-user asset' in port and fabrication operations. Adapting expertise and experience gained from Scotland's 40-year involvement with oil and gas production, the Applicant has developed sector-leading services in integrity and maintenance solutions for the offshore market.

The primary function of the Nigg Energy Park is the provision of facilities and services to support the oil and gas and renewables sectors. The Applicant has since successfully diversified to satisfy current market needs in the

north of Scotland. A typical day may include the repair of drilling rigs, fabricating subsea manifolds, berthing vessels or marshalling offshore wind components.

Also contained within Nigg Energy Park is the “not-for-profit” business - Nigg Skills Academy (NSA). The independent business was set up to support black trade skills (Welding, fabrication and pipe fitting) for local employees in partnership with North Highland College and is now diversifying into running courses for other industries.

### 1.3 Project Team

This Scoping Report has been prepared by EnviroCentre Ltd with input from other organisations shown in Table 1.1.

**Table 1.1: The Project Team**

Topic	Specialist
Project Management, EIA Coordination, Marine Ecology, Terrestrial Ecology, Water Environment, Airborne Noise, Other Issues, Sediment and Best Practicable Environmental Option Advice (BPEO).	EnviroCentre Limited
Cultural Heritage and Archaeology	Headland Archaeology
Landscape and Visual	Douglas Harman Landscape Planning
Traffic and Transport	SYSTRA
Engineering Input	Arch Henderson LLP
Planning and Consultation	GH Johnston
Underwater Noise	Irwin Carr Consulting

### 1.4 Planning History and Need for the Proposed Development

The Nigg fabrication yard was established in 1972 and consists of approximately 70 hectares (ha) of land reclaimed from the eastern edge of Nigg Bay. Nigg Oil Terminal was subsequently established to support the Beatrice oilfield development in the mid-1970s. The yard was operational from 1972 until 2001, providing fabrication services to the North Sea oil and gas industry. During peak operation, the facility employed around 5,500 personnel and supported a wider supply chain. Following sector-wide operational difficulty at the turn of the Millennium, approximately 5,000 jobs were lost along with the supply chain benefits. Following a period of instability, Global Energy purchased the facility in 2011 and have been operational since.

Following this, the Applicant is continuing to create an internationally competitive industrial multi-user facility providing fabrication and support service to the energy sector as outlined within the Nigg Development Masterplan<sup>1</sup> which was adopted by the Council in March 2013.

In May 2013, an application to MSLOT and the Council (reference 13/01825/FUL and amended by 13/04695/FUL) was submitted regarding an extension to the south quay harbour and berthing facilities at Nigg Energy Park, to accommodate large rig structures and floating production, storage and offloading vessels (FPSOs). The South Quay development was subject to a full EIA and was duly approved. Construction was completed in 2015 and the facility is now fully constructed and fully utilised, and in great demand with the Applicant’s North Sea oil and energy sector clients.

<sup>1</sup> The Highland Council (2013) – Nigg Development Masterplan Supplementary Guidance

Subsequent applications have come forward in the intervening period between May 2013 and time of writing in January 2019, including:

- Extension of Assembly Shop 7 (17/05176/FUL);
- Extension to Assembly Shop 4 to join Fabrication Shop 7 including erection of new buildings (17/03411/FUL); and
- Installation of hardstanding, compound area and welfare area, fuel tanks and delivery pipes (15/02216/FUL), as amended by 15/03325/FUL.

Offshore energy represents a key opportunity for sustainable economic growth in Scotland, with around 25% of all of Europe's wind energy crossing the seas around Scotland. Confidence in the offshore sector is growing since Electricity Market Reform, with several high profile offshore windfarms being consented in waters around Scotland in the last 5 years. According to the Scottish Government's Sectoral Marine Plan for Offshore Wind Energy<sup>2</sup>, in the last two years Scottish Ministers have given consent to several demonstration scale projects in Scottish Waters (including offshore installations such as Hywind Scotland Pilot Park off Peterhead, Kincardine Offshore Wind Farm off the Aberdeen coast, and Dounraey demonstration project off the Caithness coast. It is intended that construction and operation of these projects would occur over the next few years.

Given that as of May 2018, Scotland had 217 Megawatts (MW) of installed offshore wind capacity but with a further 4.2 Gigawatts (GW) in construction or awaiting construction, it is clear that facilities such as Nigg Energy Park has a bright future in servicing this pipeline of development. The proposed development aims to address the current lack of suitable berths at Nigg to service both the Applicant's North Sea oil sector clients, whilst the wider Energy Park would service their current and potential clients in the rapidly growing offshore renewables sector.

To address this shortfall in suitable berths, Global has considered the east quay expansion for some time but the potential was limited due to the lack of available land to the east of the present site. However, with the purchase of Dunskeath House and associated land, the proposed development is now viable at a time when it is urgently needed in order to grasp the opportunities currently arising and likely to arise over the next decade.

Extending Nigg Energy Park to include the contiguous Dunskeath lands is regarded as a practical and safe option for handling and storing renewables and North Sea oil components, which would arrive, be assembled and ultimately leave by sea. The alternative considered was to expand into vacant land to the east on the other side of the B9175 public road but this was ultimately rejected in favour of the current proposal.

The applicant was aware also that the concept of an East Quay was identified within the Nigg Masterplan as a potential access option to the sea

## **1.5 Scoping under the EIA Regulations**

As the proposed development (as fully discussed within section 2.2 of this Scoping Report) contains elements which are both above Mean High Water Springs (MHWS) and below Mean Low Water Springs (MLWS), consents will be required from both the Council and MSLOT. Accordingly the EIA Report and related statutory consultation will be undertaken in line with both regulatory regimes.

As discussed, by virtue of its nature, size and location, the proposed development could potentially have (if unmitigated) significant adverse effects on the environment. Accordingly, in recognition of the size and potential impacts generated by the proposed development, the Applicant is committed to providing an EIA in line with the pre-application advice summarised within section 1.7.

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<sup>2</sup> The Scottish Government (2018) – Sectoral Marine Plan for Offshore Wind Energy (encompassing Deep Water Plan Options Context Report



The purpose of EIA Scoping is to:

- *“Identify the key issues to be considered;*
- *Identify those matters which can be either be scoped out or which need not be addressed in detail; and*
- *Discuss and agree appropriate methods of impact assessment, including survey methodology, where relevant”.*

In accordance with the EIA Regulations, this Scoping Report is submitted to Highland Council and Marine Scotland Licensing and Operations Team (MSLOT) with the intention that it should form the basis of their Scoping Opinion. Other statutory consultees, local people and organisations and other stakeholders, are invited to comment on the potential environmental effects to be included within the EIA and the assessment methodologies to be used. As such, it should be noted that this document does not seek to assess the environmental effects of the proposed development as this is the purpose of the EIA which will be carried out once the design has been fully evolved including design-led mitigation as required.

## **2 THE PROPOSED DEVELOPMENT**

### **2.1 Site and the Surrounding Area**

#### **2.1.1 The Site**

The site is situated south east of the Nigg Energy Park at an elevation of 5m above sea level and is centred at Ordnance Survey Grid Reference (OSGR) NH 79527 69016. The proposed entirety of the site boundary is approximately 11.27ha and is comprised of coastal waters and land of the former Dunskeath House, with derelict buildings associated with the former Dunskeath House situated within the site. The area above Mean Low Water Springs within the site boundary comprises approximately 4.78ha.

The site is dominated by bare ground with areas of dense and scattered scrub, grassland, tall ruderal vegetation and broadleaved trees. Sand and shingle above the high tide mark are also present in the south of the site and a sea wall exists in the west.

The Nigg Oil Terminal is located to the immediate north of Nigg Energy Park, with the B9175 and Fearn Peninsula to the east, the area where the Cromarty Firth meets the Moray Firth to the south (known as 'The Sutors') to the south, and Nigg Bay to the west (also part of the Cromarty Firth). Adjacent to the south-east of the site, the Cromarty Ferry crosses the entrance to the firth to the west of The Sutors in the summer season from May to September. Access to the facility can be gained from via the B9715.

The site is underlain by sandstone of the Raddery Formation, formed in a fluvial or estuary setting during the Devonian Period (383 – 393 million years ago). Coastal outcrops of the Devonian Period Cromarty Fish Bed Limestone are present to the west of the site. Further west metamorphic rocks (psammite and pelite) from the Moine Supergroup are present, these rocks were formed during the Neoproterozoic Era (541 – 1,000 million years ago).

Coastal superficial deposits in the vicinity of the site take the form of marine beach deposits, gravel, sand and silt formed up to 3 million years ago during the Quaternary Period. Immediately inland wind-blown sand deposits are present, also of the Quaternary Period, with glacial till present further inland.

#### **2.1.2 The Surrounding Area**

Nigg Energy Park is situated to the immediate north of the proposed development. A dry dock, extensive laydown and some 900m of heavy load bearing quayside (with depths of up to 12m) ensure versatility of services. Technical services currently provided by Nigg Energy Park include;

- Large scale and complex fabrication projects for subsea and offshore equipment;
- Shot blasting and painting of infrastructure;
- Specialist diving (i.e. anode replacement, subsea solutions);
- Survey and engineering;
- Architectural repair and refurbishment of offshore rigs;
- Specialist rig access and inspection; in addition to
- Construction and decommission of offshore and subsea infrastructure.

The surrounding area contains several designations within a 5km radius, as illustrated within Figure 3 of this Scoping Report. These include the following:

- Cromarty Firth Site of Special Scientific Interest (SSSI), situated approximately 0.59km to the west of the site, designated for intertidal mudflats and sandflats;
- Cromarty Firth Special Protection Area (SPA), situated approximately 0.59km west of the site, designated for a range of non-breeding birds;
- Cromarty Firth Ramsar Site, situated approximately 0.59km west of the site, designated for intertidal mudflats and sandflats and waterfowl assemblage;
- Rosemarkle to Shandwick Coast SSSI, situated approximately 0.76km east of the site, designated for maritime cliffs, geological features and breeding birds;
- Moray Firth Special Area of Conservation (SAC), situated adjacent to the east of the site and designated for bottlenose dolphin;

There are other designations at greater distance, for example the Dornoch Firth and Morroch More SAC, which are relevant to the marine ecology assessment but not in the immediate vicinity of the site (see section 4.4).

Nearby settlements include the hamlets of Balnabruich and Balnapaling to the immediate north, with Castlecraig approximately 1.5km east, Nigg approximately 2km north and in the wider area, Arabella Ankerville, Ballintore and the Ag are further north.

The Port of Cromarty Firth (POCF) is the existing statutory harbour authority for the Cromarty Firth under the Cromarty Firth Port Order of Confirmation 1973 Act as amended. The POCF has the authority to grant licences for marine works and dredging operations in the firth and manages the allocated dredge disposal site at the Sutors. The Applicant are consequently required to seek these licences prior to the commencement of any marine works. Being a Trust Port, the POCF are designed to reflect local needs and markets. Invergordon Port lies approximately 8.5km west of Nigg Port and is governed by POCF. Invergordon Port is central to Highland economy and is equipped to maintain, inspect and repair vessels and subsea infrastructure. POCF maintain overall control and management of shipping and vessel access/ egress from Nigg and the wider Cromarty Firth area. Northern European Cruise ships frequently make use of the extensive berthing at Invergordon, where several liners can be anchored simultaneously.

There is currently a Phase 4 development and marine licence approval for Invergordon Service base, relating to the construction of 215m new quayside and land reclamation of 6.27ha, including rock revetment and steel-piled quay walls. This construction licence is valid until 31<sup>st</sup> March 2020. Invergordon Port has also received approved permits for the handling of hazardous wastes.

Oil fields that are serviceable by Nigg Energy Park are located in the Moray Firth, Fladen, Fortes, East and West Shetland; renewables fields including Firth of Forth, Moray Firth and Maygen are also in the vicinity and serviced by Nigg Energy Park. The Beatrice sub sea oil pipeline connects to oil storage facilities at Nigg Energy Park and traverses east across the Fearn Peninsula for 22km to the Beatrice Oil Field, which no longer produces oil. All oil field infrastructure including pipeline is scheduled for decommissioning from 2020-2024.

The Inner Moray Firth is considered to be part of the Ross-shire Growth corridor within the Inner Moray Firth Local Development Plan (2015), which sets out projected development objectives for the surrounding populations of Nigg, Alness, Evanton, Dingwall, Inverness and Invergordon which are well-placed to benefit from North Sea renewables and infrastructure investment such as the proposed development.

## **2.2 The Proposed Development**

### **2.2.1 Outline Description**

The proposed development contains the following:

- A proposed east quay of plan area 250m by 50m (0.88ha) constructed using perimeter piling to retain locally dredged material as infill
- Associated fendering and rock armouring;
- Dredging (method to be determined) of approximately 140,000m<sup>3</sup> to achieve a minimum sea bed level at the main west facing berth of 12m below chart datum to facilitate the proposed development;
- High level lighting to quayside in accordance with Port Regulations
- Sea water extraction for fire-fighting capability
- Re-use of approximately 70,000m<sup>3</sup> of dredged materials within the quay structure (quantities to be determined and material characterisation and sampling to be agreed with MSLOT);
- Disposal of excess suitable dredged material (approximately 70,000m<sup>3</sup>) within The Sutors licenced disposal site;
- Demolition and removal of buildings on site associated with the former Dunskeath House;
- Preparatory groundwork and associated landscaping for provision of a laydown area for handling and temporary storage of plant and renewable energy components;
- Access provision from the B1975; and
- Security lighting and fencing associated with the laydown area.

### **2.2.2 Dredging**

Ongoing ground investigations will determine the suitability of material for re-use. Following completion of sampling and sediment characterisation, a Best Practicable Environmental Option (BPEO) report will be prepared by EnviroCentre justifying the uses of material. Detailed construction methodology is under consideration taking due account of the need to protect the environment by restricting the underwater noise generated and ensuring only dredged material acceptable to MSLOT is deposited at the Sutors. The output from this exercise will be included within the BPEO assessment.

A dredged depth of -10m CD is known to be achievable for the main west facing berth although -12m CD may prove viable following the further ground investigation proposed. The dredge depth elsewhere will gradually decrease towards the east, the depth being restricted by the achievable bed slope and the desire not to interfere with the intertidal zone. Quantities would be confirmed at engineering design freeze but at this stage it is anticipated that approximately 140,000m<sup>3</sup> would require to be dredged with an estimated 70,000m<sup>3</sup> to be re-used.

### **2.2.3 Piling**

The engineering options for forming the piled perimeter of the proposed berths are currently under review and a favoured option will not be decided until the results of the current ground investigation are received. The engineering consultants recognise the sensitivity of the environment and in particular the need to avoid impact pile driving wherever feasible. One option would be to use tubular piles as the main king piles in a combi wall. Here the tubes would be driven at 2m spacing approx. around the berthing perimeter of the quay. The tubes would be tied back to a rear sheet pile anchor wall with sheet piles used to infill the gap between the tube king piles. The tubes would be driven using a vibro pile hammer to restrict underwater noise generation. Should very stiff material be encountered preventing a pile reaching the design depth, an auger could be inserted into the tube and the material inside loosened to allow driving to proceed.

All steelwork installed in the marine environment will be protected by the installation of cathodic protection.

#### **2.2.4 Quay Surfacing and Lighting**

The new quay area will have a top layer of compacted crushed rock which would be graded to a suitable slope towards the land and away from the sea perimeter. As for the south quay this surface will allow rainwater to effectively drain into the subsoil and allow for the quay infill to gradually settle over time. It may prove desirable in due course to construct a concrete slab finish over the quay area. At that time a positive surface water drainage system would be designed for acceptance by SEPA prior to implementation. Area lighting of the quay would be provided using LED high level towers similar to those used successfully on the south quay development and in accordance with the required lighting levels for the safe operation of docks and harbours. Floating fenders would be deployed, and additional floating fenders would be purchased as part of the construction contract.

#### **2.2.5 Access**

Road access to construct the quay would be limited as, apart from the concrete for the cope and the final crushed rock topping, the materials would probably arrive at the site by sea. The existing access would also be used by construction plant involved in preparing the Dunskeath land for the storage and handling of future components which would also involve importing crushed rock material. It is noted however that the preferred source for the crushed rock is Castlecraig quarry which is located very close to the site so that impact on traffic using the B9175 public road should be minimal. The proposed development will result in an increase in the secure area of Nigg Energy Park and the Applicant proposes to erect a chain link security fence around the revised perimeter. Whilst a gated access on to the B9175 would be retained at the existing location, the Applicant does not envisage this being a recognised point of controlled entry however, so that the gates would be locked at all times.

#### **2.2.6 Demolition of Structures and Preparation of the Laydown Area**

Following Building Warrant approval the existing buildings and stonework walls would be demolished and unsuitable materials would be removed off site to an approved disposal site. The large majority of the existing stonework consists of badly weathered sandstone which is likely to break up and disintegrate into rubble during demolition operations so may be used as infill below access routes and hardstandings. However where practical selected stone walling may be set aside for reuse possibly to form stone feature pillars at the future secure gated access point.

The laydown area would be formed on the Dunskeath land now under the control of the Applicant as well as on the land under leased agreement from the Wakelyn Trust. The laydown area would consist of defined access routes to and from the proposed quay to levelled hardstanding areas to be used for storage of components. All routes and hardstandings would be formed by removing organic material, compacting the subsoil to a predetermined load bearing capacity before placing a layer of compacted crushed rock to form the final surface. It is anticipated that all such surfaces would allow rain water to permeate into the subsoil but where ponding proves evident, local french drains may have to be provided consisting of a trench filled with clean crushed rock filter material and surrounded in geotextile. The access routes and hardstanding areas will potentially be operational 24/7 and will therefore require to be adequately lit in terms of operational safety. A lighting plan would be prepared for approval by the Local Authority's Lighting Department. Topsoil removed as part of the site preparation works would be stored on site and may be used to provide screening should this be considered appropriate.

### **2.3 Marine Licencing and Sediments**

Construction work below MLWS would require a marine construction licence from MSLOT, whilst the proposed dredging referred to in section 2.2.2 would require a dredge and disposal licence. In order to provide the requisite information to MSLOT in relation to a dredge and disposal licence, the Applicant is required to provide evidence that the material in situ is suitable for re-use. In order to do this, the Applicant is currently undertaking sampling

and characterisation of sediments via a Ground Investigation, in accordance with Marine Scotland guidance<sup>3</sup>. Having undertaken a similar ground investigation in 2014 at the east quay site when no contamination was detected, the Applicant envisages that all the material proposed to be dredged will prove acceptable for the intended use.

Once confirmed, the BPEO Report would be finalised for submission along with the application(s).

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<sup>3</sup> Marine Scotland (2017): Pre-disposal Sampling Guidance Version 2: November 2017

## **3 APPROACH TO EIA**

### **3.1 Introduction**

The objectives of an EIA are to:

- Establish the availability of the baseline data;
- Request that statutory consultees provide any relevant environmental information relating to the site and the surrounding area;
- Define a survey and assessment framework from which a comprehensive overall assessment can be produced; and
- Provide a focus for the consenting authorities and the consultees' considerations – in terms of:
  - Potential impacts to be assessed;
  - Assessment methodologies to be used;
  - Other areas that should be considered; and
  - Any other environmental issues of perceived concern.

The aim of the Scoping Report is to assist MSL0T, Highland Council and consultees to form an opinion as to the likely effects of the proposed development. It describes the proposed development and provides information with regard to the environment.

It seeks to identify potential environmental impacts of the proposed development and most importantly to reach agreement on which of the impacts could lead to significant environmental effects. The EIA will be focussed on assessing the potentially significant effects and propose mitigation measures to reduce the residual effects on the environment. The scoping process will should also identify those environmental issues which do not require further consideration.

### **3.2 General Approach to Assessment**

The project team benefits from significant experience and technical expertise in environmental assessment and development of such projects and will ensure that the EIA will be carried out in accordance with the EIA Regulations.

The potential environmental impacts during construction, operation and decommissioning will be identified and assessed in the EIA Report, based upon the recommendations of the technical EIA team, consultation with statutory consultees, other interested parties and local communities. Topic assessments will be undertaken using best practice methodology, following industry guidelines whenever appropriate and carried out by specialists with relevant professional experience.

Schedule 4 of the EIA Regulations states the information to be included within the EIA. Each assessment will consider these criteria and assess them whenever appropriate to the proposed development. This also highlights that the emphasis of the EIA process should be on assessing likely significant effects, rather than every environmental effect associated with a development.

Impartial professional consultants (as set out in Table 1.1) will assess the likely significant environmental effects identified. These specialist assessments will generally incorporate:

- Site visits;
- Collection of baseline data regarding the site and surroundings;
- Identification of the likely significant effects of the proposed development; and



- Recommendations on how these effects could be avoided or reduced.

For each topic the proposed methodology to be used within technical topics is set out within Section 4 of this Scoping Report. Cumulative effects will be assessed within each EIA Report chapter as appropriate, at a scale appropriate to that subject and in line with best practice guidance currently available.

It is essential that the methodology used for assessing the significance of environmental effects is set out clearly and transparently within an EIA Report and is justifiable. Significance is generally determined through a combination of the sensitivity of a receptor or resource to an effect and the magnitude of the change resulting from the proposed development, however where this differs the full methodology is explained within the relevant section as appropriate.

Significant effects are more likely to be predicted where important resources, or numerous or sensitive receptors, could be subject to impacts of considerable magnitude. Effects are unlikely to be significant where low value or non-sensitive resources, or a small number of receptors, are subject to minor impacts. The assessment of significance of an environmental effect resulting from the proposed development will have regard to the following:

- Sensitivity, importance or value of the resource or receptor;
- Extent and magnitude of the effect;
- Duration of the effect;
- Nature of the effect;
- Performance against environmental quality standards; and
- Compatibility with environmental policies.

The methods for predicting the nature and magnitude of any potential impacts vary according to the subject area. Quantitative methods of assessment can predict values that can be compared against published thresholds and indicative criteria in Government guidance and standards. However, it is not always possible to ascribe values to environmental assessments and thus qualitative assessments are used. Such assessments rely on previous experience and professional judgement. The methodologies used for assessing each topic area will be described within the individual chapters of the EIA Report and will follow best practice guidelines where applicable.

### **3.3 Mitigation**

The EIA Regulations state that the EIA Report must contain a “*description of the measures envisaged in order to prevent, reduce and where possible, offset any significant adverse effects on the environment.*”

As outlined in PAN 1/2017 there is a widely accepted strategy for mitigation which will be followed when considering the environmental effects of the proposed development. This comprises (in order of preference): avoidance, reduction, compensation and remediation. In addition, consideration will be given to providing the opportunity for enhancement. Mitigation and, if appropriate, monitoring proposals, will be described clearly within the ES. The mitigation will be achievable and will be delivered through appropriate mechanisms.

### **3.4 Requirements of the EIA Regulations**

In addition to those items explained above, the EIA Report will either include discussion of, or scope out via section 4 of this Scoping Report, the following items:

- A description of the development, including description of the location, its physical characteristics, land-use requirements during construction and operation, a description of characteristics of the operational phase, and an estimate of the types and quantities of expected residues and emissions;

- A description of reasonable alternatives, including development design, size, scale, and a justification of the project choices made;
- A description of the baseline environmental situation and an outline of the likely evolution thereof without implementation of the proposed development;
- An assessment of the environmental baseline for each environmental topic scoped into the EIA, with reference to those items specified within Schedule 4 (5) of the EIA Regulations;
- A description of mitigation and monitoring measures (where applicable); and
- A description of any expected adverse impacts in relation to the vulnerability of the proposed development to risks of major accidents and/or disasters which are relevant to the project.

### 3.5 Consultation and Stakeholders

The Applicant recognises the importance of consultation and community involvement throughout the project development process in line with “PAN 3/2010 Community Engagement”<sup>4</sup>. PAN 1/2017: Environmental Impact Assessment Regulations<sup>5</sup> also reinforces the importance of public involvement in the Scoping process and makes it clear that the EIA process is intended to ensure that consultation bodies and the public have opportunity to express their opinion on both the proposed development and the EIA Report. Similarly, MSLOT’s ‘Guidance on Marine Licensable Activities subject to Pre-Application Consultation’<sup>6</sup> sets out the importance of consultation along with the statutory requirements.

The Applicant has held informal pre-application discussions with several bodies including a formal pre-application consultation meeting with Highland Council culminating in an Advice Pack dated 30<sup>th</sup> April 2018, alongside a separate meeting with Highland Council on 8<sup>th</sup> November 2018. EnviroCentre have also held pre-Scoping discussions with SNH and Highland Council Environmental Health. A summary of discussions is contained in Table 3.1 below:

**Table 3.1: Summary of pre-Scoping discussions**

Organisation	Topic	Comments
Highland Council	Environmental Health	<ul style="list-style-type: none"> <li>• A construction noise assessment is required should work be undertaken outside of daytime hours, or where noise levels are likely to exceed 75dB(A) for short term works or 55dB(A) for long term works.</li> <li>• If this is required, it should be carried out in accordance with BS5228-1:2009.</li> <li>• An updated operational noise assessment would be required including existing activities and background levels. It may be more practicable to look at noise from the site as a whole rather than compare predicted levels to historic or baseline levels.</li> </ul>
	Contaminated Land	<ul style="list-style-type: none"> <li>• Site investigation for potential contamination is not required.</li> </ul>

<sup>4</sup> The Scottish Government (2010): Planning Advice Note 3/2010: Community Engagement

<sup>5</sup> The Scottish Government (2017): Planning Circular 1/2017: Environmental Impact Assessment Regulations

<sup>6</sup> Marine Scotland (2014): Guidance on Marine Licensable Activities subject to Pre-Application Consultation

Organisation	Topic	Comments
	Flood Risk	<ul style="list-style-type: none"> <li>The proposed development is considered a 'water compatible use'</li> <li>A drainage layout drawing should be provided to demonstrate surface water drainage into coastal waters</li> <li>The risk of increasing flood risk should be assessed</li> </ul>
	Historic Environment	<ul style="list-style-type: none"> <li>Elements of historic assets should be retained and relocated as opposed to demolished</li> <li>Recording should take place before construction</li> <li>Evaluation of open ground is required to assess the potential for buried remains to survive</li> </ul>
	Traffic and Transport	<ul style="list-style-type: none"> <li>A Transport Statement or EIA chapter is required</li> <li>A Construction Traffic Management Plan is needed, along with an Operational Traffic Management Plan</li> </ul>
MSLOT	Marine based guidance	<ul style="list-style-type: none"> <li>Habitats Regulations Appraisal is required</li> <li>European Protected Species Licence is required</li> <li>Water Framework Directive assessment is required</li> <li>Predisposal sampling and analysis is required</li> <li>Cumulatively, the Applicant should consider Invergordon Phase IV as well as any other relative developments</li> <li>Notification to marine statutory consultees is required as part of the pre-application consultation process.</li> </ul>
SNH	Terrestrial and marine ecology	<ul style="list-style-type: none"> <li>Consideration should be given to impacts upon designations including Moray Firth SAC (dolphins and subtidal sandbanks), Dornoch Firth and Morrich More SAC (common seal), Cromarty Firth SPA and Ramsar site (birds), Proposed Moray Firth SPA, Cromarty Firth SSSI</li> <li>Assessment should be undertaken of impacts upon cetaceans in relation to marine works including sediment transportation, underwater noise and piling.</li> <li>Assessment should be undertaken in relation to the loss of buildings as part of the Dunskeath Estate</li> <li>Consideration should be given to dredge and disposal options</li> <li>Consideration of vessel movements, cumulatively</li> </ul>

Organisation	Topic	Comments
SEPA	Water environment	<ul style="list-style-type: none"><li>• The proposed development should incorporate SUDS and adequate space should be provided</li><li>• Proposed development should meet CIRIA C753</li></ul>
Transport Scotland	Traffic and Transport	<ul style="list-style-type: none"><li>• In the absence of detailed information, a Transport Assessment is sought</li><li>• A threshold assessment of the A9 trunk road is also requested.</li></ul>

Where applicable, these points have been addressed within the scope of work outlined below, and where the proposed scope varies from what has been suggested by regulators, this has been justified as appropriate.

## 4 POTENTIAL FOR SIGNIFICANT ENVIRONMENTAL EFFECTS

### 4.1 Introduction

This section discusses potentially significant effects. Each of the environmental topics discussed within this section could have the potential to be impacted by the proposed development. By establishing the extent of potential impacts and subsequent effects, the topic can be scoped into the EIA Report, or scoped out as appropriate.

### 4.2 Landscape and Visual

#### 4.2.1 Introduction

This section addresses the potential significant adverse effects of the proposed development on the landscape and visual interests of the site and surrounding area. These are defined respectively within paragraph 3.21 of the *Guidelines for Landscape and Visual Impact Assessment (GLVIA)*<sup>7</sup> as:

*“...the constituent elements of the landscape, its specific aesthetic or perceptual qualities and the character of the landscape”*

and

*“...the people who will be affected by changes in views or visual amenity at different places”.*

To help determine the need for, and to ascertain the potential scope of a Landscape and Visual Impact Assessment (LVIA) as part of an EIA, an initial landscape and visual appraisal has been undertaken, informed by a site visit, to identify the following:

- the landscape character of the site and surrounding area;
- the seascape character of the site and surrounding area;
- the coverage of any landscape designations across the site and surrounding area;
- important views and viewpoints towards the site from the surrounding landscape/seascape;
- any potentially significant landscape and visual effects during construction and post-completion;
- recommendations for mitigating any potentially significant adverse effects; and
- recommendations for further study.

#### 4.2.2 Baseline Conditions

The purpose of this baseline assessment is to identify the existing landscape and visual resource of the site and surrounding landscape, against which any potential significant effects of the proposed development are predicted. Although any potential significant effects are very unlikely to be experienced beyond 5 km from the site, the assessment of the following landscape and visual receptors has been identified within an indicative study area of 15 km:

- the site and its setting;
- landscape character;

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<sup>7</sup> Landscape Institute and Institute of Environmental Assessment (2013). *Guidelines for Landscape and Visual Impact Assessment*. Third edition.

- seascape character;
- landscape designations; and
- key views and visual receptors.

### ***The Site and its Setting***

As detailed in Section 2.1 of this Report, the Site is located on the south-western shore of the Fearn Peninsula that in association with the Cromarty peninsula to the south, separate the inner and outer waters of the Cromarty Firth. The inner firth stretches 25 km from Canon Bridge to Cromarty and Nigg where the Cromarty Ferry crosses the entrance to the firth during the summer season.

The Nigg Energy Park occupies a substantial area of reclaimed land accommodates several large industrial fabrication buildings, open lay-down areas, the graving dock (dry dock) and an extended berth fronting onto the Cromarty Frith at the south quay. Historically, many of the largest North Sea oil and gas production platforms were constructed at Nigg and at present, large oil and gas exploration rigs are berthed at Nigg for inspection, repair, and maintenance (IRM) services. The industrial setting at Nigg is reflected a little further to the west at Invergordon service yard, where IRM services are also carried out on oil and gas exploration rigs, and rig supply vessels. Often, these oil and gas exploration rigs, and rig supply vessels anchor within the Cromarty Firth awaiting access into Nigg or Invergordon.

The site is comprised of made ground, with intertidal and estuarine littoral rocks and sediments to the north, and agricultural improved grasslands comprising of 'Hill of Nigg' to the east. Hinterland consists of extensive coniferous woodlands of the Balnagowan Estates north-west of the enclosed estuary. Access can be gained from Inverness via the A9 and the Cromarty Bridge and subsequent B9175 route around the northern Fearn Peninsula.

The hamlets of Balnabruaich and Balnapaling lie in quite close proximity to the north and a single dwelling (Dunskeath House) to the immediate south-east of the site. Cromarty Lighthouse lies adjacent to the south, on the opposing northern tip of the headland that accommodates the village of Cromarty.

### ***Landscape character***

As detailed in the Landscape Character Assessment<sup>8</sup> (LCA), the site of the proposed development is located within the *Enclosed Firth* landscape character type (LCT) and as noted in the LCA, the LCT extends from where the firth is narrowed by sand bars or rocky headlands, inland to where the inter-tidal zone dramatically narrows in response to a more a prominent slope at the mouth of the Cromarty Firth.

In close proximity to the east of the site, the character of the Fearn Peninsula is represented by the *Open Framed Slopes* LCT, and separated by Nigg Bay to the west; the *Enclosed Farmed Landscapes* LCT is viewed against a backdrop of extensive coniferous forest on higher ground. Beyond the *Hard Coastal Shore* LCT that extends the mouth of the inner firth, the opposing peninsula is also characterised by the *Open Framed Slopes* LCT.

Although information on landscape character provides a useful framework in which to describe the landscape and predict potential effects, the information provided in the landscape character assessment is relatively broad brush and in some instances, it does not always provide an understanding of variations at the local level. In understanding the sensitivity of the landscape to the proposed development therefore, it important to consider the following factors:

- Nigg Energy Park occupies a substantial area of reclaimed land from the adjacent Nigg Bay and currently accommodates several large industrial fabrication buildings and lower rise office blocks;
- large areas of open hard standing are present along the graving dock and south quayside for temporary storage during loading and off-loading operations to and from vessels and barges;

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<sup>8</sup> Scottish Natural Heritage (1998). *Inner Moray Firth Landscape Character Assessment*.

- the open pastoral farmed slopes of the Hill of Nigg are influenced by several disused quarries and gravel pits on its slopes; and
- the settlements on the south-west slopes of the Hill of Nigg (Nigg and the tightly grouped Pitcalzean House and Pitcalzean Mains found midway down the lower slopes) are partially enclosed by mature deciduous woodland.

### ***Seascape character***

Considering the coastal location of the site, the character of the seascape is also an important factor to consider. Seascape character is made up of physical characteristics of hinterland, coast and sea plus a range of perceptual responses to the seascape, as well as visual aspects. Although no explicit detailed seascape character assessment has been undertaken for the study area, the *Inner Moray Firth Landscape Character Assessment* extends across areas of open water, as characterised by the *Inner Firth* and *Hard Coastal Shore* LCTs.

A regional/national coastal character assessment was undertaken in support of a study on the sensitivity and capacity of the Scottish seascape in relation to windfarms<sup>9</sup>. As detailed within this study, the site of the proposed development is located within the *Moray Firth* seascape character area (SCT) and in assessing the sensitivity to wind farms, the following factors, as detailed in the report, are relevant to the proposed development:

- generally a modified seascape with a well settled coastal edge in places, including the village of Cromarty at the mouth of the inner firth;
- some isolated but large scale industry e.g. oil platforms and Nigg oil terminal within the Cromarty Firth;
- illumination of settlements around coastal fringes but generally sparse lighting in the Outer Firth. Oil platforms lit at night in Cromarty Firth; and
- it is common to see oil platforms being towed fairly close to Moray coast to and from Cromarty Firth.

In taking into account the factors outlined in this section, particularly concerning the industrial character of the site's locality, the sensitivity of landscape/seascape character to the proposed development is assessed as **medium**.

### ***Nationally Important Landscape Designations***

There are no National Parks within the study area and the closest National Scenic Area is located at the Dornoch Firth, some 15km to the north of Nigg. As detailed in *The Inventory of Gardens and Designed Landscapes* (GDLs), there are 3 GDLs within the study area and considering their national importance, these are assessed as having a **high** sensitivity to change. These are:

- Cromarty House;
- Balnagown Castle; and
- Tarbat House.

### ***Locally Important Landscape Designations***

As detailed in Highland Council's citation<sup>10</sup>, the *Sutors of Cromarty, Rosemarkie and Fort George* Special Landscape Area (SLA) is located in quite close proximity to the east and south-east of the site. It is a coastal area of intersecting firths and pointed headlands stretches from Port An Righ (just south of Shandwick) across the Sutors at the mouth of the Cromarty Firth, along the north-eastern edge of the Black Isle to take in Chanonry Point, then across the inner Moray Firth to take in Fort George, and Whiteness Head.

This SLA encompasses some of the key landscape features of the Inner Moray Firth. It is an area of contrasts which forms the gateway between the open coast and expansive waters of the Moray Firth and the intimate

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<sup>9</sup> Scottish Natural Heritage (2005). *An assessment of the sensitivity and capacity of the Scottish seascape in relation to windfarms*.

<sup>10</sup> Highland Council (1998). *Assessment of Highland Special Landscape Areas*.



landscapes of the Cromarty and Inverness Firths. The twin headlands at North and South Sutor which stand guard over the entrance to the Cromarty Firth are another key feature, visible from a considerable distance.

As a locally important landscape designation, its sensitivity to change is assessed as **medium-high**.

#### ***Key views and visual receptors***

Although no detailed analysis of the zone of theoretical visibility has been undertaken at this stage, it is evident that views from the site are focused on surrounding coastal areas of the inner firth. Looking south, there are views over open water towards the relatively nearby Cromarty peninsula and its associated village and lighthouse. Looking west, there are medium-range views over Nigg Bay towards the settlement of Invergordon, beyond which the inner firth narrows. Views to the east are short range, curtailed by rising ground.

Key visual receptors to be considered include:

- road users travelling along the B9175 and A9 – medium sensitivity;
- passengers on the Nigg Ferry – high sensitivity;
- residents in close proximity to the site including Dunskeath House, Balnabruaich, Balnapaling and Pitcalzean Mains – high sensitivity;
- residents in the larger settlements of Cromarty and Invergordon – high or medium sensitivity respectively; and
- recreational users at Cromarty viewpoint – high sensitivity.

#### **4.2.3 Potentially Significant Effects during Construction**

In considering the preceding assessment of Baseline Conditions, this section identifies any potential significant effects predicted during the construction phase, without any landscape related mitigation.

##### ***Landscape and Seascape Character***

Taking into account the existing industrial use of the site and its immediate setting, and the associated prominent land and sea based activity taking place such as loading and off-loading operations to and from vessels and barges, including oil platforms being towed, any construction activity would generally be experienced within this context. Although any activity associated with the construction of the proposed development would be very noticeable from some nearby areas, this would be characteristic to its immediate setting. Consequently, the magnitude of landscape and seascape effect would be relatively limited and considering the medium sensitivity of the *Enclosed Firth* LCT, effects are very likely to be **not significant** on its integrity.

##### ***Nationally Important Landscape Designations***

###### *Tarbat House*

As noted in the GDL inventory, Tarbat House is located on high ground on the north shore of the Cromarty Firth at Nigg Bay and there are views south over the Cromarty Firth and the Sutors of Cromarty. Although some construction activity could be visible amongst intervening built development at the quay, as the designation is located approximately 5 km from the site, effects are very likely to be **not significant** at this distance.

###### *Cromarty House GDL*

As noted in the GDL inventory, the parkland is enclosed by woodlands, which screen the town and the Firth from view. As such, it is unlikely that any construction activity would be visible, resulting in **not significant** effects.

###### *Balnaquown Castle*

As noted in the GDL inventory, the designation commands fine views to the south-west and east over the coastal flats and therefore, it is possible that some construction activity could be visible although intervening built development at the quay is likely to provide some screening. Nonetheless, as the designation is located approximately 7 km from the site, effects are very likely to be **not significant** at this distance.

#### ***Sutors of Cromarty, Rosemarkie and Fort George SLA***

Although the western boundary of the designation lies in quite close proximity to the site, the large majority of the SLA would not experience any views of construction activity due to the screening effects of intervening landform. From those parts near to Cromarty where activity would be visible, it would be experienced in context of other activity taking place in and around the industrial setting of the quay and as such, the effect on the special qualities of the designation would be very limited. Consequently, effects are predicted to be **not significant**.

#### ***Road users travelling along the B9175 and A9***

Considering the screening effect of intervening trees and built development along these routes, particularly some large buildings and other infrastructure at the quay, effects on those travelling the B9175 and A9 are very likely to be **not significant**.

#### ***Passengers on the Nigg Ferry***

When travelling north, passengers would experience some very noticeable views of constructions activity and although this would be in the context of other surrounding industrial land use and activity, short-term effects could be **significant**.

#### ***Settlement***

From those relatively nearby settlements of Balnabruaich, Balnapaling and Pitcalzean Mains, it is very unlikely that due to the screening effect of intervening trees and built development, including the large buildings and other infrastructure at the quay, residents would not experience any open views of the site. Consequently, effects are very likely to be **not significant**.

From the settlements of Invergordon and Cromarty, including those undertaking recreational activity at Cromarty viewpoint, some construction activity is very likely to be visible although considering this would be experienced in a context of other activity taking place in and around the industrial setting of the quay, effects are very likely to be **not significant** at this distance.

### **4.2.4 Potentially Significant Effects post-Completion**

As the operational effects of the proposed development would result in a smaller magnitude of effect than those predicted during the construction phase, it is likely that all long-term effects on the relevant landscape and visual receptors in the study area would be **not significant**. To avoid unnecessary duplication of the factors in support of this (as set out in the preceding section of construction effects), no detailed justification is provided although in general, it is clearly evident that the existing industrial land uses and activity taking place in and around the quay would significantly limit the magnitude of all landscape and visual effects.

### **4.2.5 Design and Mitigation**

As no long-term significant effects are predicted, it not considered necessary at this stage to embed any landscape related mitigation measure in the design process. Nonetheless, it is important that any subsequent assessment of effects considers landscape design measures to ensure any adverse effects are mitigated as far as possible.

#### **4.2.6 Inclusion or Exclusion from EIA**

Based on the assumption that any potential significant adverse effects predicted during the construction phase would be limited to passengers on the Nigg Ferry, and more importantly, that no long-term significant effects are likely to be experienced during the operational phase, it recommended that landscape and visual interests should not be subject to assessment as part of an EIA.

Nonetheless, it is proposed that a Landscape and Visual Appraisal would be undertaken and submitted as Supplementary Environmental Information as part of the Planning Application. This would be undertaken in accordance with *Guidelines for Landscape and Visual Impact Assessment 3* and although not necessarily as detailed as an EIA LVIA would be, it would however provide a proportionate examination of effects to a very similar scope.

#### **4.2.7 Assessment Methodology**

Based on the assumption that a LVIA would not be required as part of an EIA, the following approach would underpin the production of Landscape and Visual Appraisal (LVA), to be undertaken by a Chartered Member of Landscape Institute. The LVA would be based on the following methodology.

##### **Evaluation of the Existing Environment – the Baseline**

The baseline review for the landscape and visual resource has three elements:

1. Description – a systematic review of existing information and policy relating to the existing landscape and visual resource;
2. Classification – analysis of the data to subdivide the landscape/seascape resource into discrete areas of recognisable character and identification of the visual receptors; and
3. Evaluation – Use of professional judgement to apply sensitivity criteria to a landscape/seascape or visual resource with reference to specified criteria.

The baseline review is undertaken through desk-based data review followed by a site survey to verify the findings, and then analysis of the data. This process is described in detail in the following paragraphs.

##### **Desk Based Data Review**

Existing mapping, legislation, policy documents and other written, graphic and digital data relating to the proposal and broader study area is reviewed. This includes the following documents:

- Highland-Wide Local Development Plan (2012);
- Inner Moray Firth Landscape Character Assessment (1998);
- Assessment of Highland Special Landscape Areas (2010);
- Ordnance Survey maps; and
- Digital sources of mapping and aerial photography.

The desk study also establishes the main users of the area, key viewpoints and key features, thus defining the visual baseline which requires to be verified on site. The potential visual receptors are identified and classified according to their associated use (settlements, footpaths, roads etc.). The aim of the baseline review of visual resources is to ensure that an appropriate range of viewpoints is included in the visual assessment. The potential extent of visibility of the proposed development as identified in the preliminary Zone of Theoretical Visibility (ZTV) provides the basis upon which the potential visual receptors are initially identified.

The desk study informs subsequent site work, which allows the confirmation of the Landscape/Seascape Character Types (LCTs/SCTs) and Landscape/Seascape Character Areas (LCAs/SCAs) where applicable.

## **Site Survey**

Field survey work is carried out to verify and, if required, refine the landscape/seascape character types identified within the study area, and to gain a full appreciation of the relationship between the proposed development, and the landscape.

The baseline visual resource is verified during the survey work and at this time, the validity of the list of representative viewpoints used in the LVIA. Since the ZTV is based on a 1:50,000 digital terrain model, it does not capture local landform. There are times when a viewpoint selected from analysis of the ZTV does not actually have any views to the proposed development. In some instances, this can be remedied by slight adjustments of the grid references, although the location must remain relevant to the particular receptor(s) for which the viewpoint was selected. It is also important to ensure that the viewpoints remain a representative selection of views.

## **Data Analysis**

Analysis and reporting of the baseline resource takes place after the completion of the desk and field surveys. The baseline landscape and visual review provides a description, classification, and evaluation of the landscape and visual resource of the study area.

The baseline review provides a robust description of the landscape and visual resource from which to assess the landscape and visual effects of the proposed development and to advice, in landscape and visual terms, on the development's acceptability in principle and upon its siting, layout and design. This involves identification of all the landscape and visual receptors and analysis of the sensitivity of each of these receptors to the proposed development.

## **Extent of the Study Area and Viewpoint Selection**

Maps of Zone of theoretical visibility (ZTVs) are prepared using digital terrain models based on a maximum height of the proposed development. These represent the 'worst case' area of theoretical visibility where the proposed development may theoretically be seen. The ZTVs are based entirely on topographic factors and do not account for any screening effects provided by vegetation, buildings or minor variations in landform or the orientation of view. Therefore, the extent of any ZTVs tends to be greater than actual visibility and does not take account of climatic factors such as light conditions.

The ZTV for the proposed development is then used as a basis for the further assessment and evaluation of the magnitude of visual impacts.

Through the initial stages of the desk study, viewpoints are selected to represent views experienced from a variety of receptors, within different landscape character types and at a variety distances from the proposed development where the view may be apparent.

A study area centred on a likely 5 km radius from the proposed development will be used for the study of landscape and visual effects. Given the relative scale of the development and the character of the landscape, significant effects are very unlikely to be experienced at distances over 5 km.

## **Landscape/seascape Susceptibility and Value**

The GLVIA indicates that landscape receptors need to be assessed firstly in terms of their sensitivity, combining judgements of their susceptibility to the type of proposal and the value attached to the landscape.

### *Landscape Susceptibility*

This LVA includes an assessment of factors affecting the susceptibility of the landscape to the changes brought about by the proposed development, in order to identify any variation at the local scale.

### **Factors affecting landscape/seascape susceptibility**

#### *Landscape Value*

The assessment takes as its starting point the recognised value of the landscape, for example, as identified by landscape designations.

In addition, the assessment considers the following factors, in order to identify how the relative landscape value may vary at the local scale.

### **Sensitivity of Visual Receptors**

The sensitivity of each visual receptor is assessed in terms of susceptibility to change in views or visual amenity as well as the value attached to particular views.

#### *Susceptibility to Change*

People generally have differing responses to views and visual amenity depending on the context (e.g. location, time of day, degree of exposure), and their purpose for being in a particular place (e.g. whether for recreation, travelling through the area, residence or employment). Susceptibility to change is therefore a function of:

- The occupation or activity of people experiencing the view or visual amenity; and
- The extent to which their attention or interest may be focused on the landscape around them.

#### *Value attached to particular views*

Judgments are also be made about the value attached to views, based on the following considerations:

- Recognised value – such as views from heritage assets or designated landscapes;
- Inclusion in guidebooks or on tourist maps, the facilities provided for visitors or references to the view in literature or art; and
- The relative number of people who are likely to experience the view.

People that are more susceptible to change at viewpoints of recognised value are more likely to be significantly affected by any given change.

### **Assessing Effects**

The impact assessment aims to identify all the potential landscape and visual effects of the development taking account of any proposed mitigation measures. This is carried out by:

- Assessing the magnitude of change brought about by the proposed development on each of the receptors identified in the baseline review;
- The effect is then predicted by combining the sensitivity and importance of the receptor (as identified in the baseline review) with the magnitude of change; and
- Lastly, the significance of the predicted effect is assessed in a logical and well-reasoned analysis.

The assessment aims to describe the changes in the character and the landscape resources that are expected to result from the proposed development. It covers both landscape effects (changes in the fabric, character and key defining characteristics of the landscape); and the visual effects (changes in available views of the landscape and the significance of those changes on people).

## **Magnitude of Landscape Change**

Each effect on landscape receptors is also assessed in terms of its size or scale, the geographical extent of the area influenced and its duration and reversibility.

### Geographical Extent of Effect

The geographical area over which the landscape effects would be experienced (regional, local or restricted to the site) is also taken into account. This is distinct from the scale of the change. For example, a small change to the landscape over a large geographical area could be comparable to a very large change affecting a much more localised area.

## **Magnitude of Visual Effect**

Visual effects result from the changes in the content or character of views and visual amenity, due to changes in the landscape. The assessment of visual effects takes account of both the sensitivity of the visual receptors (individuals or groups of people) and the magnitude of the change on their views and visual amenity.

The magnitude of the visual effect resulting from the Proposed Development is evaluated in terms of size or scale, geographical extent, duration and reversibility.

### Size or Scale of Effect

This is based on the interpretation of a combination of a range of factors. Some of these are largely quantifiable and include:

- Distance and direction of the viewpoint from the Proposed Development;
- Extent of the Proposed Development visible from the viewpoint
- Scale of the change in the view, including the proportion of the field of view occupied by the Proposed Development;
- Degree of contrast with the existing landscape elements and characteristics in terms of background, form, pattern, scale, movement, colour, texture, mass, line or height;
- The relative amount of time during which the effect would be experienced and whether views would be full, partial or glimpses; and
- Orientation of receptors in relation to the Proposed Development, e.g. whether views are oblique or

### Geographical Extent

The extent over which the changes would be visible is also taken into account.

The magnitude of visual change arising from the Development is described as High, Medium, Low or Negligible based on the overall extent of visibility. For individual viewpoints it will depend upon the combination of a range of factors:

- The distance of the viewpoint from the development;
- The duration of effect;
- Extent of the development visible from the viewpoint;
- The angle of view in relation to main receptor activity;
- The proportion of the field of view occupied by the development;
- The background to the development; and
- The extent of other built development visible.

Other factors may also influence the visual effect. These relate to both human perception and to the physical environment itself. Factors which tend to reduce the apparent magnitude include the following:

- An absence of visual clues;
- A complex and varied scene; and
- Low relative elevation of view

Factors which tend to increase the apparent magnitude include the following:

- Visual clues;
- A simple scene; and
- High relative elevation of view.

### Sequential Visual Effects

Sequential visual effects typically occur when moving along a linear route, as the observer moves from one point to another and gains views of other developments or a different view of the same development.

### Significance of Effects on Landscape and Visual Receptors

The assessment of significance is based on professional judgement, considering both the sensitivity of the receptor and the predicted magnitude of effect resulting from the proposed development.

Major loss of landscape features or characteristics across an extensive area that are important to the integrity of a nationally valued landscape are likely to be of greatest significance. Short-term effects on landscape features or characteristics over a restricted part of a landscape of lower value are likely to be of least significance

The degree of significance of effects on visual receptors is determined from a combined evaluation of the sensitivity of the visual receptor and the magnitude of the visual effect.

Effects are more likely to be significant on people who are particularly sensitive to changes in views and visual amenity, or who experience effects at recognised and important viewpoints, or from recognised scenic routes. Large scale changes which introduce new, discordant or intrusive elements into the view are also more likely to be significant than small changes or changes involving features already present within the view.

The significance of any identified landscape or visual effect is assessed as Major, Moderate, Minor or Negligible effect. These categories have been determined by consideration of viewpoint or landscape sensitivity and predicted magnitude of change as described above, with the table below used as a guide to correlating sensitivity and magnitude to determine significance of effects. It should be noted that this is a guide only, and there will be times when the combination of sensitivity and magnitude yield a slightly different result from that predicted by the table. Where this discrepancy leads to prediction of significant effect, it is explained in the text.

**Table 4.1: Assessment of significance of landscape and visual effects**

Magnitude of Change				
<i>Sensitivity</i>	<i>High</i>	<i>Medium</i>	<i>Low</i>	<i>Negligible</i>
<i>High</i>	Major	Major to moderate	Moderate	Moderate to minor
<i>Medium</i>	Major to moderate	Moderate	Moderate to minor	Minor
<i>Low</i>	Moderate	Moderate to minor	Minor	Minor to none
<i>Negligible</i>	Moderate to minor	Minor	Minor to none	None



Where overall effects are predicted to be *major* (shaded dark grey) these are considered to be equivalent to significant effects. Overall effects of moderate to major (shaded light grey) may be significant if experienced over an extensive proportion of a receptor, area or route. Changes of moderate or less are not likely to result in significant effects.

## 4.3 Terrestrial Ecology

### 4.3.1 Introduction

The assessment of terrestrial ecology will consider the geographical area potentially affected by the proposed development. Particular attention will be given to protected habitats and species. The proposed development has the potential to affect ecology in the development footprint in terms of direct habitat losses. It is also envisaged that a range of other effects on ecology in the wider area could occur.

### 4.3.2 Baseline Conditions

#### Statutory Designated Sites

No statutory designated sites are present within the site boundary. However, three designated sites are present within a 5km radius of the site as detailed in Table 4- which are relevant to terrestrial ecology and should be read in conjunction with Table 4.7 within the Marine Ecology section.

**Table 4-2: Statutory Designated Sites**

Site Name	Designation <sup>11</sup>	Distance and Orientation	Features	Ecologically Connected to the Site
Moray Firth	SAC	Adjacent to site	Subtidal sandbanks	Via the marine environment
Cromarty Firth	SSSI/ RAMSAR	Approx. 0.59km west	Intertidal mudflats and sandflats	Via the marine environment
Rosemarkie to Shandwick Coast	SSSI	Approx. 0.76km east	Maritime cliffs, geological features	Via the marine environment

#### Non-Statutory Designated Sites

No non-statutory designated sites exist within the site boundary, or within a 5km radius of the site.

#### Ancient Woodland Inventory Sites

No areas of ancient woodland are present within the site. However, three areas are present within a 2km radius of the site boundary as detailed in Table 4-:

**Table 4-3: Ancient Woodland Inventory**

Site name	Distance and Orientation	Designation <sup>12</sup> (Ancient Woodland Categories)
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<sup>11</sup> SAC (Special Area of Conservation), SPA (Special Protection Area), RAMSAR (Wetlands of International Importance), SSSI (Site of Special Scientific Interest), NNR (National Nature Reserve)

<sup>12</sup> Definition of antiquity categories, available from: <http://www.snh.org.uk/publications/on-line/advisorynotes/95/95.html>. ASNO: Sites shown as woodland on all available map sources from 1750 onwards and as semi-natural woodland on the 1750 'Roy' maps. LEPO: Sites

Unnamed Woodland	Approx. 0.74km north	Long-Established (of Plantation Origin) (LEPO)
Unnamed Woodland	Approx. 1.5km south	Ancient (of Semi-Natural Origin) (ASNO)
Unnamed Woodland	Approx. 1.5km south	LEPO

## Local Records

The following is a summary of the notable local records returned from Highland Biological Recording Group (HBRG):

**Table 4-4: Local Biodiversity Records**

Species	Latin Name	Number of Records	Location (Approx.)	Date
<b>Mammals</b>				
West European hedgehog	<i>Erinaceus europaeus</i>	One	Lower Pitcalzean	2001
Brown Hare	<i>Lepus europaeus</i>	One	Nigg	2002
Otter	<i>Lutra lutra</i>	Two	North Suttor Nigg	2001 and 2014
<b>Herpetofauna</b>				
Common lizard	<i>Zootoca vivipara</i>	Three	NH8000689 and NH804689	2015 and 2016

## Biodiversity Action Plan and SBL Species and Habitats

The site is within the Highland Council area, which considers wider ecosystems within the Highland Biodiversity Action Plan (HBAP) and therefore does not highlight specific species and habitats of importance. The Ross and Cromarty (East) Biodiversity Action Plan (RCBAP) covers the area the site is situated and targets specific species and priority habitats. tentially relevant to the site:

Table 4-4-5below presents the species and habitats listed on the RCBAP, UKBAP and SBL that are potentially relevant to the site:

**Table 4-5: Biodiversity Action Plan and SBL Species and Habitats**

Species	RCBAP	UKBAP	SBL
<b>Mammals</b>			
Badger ( <i>Meles meles</i> )	✓		
Brown long-eared bat ( <i>Plecotus auritus</i> )	✓		
Common pipistrelle ( <i>Pipistrellus pipistrellus</i> )	✓	✓	✓
Soprano pipistrelle ( <i>Pipistrellus pygmaeus</i> )	✓	✓	✓
Daubenton's bat ( <i>Myotis daubentonii</i> )	✓	✓	✓
Natterer's bat ( <i>Myotis nattereri</i> )	✓	✓	✓
Brown hare ( <i>Lepus europaeus</i> )	✓		✓
West European hedgehog ( <i>Erinaceus europaeus</i> )	✓	✓	✓
Otter	✓	✓	✓
Minke whale ( <i>Balaenoptera acutorostrata</i> )	✓	✓	✓
Harbour porpoise ( <i>Phocoena phocoena</i> )	✓	✓	✓
Bottlenosed dolphin	✓	✓	✓
Grey seal ( <i>Halichoerus grypus</i> )	✓		
Common (Harbour) seal	✓		
<b>Birds*</b>			
	RCBAP	UKBAP	SBL

shown as plantation woodland in c.1860 but not shown as woodland at all in 1750 or shown as plantation on these maps. These are woods that were apparently planted before 1860

Species	RCBAP	UKBAP	SBL
Skylark ( <i>Alauda arvensis</i> )	✓	✓	✓
Wigeon ( <i>Anas penelope</i> )	✓		
Twite ( <i>Acanthis clavirostris</i> )	✓		
House Sparrow ( <i>Passer domesticus</i> )	✓		
Swallow ( <i>Hirundo rustica</i> )	✓	✓	✓
Tree Sparrow ( <i>Passer montanus</i> )	✓	✓	✓
Fish	RCBAP	UKBAP	SBL
Salmon ( <i>Salmo salar</i> )	✓	✓	✓
Brown trout ( <i>Salmo trutta</i> )	✓	✓	✓
Cod ( <i>Gadus morhua</i> )	✓	✓	✓
Herring ( <i>Clupea harengus</i> )	✓	✓	✓
Mackerel ( <i>Scomber scombus</i> )	✓	✓	✓
Habitats	RCBAP	UKBAP	SBL
Sea and Coast	✓	✓	✓

\*Marine mammals and birds are covered in further detail in the other reports which focus solely on these species.

## NBN Atlas

The following is a summary of reported sightings of species potentially relevant to the site, within a 2km radius:

**Table 4-6: Species records from NBN Atlas**

Species*	Orientation	Date	Comments
Brown hare	One sighting (north of site)	08/07/2002	No information
West European hedgehog	One sighting (north of site)	23/09/2001	No information
Otter	Two sightings (east and south)	05/2014	Field evidence (spraint) and actual sighting

## Habitat Types

During the Phase 1 Habitat Survey (full details within Appendix B), a total of 17 Phase 1 habitat types including buildings were recorded on the site:

- A2.1 Dense Scrub;
- A2.2 Scattered Scrub;
- A3.1 Broadleaved Parkland/Scattered Trees;
- B2.2 Semi-Improved Neutral Grassland;
- B4 Improved Grassland;
- C3.1 Tall Ruderal Vegetation;
- H1.1 Intertidal Mud/Sand;
- H3 Shingle/Gravel Above High-Tide Mark;
- H6.5 Dune Grassland;
- H6.8 Open Dune;
- J1.3 Ephemeral/Short Perennial;
- J2.4 Fence;
- J2.5 Wall;
- J3.5 Sea Wall;
- J3.6 Buildings;
- J4 Bare Ground; and

- J5 Other Habitat.

The main habitats are described in Appendix B and detailed in Figure 4.

### **Bats**

Bat species are European Protected Species (EPS). No records of bats within a 2km radius of the site were returned from the desk study (see Appendix B).

During the Potential Roost Features Assessment (PRF) undertaken in December 2018, two sycamore (*Acer pseudoplatanus*) trees with PRFs were recorded within the site, located at NH79528 68907 and NH 79561 68905. Tree 1 was classified as offering negligible potential for roosting bats and Tree 2 as having low potential for roosting bats.

Six buildings are present within the site boundary. The roughcast building with the red corrugated metal roof is to be retained, therefore only the remaining five buildings were subject to an external inspection. Based on this survey, the buildings were considered to offer potential for summer roosting bats but, despite the presence of PRFs, were classified as offering low suitability due to their isolated coastal location and limited connecting terrestrial habitat. All five buildings were considered to offer low potential for hibernating bats as they could provide constant cool temperatures during the hibernating season (as reported within Appendix B: Phase 1 Habitat and Protected Species Survey). During ongoing bat work outlined in section 4.3.4 below, an internal inspection of the buildings was undertaken on 17<sup>th</sup> January 2019, which resulted in one of the buildings being re-categorised as offering moderate potential for roosting bats. Bat droppings and evidence of bat foraging (butterfly wings) were also identified.

The site has no tree lines, hedgerows or woodland edges that connect to adjacent features out-with the site, therefore the site is assessed as offering low potential for commuting and foraging bats.

### **Otter**

Two records of otter were returned from the desk study, east and south east of the site boundary. Spraint was identified along the Cromarty Firth coast and an observational sighting was reported in grassland adjacent to a quarry. No evidence of otter was identified during the survey (see Appendix B).

The marine environment of the Moray Firth and Cromarty Firth provide suitable commuting and foraging habitat for otter, where they could obtain varied foraging resources such as Atlantic salmon (*Salmon salar*), brown trout (*Salmo trutta*), flatfish and eels, crustaceans and occasionally wading birds. Otters that inhabit coastal habitats utilise inshore areas which are shallow, for foraging and commuting.

In general, coastal otter habitats range from open, low-lying coastal habitat to sheltered wooded inlets. The dense scrub, within the site, adjacent to the shore, provides opportunities for rest sites and sheltered commuting. Otters will also utilise terrestrial habitats, including rough grassland, for resting and breeding holt. Otters may also utilise other mammal species' burrows for resting sites. Multiple burrows were present within the dense scrub, likely attributed to rabbit (*Oryctolagus cuniculus*), due to their small size, lack of spoil heaps and circular shapes, which otter could utilise for resting.

Overall the site has some suitable habitat for commuting, foraging and resting otter, however, the site is highly frequented by members of the public and dog walkers, which reduces its suitability.

### **Badger**

No records of badger were returned from the desk study and no evidence of badger was identified during the survey (see Appendix B).

Suitable habitat for sett creation is lacking due to the site predominantly consisting of bare ground.

The semi-improved grassland and berry producing scrub habitats within the site offer secondary foraging resources and the small area of improved grassland offers a limited primary foraging habitat as a source of earthworms, which comprise the majority of badgers' diet. Broadleaved woodland, arable fields and short mown grassland are present in the wider area which provide a primary foraging resource for badger.

Fragmented habitat is present within the site in the form of dense scrub and scattered scrub which provide some connecting habitat to the wider landscape.

#### **Other Observations**

Multiple rabbit (*Oryctolagus cuniculus*) burrows are present within the dense scrub on the site.

#### **4.3.3 Potentially Significant Effects during Construction**

Based on our current understanding of the proposed development, potentially significant effects on terrestrial ecology could be incurred by the loss of buildings during the construction process. Suitable habitat has been identified within the site for roosting bats and further targeted surveys will be undertaken in 2019 and any impacts on bats species will be addressed via the Scottish Natural Heritage (SNH) licensing process with appropriate mitigation outlined in a Species Protection Plan (SPP).

Good practice measures detailed in the baseline report will above will minimise effects on habitats and species in the vicinity of the site.

#### **4.3.4 Potentially Significant Effects post-Completion**

Based on our current understanding of the proposed development it is not anticipated that there will be any significant effects on terrestrial ecology post-completion.

#### **4.3.5 Design and Mitigation**

Impacts on terrestrial habitat will be mitigated by design. The following good practice measures are recommended to minimise impacts effects on terrestrial species and habitats:

- The development design should seek to retain and enhance open dune, trees and scrub habitats wherever possible.
- All site contractors should be made aware of the potential presence of protected species in the locale, and in the event that a protected species is discovered on site, all work in that area must stop immediately and a suitably qualified ecologist contacted.
- Any required vegetation removal should be undertaken outside the nesting bird season (March - August).
- If Tree 2 is to be felled or subjected to arboricultural operations to facilitate development, an elevated inspection to search for roosting bats will be required prior to works commencing.
- If works do not commence prior to December 2020, pre-works check for otter, badger and birds should be undertaken by a suitably qualified ecologist or Ecological Clerk of Works (ECOW) prior to the commencement of any works.
- Temporary lights used during construction must be fitted with shades to prevent light spillage outside the working area. Temporary lights must not illuminate scrub, scattered trees and hedgerows as lighting can affect commuting and foraging success of mammals and other species.

- Any trenches or pits made during construction must be covered when unattended or a shallow angled plank inserted to allow animals to escape, should they become trapped inside them. The ends of any pipeline must be capped when unattended, or at the end of each working day to prevent animal access.
- Site compounds/materials or plant storage areas would be located away from trees to avoid damage to the tree limbs and infringement of rooting areas.
- All site staff should be aware of the need for careful working practices to avoid environmental damage.

#### **4.3.6 Inclusion or Exclusion from EIA**

Based on the baseline data gathered from the ecological survey and desk study terrestrial ecology will be scoped out of the EIA process. Impacts on terrestrial habitat will be mitigated by design. Further targeted assessments detailed below will be undertaken for bats, included as standalone reporting with the summary held within the EIA 'Other Issues' chapter.

Reporting will be contained within a standalone bat report which would accompany the application to the Council, however based on the recent baseline survey, a full EIA for terrestrial ecology is not required.

#### **4.3.7 Assessment Methodology**

During the external PRF inspection undertaken in December, the five buildings assessed within the site boundary were classified as providing low potential for summer roosting bats and low potential for hibernating bats. Based on the detailed internal inspection of the buildings undertaken on 17<sup>th</sup> January 2019, further suitable habitat for summer roosting bats was identified in one of the buildings and as such this building was re-classified as offering moderate habitat for roosting bats.

Hibernation surveys of the five buildings within the site will be completed, consisting of a two visits, one in mid-January (which was undertaken on 17<sup>th</sup> January 2019) and one in mid-February, including a detailed internal inspection up to ladder height of any PRFs which may provide hibernating opportunities for bats. During the first hibernation survey, no roosting bats were identified but bat droppings and evidence of foraging bats (butterfly wings) were recorded. As part of the on-going bat work, these droppings will be sent for DNA analysis to identify the species.

One bat activity survey will be carried out on each building, in the bat activity season (May-August) to determine the presence/absence of summer roosting bats. A second bat activity survey will be carried out on the building offering moderate potential for roosting bats after a period of two weeks following the first survey.

If during the hibernation surveys and/or bat activity survey a roost/evidence of bats is identified or bat activity suggests that a roost may be present, further surveys will be required.

### **4.4 Marine Ecology**

#### **4.4.1 Introduction**

The assessment of marine ecology will consider the geographical area potentially affected by the proposed development. Particular attention will be given to cetaceans and seals, fish and intertidal and benthic ecology.

The proposals have the potential to affect marine ecology in the immediate vicinity of the development footprint in terms of habitat loss; and in the wider area in terms of underwater noise via impact piling, vibratory piling and dredging; and increased vessel movement. It is also envisaged that a range of other effects on marine ecology in the wider area could occur. These include, but are not limited to, those related to changes in the hydrodynamic

regime, physical disturbance during construction and operation of the port, and pollution arising from construction activities. These areas will all be considered in the assessment. Impact of the development on the water environment including hydrology, hydrogeology, water quality and coastal processes will be considered in the Water Environment and Coastal Processes section of the EIA (see section 4.8).

#### 4.4.2 Baseline Conditions

Table 4-7 details statutory designated sites that are considered to be ecologically connected to the site in terms of marine ecology, and should be read in conjunction with Table 4.2 within the Terrestrial Ecology section.

**Table 4-7: Marine Designated Sites**

Site Name	Designation	Distance and Orientation	Comment
Moray Firth	Special Area of Conservation (SAC)	Adjacent to the site	Designated for bottlenose dolphin ( <i>Tursiops truncatus</i> ) and subtidal sandbanks.
Cromarty Firth	Special Protection Area (SPA), SSSI and Ramsar	Approximately 0.59km west	<p><b>SPA:</b> Waterfowl assemblage: Bar-tailed godwit (<i>Limosa lapponica</i>), Common tern (<i>Sterna hirundo</i>), Curlew (<i>Numenius arquata</i>), Dunlin (<i>Calidris alpina alpina</i>), Greylag goose (<i>Anser anser</i>), Knot (<i>Calidris canutus</i>), Osprey (<i>Pandion haliaetus</i>), Oystercatcher (<i>Haematopus ostralegus</i>), Pintail (<i>Anas acuta</i>), Red-breasted merganser (<i>Mergus serrator</i>), Redshank (<i>Tringa totanus</i>), Scaup (<i>Aythya marila</i>), Whooper swan (<i>Cygnus cygnus</i>), Wigeon (<i>Anas penelope</i>).</p> <p><b>Ramsar:</b> Intertidal mudflats and sandflats, waterfowl assemblage: Bar-tailed godwit, Greylag goose.</p> <p><b>SSSI:</b> mudflats, saltmarsh, sandflats and waterfowl: Bar-tailed godwit, red-breasted merganser, redshank, whooper swan, wigeon</p>
Rosemarkie to Shandwick Coast	Site of Special Scientific Interest (SSSI)	Approximately 0.76km east	Designated for Cormorant ( <i>Phalacrocorax carbo</i> ), maritime cliff, mesozoic palaeobotany, earth sciences, vascular plants, sand dunes and upland birch woodland.
Ardersier (MF-001 <sup>13</sup> )	Seal haul-out site	Approximately 12km south	Key site based on August breeding survey counts
Cromarty Firth (MF-005)	Seal haul-out site	Approximately 13km west	Key site based on August breeding survey counts
Findhorn (MF-003)	Seal haul-out site	Approximately 25km south east	Key site based on August breeding survey counts
Dornoch Firth and Morrich More SAC	SAC	Approximately 36km north east	Harbour seal ( <i>Phoca vitulina</i> ), otter, reefs, dune grassland,
Beaully (MF-002)	Seal haul-out site	Approximately 42km south west	Key site based on August breeding survey counts

<sup>13</sup> Moray Firth (MF) 001 – List of Seal Haul-out sites across Scotland available at: <https://www2.gov.scot/Topics/marine/marine-environment/species/19887/20814/haulouts/list> last accessed 29/01/2019

## Marine Mammals (Cetaceans and Seals)

Monitoring is undertaken to determine the condition of the bottlenose dolphin (*Tursiops truncatus*) feature of the Moray Firth SAC. This feature is currently in Favourable condition according to the last assessment in 2010<sup>14</sup>.

The monitoring used timing porpoise detectors (T-PODs<sup>15</sup>) to assess the baseline activity of cetaceans. T-POD sampling locations were positioned to the north and north east of Whiteness Head (entrance to Cromarty Firth, Lossiemouth, and Outer Moray Firth). During these studies differing densities of bottlenose dolphin and harbour porpoise were determined, and generally speaking dolphins were detected regularly at the entrance to Cromarty Firth, only rarely in the outer Moray Firth, and at an intermediate level at Lossiemouth. The entrance to Cromarty Firth is within 1.5km of the site.

Cheney *et al*<sup>16</sup> conducted photo-identification surveys and Passive Acoustic Monitoring (PAM) studies in core sampling areas within the Moray Firth SAC during the summers (May to September) of 2008 to 2010. Mark-recapture analysis of photographs collected during photo-identification surveys indicated that an estimated 68 individual dolphins used the SAC during the summer of 2008, 102 in 2009 and 114 in 2010. This indicates that the number of dolphins using the SAC between 1990 and 2010 appears to be stable; and at least 60% of the population have been seen within the SAC in 16 of the 21 years of photo-identification effort. Mark-recapture analysis of photographs collected during surveys in the summer of 2016 indicated that the estimated number of individual dolphins using the SAC was 103 (95% confidence interval: 93-115).

T-PODs deployed to the west, north and north east of Whiteness Head (2008-2010), approximately 14km south of Nigg East Quay, and survey transects identified bottlenose dolphin (with varying densities) within the deep water channel immediately adjacent/north of Whiteness Head; highlighting this as an important area for bottlenose dolphin. There were group encounters here in 2008, 2009 and 2010, particularly during the months of May to September.

Chanonry Point, approximately 17km south west of the proposed development, is a well-known bottlenose dolphin hotspot. PAM is ongoing in this area to monitor the status of the SAC feature. Between 2011 and 2016, during the summer months (May – September), the percentage of days that dolphins were detected was over 90%.

Harbour porpoise (*Phocoena phocoena*) were detected regularly during the T-POD monitoring in the outer Moray Firth, only rarely Lossiemouth, and at an intermediate level at the entrance to the Cromarty Firth.

Two harbour porpoise were observed by EnviroCentre ecologists during the first bat hibernation survey on 17<sup>th</sup> January 2019, approximately 1km south of the site in the Cromarty Firth (off Cromarty).

Minke whale (*Balaenoptera acutorostrata*) is the most commonly seen baleen whale in Scotland and sightings are frequent and widespread from May to October, peaking in July. The southern and Outer Moray Firth are thought to be particularly important areas for minke whale. The closest recently recorded sightings of minke whale, to the site, were from Burghead, Moray, approximately 32km south east of the proposed development; in November 2018.

In August 2017, a pod of 30 long-finned pilot whale (*Globicephala melas*) travelled up the Moray Firth to North Kessock, approximately 32km south west of the proposed development. The sighting was extremely rare,

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<sup>14</sup> Scottish Natural Heritage Research Report No. 1021 Site Condition Monitoring of bottlenose dolphins within the Moray Firth Special Area of Conservation: 2014-2016.

<sup>15</sup> T-PODS are autonomous data recorders for detecting cetacean echolocation clicks and potentially provide cost-impactive opportunities for monitoring cetacean activity.

<sup>16</sup> Cheney, B., Corkrey, R., Quick, N.J., Janik, V.M., Islas-Villanueva, V., Hammond, P.S. & Thompson, P.M. (2012). Site Condition Monitoring of bottlenose dolphins within the Moray Firth Special Area of Conservation: 2008-2010. Scottish Natural Heritage Commissioned Report No. 512.



however important to note, as if they become stressed, entire pods of pilot whales are known to beach themselves.

Two orca (*Orcinus orca*) were identified near Chanonry Point (approximately 17km south west of the proposed development site) in January 2019. A pod of six orca were identified in the Moray Firth in 2016, approximately 11km north west of Findhorn (and approximately 20km south east of the proposed development). Orca may occur in coastal regions to feed on breeding seals.

Humpback whale (*Megaptera novaeangile*) was observed in the Moray Firth in 2016 and 2017. In 2016, one individual was identified from Sutors of Cromarty, approximately 2.5km south east of the proposed development; and in 2017 two individuals were observed from between Hopeman and Burghead, approximately 32km south east along the Moray coast.

The Dornoch Firth and Morrich More SAC is designated for its population of harbour seal (also known as common seal) which is currently classed as 'Unfavourable – declining' (2013)<sup>17</sup>. The development lies approximately 36km north of the SAC, which is within the range of observed harbour seal movements between haulout areas (the locations on land where seals come ashore to rest) and also well within the 'normal' range of foraging trips.

There is a designated haulout site at Ardersier, approximately 12km south of the proposed development site. This site holds 20% of the Moray Firth population of common seal and is seen as the most important haulout for this species not only in the Moray Firth but on the east coast of Scotland. The average moult counts (during August) are around 200 animals and this has been steady since 1992. The location is also used for pupping with a count undertaken in June 2011 having 216 adult harbour seal and 28 mean number of pups (56 pups was higher figure). The location is also used by large numbers of grey seal (*Halichoerus grypus*); 204 animals during the June count in 2011 and 297 during the August count 2010.

All species of dolphin, porpoise and whale are European Protected Species (EPS). Marine mammal species (including seals) are included in the Scottish Biodiversity List (SBL) and the UK Biodiversity Action Plan (UKBAP) are listed in Table 4-8. All of the species listed can be found in UK waters and therefore have the potential to be present in the vicinity of Nigg East Quay.

**Table 4-8: Marine mammal SBL and UKBAP species**

Species name	SBL	UKBAP	Marine (Scotland) Act 2010/The Protection of Seals (Designation of Haul-Out Sites) (Scotland) Order 2014
Harbour porpoise	✓	✓	
Northern right whale ( <i>Balaena glacialis</i> )	✓	✓	
Minke whale	✓	✓	
Sei whale ( <i>Balaenoptera borealis</i> )	✓	✓	
Blue whale ( <i>Balaenoptera musculus</i> )	✓	✓	
Fin whale ( <i>Balaenoptera physalus</i> )	✓	✓	
Humpback whale	✓	✓	
Bottlenose dolphin	✓	✓	
Risso's dolphin ( <i>Grampus griseus</i> )	✓	✓	
White-beaked dolphin ( <i>Lagenorhynchus albirostris</i> )	✓	✓	
Atlantic White-sided dolphin ( <i>Lagenorhynchus acutus</i> )	✓	✓	
Common dolphin ( <i>Delphinus delphis</i> )	✓	✓	
Striped dolphin ( <i>Stenella coeruleoalba</i> )	✓	✓	
Northern bottlenose whale ( <i>Hyperoodon ampullatus</i> )	✓	✓	

<sup>17</sup> Site details for Dornoch Firth and Morrich More SAC available at:  
[https://gateway.snh.gov.uk/sitelink/siteinfo.jsp?pa\\_code=8242#features](https://gateway.snh.gov.uk/sitelink/siteinfo.jsp?pa_code=8242#features) last accessed 25/01/2019

Species name	SBL	UKBAP	Marine (Scotland) Act 2010/The Protection of Seals (Designation of Haul-Out Sites) (Scotland) Order 2014
Cuvier's beaked whale ( <i>Ziphius cavirostris</i> )	✓	✓	
Sowerby's beaked whale ( <i>Mesoplodon bidens</i> )	✓	✓	
True's Beaked Whale ( <i>Mesoplodon mirus</i> )	✓	✓	
Orca	✓	✓	
False Killer Whale ( <i>Pseudorca crassidens</i> )	✓		
Long-finned Pilot Whale	✓	✓	
Sperm Whale ( <i>Physeter macrocephalus</i> ( <i>P. catodon</i> ))	✓	✓	
Harbour seal	✓	✓	✓
Grey Seal ( <i>Halichoerus grypus</i> )			✓

## Fish

Several rivers (Alness, Balnagowan, Conon, Glass and Peffery) flow into the Cromarty Firth, all of which support populations of migratory Atlantic Salmon (*Salmo salar*) and Sea Trout (*Salmo trutta trutta*) that return to the river annually. The nearest of these rivers, the Balnagowan, is 4km from the proposed development.

Marine Scotland (MS) data shows that Salmon primarily run into local rivers between April and September, with a separate Grilse run arriving in the river from June to September. Data obtained from the Cromarty District Salmon Fisheries Board (DSFB) states that the emigration of juvenile Salmon (Smolts) in the local area is between May and early June annually. The same MS data also shows that Sea Trout migrate into local rivers between June and September, peaking between July and August.

Other diadromous species of conservation interest, specifically European Eel (*Anguilla anguilla*), Sea Lamprey (*Petromyzon marinus*) and River Lamprey (*Lampetra fluviatilis*) are known to migrate through the Cromarty Firth both from and to connected rivers.

With regard to marine fish, there is potential for local marine fish species to utilise the area around the vicinity of the proposed development as nursery or spawning ground. This may in turn provide a source of food for bird and marine mammal species.

## Intertidal and Benthic ecology

The intertidal habitats within the site include intertidal mud/sand and shingle/gravel above high-tide mark; both of which are Annex 1 habitats. A description and the location of these habitats can be found in Appendix B: Phase 1 Habitat and Protected Species Survey. Due to the high level of disturbance as a result of historic and current developments in the vicinity of the proposed development; and the small areas the habitats cover; these habitats are assessed to be of low ecological value.

Desktop assessment of benthic ecology has been previously undertaken to inform an Environmental Statement, relating to the extension of Nigg South Quay<sup>18</sup>. It was assessed that due to extensive dredging and disturbance both in the past and presently, to maintain approach channels, the benthic ecology would be in poor condition as a result.

<sup>18</sup> Grontmij (2013) South Quayside Extension, Nigg Energy Park, Nigg

#### 4.4.3 Potentially Significant Effects during Construction

It is anticipated that the proposed development will comprise activities with the potential to impact on marine ecology in the area during construction as follows:

- Direct loss of tidal, intertidal and subtidal habitats in the footprint of the development;
- Underwater noise which could cause lethal or sub-lethal effects on bottlenose dolphin which are a qualifying feature of the Moray Firth SAC;
- Underwater noise which could cause lethal or sub-lethal impacts on marine mammals and fish;
- Underwater noise or above ground noise disturbance to harbour seals which are a qualifying feature of the Dornoch Firth and Morrich More SAC;
- Cumulative impacts from other ongoing developments (primarily underwater noise) causing lethal or sub-lethal impacts on marine mammals and fish;
- Cumulative impacts from other ongoing developments (above ground noise) causing disturbance to seals using haul-out sites in the vicinity;
- Light disturbance to marine mammals and fish during the hours of darkness through the use of artificial lighting;
- Increases in suspended sediment and/or deposition from dredging and construction activities creating physical disturbance to marine mammals and fish;
- Release of contaminants from disturbed sediments;
- Pollution from fuels, oils etc. into the marine environment;
- Changes to coastal processes including tidal flows, local current and sediment movement; and
- Impacts on marine habitats and the associated intertidal and benthic communities during dredging and disposal operations.

#### 4.4.4 Potentially Significant Effects post-Completion

It is anticipated that the proposed development will comprise activities with the potential to impact on marine ecology in the area post-completion as follows:

- The increase in vessel movement occurring throughout the Moray Firth SAC and the known range of bottlenose dolphin;
- The increase in vessel movement occurring in proximity to the Dornoch Firth and Morrich More SAC and seal haul-out sites in the vicinity of the proposed development site; and
- Increased vessel numbers post construction causing disturbance and/or potentially death or injury to marine mammals.

#### 4.4.5 Design and Mitigation

Upon confirmation of detailed construction methodology and underwater noise modelling, further targeted assessments will be made to design out as many potential significant effects on marine ecology as possible. Mitigation will be designed to be site and species specific, according to environmental receptors, the species of concern and additional noise producing activities occurring in the Moray Firth.

The Joint Nature Conservation Committee (JNCC) *Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise* (2010)<sup>19</sup> will be consulted to design a site specific

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<sup>19</sup> JNCC Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise (2010) available online: [http://jncc.defra.gov.uk/pdf/JNCC\\_Guidelines\\_Piling%20protocol\\_August%202010.pdf](http://jncc.defra.gov.uk/pdf/JNCC_Guidelines_Piling%20protocol_August%202010.pdf) last accessed 29/01/2019

mitigation protocol, involving the use of Marine Mammal Observers (MMOs) and Passive Acoustic Monitoring (PAM).

Mitigation proposals will be agreed through discussion with SNH and Marine Scotland to ensure they provide the appropriate protection for marine mammals during construction.

Scientific papers produced by Aberdeen University, regarding their monitoring of the Moray Firth (SAC) bottlenose dolphin population, will be consulted; this will assist in developing an assessment of the impacts of other construction activities within the Moray Firth that will be ongoing during the construction of Nigg East Quay. The integrity of the Moray Firth SAC will also be fully considered within a HRA.

#### **4.4.6 . Inclusion or Exclusion from EIA**

##### **Designated Sites**

The Moray Firth SAC, designated for bottlenose dolphins; and the Dornoch Firth and Morrich More SAC; designated for harbour seal, will be considered during the assessment of marine ecology and will be scoped into the EIA. A Habitats Regulation Assessment (HRA) will be undertaken of the designated sites in proximity to the proposed development; which will be presented as a technical appendix to the EIA.

##### **Marine Mammals**

The Moray Firth, which is designated for bottlenose dolphin, is adjacent to the site boundary; and in-combination effects of additional developments underway in the Moray Firth (and further afield) have the potential to impact bottlenose dolphin and other species of marine mammal utilising the Moray Firth. Therefore marine mammals will be scoped into the EIA.

##### **Fish**

Given that the proposed development lies directly on a potential migratory pathway to and from several local rivers for Atlantic Salmon, which are listed in Annexes IIa and Va of the EC Habitats and Species Directive, as well as Sea Trout, which are listed as a Priority Species on the UK Biodiversity Action Plan (UK BAP), these two species will be scoped into the EIA.

Given that the proposed development lies within the potential migratory pathway of European Eel (Classified as Critically Endangered on the IUCN Red List and listed as a priority species on the UK BAP), Sea Lamprey and River Lamprey (Both listed as a Priority Species on the UK BAP) these three species will be scoped into the EIA.

Any occurrence of spawning or utilisation of benthic habitat in the vicinity of the proposed development as a nursery ground by marine fish species is envisaged to be small and of low importance. Furthermore, there are no known species of marine fish resident within the Cromarty Firth that are currently classified as rare, or afforded any legal protection at either International or National level. Marine fish species will therefore be scoped out of the EIA.

##### **Intertidal and Benthic ecology**

Based on the baseline data gathered from the desk study, intertidal and benthic ecology will be scoped out of the EIA process.

#### 4.4.7 EIA Assessment Methodology

##### Marine Mammals

The Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines for Ecological Impact Assessment<sup>20</sup> will be followed in order to evaluate receptors and form an impact assessment to determine the significance of effects. This will include further desktop study to review the existing literature and data sets for marine mammals present in the local area to identify the species' present in the vicinity of the development and their behaviours; and in turn the species of most concern.

Upon receipt of detailed construction proposals, site specific underwater noise modelling will be completed and mitigation requirements will be identified. Underwater noise modelling will be carried out by Irwin Carr, which will involve modelling representative scenarios taking into account environmental variables and animals' hearing capabilities, in order to identify the risk zones for each group of marine mammal species.

The way in which noise affects marine mammals is dependent on several factors, including the type of noise generated, the noise level, the species of marine mammal and the distance between the animal and the source of the noise. The National Oceanic and Atmospheric Administration (NOAA) describes how different groups of marine mammals hear and are affected by sounds, which can be found in the *'Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing'*<sup>21</sup>. The effects can be described as either a Permanent Threshold Shift (PTS), where an animal experiences irreversible damage to their hearing which can in turn affect their ability to forage and reproduce and in extreme circumstances result in death; or a Temporary Threshold Shift (TTS) which an animal can recover from, but may experience 'masking' which reduces its ability to communicate with other animals and locate prey, resulting in fatigue<sup>22</sup>. The outputs of the underwater noise modelling include maps highlighting the PTS/TTS risk zones of each group of marine mammals and will form the marine mammal mitigation zone.

Cumulative interactions will require to be considered and are set out within section 4.10 of this Scoping Report.

It is anticipated that a Marine Mammal Observation Protocol (MMOP) will be required so that the proposed construction works, particularly piling, dredging and disposal, do not cause unnecessary disturbance to marine mammals (cetaceans and seals). This is likely to incorporate the use of suitably qualified MMOs and/or PAM operators, competent in the identification of marine mammals, being present during construction. The MMOs will undertake observation for marine mammals during high sound producing activities (piling and heavy engineering activities), and during dredging and disposal operations. The PAM Operators will set up monitoring stations/transects and listen for the presence of marine mammals within the mitigation zone before and during high sound producing activities. It is likely that a MMOP will be incorporated into a Marine Mammal Protection Plan (MMPP).

It is envisaged that it will be necessary to apply for an EPS licence from the licensing authority, Marine Scotland prior to commencing construction works.

##### Fish

Atlantic Salmon, Sea Trout and other diadromous species of conservation interest (European Eel, Sea Lamprey and River Lamprey) will be included within the EIA. CIEEM EclA Guidance will be followed for the evaluation of receptors and the impact assessment to determine the significance of effects, with regard to these species.

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<sup>20</sup> CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland available online: [https://www.cieem.net/data/files/Guidelines\\_for\\_Ecological\\_Impact\\_Assessment\\_in\\_the\\_UK\\_and\\_Ireland\\_2018.pdf](https://www.cieem.net/data/files/Guidelines_for_Ecological_Impact_Assessment_in_the_UK_and_Ireland_2018.pdf) last accessed 28/01/2019

<sup>21</sup> NOAA guidance available at: <http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm> last accessed 29/01/2019

<sup>22</sup> JNCC UK Marine Noise Registry: Information Document available at: [http://jncc.defra.gov.uk/pdf/MNR\\_Draft\\_InfoDoc\\_V1\\_20160808.pdf](http://jncc.defra.gov.uk/pdf/MNR_Draft_InfoDoc_V1_20160808.pdf) last accessed 29/01/2019

Available data on fish movements in the Cromarty Firth and local rivers connected to the Firth will be collated. It is considered that no additional fisheries surveys are required to assess direct impacts upon these rivers.

## 4.5 Ornithology

### 4.5.1 Introduction

The assessment of ornithology will consider the geographical area potentially affected by the proposed development.

This section discusses potentially significant effects on ornithology.

### 4.5.2 Baseline Conditions

#### Designated Sites

The proposed development lies approximately 600m east of the Cromarty Firth SPA which qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex 1 species: Osprey (*Pandion haliaetus*) forage throughout the SPA (2008 to 2012, five year mean of up to 25 territories within feeding range, 12.5% of the GB population, with 1 pair breeding within the site, 1% of the GB population); Common Tern (*Sterna hirundo*) (1989 to 1993 mean of 294 pairs; 2% of the GB population); Whooper Swan (*Cygnus cygnus*) (1992/93 to 1996/97 winter peak mean of 64 individuals, 1% of the GB population) and Bar-tailed Godwit (*Limosa lapponica*) (1,355 wintering individuals, 3% of the GB population).

Cromarty Firth SPA further qualifies under Article 4.2 by regularly supporting a population of European importance of the migratory species: Greylag Goose (*Anser anser*) (1992/93 to 1996/97 winter peak mean of 1,782 individuals; 2% of the Iceland/UK/Ireland biogeographic population).

Cromarty Firth SPA also qualifies under Article 4.2 by regularly supporting in excess of 20,000 individual waterfowl. In the five-year period 1992/93 to 1996/97, a winter peak mean of 30,200 individual waterfowl was recorded, comprising 14,800 wildfowl and 15,400 waders including nationally important populations of the following species: Redshank (*Tringa totanus*) (1,149 individuals, 1% of the GB population); Curlew (*Numenius arquata*) (1,313 individuals, 1% of the GB population); Knot (*Calidris canutus*) (4,312 individuals, 1% of the GB population); Red-breasted Merganser (*Mergus serrator*) (204 individuals, 2% of the GB population); Scaup (*Aythya marila*) (295 individuals, 3% of the GB population); Pintail (*Anas acuta*) (319 individuals, 1% of the GB population); Wigeon (*Anas penelope*) (9,204 individuals, 3% of the GB population); Greylag Goose (1,782 individuals, 2% of the GB population); Bar-tailed Godwit (1,355 individuals) and Whooper Swan (64 individuals). In the five-year period 1991/92 to 1995/96, a winter peak mean of 34,847 individual waterfowl was recorded with the assemblage additionally including nationally important populations greater than 2,000 individuals of: Dunlin (*Calidris alpina alpina*) (3,384 individuals, 0.6% of the GB population) and Oystercatcher (*Haematopus ostralegus*) (2004/5 to 2009/10, 2,702 individuals, 0.8% of the GB population).

Approximately 2km east of the proposed development is the Moray Firth Proposed Special Protection Area (pSPA), with the proposed qualifying species being:

- Breeding and Non-breeding
  - European Shag (*Phalacrocorax aristotelis*)
- Non-breeding
  - Common Eider (*Somateria mollissima*);
  - Common Goldeneye (*Clangula bucephala*);
  - Common Scoter (*Melanitta nigra*);

- Great Northern Diver (*Gavia immer*);
- Greater Scaup;
- Long-tailed Duck (*Clangula hyemalis*);
- Red-breasted Merganser;
- Red-throated Diver (*Gavia stellata*);
- Slavonian Grebe (*Podiceps auritus*); and
- Velvet Scoter (*Melanitta fusca*).

Although the proposed development lies approximately 600m from the SPA boundary, there is the potential for SPA qualifying species to be present, either foraging or roosting.

#### Baseline Data

Wetland Bird Survey (WeBS) data obtained from the British Trust for Ornithology (BTO) from within the Nigg Ferry count sector (which the proposed development lies within) shows that small numbers of birds are present in the area. These are recorded within Table 4.9 and 4.10 respectively and includes foraging and roosting waders and waterfowl offshore. None of the species recorded comprise significant numbers against the overall populations of the Cromarty Firth SPA:

- Red-breasted Merganser – Peak count of 4 and mean peak of 2 (between 2012 and 2017), comprising 2% and 1% of the SPA population respectively;
- Bar-tailed Godwit – Peak count of 3 and a mean peak of 2 (between 2012 and 2017), comprising 0.2% and 0.1% of the SPA population respectively;
- Curlew – Peak count of 32 and a mean peak of 13 (between 2012 and 2017), comprising 2.4% and 1% of the SPA population respectively;
- Redshank – Peak count of 12 and mean peak of 6 (between 2012 and 2017), comprising 1% and 0.5% of the SPA population respectively; and
- Oystercatcher – Peak count of 122 and a mean peak of 72 (between 2012 and 2017), comprising 4.5% and 2.6% of the SPA population respectively.

**Table 4-9: BTO Wetland Bird Survey Data: Five-year peak monthly counts for each species**

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Eider	N/C	N/C	N/C	4	N/C	71	35	20	N/C	N/C	N/C	N/C
Long-tailed Duck	N/C	N/C	N/C	50	N/C	16	8	10	N/C	N/C	N/C	N/C
Common Scoter	N/C	N/C	N/C	0	N/C	1	0	0	N/C	N/C	N/C	N/C
Goldeneye	N/C	N/C	N/C	0	N/C	0	2	0	N/C	N/C	N/C	N/C
Red-breasted Merganser	N/C	N/C	N/C	2	N/C	4	2	2	N/C	N/C	N/C	N/C
Red-throated Diver	N/C	N/C	N/C	0	N/C	0	0	1	N/C	N/C	N/C	N/C
Cormorant	N/C	N/C	N/C	3	N/C	0	0	5	N/C	N/C	N/C	N/C
Shag	N/C	N/C	N/C	7	N/C	0	1	0	N/C	N/C	N/C	N/C
Grey Heron	N/C	N/C	N/C	4	N/C	8	2	6	N/C	N/C	N/C	N/C
Oystercatcher	N/C	N/C	N/C	67	N/C	84	122	48	N/C	N/C	N/C	N/C
Bar-tailed Godwit	N/C	N/C	N/C	0	N/C	3	3	3	N/C	N/C	N/C	N/C
Curlew	N/C	N/C	N/C	18	N/C	6	6	32	N/C	N/C	N/C	N/C
Redshank	N/C	N/C	N/C	30	N/C	12	6	7	N/C	N/C	N/C	N/C

**Table 4-10: BTO Wetland Bird Survey Data: Five-year winter peak counts, and month in which this was recorded, of each species**

Species	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	Mean Peak
Eider	71 (DEC)	1 (JAN)	35 (JAN)	19 (DEC)	27 (JAN)	31
Long-tailed Duck	2 (JAN)	10 (FEB)	2 (DEC)	16 (DEC)	8 (JAN)	8
Common Scoter	1 (DEC)	0	0	0	0	0
Goldeneye	2 (JAN)	0	0	0	0	0
Red-breasted Merganser	4 (DEC)	0	0	2 (FEB)	2 (JAN)	2
Red-throated Diver	0	0	1 (FEB)	0	0	0
Cormorant	0	0	5 (FEB)	0	0	1
Shag	0	1 (JAN)	0	0	0	0
Grey Heron	1 (FEB)	7 (DEC)	8 (DEC)	1 (DEC)	6 (FEB)	5
Oystercatcher	43 (FEB)	84 (DEC)	122 (JAN)	55 (DEC)	57 (DEC)	72
Bar-tailed Godwit	3 (DEC)	3 (FEB)	1 (DEC)	2 (DEC)	2 (FEB)	2
Curlew	8 (FEB)	12 (FEB)	6 (JAN)	5 (DEC)	32 (FEB)	13
Redshank	7 (FEB)	4 (DEC)	6 (DEC)	2 (DEC)	12 (DEC)	6

The SNH Commissioned Report No.252: Moray Firth Wildfowl and Wader Roosts<sup>23</sup> identified a small wader roost east of the Nigg Ferry terminal, located approximately 1.2km from the proposed development. This roost site is relatively undisturbed and numbers have been stable since 1994. There are four major wader roost sites within Nigg Bay, all of which are at least 4.5km from the proposed development site.

The Environmental Impact Assessment undertaken for the Nigg Energy Park<sup>24</sup> established that there are no breeding Osprey within 5km of the proposed development.

Nigg Oil Terminal used to historically support a population of breeding Common and Arctic Terns. However, this was been abandoned since 2004<sup>5</sup>. Nesting Arctic terns have been using the western side of Nigg Energy Park (outside of the site boundary) between the existing finger quay and the Nigg Oil Terminal. Nesting terns are also present at the quaysides at Invergordon, approximately 8km to the west.

Within the terrestrial habitats on site, the following species were recorded during the Phase 1 Habitat Survey: Wren (*Troglodytes troglodytes*), Great Tit (*Parus major*), Robin (*Erithacus rubecula*), Jackdaw (*Corvus monedula*), Herring Gull (*Larus argentatus*) and Black-headed Gull (*Chroicocephalus ridibundus*).

Wren, Great Tit, Robin and Jackdaw are listed on the BOCC Green List.

Black-headed Gull feature on the BOCC Amber List and Herring Gull on the BOCC Red List.

<sup>23</sup> Bob Swann. North of Scotland Ornithological Services (2007). Moray Firth Wildfowl & Wader Roosts. Scottish Natural Heritage Commissioned Report No.252 (ROAME No. F098LG02)

<sup>24</sup> Eco-Fish Consultants (2013). Ecological Impact Assessment (Marine), South Quayside Development, Nigg Energy Park, Nigg.



#### **4.5.3 Potentially Significant Effects during Construction**

There are two potential effects to birds during the construction phase of the proposed development – disturbance and displacement.

- Disturbance may be caused by startling noise or visual stimuli (including lighting) to the birds in the area from construction vehicles, construction personnel, or from construction activity.
- Displacement may be caused when construction (including dredging and disposal) activity leads birds to abandon their preferred areas of foraging or roosting in order to settle in a suboptimal location.

Both effects could occur during piling, dredging (and disposal) or general construction works for species present in the area, including duck, grebes and waterfowl offshore.

From the data obtained, the proposed development is considered unlikely to cause significant effects on any individual bird species, and it is unlikely to significantly impact the qualifying species of the nearby SPA and pSPA. Therefore, the integrity of these designations will remain intact. There is a long history of construction activities within Nigg Bay, with no evidence of either bird fatalities or disturbance to/displacement of local bird populations.

The proposed development site has the potential to support small numbers of breeding birds, within the limited scrub habitat and derelict buildings. However, the species likely to be present will be birds that are common and widespread in the area and the loss of these habitats is unlikely to have a significant effect on the local populations of these species.

#### **4.5.4 Potentially Significant Effects post-Completion**

Post-completion, there may be minor disturbance and displacement incidents during periods of high activity within the quay which may affect roosting or foraging birds, or birds offshore.

As with previous applications, it has been noted that the proposed development could coincide with flight paths that are regularly used by birds moving between foraging and roosting sites. However, structures and vessels present within the quay post-construction will be similar to other structures and vessels already present on site and will not provide a barrier to movement. In addition, the use of directional lighting will prevent disorientation of commuting birds through lighting glare.

There is a long history of operation/fabrication activities within Nigg Bay, with no evidence of either bird fatalities or disturbance to/displacement of local bird populations.

No significant effects are considered likely.

#### 4.5.5 Design and Mitigation

Applying appropriate mitigation such as timing of works (vegetation clearance and building demolition) out with the nesting season will be sufficient to avoid any impact on breeding birds. Bird dissuasion methods (including regular inspections by an Ecological Clerk of Works (ECoW) and artificial deterrents) to discourage ground nesting birds on site during construction and operation phases can be incorporated into any Environmental Management Plans. Dissuasion methods will be further discussed for nesting terns and will include discouraging terns nesting on site.

#### 4.5.6 Inclusion or Exclusion from EIA

Given the baseline conditions detailed in 4.5.2 and by applying the mitigation measures detailed in 4.5.5 it is not considered likely that there would be any significant effects on the bird populations as a result of the proposed development. Therefore, it is considered that ornithology does not require to be assessed further in the EIA.

As part of the Habitat Regulations Appraisal (HRA), the Cromarty Firth SPA and Moray Firth pSPA (and its qualifying species) will be assessed to ensure that none of the designations or their qualifying species would be negatively impacted by the proposed development.

#### 4.5.7 Assessment Methodology

Although no significant effects upon ornithology are predicted, and an HRA will be carried out to understand potential impacts upon the integrity of the relevant designations within the area, a desk-top assessment will be undertaken. This will incorporate WeBS data, consultation with relevant stakeholders (SNH and Highland Raptor Study Group) and provide sufficient information to inform the HRA process. This will take the format of a technical appendix to the Other Issues chapter and be summarised within that chapter.

### 4.6 Cultural Heritage and Archaeology

#### 4.6.1 Introduction

This section of the EIA Scoping Report summarises the baseline archaeological and cultural heritage conditions at the site and considers the likely significant potential effects from the proposed development on heritage assets.

#### 4.6.2 Baseline Conditions

There are two known heritage assets within the Site (Table 4.11, and Figure 6 within Appendix B). These comprise the remains of Dunskeath House and the site of a WW2 Depot. Both are non-designated and considered to be of Low importance. Canmore Maritime records note three wrecks in the general area of the Cromarty Firth, but none of them appear to be within the Site boundary.

**Table 4.11: Heritage Assets within the Site Boundary**

Asset	Description	NGR
MHG21540	Dunskeath House, Nigg Ferry	NH 79515 68909
MHG52973	Concrete Hut Bases, Submarine Mine Depot, Nigg	NH 79594 68899

Dunskeath House (MHG21540) is recorded on the Highland Council Historic Environment Record (HER) as a former country house that burnt down in the 1960s and has since been demolished – the servants' quarters survive as a range of upstanding buildings, along with some garden buildings and walls.

The WW2 Depot (MHG52973) comprises the concrete bases of at least three huts relating to the Submarine Mine Depot built as part of the Cromarty Firth's wartime defences.

Within 2km of the Site boundary there is one Scheduled Monument (SM), one Inventory Garden and Designed Landscape (IGDL), two Listed Buildings (LB) and one Conservation Area (CA) and approximately 160 non-designated heritage assets recorded on Pastmap and the Canmore database.

Dunskeath Castle (SM3319) is the site of a 12th century castle on a promontory overlooking the Firth 1km east of the Site. The two Listed Buildings are 1.3 km north-east and consist of one Category B (LB14049; the early nineteenth century Pitcalzean House) and one Category C (LB14050; the Coach House at Pitcalzean House). The IGDL comprising the grounds of Cromarty House (GDL00120) is located 1.4 km away on the south bank of the Firth and there are five LBs within the IGDL – including two Category A listed buildings. The CA encompasses the historic fishing village of Cromarty, 1 km south-west of the Site, and includes 185 LBs.

#### **4.6.3 Potentially Significant Effects during Construction**

Groundworks comprising onshore excavation and offshore dredging and land reclamation required for the proposed development have the potential to impact directly upon known heritage assets present within the Site. Impacts will potentially be of high magnitude as they could result in the complete destruction and removal of archaeological remains. Both heritage assets within the Site boundary are potentially subject to direct impacts.

In addition to possible impacts upon known heritage assets, possible impacts upon hitherto unknown buried archaeological remains should also be considered. The level of effect will be dependent upon the finalised design and construction methods associated with the proposed development. However, due to previous development and ground-levelling the Site is considered to be of low archaeological potential – meaning that it is possible, but unlikely, that undiscovered archaeological deposits survive.

#### **4.6.4 Potentially Significant Effects post-Completion**

The proposed development has the potential to affect the settings of designated heritage assets including Scheduled Monuments, Listed Buildings, a Conservation Area and an Inventory Garden and Designed Landscape.

Designated heritage assets up to 2 km distant from the Site have been identified. However, given the local topography and the character of the heritage assets, it is unlikely that significant setting effects will occur.

#### **4.6.5 Design and Mitigation**

Where potential adverse effects are identified in the Desk Based Assessment (DBA), further works may be required. The Highland Council Historic Environment Team (HC:HET) and Historic Environment Scotland (HES) would be consulted in order to establish appropriate design responses or mitigation measures required to avoid, minimise or offset significant effects.

#### **4.6.6 Inclusion or Exclusion from EIA**

As the Site is considered to be of low archaeological potential, and no significant effects are anticipated upon any designated heritage assets it is considered that cultural heritage and archaeology can be scoped out of the EIA Report.

A desk-based assessment (DBA) of archaeology and cultural heritage, informed by a site walkover and setting visits, will be undertaken and provided as a Technical Appendix to the EIAR and summarised within the Other Issues chapter.

The DBA will consider the potential for direct effects upon heritage assets within the Site. The methodology to be employed in identifying direct effects is outlined below in section 4.5.7.

#### **4.6.7 Assessment Methodology**

The DBA will aim to identify all known heritage assets potentially affected by the proposed development, and to estimate the potential for currently unknown heritage assets. The DBA will be based on a study of all readily available documentary sources, following the ClfA Standards and Guidance (ClfA 2014), and will also be informed by a walkover survey of the Site and setting visits to particular heritage assets in the wider Study Area.

The DBA will aim to identify any impacts which will affect the cultural significance of an asset, particularly where special/key characteristics will be affected. The DBA will also identify any areas of uncertainty, where potential effects cannot be predicted, including effects on currently unknown assets. Where areas of uncertainty are identified, the DBA will propose further works that may help to resolve this uncertainty.

A heritage asset is defined as any element of the historic environment which has cultural significance. Both discrete features, and extensive landscapes defined by a specific historic event, process or theme, can be defined as heritage assets; and assets may overlap or be nested within one another. Some heritage assets are designated as Scheduled Monuments, Listed Buildings, World Heritage Sites, Conservation Areas, Inventory Gardens and Designed Landscapes, Inventory Historic Battlefields, Historic Marine Protected Areas, or locally designated through policies in the Local Plan. Undesignated assets may be recorded in the NRHE or Historic Environment Records, while many other assets are currently unrecorded.

Heritage assets are assessed in terms of their cultural significance and importance. Cultural significance is a quality that applies to all heritage assets and is defined in 'Historic Environment Scotland Policy Statement 2016'. The importance of a heritage asset is the overall value assigned to it based on its cultural significance, reflecting its statutory designation or, in the case of undesignated assets, the professional judgement of the assessor.

Archaeological features are often impossible to identify through desk-based assessment. The likelihood that significant undiscovered heritage assets may be present within the Site is referred to as archaeological potential. Overall levels of potential will be assigned to different landscape zones, following criteria to be determined in the DBA, while recognising that the archaeological potential of any zone will relate to particular historical periods and types of evidence. The following factors are to be considered in assessing archaeological potential:

- The distribution and character of known archaeological remains in the vicinity, based principally on an appraisal of data in the HER;
- The history of archaeological fieldwork and research in the surrounding area, which may give an indication of the reliability and completeness of existing records;
- Environmental factors such as geology, topography and soil quality, which would have influenced land-use in the past and can therefore be used to predict the distribution of archaeological remains;
- Land-use factors affecting the survival of archaeological remains, such as ploughing or commercial forestry planting; and

- Factors affecting the visibility of archaeological remains, which may relate to both environment and land-use, such as soils and geology (which may be more or less conducive to formation of cropmarks), arable cultivation (which has potential to show cropmarks and create surface artefact scatters), vegetation, which can conceal upstanding features, and superficial deposits such as peat and alluvium which can mask archaeological features.

## **4.7 Airborne Noise**

### **4.7.1 Introduction**

The noise assessment will consider the potential for noise generated by the proposed development to impact upon existing residential receptors during the construction and operational phases. The significance of any noise impact will also be predicted. The effects of construction noise on marine life shall be considered as part of the ecological scope of works as discussed in Section 4.4.

### **4.7.2 Baseline Conditions**

A number of existing residential properties are located in the surrounding areas, within the hamlets of Balnabruaich and Balnapaling to the East, and the town of Cromarty situated approximately 1.5km to the south. The closest existing residential properties within Balnabruaich are located circa 25m to the west of the site boundary. The hamlet of Balnapaling is located to the east of the proposed laydown area, in which the Nigg Ferry Hotel is the closest property, approximately 100m from the site boundary.

The current baseline noise environment in the area surrounding the proposed development contains components of noise generated by existing operations within Nigg Energy Park site boundary. This is most significant at existing noise sensitive receptors located closest to the existing operations in Balnabruaich and Balnapaling. Current existing noise generating operations at Nigg Energy Park include the following;

- Ship berthing, pilotage and mooring of client assets;
- Movement of materials between ships and laydown areas;
- Fabrication of subsea and offshore equipment;
- Construction and decommissioning of offshore and subsea infrastructure;
- Architectural repair and refurbishment of offshore rigs; and
- Shot blasting and painting of infrastructure.

Existing operations at Nigg Energy Park are carried out over a 24 hour period, therefore certain of the above noise generating activities are carried out at sensitive times when background noise is typically low.

Current noise generating activities in the surrounding area outside of the site boundary include;

- Industrial activities within RepsolSinopec's premises to the north of Nigg Energy Park;
- Road traffic on local road network;
- Marine vessels passing in the Cromarty Firth;
- The Cromarty Ferry arriving/departing from the slipways in Nigg and Cromarty between the months of May and September;
- Industrial / commercial activities within Cromarty.

#### ***Previously Reported (2013) Baseline***

As part of the planning application for South Quay in 2013, a construction noise assessment was carried out by New Acoustics (dated 9<sup>th</sup> April 2013). As part of the assessment the existing day and night-time baseline noise (including operational activities) were measured. It was noted by Environmental Health at Highland Council at the time that the measured existing baseline noise levels were high at some of the closest existing receptors. It was also noted that complaints had been received from Cromarty residents regarding night-time operations at Nigg Energy Park. No operational noise assessment was carried out as part of the application.

As part of the planning application in 2017 for site extension and refurbishment works at Nigg Energy Park, a construction noise assessment was carried out by Atmos Consulting (dated 9<sup>th</sup> October 2017). The assessment used the baseline noise measurements carried out by New Acoustics in 2013. No operational noise assessment was carried out as it was argued that the proposed development would enable continuation of existing site processes through upgrading with no new noise sources added which would change the character or nature of noise experienced by receivers.

The baseline environment is anticipated to have changed since that measured by New Acoustics in 2013, as a result of the proposed extension to the south quayside and further extension and refurbishment works. That previous baseline noise levels were noted to be high at some of the closest residential receptors, it is anticipated that this may still be the case in 2019.

#### **4.7.3 Potentially Significant Effects during Construction**

The noise from certain construction activities has the potential to impact upon existing noise sensitive receptors. Construction details have not been finalised at this stage. The degree of impact during each phasing stage will depend upon:

- The nature of construction activities being carried out; this includes the type and size of machinery/plant involved, combinations of activities occurring simultaneously and HGV routes in and around the site;
- Location of construction activities relative to the closest noise sensitive receptors;
- Duration of proposed activities;
- Construction site operating times; and
- Extent of noise mitigation measures in place.

Noise generating activities during the construction phase are understood to include;

- Dredging of area around proposed quay;
- Piling of structure for quay wall;
- Delivery and tipping of materials; and
- HGV and plant movements in and around the site.

These elements have the potential to impact upon noise sensitive receptors within Balnabruaich and Balnapaling to the east, and Cromarty to the south if unmitigated.

#### **4.7.4 Potentially Significant Effects post-Completion**

During the operational phase, new proposed noise generating activities have the potential to increase the day and night-time existing baseline (including current operational activities) noise levels at surrounding noise sensitive receptors. The proposed East Quay development will also bring noise generating sources into closer proximity to residential receptors in Balnapaling than current operations, therefore there is the potential for a significant adverse effect at this location. A potential increase in noise levels at receptors in Balnabruaich and Cromarty is also possible.

Noise generating activities which shall be carried out during the operational phase include;

- Ship berthing and mooring;
- Ship loading / unloading activities; including operation of cranes;
- Movement of materials between ships and laydown area;
- Plant and HGV movements within quay and laydown area;
- Loading / unloading of HGVs; and
- Maintenance activities.

#### **4.7.5 Design and Mitigation**

There is the potential for adverse impacts from noise generating activities during both the construction and operational phases at surrounding residential receptors, therefore noise mitigation shall be employed to address this.

Details of phasing along with associated construction activities have not been finalised at this stage, and in accordance with standard industry practice, the specifications, locations and durations of potentially noise plant and equipment will be determined upon the appointment of a contractor post-consent. When this information is known a construction noise assessment shall be carried out as part of the EIA, the results of which will be used to inform a construction noise management plan.

Similarly, the post-completion operational noise impact assessment shall identify potential adverse impacts, which shall be used to inform mitigation measures to be employed at the site. There are current operational noise management/mitigation measures carried out at Nigg Energy Park, which if required, can be updated to address any additional impact as a result of the proposed development.

#### **4.7.6 Inclusion or Exclusion from EIA**

Both construction and operational noise assessments shall be carried out as part of the EIA.

#### **4.7.7 EIA Assessment Methodology**

##### **Baseline Noise Monitoring**

It is proposed to carry out existing baseline noise monitoring, the results of which shall be used alongside calculated predicted levels in the assessment of construction and operational activities. Noise sensitive receptors to be used within the assessments shall be located at the residential properties located closest to the proposed noise monitoring locations.

The existing baseline noise monitoring shall comprise of the following stages:

- Measurement of existing baseline environment (including current operations at Nigg Energy Park) at a sample of 5 areas representative of the most exposed noise sensitive receptors surrounding the site; the location of the proposed monitoring locations are shown in Figure 7 within Appendix A;
- The monitoring shall be carried out during week days at each position for a duration of 1 hour during the daytime, and 0.5 hours during the night-time;
- The monitoring shall be repeated at each position (i.e two rounds of monitoring will be carried out).

##### **Construction Noise**

Noise from construction activities shall be predicted at the most exposed residential receptors following guidance provided in *BS5228-1:2009; Code of Practice for Noise and Vibration Control on Construction and Open Sites*. Baseline noise surveys pre-construction shall be carried out to determine the existing noise climate.

Predicted increases in levels above baseline shall be assessed in order to determine the significance of effects. As discussed in section 4.7.5, the results of the assessment can be used to inform a construction noise management plan, to help mitigate any effects at the most exposed sensitive receptors.

The construction noise assessment sites shall comprise of the following stages;

- Review of construction activities, locations and noise data;
- Calculation and assessment of construction noise at the most exposed sensitive receptors, following the ABC Method provided in BS5228-1:2009; Code of Practice for Noise and Vibration on Construction and Open Sites. A combination of calculation and 3D computer noise modelling using CadnaA software shall be used in the calculation of construction noise at sensitive receptors;
- Only significant noise generating construction stages shall be considered within the above assessment; and
- If required, recommend mitigation measures to reduce construction noise impact at existing residential receptors and to inform construction noise management plan.

### Operational Noise

Operational noise shall be predicted and assessed at the most exposed residential receptors following guidance provided in the Scottish Government Publication *TAN 2011: Technical Advice Note: Assessment of Noise*, and *BS4142:2014 Methods for Rating and Assessing Industrial and Commercial Sound*. Baseline noise surveys pre-construction shall be carried out to determine the existing noise climate. Predicted increases in levels above baseline shall be assessed in order to determine the significance of effects. As discussed in Section 4.6.5, the results of the assessment can be used to inform operational noise mitigation measures to be employed at the site.

The operational noise assessment shall comprise of the following stages;

- Review of proposed operational activities, locations and noise data;
- Prediction of operational noise from proposed East Quay Development using CadnaA 3D noise modelling software at location of most exposed sensitive receptors;
- Carry out PAN 1/2011 (using principles defined in BS4142:2014) assessment of change in operational noise levels, comparing existing operations (before) to existing and proposed operations (after). The noise criteria to be applied is summarised in Table 4.12, where moderate effects or above would be classed as significant;
- If required, make recommendations on mitigation measures required to reduce noise impact at existing residential receptors and to inform operational noise management plan.

**Table 4.12: Significance of Effects**

Magnitude of Impact (After – Before) L <sub>AeqT</sub> dB	Sensitivity of Receptor Based on Likelihood of Complaint X = (Rating (L <sub>Af,Tr</sub> ) – Background (L <sub>A90,T</sub> )) dB		
	Low (x < 5)	Medium (5 ≤ x < 10)	High (x ≥ 10)
Major (≥ 5)	Slight / Moderate	Moderate / Large	Large / Very Large
Moderate (3 to 4.9)	Slight	Moderate	Moderate / Large
Minor (1 to 2.9)	Neutral	Slight	Slight / Moderate
Negligible (0.1 to 0.9)	Neutral / Slight	Neutral / Slight	Slight



Magnitude of Impact (After – Before) L <sub>AeqT</sub> dB	Sensitivity of Receptor Based on Likelihood of Complaint X = (Rating (L <sub>Ar,Tr</sub> ) – Background (L <sub>A90,T</sub> )) dB		
	Low (x < 5)	Medium (5 ≤ x < 10)	High (x ≥ 10)
No Change (0)	Neutral	Neutral	Neutral

## 4.8 Water Environment and Coastal Processes

### 4.8.1 Introduction

The water environment is considered to encompass hydrology, hydrogeology and water quality, whilst coastal processes are considered to encompass tides, waves and sediment transport processes. This section of the Scoping Report will therefore address all of these subject areas, in addition to geology. The associated interactions between the water environment, ecology and fisheries will be considered within the ecology section of this document.

The Water Framework Directive (WFD) (Council Directive 2000/60/EC) aims to protect and enhance water bodies within Europe and covers all estuarine and coastal waters out to 1 nautical mile. This requires that there is no deterioration in the quality of surface or groundwater bodies and aims to achieve good ecological status or potential. The implications of the WFD must be considered when assessing this project and the details of how compliance will be achieved provided in the EIA.

The development proposals for construction of a new quay, and associated dredging, have the potential to cause changes to the baseline hydro(geo)logical conditions and the ongoing coastal processes at the site, and in the wider area. Given the importance of water as a valued resource, coastal processes to the surrounding environment, and of ensuring sustainable development, an initial assessment of the water environment and coastal processes is considered essential.

### 4.8.2 Baseline Conditions

The proposed development site is situated at Nigg Energy Park, located on the northern shore at the mouth of the Cromarty Firth. The Cromarty Firth extends over 28km in length, and around 12km in width at its widest point. At the mouth, near the development site, the firth is around 1.5km in width. In total the firth covers an area in excess of 78km<sup>2</sup>.

#### Geology

The site is underlain by sandstone of the Raddery Formation, formed in a fluvial or estuary setting during the Devonian Period (383 – 393 million years ago). Coastal outcrops of the Devonian Period Cromarty Fish Bed Limestone are present to the west of the site. Further west metamorphic rocks (psammite and pelite) from the Moine Supergroup are present, these rocks were formed during the Neoproterozoic Era (541 – 1,000 million years ago).

Coastal superficial deposits in the vicinity of the site take the form of marine beach deposits, gravel, sand and silt formed up to 3 million years ago during the Quaternary Period. Immediately inland wind-blown sand deposits are present, also of the Quaternary Period, with glacial till present further inland<sup>25</sup>.

### Coastal Processes

The Cromarty Firth is a glacial valley formed during the last Ice Age and subsequently flooded as a result of post-glacial sea level rise. Significant sediment deposits are present within the firth as a result of post-glacial erosion and sedimentation processes, with present day sediment processes within the firth largely relating to the re-working of this material.

Review of historical mapping<sup>26</sup>, as well as the Dynamic Coast National Coastal Change Assessment map<sup>27</sup> and associated reports<sup>28</sup>, highlights the local changes to the coastline at the development site as a result of land reclamation and hard engineering during previous phases of development. It is also highlights that the coastline to the east of the development site, and on the opposite shore of the firth to the south, has remained relatively stable throughout the mapped record.

Tidal currents are low in the Inner Moray Firth, but increase in the constricted mouth of Cromarty Firth, adjacent to Nigg. A gyre exists across Nigg Bay, acting to circulate currents locally. Further west as the Cromarty Firth widens the tidal currents are generally low.

Within the Cromarty Firth the wave climate is heavily influenced by locally wind-generated waves, with south-westerly wind predominant. Some limited North Sea swell penetration into the Cromarty Firth from the Inner Moray Firth also occurs.

Previous assessments of sediment transport in the vicinity of the proposed development site indicate that sediment can move from sandbanks in the Inner Moray Firth to the Cromarty Firth episodically as a result of storm wave driven bedload transport. This material then subsequently becomes re-worked by wave action towards the shoreline, with resultant long-shore transport westwards. Average deposition rates within dredged areas in the vicinity of the development site are around 100mm/year<sup>29</sup>.

### Tidal Water Levels

The nearest standard port to the development site is Invergordon, situated around 8km further west within the Cromarty Firth. Tidal levels at Invergordon as presented within the Admiralty Tide Tables<sup>30</sup> are shown in Table . The mean tidal range at Invergordon is 3.6m during spring tides, and 1.7m during neap tides.

**Table 4.13: Tidal Range at Invergordon**

Tide Condition	Chart Datum (mCD)	Ordnance Datum (mOD)*
Highest Astronomical Tide (HAT)	5.0	2.9
Mean High Water Spring (MHWS)	4.3	2.2
Mean High Water Neap (MHWN)	3.3	1.2
Mean Low Water Neap (MLWN)	1.6	-0.5

<sup>25</sup> BGS Geology of Britain Viewer (<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>)

<sup>26</sup> National Library of Scotland (<https://maps.nls.uk/>)

<sup>27</sup> The Scottish Government (2017). Dynamic Coast: Scotland's National Coastal Change Assessment. Retrieved from <http://www.dynamiccoast.com/webmap.html>

<sup>28</sup> Hansom, J.D., Rennie, A.F. & Fitton, J. M. (2017). Dynamic Coast - National Coastal Change Assessment: Cell 3 -

Cairnbulg Point to Duncansby Head. CREW.

<sup>29</sup> Royal Haskoning DHV (2013). Nigg Energy Park: Sedimentation and Wave Modelling. Global Energy Nigg Ltd.

<sup>30</sup> UKHO (2019). Admiralty Tide Tables Volume 1B: United Kingdom and Ireland (Excluding Isles of Scilly, English Channel to River Humber, Channel Islands and European Channel Ports) (Vol. 1).

Tide Condition	Chart Datum (mCD)	Ordnance Datum (mOD)*
Mean Low Water Spring (MLWS)	0.7	-1.4
Lowest Astronomical Tide (LAT)	0.0	-2.1

\* Height of Chart Datum (m) relative to Ordnance Datum is -2.1mOD Newlyn

Extreme sea levels have been predicted around the whole UK coastline and published by the Environmental Agency/Department for Environmental Food and Rural Affairs report<sup>31</sup>. These extreme levels include the effects of both tides and storm surge but not the effect of amplification within estuaries or sea lochs. In order to provide better estimates around the Scottish coastline, SEPA have updated the original estimates<sup>32</sup>. The SEPA derived extreme sea levels, predicted at a point adjacent to Nigg, are 3.37m Above Ordnance Datum (AOD) for the 1 in 200 year return period event and 3.53mAOD for the 1 in 1,000 year return period event.

## Hydrology

The three main watercourses discharging to the Outer Cromarty Firth are the Balnagown River, Pollo Burn, and Fearn Canal. The Balnagown River and Fearn Canal are larger watercourses with catchment areas in excess of 50km<sup>2</sup>. All three are classified waterbodies under the Water Framework Directive (WFD) monitoring programme<sup>33</sup>.

The River Conon represents the largest watercourse discharging to the wider Cromarty Firth, joining the firth near Dingwall at the western extremity, with a contributing catchment in excess of 1,000km<sup>2</sup>.

Overall, the inflow of freshwater remains insignificant relative to the much larger volume of seawater exchanged within the Cromarty Firth embayment.

## Water Quality

The waters of the Outer Cromarty Firth are classified under the WFD monitoring programme as a transitional waterbody. The waterbody is classified as being of overall 'Good' status in 2017, with a physico-chem status of 'High' and a hydromorphology status of 'Good'.

No designated EU bathing waters are present in proximity to the proposed development site or within the wider Cromarty Firth<sup>34</sup>.

## Flood Risk

The proposed development is situated within the 1 in 200 year return period coastal flood extent as shown on the SEPA flood map. As detailed above, the 1 in 200 year coastal flood level is 3.37mAOD.

### 4.8.3 Potentially Significant Effects during Construction

The proposed development will involve construction activities in and near the water environment, including construction of new quay wall, associated fendering and rock armouring, seabed dredging and disposal of dredged material. The key potential environmental impacts on the water environment and coastal processes during construction and operation have been identified and are outlined below:

<sup>31</sup> McMillan, A., Batstone, C., Worth, D., Tawn, J., Horsburgh, K. & Lawless, M. (2011). Coastal flood boundary conditions for UK mainland and islands; Project: SC060064/TR2: Design sea levels. Bristol: Environment Agency.

<sup>32</sup> SEPA (2014). Scottish Coastal Flood Boundary (CFB) Dataset.

<sup>33</sup> SEPA Water Classification Hub (<https://www.sepa.org.uk/data-visualisation/water-classification-hub/>)

<sup>34</sup> Scotland's Environment Map Viewer (<https://map.environment.gov.scot/sewebmap/?layers=bathingWaterAreas>)

- Potential changes in the local coastal processes, including tidal currents, wave climate and sediment transport;
- Potential changes in local drainage;
- Potential contamination of coastal water and sediments through spillages and/or sediment transfer (oil, fuels and suspended solids); and
- Potential interactions between water environment and coastal process impacts and associated ecology and environmental designations.

#### **4.8.4 Potentially Significant Effects post-Completion**

Potentially significant effects arising from the post-completion phase (i.e. once the development has been built) are likely to arise from the same potential impacts as highlighted above within section 4.7.3.

#### **4.8.5 Design and Mitigation**

Where any significant effects on the water environment or coastal processes are identified as part of the EIA process, recommendations for design alteration or mitigation which could avoid, reduce or remedy the adverse effects will be identified.

The proposed design has been developed in order to mitigate adverse effects. Development design levels and materials will be selected in order to mitigate flood risk as further outlined in section 4.7.6 below. Additionally materials and design of seaward facing components will be designed in order to mitigate any impacts on local wave climate. Dredged material will be re-used within the quay construction where suitable in order to reduce disposal requirement.

#### **4.8.6 Inclusion or Exclusion from EIA**

The nature of the proposed works, including new quay wall construction and capital dredge requirement, raises the potential for impacts on the local water environment and coastal processes, including tidal current, wave action, and associated sediment transport processes.

The proposed development represents a redevelopment and extension of the existing Nigg Energy Park, and is both similar in character, and in close proximity to, the recent South Quay extension and West Finger Jetty. As such, recent technical assessments of likely impact to coastal processes as a result of the South Quay extension are relevant to the future assessment of impact of the proposed development. It is proposed to scope in the qualitative assessment of impact to coastal processes including sediment transport, informed in part by the existing findings of technical assessments and modelling undertaken for the South Quay extension.

Assessment of the potential for particulate and chemical contamination of the water environment will be central to the EIA. The prevention of pollution during construction and operational phases will be a specific focus, and recommendations will be made for the adoption of good working practices, including suitable drainage measures in line with appropriate guidance. Details of existing and proposed drainage measures will be included within the EIA.

Review of site investigation within the proposed works area, particularly the dredge pocket, will determine the nature of the substrate, the likely implications for the project, and licencing requirements.

The EIA will consider the potential impacts of proposed dredging activities, and any related dredged material disposal and re-use proposals. The assessment of dredging and disposal impact will be informed by a Best Practicable Environmental Option (BPEO) assessment, as well as the existing findings of the previous technical assessment of dredging and disposal for the recent South Quay extension.

The EIA will include an assessment of impact to WFD status of the associated waterbodies, particularly the Outer Cromarty Firth.

Whilst the development is situated within the 1 in 200 year coastal flood extent as shown by the SEPA flood map, as noted in the SEPA pre-application response the development represents a water compatible use, and requires to be located within this flood zone for operational reasons.

As noted above and within the SEPA pre-application response, the estimated 1 in 200 year coastal flood level in the vicinity of the proposed development is 3.37mAOD. Finished development platform levels will therefore be as a minimum 3.97mAOD, allowing for a suitable 600mm freeboard to account for modelling uncertainties. Whilst the development will require some land reclamation as part of the quay construction, this volume is insignificant in terms of the much larger volume of the Cromarty and Moray Firth. It is therefore considered that the development will have negligible impact on coastal flood levels. In light of the above it is proposed to scope out further assessment of flood risk within the EIA.

#### **4.8.7 EIA Assessment Methodology**

The assessment will follow standard EIA procedures and will include:

- Desk based review of the design of the proposed development in relation to the local water environment and coastal processes;
- Consultation with key stakeholders to obtain relevant information to ensure their concerns are addressed within the study;
- Establishing the existing baseline conditions:
  - Review topography and ground conditions at the site and environs;
  - Review of hydrology, catchment characteristics, local drainage and water quality conditions;
  - Review of coastal processes including bathymetry, tidal levels, river and tidal flow currents, wave action, bed sediment type and distribution, sediment transport and deposition, geology;
  - Reporting of baseline conditions to provide a basis for assessment of the potential impact.
- Impact Assessment:
  - Identification of sensitive receptors and environmental constraints;
  - Identification of potential impacts;
  - Assessment of impact significance;
  - Identification and assessment of mitigation measures to reduce or avoid any potential impacts of the proposed development; and
  - Statement of residual impacts.

Potential impacts arising from the development will be predicted and evaluated by comparison with environmental quality standards, sediment quality standards, and water and sediment quality objectives. The observed baseline data will initially be used along with expert opinion to qualitatively assess the potential impacts and the significance to receptors.

### **4.9 Traffic and Transport**

#### **4.9.1 Introduction**

This assessment will identify the preferred route(s) for access to the site and will consider the potential effects of traffic generated during the construction and operational stage of the proposed development.

The assessment will include identification of possible measures to mitigate any disruption to the local road network and receptors along the route(s). This scoping study and the access, traffic and transport assessment will be undertaken by SYSTRA Ltd.

The Access, Traffic and Transport EIA Chapter will be prepared taking cognisance of the relevant policy guidance, as follows:

- Scottish Planning Policy (2014);
- Institution of Highways and Transportation (IHT) (1994) "Guidelines for Traffic Impact Assessment";
- Institute of Environmental Assessment (IEA) now the Institute of Environmental Management and Assessment (IEMA) (1993) "Guidelines for the Environmental Assessment of Road Traffic";
- Transport Scotland (2012) "Transport Assessment Guidance";
- The Highland-wide Local Development Plan (HwLDP) (2012);
- Planning Advice Note 75: Planning for Transport (2005) Scottish Government; and
- Design Manual for Roads & Bridges (DMRB);

This scoping study has been informed by a site visit undertaken on 15<sup>th</sup> January 2019 and supported by a comprehensive desktop study.

#### **4.9.2 Baseline Conditions**

##### **Site Access**

Access to the current Nigg Energy Park facility is gained from the B9175, which travels in a north-west direction between Nigg Ferry Port and the A9 trunk road. During construction, the proposed East Quay development will be accessed from an existing priority controlled junction along the B9175 approximately 450m north-west of the Nigg Ferry Port (as the crow flies).

##### **B9175**

The B9175 is a single carriageway road generally of a good standard throughout and rural in nature. The B9175 has a derestricted speed limit (60mph) except for a small section of the road through the villages of Nigg Station and Arabella, whereby the speed limit is reduced to 40mph. There is street lighting within the villages and there are intermittent sections of footway along the length of the B9175.

##### **A9 Trunk Road**

The A9 connects to the B9175 via a four arm roundabout. The A9 in the vicinity of the B9175 is a good standard single carriageway with a derestricted speed limit (60mph). The A9 provides a link south to Inverness, the nearest city to the proposed development, and continues north from the roundabout with the B9175 to Thurso and Scrabster.

##### **Study Area**

The study area for the access, traffic and transport assessment will effectively be the public road network in the vicinity of the proposed East Quay and the route to the site from the wider strategic road network (the A9), i.e. the B9175.

#### **4.9.3 Potentially Significant Effects**

The IEMA guidelines set out a list of environmental effects which should be assessed for significance in relation to the transport resource (the identified thresholds are exceeded, i.e. 'Rule 1' or 'Rule 2' described below), as follows:

- Noise and vibrations;
- Air pollution;
- Severance;
- Driver delay;
- Pedestrian delay and amenity;
- Accidents and safety;
- Dust and dirt; and
- Hazardous loads.

The EIA would explore whether effects on these are likely to be significant based upon two tests contained within IEMA Guidelines. The guidelines suggest that, in order to determine the scale and extent of the assessment and the level of impact that the development will have on the surrounding road network, the following two 'rules' should be applied:

- Include highway links where flows are predicted to increase by more than 30% or where the number of HGVs is predicted to increase by more than 30%; and
- Include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

Whilst construction and operation of the proposed development will see an increase in current baseline traffic along the A9 and B9175, it is worth noting that the expected increase in traffic volumes associated with the proposals is considered to be minor in relation to historic operations at the existing Nigg facility. It is understood that when the Nigg facility formerly operated as an oil platform construction and fabrication yard (opened in 1972 and put up for sale in 2006), there were in the region of 3,000 – 5,000 staff employed at the facility, and therefore significantly more vehicle movements on the local road network than experienced at present and proposed through the East Quay development proposal.

#### **4.9.4 Inclusion or Exclusion from EIA**

Details of the expected traffic generation during the construction and operational phases has not been finalised at this stage. When this information is known, traffic generated as a result of the proposed development shall be assessed as part of the EIA. In order to demonstrate whether projected traffic exceeds the IEMA tests highlighted within section 4.9.5 below, traffic surveys would be deployed to understand baseline flows. It is unlikely that significant effects would be found however the assessment would be undertaken to demonstrate this. Therefore, traffic and transport would be scoped in as an EIA chapter, however it is expected that a full Transport Assessment is not required to support the proposed development, particularly given the significant traffic volumes experienced on the B9175 during historic operation of the fabrication yard.

#### **4.9.5 EIA Assessment Methodology**

##### **Method of Baseline Data Collection**

In order to establish the baseline traffic flows, new traffic surveys will be undertaken to supplement existing data and accident records will be sought for route within the study area. A review of the road capacities within the study area will also be undertaken by reference to the DMRB.

SYSTRA proposes to commission two automatic traffic counts (ATCs) along the B9175 and make use of publically available annual average daily traffic (AADT) flows from the Department for Transport (DfT) traffic counts and / or Transport Scotland traffic counters (along the trunk road network). The ATCs will record the traffic volumes, classifications and speeds during a neutral week for the road link(s) within the identified study area. The proposed locations for the ATC surveys are indicated by Figure 8 within Appendix A.

### **Evaluation Criteria**

In accordance with the IEMA Guidelines, the method used for assessing environmental effects of increased traffic will be based on a comparison between predicted traffic flows on potentially affected roads (i.e. the study area) with and without development traffic, in percentage terms.

Criteria are applied to the percentage increases to establish whether significant environmental effects are likely. These criteria take into account the sensitivity of the receptors likely to be affected and the magnitude of the change which can be influenced by the composition of the traffic.

The significance of the effect of receptors will therefore be evaluated against the IEMA Guidelines. These criteria are subjective but take into account the numbers of receptors affected, their sensitivity, the length of the period for which they will be affected and professional judgement. A conclusion will then be drawn as to whether the effect is Significant or Not Significant for each criteria.

The IEMA Guidelines state that projected changes in base traffic levels of less than 10% create no discernible environmental impact, given that daily variations in background traffic flow may fluctuate by this amount.

Mitigation measures will be identified and incorporated into the development proposals where an effect is deemed to be Significant (prior to any mitigation).

### **Determining the Magnitude of the Impact**

The magnitude of traffic effects is a function of existing traffic volumes, the percentage increase due to the proposals for the development, and changes in type of traffic. IEMA guidelines identify thresholds for determining the magnitude of the impact based on percentage changes in traffic levels. The magnitude of effects arising from the increase in traffic volumes is categorised as follows:

- Substantial: above 90% increase in existing traffic levels (or 70% at sensitive receptors);
- Moderate: between 60% and 90% increase in existing traffic levels (or between 40% and 70% at sensitive receptors);
- Slight: between 30% and 60% increase in existing traffic levels (or 10% and 40% at sensitive receptors); and
- Negligible: under 30% increase in existing traffic levels (or under 10% at sensitive receptors).

The determination of the magnitude of the effects will be undertaken by reviewing the characteristics of the proposed development, establishing the parameters of the road traffic that has the potential to cause an effect, and quantifying these effects against the criteria set out above.

Consideration is given to the composition of the traffic on the road network under both existing and predicted conditions. For example, cars and light goods vehicles (LGVs) have less effect on traffic and the road system than HGVs.

### **Determining the Sensitivity of the Receptor**

The sensitivity of roads to increased severance of communities and pedestrian delay and intimidation is conventionally evaluated based on the proximity and size of residential populations to each road section, in accordance with the EIA guidelines.



The IEMA guidelines do not provide specific criteria for evaluating sensitivity, however, it states:

*“For many effects there are no simple rules or formulae which define the thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed-up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact as well as the assessment of the damage to various natural resources.”*

For the purposes of this assessment, the sensitivity of the road links within the study area to changes in traffic levels will be evaluated on a scale of “low”, “medium” and “high”, based on their usage by pedestrians and cyclists and the size of communities through which the road section passes.

An EIA Chapter would then be prepared to report on all of the above.

## **4.10 Other Issues**

### **4.10.1 Introduction**

The Other Issues chapter within the EIA Report would incorporate those issues which are relevant to the proposed development however do not merit a full EIA chapter, or for those areas where a full EIA assessment has been scoped out, the chapter would summarise the ‘sub-EIA’ findings. Changes to the EIA Regulations in 2017 also included a requirement to incorporate considerations on population and human health, climate change and natural disasters

### **4.10.2 Population and Human Health**

The 2017 EIA Regulations require an examination of population and human health to be considered within EIA projects. Given the proposed development adds to an existing facility at Nigg Energy Park and will assist the local economy, it is unlikely to create significant effects, either positive or adverse, on the integrity of local population numbers.

Human health is a loose and wide term for a number of components that influence public health including pollution, amenity and opportunities gained or lost by direct land-take. Given noise assessment is scoped in to the EIA and a landscape and visual appraisal will be carried out, it is considered that the impacts upon human health can be derived from the outcomes of these assessments, and that the overall health of the local population is not likely to be significantly affected by the proposed development.

Accordingly, population and human health is scoped out of the EIA.

### **4.10.3 Climate Change**

Climate change has taken a prominent position within policy and legislation at a national level, with the Climate Change (Scotland) Act 2009 creating a long-term framework for ensuring reduction in Scottish greenhouse gas emissions of 80% by 2050.

Under Schedule 4(4), the EIA Regulations require “a description of the factors specified in 4(3) likely to be significant affected by the development...(including) climate (for example greenhouse gas emissions, impacts relevant to adaption)”. In addition, Schedule 4(5)(f) of the EIA Regulations requires a “description of the likely significant effects of the development on the environment resulting from...the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change”.

It is considered at the Scoping stage that the proposed development would not result in a significant effect upon climate given the nature of the development. Any increase in emissions created during either construction or operation is likely to be negligible, and pollution and emissions control would be discussed within a detailed Construction Environmental Management Plan (CEMP). Discussion of the vulnerability of the project to climate change is primarily concerned with the water environment, including flood risk and wave overtopping due to increases in sea level. This would be covered within impact assessment within the Water Environment and Coastal Processes chapter.

It is therefore proposed that climate change is scoped out of the EIA.

#### **4.10.4 Natural Disasters**

The proposed development is not located within an area of significant seismic activity, nor are climatic factors prone to creating disasters such as tsunamis, hurricanes or catastrophic flooding. Accordingly, consideration of natural disasters is scoped out of the EIA.

#### **4.10.5 Air Quality**

A qualitative discussion of air quality would form part of the Other Issues chapter, with particular reference to dust and its management via Construction Environmental Management Plan.

#### **4.10.6 Navigation and Vessel Movements**

Discussion of navigation would be included within the Other Issues chapter including the impacts of dredging upon vessel movements, and protocol including notices to mariners, updates of admiralty charts and exclusion areas during construction would be incorporated.

Previous studies undertaken for the South Quay development associated with vessel movements would be consulted and an assessment made of the likelihood for increased impacts as a result of the development both during construction and operation. This would closely be linked to the proposed Marine Mammal Protection Plan which is discussed within section 4.4.

#### **4.10.7 Summary of sub-EIA assessments**

The Other Issues chapter would also include a summary discussion of those technical topics which are important to include within the application but are not anticipated to have significant effects upon them, such as landscape and visual, ornithology, terrestrial ecology (and in particular the ongoing bat work) and cultural heritage. Desk based reports and assessments would be provided as appendices.

### **4.11 Schedule of Mitigation and Draft CEMP**

The EIA Report would conclude with two short chapters. The Schedule of Mitigation would highlight all mitigation that the Applicant has committed to, and often takes a tabular format for ease of reference and is split into the stage of development it is required. It is envisaged that the Schedule of Mitigation would subsequently inform a draft Construction Environmental Management Plan (CEMP) which would also be submitted alongside the application.

The draft CEMP would be closely linked to the Schedule of Mitigation and provide regulators with the site-specific details of how the mitigation measures would be implemented. Should the applications be approved, this would

then be cross-checked by the contractor and further detail added, and it is anticipated that a final CEMP would be secured by condition.

## **4.12 Cumulative Assessment**

### **4.12.1 Introduction**

It is acknowledged that there may be cumulative interactions with other terrestrial and marine based developments which are committed through the planning and marine licencing system. Planning consultants GH Johnston have advised that there are no terrestrial planning applications in the vicinity of the site that would be likely to have a cumulative interaction with the proposed development.

Three potential sites have been identified that may have cumulative interactions with the proposed development, with details as follows.

### **4.12.2 Ardersier**

Ardersier port development is located on the former McDermott Fabrication Yard, 7.5km west of Nairn and approximately 15km south of Nigg. Sand dunes and tidal mudflats are extensive to the west of the site. Whiteness Head sand spit impinges upon port access, whereby a steel-piled retaining wall was previously established until the cessation of offshore infrastructure fabrication works in 2001.

Renewal of Planning Permission in Principle and associated Environmental Impact Assessment (18/04552/PIP) were submitted to MS-LOT and Transport Scotland in October 2018 for marine construction works and dredging associated with the creation of, (i) a sheet-piled quay wall and quayside facilities; (ii) capital dredging of access and inner channels for berthing; and (iii) main port activity areas (ie. pipe-spooling, admin buildings). The Port intends to be utilised by the North Sea renewables sector. The Marine Licence has not yet been approved by MS-LOT and subsequently, contractors have yet to be appointed. Dredging works are likely to over-lap with Invergordon and Ardersier. Assessment of the potential cumulative interactions with Nigg may include:

- Navigation and vessel movements in the waters of the adjoining Moray Firth waters (ie. operational shipping schedules pertaining to Invergordon, Nigg Energy Park and Ardersier Port due to their relative proximity, and anticipated size of vessels expected inc. cruise liners, Mobile Offshore Units);
- Habitat management strategies (i.e. provision for tern, bird roosts etc) will likely remain unaffected by the Nigg development.
- Piling is to be vibration only at Ardersier, however the timing of works and potential displacement of marine mammals in conjunction with other port developments has the potential to impact upon qualifying features of the Moray Firth SAC.

Accordingly, the Marine Ecology chapter will include discussion of cumulative impacts.

### **4.12.3 Invergordon Phase 4**

Invergordon Service Base is located on the north shore of the Cromarty Firth, 11 km west of the Sutors at the mouth of the Firth. In its existing condition, the Service Base currently consists of 5 berths and Queens Dock providing 600m of berthing. The development, initiated by Cromarty Firth Port Authority (PoCF), seeks to balance the port's utility as a multi-user, multi-sector facility in keeping with the National Marine Plan (2015) objectives for the sustainable use of ports. The port has until now, been primarily been dependent upon the oil and gas sector, specifically in the Inspection, Repair and Maintenance (IRM) of Mobile Offshore Units (MOU) as well as a prominent stop on the British Isles and North Sea Cruising Circuits.

The Phase 4 project incorporates the reclamation of 4.5 ha of laydown with heavy-lift quay, which will allow for the bulk handling associated with renewables infrastructure (i.e. wind turbines and towers), multi-functioning as an onshore cruising reception and marshalling zone. The creation of Berth 6 will allow for a fully-fendered, 369m long combined quay face which will accommodate the largest liners, to the west of the base. Assessment of the potential cumulative interactions with Nigg, would likely include consideration of;

- Navigation and vessel movement in and around the firth (i.e. construction vehicles, vessels and plant and operational shipping movements);
- Water Quality and Coastal Processes (i.e. sedimentation, alteration to bathymetry, contamination from construction vessels);
- Benthic and Fish (i.e. sedimentation of sea bed and/or water column leading to potential smothering of benthic habitats, poor visibility and/or disturbance of foraging/migratory behaviour in fish);
- Marine Mammals (i.e. piling during construction have the potential to produce sediment plumes and auditory injury from underwater noise); and
- Airborne Noise (i.e. cumulative impacts of concurrent construction works, specifically dredging and piling)

Consideration of these factors would be included within the appropriate EIA chapters.

#### **4.12.4 Nigg Bay Aberdeen**

Nigg Bay is located within the city of Aberdeen, on Scotland's east coast. The proposed new harbour facility will be south-east of the existing harbour at Bay of Nigg, Aberdeen. Aberdeen Harbour Trust Port have commissioned the harbour expansion in response to the case for growth in respect of increased size of offshore support vessels and anticipated opportunities in decom, increased cargo vessel size and general growth in the cargo sector; and demand for multi-user berthing and maintenance space. New components proposed include:

- dredging to 9m and 10.5m of existing bay and east quay
- provision of 1500m of new quay and associated support infrastructure (solid walls and suspended decks)
- reclaiming land from dredge uprisings
- construction development areas (i.e. for bulk commodities)

Works commenced in 2017 and are expected to be completed by 2020. Construction works are expected to impact upon navigation and vessel movements in and around the harbour. Anticipated piling, drilling and blasting have the potential to impact upon marine mammals in terms of displacing protected species of the Moray Firth SAC and therefore cumulative interactions would require to be considered in terms of marine mammal protection, including working protocols.

## **5 CONTENT AND STRUCTURE OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

### **5.1 Content and Structure**

Following the rationale set out within the above sections, it is proposed that the final EIAR is set out within the following structure:

- Volume 1: EIA Report, containing:
  - Chapter 1: Introduction
  - Chapter 2: EIA Methodology and Scoping
  - Chapter 3: Proposed Development
  - Chapter 4: Marine Ecology
  - Chapter 5: Noise
  - Chapter 6: Water Environment and Coastal Processes
  - Chapter 7: Traffic and Transport
  - Chapter 8: Other Issues
  - Chapter 9: Schedule of Mitigation
  - Chapter 10: Conclusions
- Volume 2: Figures, containing relevant supplementary figures and drawings relevant to Volume 1 chapters;
- Volume 3: Technical Appendices, including reports and technical background documents which support the main assessments contained within Volume 1; and
- A standalone Non-Technical Summary (NTS).

## 6 CONCLUSIONS

It is anticipated that the proposed development as described will fall under Schedule 1 of both the TCPA EIA Regulations and the Marine EIA Regulations. Accordingly it is appropriate to request a Scoping Opinion from both the Highland Council and MSLOT under both Regulations. Sufficient baseline information has been provided regarding the proposed development and the surrounding and receiving environment upon which to base a decision.

The information and methodologies contained within this report allow the Council, MSLOT and other consultees to advise and approve the scope of work and add relevant information and guidance as required. We would be very grateful to receive a Scoping Opinion within the 35 day statutory period and are committed to working with all consultees to deliver a proportionate and robust EIA which benefits the area.

For the benefit of doubt, the environmental topics to be scoped in to the EIA Report are as follows:

- Marine Ecology (including underwater noise);
- Airborne Noise;
- Water Environment and Coastal Processes;
- Traffic and Transport;
- Other Issues (including summaries of those elements scoped out but where sub-EIA work has been required, navigation and vessel movement); and
- Cumulative assessment as appropriate.

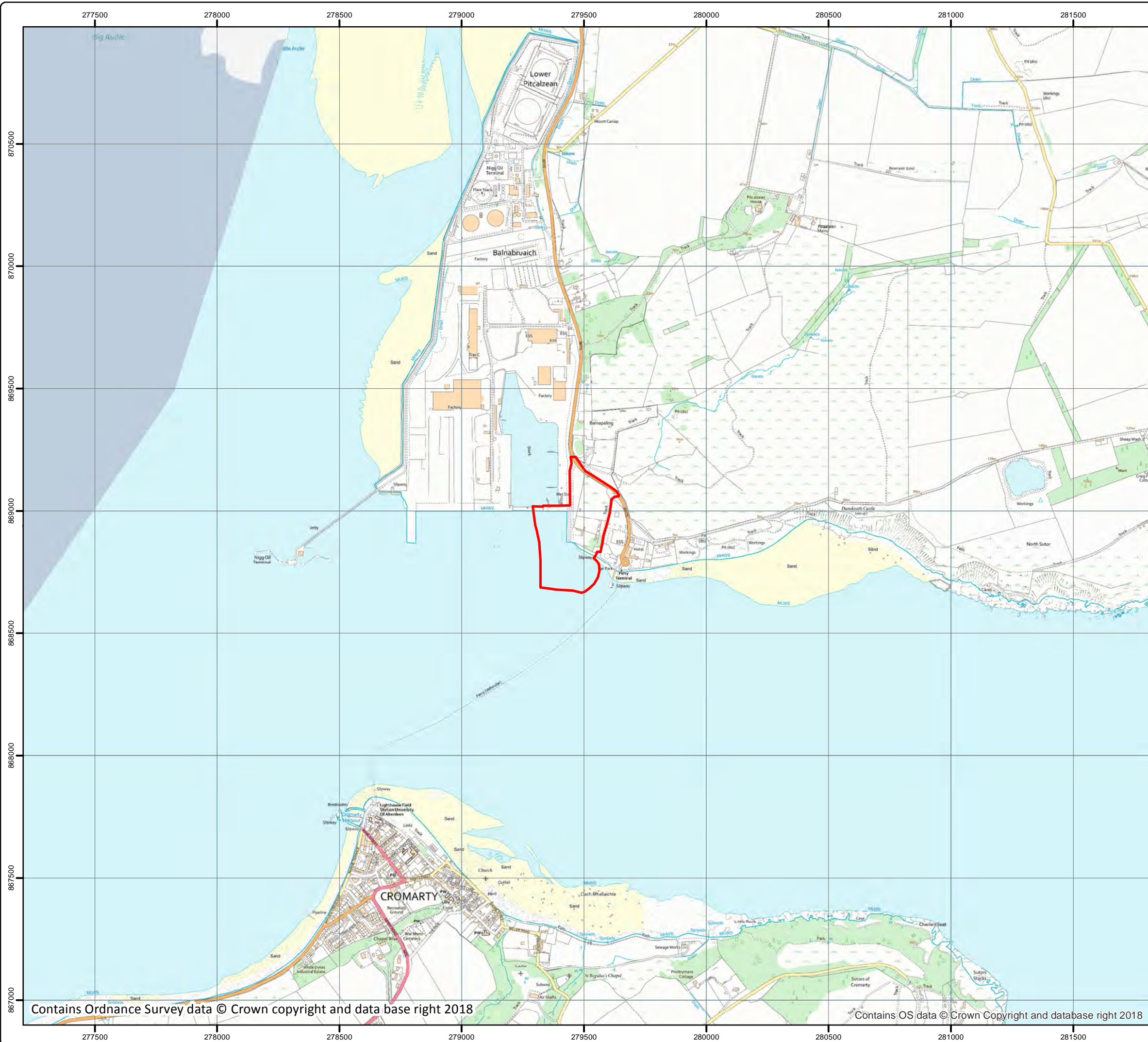
The environmental topics that are proposed to be scoped out of full EIA assessment are:

- Landscape and Visual – however a sub-EIA appraisal will be carried out and summarised within the Other Issues chapter (see section 4.4);
- Cultural Heritage and Archaeology – however a desk based assessment would be provided at a sub-EIA level and summarised within the Other Issues chapter (see section 4.5);
- Terrestrial Ecology – however a bat report will be submitted with the application and summarised within the Other Issues chapter;
- Ornithology – however a desktop assessment will be carried out and summarised within the EIA chapter;
- Air Quality; and
- Natural Disasters, Climate Change and Population and Human Health.

## **APPENDICES AND DRAWINGS**

## **A      FIGURES**





Legend

Site Boundary

Do not scale this map

Client

Global Energy Nigg Limited

Project

Nigg East Quay

Title

Figure 1 - Site Location Plan

Status

FINAL

Drawing No.

671906-001

Revision

Scale

1:15,000

A3

Date

12 Feb 2019

Drawn


SMC

Checked

JEP

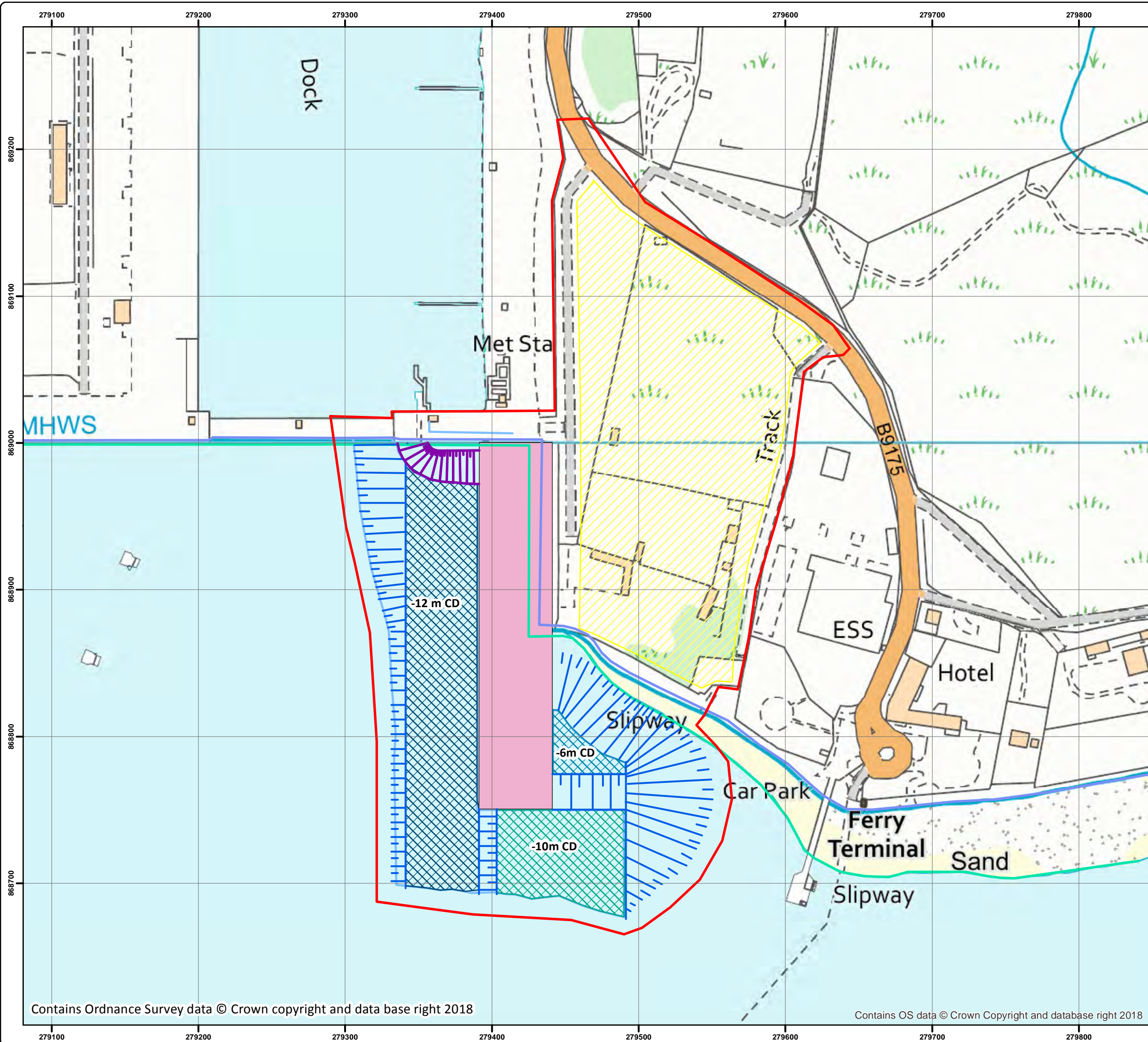
Approved

MH



Craighall Business  
Park, Eagle Street,  
Glasgow, G4 9XA  
Tel: 0141 341 5040  
Fax: 0141 341 5045





Legend

Site Boundary

Proposed East Quay

Do not scale this map

Client

Global Energy Nigg Limited

Project

Nigg East Quay

Title

Site Layout Plan

Status

FINAL

Drawing No.

671906-002

Revision

Scale

1:2,500

A3

Date

12 Feb 2019

Drawn

EQ

Checked

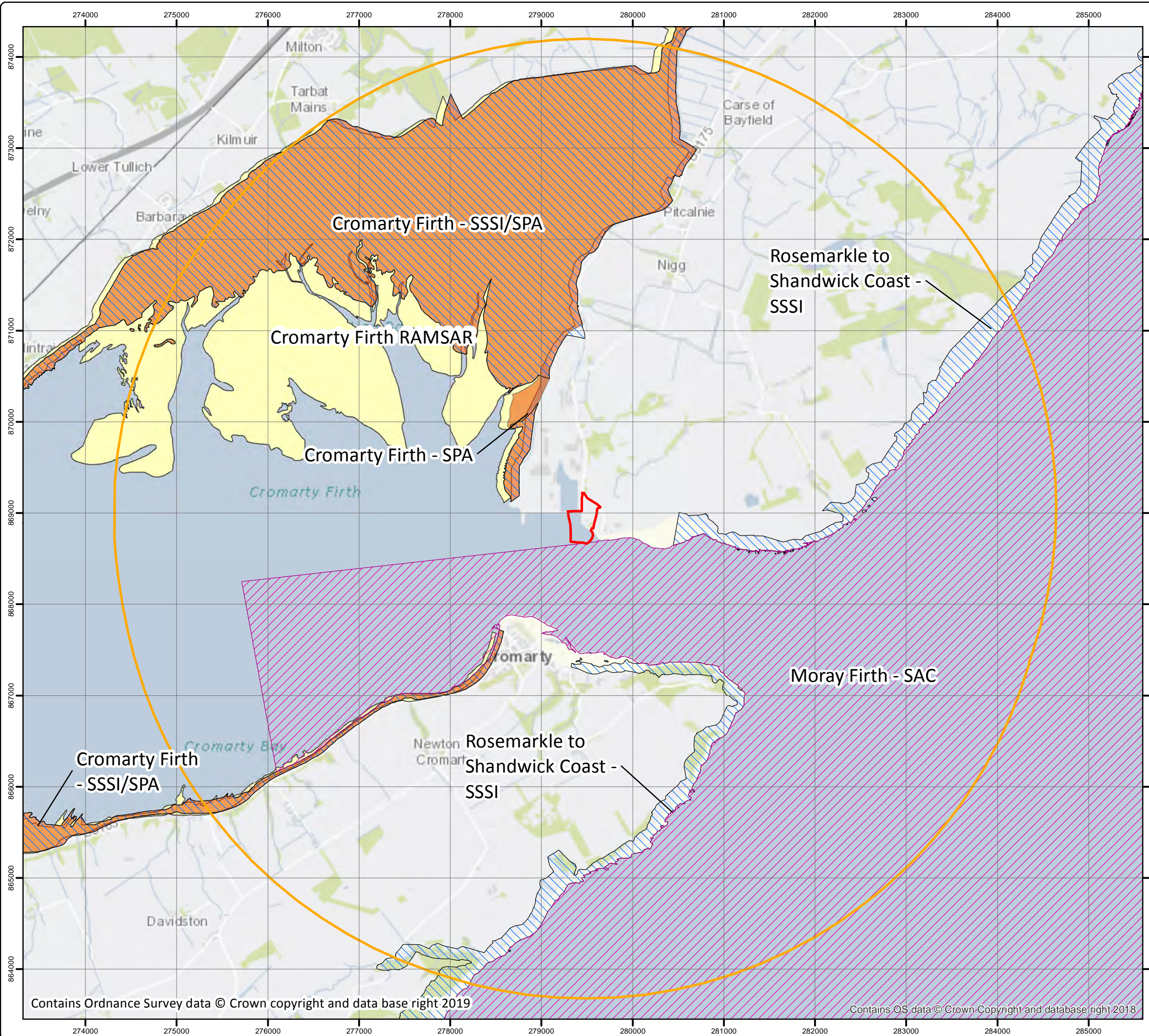
SMC

Approved

CP

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Fax: 0141 341 5045





**Legend**

- Site Boundary
- 5km Buffer
- Special Areas of Conservation
- Sites of Special Scientific Interest
- Special Protection Areas
- RAMSAR Site

Do not scale this map

Client	Global Energy Nigg Limited	
Project	Nigg East Quay	
Title	Figure 3 - Environmental Designations	
Status	FINAL	
Drawing No.	671906-003	Revision
Scale	1:40,000	A3
Drawn	SMC	Checked JEP
Date	12 Feb 2019	
Approved	MH	

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Legend

- Site Boundary
- TargetNote

JNCC Phase 1 Habitat Code

- A2.1 Dense/Continuous Scrub
- A2.2 Scattered Scrub
- A3.1 Parkland/Scattered Broad-leaved Trees
- B2.2 Neutral Semi-Improved Grassland
- B4 Improved Grassland
- C3.1 Tall Ruderal Vegetation
- H1.1 Intertidal Mud/Sand
- H3 Shingle above High Tide Mark
- H6.5 Dune Grassland
- H6.8 Open Dune - Grey Dune
- J1.3 Ephemeral/Short Perennial
- J2.4 Fence
- J2.5 Wall
- J3.5 Sea Wall
- J3.6 Building
- J4 Bare Ground
- J5 Other Habitat

Do not scale this map

Client

Global Energy Nigg Limited

Project

Nigg East Quay

Title

Figure 4 - Phase 1 Habitat Survey Map

Status

FINAL

Drawing No.

671906-004

Revision

Scale

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A3

Date

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Drawn

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Checked

JEP

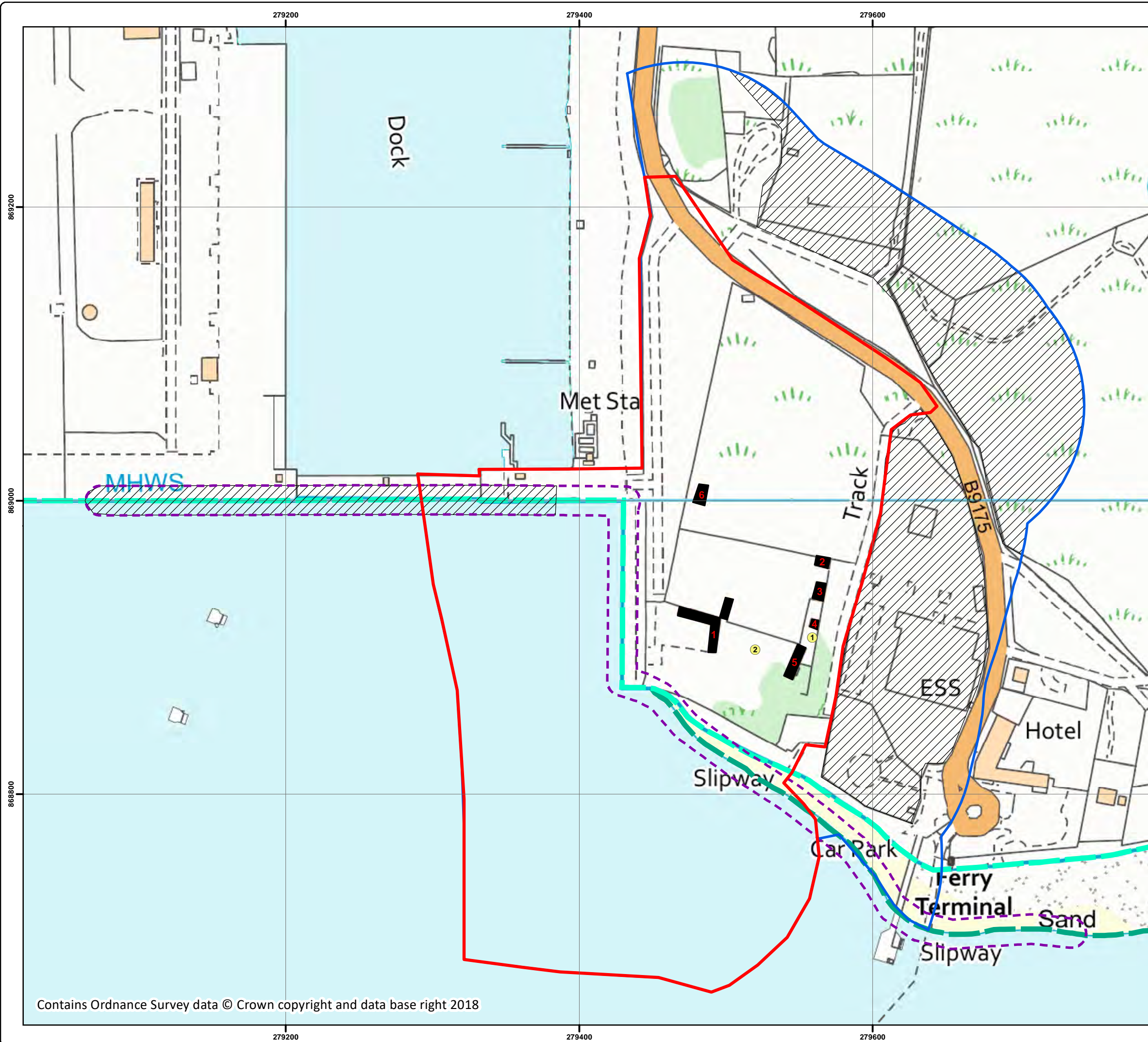
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Legend

- Site Boundary
- 100m Survey Buffer
- 250m Survey Buffer
- Inaccessible Areas
- Buildings
- Trees With Potential Roost Features
- MHWS
- MLWS

Do not scale this map

Client  
Global Energy Nigg Limited

Project  
Nigg East Quay

Title  
Figure 5 - Protected Species Survey Area

Status  
FINAL

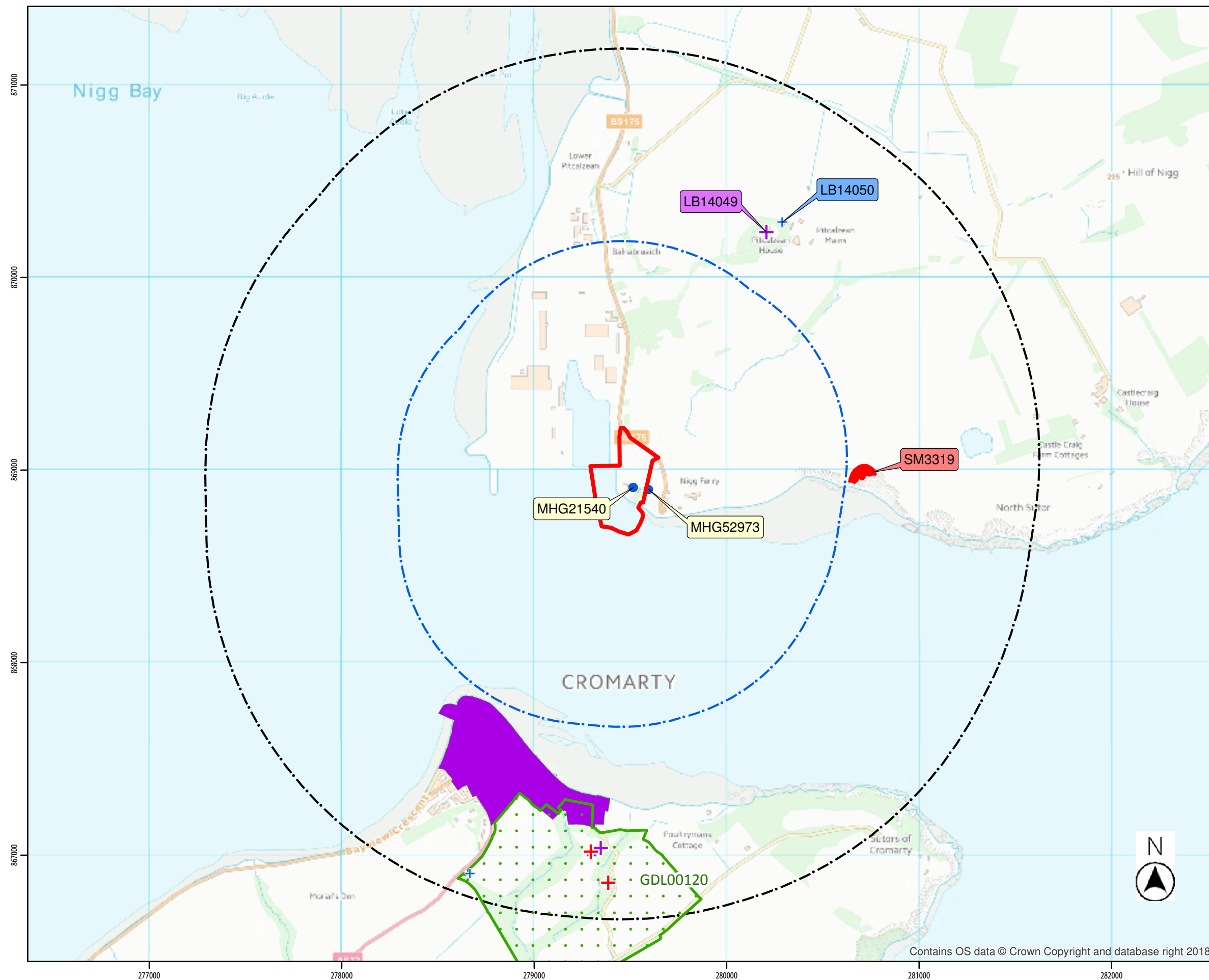
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Drawn JEP	Checked JEM	Approved CP
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KEY

- ▬ Site Boundary
- Non-Designated Heritage Asset
- + Category A Listed Building
- + Category B Listed Building
- + Category C Listed Building
- Scheduled Monument
- ▭ Inventory Garden and Designed Landscape
- Conservation Area
- · - · - 2km Radius
- · - · - 1km Radius

Non-designated heritage asset information derived from NRHE data via Pastmap website dated 2019 © Crown Copyright

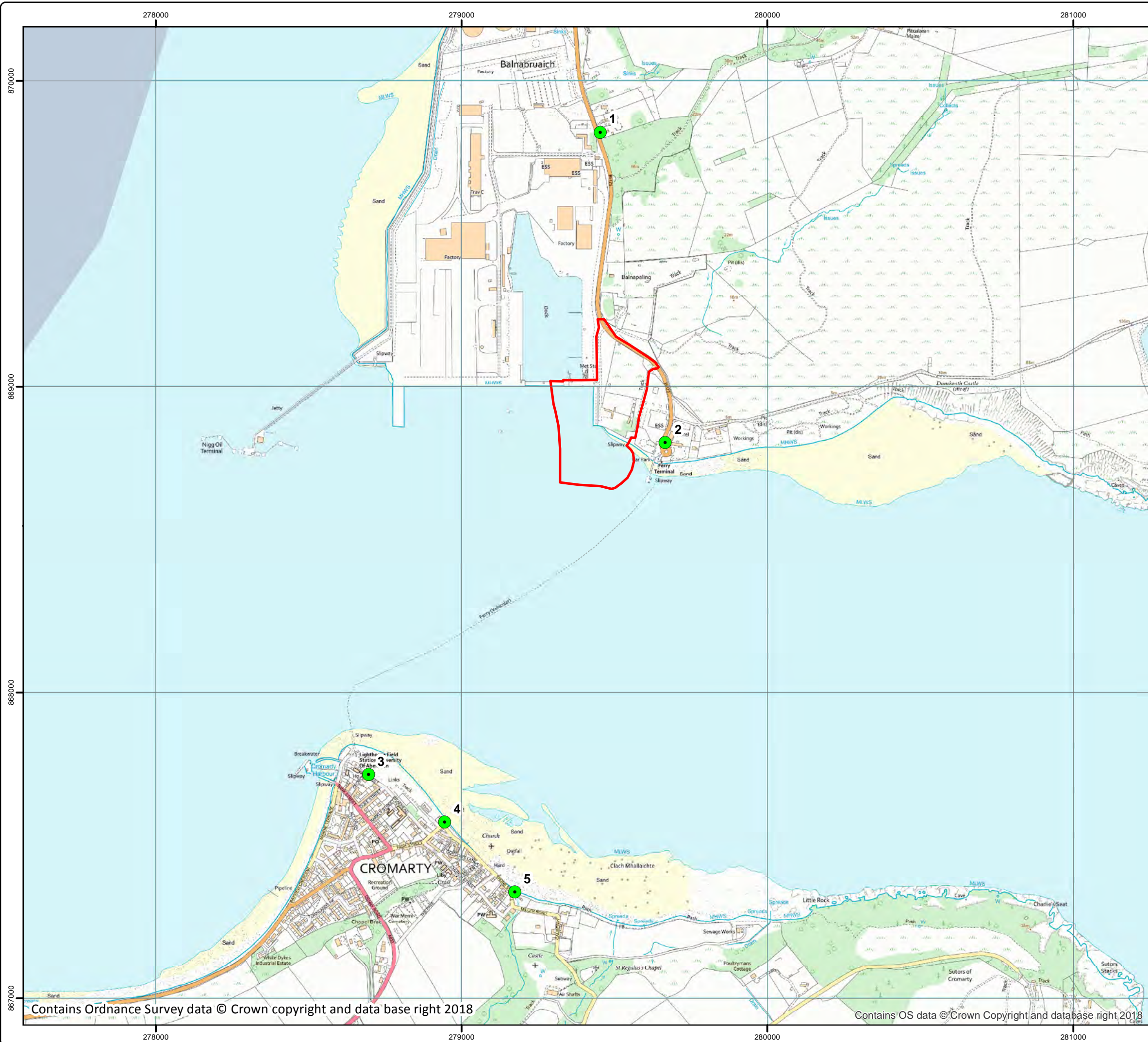
Designations area information derived from Historic Environment Scotland data dated 8/1/19. © Crown Copyright. All rights reserved 2019.

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0 125 250 500 m



**Figure 6**  
Heritage Assets within Site and Study Area





Legend

Site Boundary

Noise Monitoring Locations

Do not scale this map

Client

Global Energy Nigg Limited

Project

Nigg East Quay

Title

Figure 7 - Noise Monitoring Locations

Status

FINAL

Drawing No.

671906-007

Revision

Scale

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A3

Date

12 Feb 2019

Drawn

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Checked

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Approved

CP

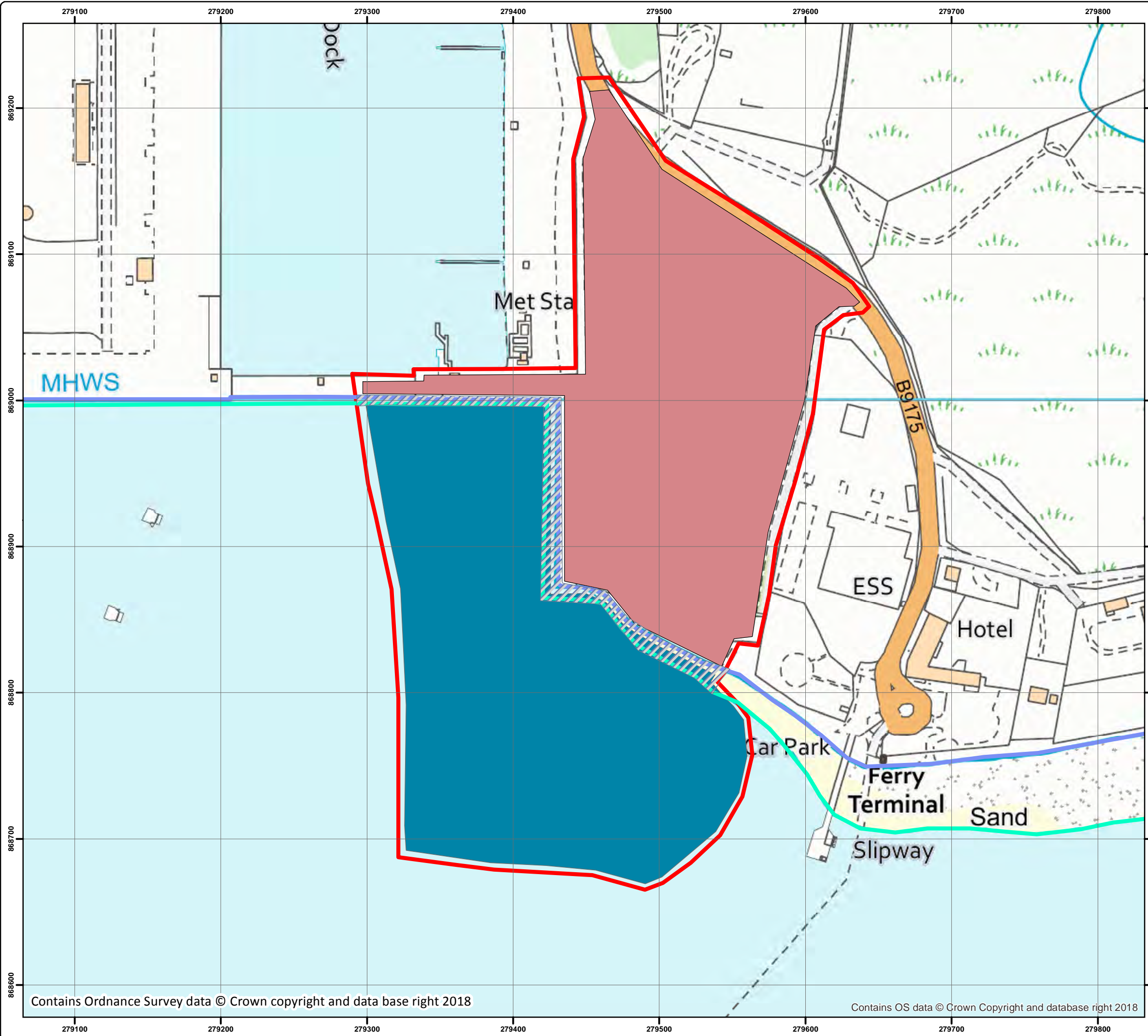
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<p>Key:</p> <p>● - ATC Locations</p> <p style="text-align: right;">   N </p>				
<p>SYSTRA Ltd  124 St Vincent Street  Glasgow  G2 5HF</p> <p style="text-align: right;"><b>SYSTRA</b></p>				
<p>Project:</p> <p style="text-align: center;">Nigg East Quay EIA Scoping Report</p> <p style="text-align: center;">Figure 8: Proposed ATC Locations</p>				
Date:	Scale:	Drawn by:	Checked by:	Approved by:
Jan '19	N.T.S	SM	BF	SL
DWG No: 108490/I/ATC/001				Rev: A





Site Boundary

Town and Country Planning (above MLWS)

Marine Scotland Licencing (below MHWS)

Intertidal Zone (overlapping of consenting boundaries)

MLWS

MHWS

Do not scale this map

Client

Global Energy Nigg Limited

Project

Nigg East Quay

Title

Figure 8 - Consenting Plan

Status

FINAL

Drawing No.

671906-009

Revision

Scale

1:2,500

A3

Date

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## **B PHASE 1 HABITAT AND PROTECTED SPECIES SURVEY**



## **Nigg East Quay**

### **Appendix B: Phase 1 Habitat & Protected Species Survey**



**February 2019**

# Nigg East Quay

## Appendix B: Phase 1 Habitat & Protected Species Survey

Client: Global Energy Nigg Bay

Document number: 8527

Project number: 671906

Status: Final

Author: Jennifer Paterson

Reviewer: Joanne Martindale and Kathy Dale

Date of issue: 12 February 2019

Filename: K:\671906 - Nigg East Quay EIA\300 - Ecology and Ornithology\340 - Ecology Reporting\Issued

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This report has been prepared by EnviroCentre Limited with all reasonable skill and care, within the terms of the Contract with Global Energy Nigg Bay ("the Client"). The report is confidential to the Client, and EnviroCentre Limited accepts no responsibility of whatever nature to third parties to whom this report may be made known.

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## EXECUTIVE SUMMARY

EnviroCentre Limited was commissioned by Global Energy Nigg Limited to undertake a Phase 1 Habitat and Protected Species Surveys of Nigg East Quay located approximately 1.5km north of Cromarty in the town of Nigg, Cromarty Firth.

The key aim of this survey is to establish an ecological baseline for the site and to allow further ecological surveys required to be identified and appropriately designed.

No statutory designated site, non-statutory designated site or ancient woodland are present within the site.

A total of 17 Phase 1 Habitat types, including boundary features, were identified on the site and consist of habitats such as scrub, improved grassland, semi-improved grassland, dune grassland, open dune, ephemeral/short perennial, tall ruderal vegetation, intertidal sand, shingle, sea wall, bare ground, scattered trees, buildings and fencing. Commuting and foraging habitat was assessed as low due to isolated features which bats may utilise, that lack good connection to suitable habitat in the wider environment.

Two trees with Potential Roost Features (PRFs) were identified within the site and assessed as negligible and low for roosting bats. Six buildings exist within the site, however one is not involved in any works. The five buildings were assessed as low potential for hibernating and roosting bats due to PRFs and features.

No evidence of otter was identified during the survey, however suitable habitat exists within the site for otter and the desk study results highlight that they have been noted in the wider area.

No evidence of badger was identified and a lack of suitable habitat for foraging, commuting and sett creation is available.

Ecological data is considered valid for a period of 12 months. Providing that ground works commence before December 2019 then no further update to the baseline data in relation to these species is considered necessary other than pre-works checks. If the site boundary was to change, further survey work for these protected and notable species may be required.

Further surveys which are ongoing as part of the baseline ecological assessment include:

- Hibernation surveys of the five buildings within the site completed over two visits, one in mid-January and one in mid- February, which will also include a detailed internal inspection of PRFs.
- One bat activity survey carried out on each building, in the bat activity season (May-August) to determine the presence/absence of summer roosting bats.
- Elevated inspection of ivy covered tree if it is to be felled or subjected to arboricultural operations to facilitate development, prior to works commencing.

**The requirement for a licence from Scottish Natural Heritage to disturb or destroy a bat roost will need to be re-assessed following the above surveys.**

No building demolition or vegetation removal should be scheduled to occur during the bird breeding season (March-August), otherwise a nesting bird survey may need to be undertaken as suitable habitat exists for nesting birds.

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# **1 INTRODUCTION**

## **1.1 Terms of Reference**

EnviroCentre Limited was commissioned by Global Energy Nigg Limited to undertake Phase 1 Habitat and Protected Species Surveys of Nigg East Quay located approximately 1.5km north of Cromarty in the town of Nigg, Cromarty Firth. The proposal comprises the construction of a new quay and associated dredging in addition to the creation of an extensive laydown area from adjacent countryside at Dunskeath House.

The 'site' is defined as the area demarcated by the red line boundary as shown in Appendix A. The 'survey area' constitutes the area of the 'site' plus appropriate buffers.

The results and recommendations in this document relate to the site boundary as provided by the client in December 2018.

## **1.2 Scope of Report**

The key aim of these surveys is to establish an ecological baseline for the site to inform further assessment and surveys for the development proposals.

The main objectives are as follows:

- Identify and map the broad habitats present on the site;
- Search for field evidence of a range of protected or notable faunal species which may frequent the survey area;
- Identify suitable habitat for protected or notable faunal species in the survey area; and
- Make recommendations for any further survey and/or species licensing requirements.

## **1.3 Site Description**

The site is situated south east of the Nigg Energy Park at an elevation of 5m above sea level and is centred at Ordnance Survey Grid Reference (OSGR) NH 79527 69016. The site is dominated by bare ground with areas of dense and scattered scrub, grassland, tall ruderal vegetation and broadleaved trees. Sand and shingle above the high tide mark are also present in the south of the site and a sea wall exists in the west. The site extends into the Moray Firth which meets the Cromarty Firth south west of the site. The village of Nigg is located north of the site beyond arable and grassland fields, and the B9175 forms the northern site boundary. In the wider area woodland, grassland and scrub are located to the north and east, whilst the Moray Firth and Cromarty Firth are present to the south and west respectively.

On arrival at the site, it was noted that works had previously been undertaken within the site boundary, as a large proportion of the site was disturbed and covered in rubble and gravel.

## **1.4 Legislation, Policy and Guidance**

European and national legislation and national and local policy relevant to this report includes:

- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- The Wildlife and Countryside Act 1981 (as amended) (WCA);



- The Nature Conservation (Scotland) Act 2004;
- The Wildlife and Natural Environment (Scotland) Act 2011 (WANE);
- Water Framework Directive (WFD) 2000/60/EC;
- The Protection of Badgers Act 1992 (as amended by the WANE Act 2011);
- British Standard BS 42020:2013 Biodiversity – Code of practice for planning and development;
- The Scottish Biodiversity Strategy;
- Scottish Planning Policy (2014);
- Highland Biodiversity Action Plan (HBAP) (2015);
- Highland-Wide Local Development Plan (HWLDP) (2012); and
- The Ross and Cromarty (East) Biodiversity Action Plan (RCBAP) (2004).

A summary of protected species legislation is provided in Appendix B.

## **1.5 Report Usage**

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre.

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## 2 METHODS

### 2.1 Desk Study

In order to anticipate the potential ecological sensitivities at the site, a desk study was conducted in advance of the field studies in December 2018. The following sources were checked:

- Scotland's Environment Web (SEW) (The Scottish Government, n.d.) and Scottish Natural Heritage (SNH) Sitelink website (SNH, n.d.) for statutory designated sites up to 5km from the site;
- The HWLDP (THC, 2012) (up to 2km from the site) for non-statutory designated sites up to 2km from the site;
- Ancient woodland and Scottish native woodland locations available through SEW (up to 2km from the site);
- The Highland Biological Recording Group (HBRG) (up to 2km from the site) for species records;
- The UK Biodiversity Action Plan (UKBAP) (JNCC, n.d.) for National (UK) Priority Habitats and Species;
- The Scottish Biodiversity List (SBL) (Scottish Government, 2013) for National (Scotland) Priority Habitats and Species;
- The HBAP (Highland Environmental Forum, 2015) and RCBAP (Ross & Cromarty (East) Biodiversity Group, 2004) for Local Priority Habitats and Species;
- National Biodiversity Network (NBN) Atlas (NBN Atlas Scotland Partnership, 2017) for records of species (up to 2km from the site); and
- Aerial imagery from Google Earth (Google, 2015).

### 2.2 Field Survey

Guided by the results from data searches, the following relevant species groups were focussed upon:

- Plants;
- Bats;
- Otter;
- Badger;
- West European hedgehog;
- Brown hare; and
- Birds.

All field survey work was undertaken by experienced and competent ecologists, who are members of the Chartered Institute of Ecology and Environmental Management (CIEEM). The surveys were designed using the guidelines endorsed by SNH and CIEEM (CIEEM, 2013a, 2013b, n.d.). The surveys focussed on plants and habitats on the site and those faunal species that are most likely to be found in the habitats which make up the landscape in and around the site. The survey was undertaken on the 18<sup>th</sup> and 19<sup>th</sup> December 2018. For the duration of the survey the weather conditions were dry with a light easterly breeze. The Phase 1 Habitat and Bat Potential Roosting Feature (PRF) surveys were undertaken on 18<sup>th</sup> December 2018 when conditions were cloudy and overcast. The otter survey was undertaken on 19<sup>th</sup> December 2018 when conditions were dry and sunny. Visibility was good throughout all surveys and the air temperature was measured at 9°C.

This section provides details of the methods adopted in the survey areas described in Table 2-1.

**Table 2-1: Survey Areas**

Habitat/Species/Species Group	Survey Area
Phase 1 Habitat	Within site boundary
Bats	Site plus 50m survey buffer
Otter	Site plus 250m survey buffer upstream and downstream
Badger	Site plus 100m survey buffer
West European hedgehog	Site plus 50m survey buffer
Brown hare	Site plus 50m survey buffer
Birds	Within site boundary

### 2.2.1 Phase 1 Habitat Survey

A Phase 1 Habitat Survey is a method that rapidly records vegetation and wildlife habitat over large areas. The information is used to identify ecologically sensitive features, inform additional species surveys and, ultimately, recommend mitigation and enhancement measures in connection with a proposed development.

The Phase 1 Habitat Survey was undertaken according to the standard Joint Nature Conservation Committee method (JNCC, 2010) and was used to determine the presence of any Annex I habitat types included in the appropriate UK Biodiversity Action Plan (BAP) priority habitats.

### 2.2.2 Groundwater Dependent Terrestrial Ecosystems

The Functional Wetland Typology (SNIFFER, 2009) was used to aid identification of wetland habitats that derive their water from groundwater and surface water. This information is useful in identifying if and where further surveys are required to identify the presence and potential sensitivity of Groundwater Dependent Terrestrial Ecosystems (GWDTEs). To help assess ground water dependency, observations of local topography, underlying geology, and features such as springs, diffuse ground water emergence and floristic indicators of base enrichment were made.

## 2.3 Invasive Non-Native Species

The survey included a check for the presence of any invasive non-native species (INNS) including but not limited to the following:

- Japanese knotweed (*Fallopia japonica*);
- Giant hogweed (*Heracleum mantegazzianum*); and
- Himalayan balsam (*Impatiens glandulifera*).

### 2.3.1 Bats

A survey was undertaken in accordance with the criteria set out by the Bat Conservation Trust (BCT) (The Bat Conservation Trust, 2016). The suitability of roosting, commuting and foraging habitats was classified according to the criteria in Table 2-2.

Six buildings are present on the site. One of the buildings is being retained and will not undergo any renovation works, therefore no assessment has been undertaken of that building (see building 6 detailed in Appendix D).

Internal inspections were not completed on the buildings for health and safety reasons, due to uncertainties regarding their structural integrity and the presence of asbestos.

**Table 2-2: Suitability Classification of Roosting, Commuting and Foraging Habitats for Bats**

Suitability	Roosting Features	Foraging and Commuting Habitats
<b>High</b>	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	<p>Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edges.</p> <p>High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>The site is close to and connected to known roosts.</p>
<b>Moderate</b>	A structure or tree with one or more potential roost sites that could be used by bats due their size, shelter, protection, conditions and/or surrounding habitat but unlikely to support a roost of high conservation status.	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
<b>Low</b>	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis; or A tree of sufficient size and age to contain potential roost features but with none seen from the ground; or features seen with only very limited roosting potential.	<p>Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated.</p> <p>Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree or a patch of scrub.</p>
<b>Negligible</b>	A structure or a tree with negligible features likely to be used by roosting bats.	Negligible habitat features likely to be used by foraging or commuting bats.

Potential Roosting Features (PRFs) in trees and structures commonly utilised by roosting bats are listed in 2-3 below.

**Table 2-3: PRFs in Trees and Structures Frequently Used by Bats for Roosting**

PRFs in trees frequently used as bat roosts	Access points in structures frequently used as bat roosts	Frequently used roosting locations in structures
Hollows and cavities from woodpecker, rot and knot holes Hazard beams and other vertical or horizontal cracks and splits in stems or branches	Gaps in windowsills and window panes Underneath peeling paintwork or lifted rendering	Top of chimney breasts, gable ends and dividing walls All beams and roof beams (ridge, hip etc.)
Partially detached plated bark	Behind hanging tiles, weatherboarding, eaves, soffit boxes, fascias and lead flashing	Junction of timber joints, mortise and tenon joints
Cankers, included bark and compression forks with potential cavities	Under tiles and slates	Behind purlins
Partially detached ivy with stem diameters in excess of 50mm	Gaps in brickwork and stonework	Between tiles/slates and the roof lining
Bat or bird boxes	Gaps in rendering behind gutters	Under flat roof materials

### 2.3.2 Otter

The otter survey was undertaken along the Cromarty Firth, situated within the south of the site, plus a 250m buffer upstream and downstream, following best practice guidelines (Chanin, 2003), and aimed to identify suitable otter habitat and field signs, including:

- Spraints (otter faeces/droppings used as territorial signposts. Often located in prominent positions and can be placed on deliberate piles of soil or sand). Three categories are used for describing otter spraint: Dried fragmented (Df); Dried intact (Di); and Not fully dry (Nd);
- Footprints;
- Feeding remains (can often be a useful indication of otter presence);
- Paths/slides (otter can often leave a distinctive path from and into the watercourse);
- Holts (underground shelter) are generally found:
  - Within trees roots at the edge of the bank of a river;
  - Within hollowed out trees;
  - In naturally formed holes in the river banks that can be easily extended;
  - Or preferably in ready-made holes created by other large mammals such as badger setts, rabbit burrows or outlet pipes; and
- Couches/lay-ups (couches or lay-ups are places for lying up above ground are usually located near a watercourse, between rocks or boulders, under dense vegetation).

In order to assess their importance, the status of otter resting sites was assigned from Low to High according to Table 2-4 below (Bassett & Wynn, 2010).

**Table 2-4: Status of Otter Resting Sites**

Resting Site Status	Definition
Low	Feature with limited evidence of otter activity – low number of spraints, not all age classes present. Insufficient seclusion to be a breeding site or key resting site, unlikely to have links to the key otter requirements. Most likely to provide a temporary 'stop off' for otters when moving through their territory. Loss/disturbance of such a feature is unlikely to be significant in terms of the individual or population.

Resting Site Status	Definition
Moderate	Feature containing sprainting with a range of age classes, but not in significant quantities. Availability may be limited by season, tides or flow. Unlikely to be suitable as a breeding/natal site but will be a key resting site and may be linked to other important features within the territory. The impact arising from a loss or disturbance of such a feature will be determined by the availability of more suitable or well used sites within the otter's territory.
High	Feature has a high level of otter activity, including an abundance of sprainting of all age classes, large spraint mounds, well used grooming hollows, paths and slides. Affords a high degree of cover and is linked to key features such as fresh water and abundance of prey. May be suitable as a breeding area (spraints may be absent from natal holts). The site is usually available at all times of year and at high and low tide/flow. The loss/ disturbance of such a feature will often be considered significant in terms of the individual or population.

### 2.3.3 Badger

A badger survey was undertaken in suitable and accessible habitat within the site and a survey buffer of 100m, with reference to the methodology described by (Scottish Badgers, 2018). The Quay, west of the site and Cromarty/Moray Firth south of the site boundary are deemed unsuitable for badger and were therefore not surveyed for badger. The survey aimed to identify the following field evidence:

- Setts (any structure or place, which displays signs indicating current use by badger/located within an active badger territory as defined by the standard guidance);
- Day beds (above ground areas where badgers sleep, characterised by flattened vegetation or bundles of grass);
- Badger paths (network of paths generally linking setts to foraging habitat);
- Footprints;
- Guard hair;
- Foraging signs such as diggings or snuffle holes (badgers use their snout to turn over vegetation or soft soil to forage for bulbs and invertebrates);
- Scratching posts (marks on tree trunks/ fallen trees where badgers have left claw marks);
- Breach points (gaps in fences or crossing points over roads);
- Dung pit (single faeces deposit placed in a small excavation); and
- Latrines (collection of faecal deposits often used by badger clans to mark home range boundaries).

Setts were categorised as follows (Scottish Badgers, 2018):

- Main sett: Numerous entrances, large spoil heaps, active and with well-used paths. One per social group.
- Annex setts: Numerous entrances and well used paths leading to the main sett nearby. Not always in use.
- Subsidiary setts: Variable number of entrances not connected to other setts by obvious path. Not always used.
- Outlier setts: one or two entrances, no defined paths. Used sporadically.

Suitable foraging habitat was categorised with reference to SNH approved guidance (Scottish Badgers, 2018):

- Primary foraging habitat (short grazed or mown grassland and broadleaved woodlands); and
- Secondary foraging habitat (arable land, rough grassland, scrub and mixed woodland).

### 2.3.4 West European Hedgehog

The suitability of the habitats for hedgehog was assessed according to guidance (The Mammal Society, 2012) Suitable habitats include:

- Grazed pastureland separated into small fields by hedgerows;
- Deciduous woodland copses (oak, beech);
- Overgrown verges or margins; and
- Suburban gardens, woodpiles or parklands.

### 2.3.5 Brown Hare

Guidance (The Mammal Society, 2012) was used to identify direct evidence of brown hare and to assess the suitability of the habitat for brown hare as follows:

- Direct sightings;
- Suitable habitat: lowland, mixed arable, hayfields and pasture land with hedgerows and field margins;
- Forms (resting places): typically beside a tuft of grass or rushes or a shallow scrape in soil, on a gentle slope with a good view ahead; and
- Droppings: hard round or slightly flattened pellets, about 1cm across, usually straw to mid brown coloured, scattered in small quantities or singular.

### 2.3.6 Birds

Habitats within the survey area were assessed for their suitability to support breeding and over wintering birds. Observations of birds were noted during the survey.

## 2.4 Constraints

### 2.4.1 Desk Study

It should be noted that the desk study is limited by the reliability of third party information and the geographical availability of biological and/or ecological records and data. This emphasises the need to collate up-to-date, site-specific data based on field surveys by experienced surveyors. The absence of species from biological records cannot be taken to represent actual absence. Species distribution patterns should be interpreted with caution as they may reflect survey/reporting effort rather than actual distribution.

### 2.4.2 Field Study

The Phase 1 Habitat Survey was undertaken outside the main flowering plant season (May-September). This is unlikely to change the habitat assessment on site, however, some flowering species within these areas would not have been visible due to these constraints.

Sections of the 100m survey buffer, west of the site, could not be accessed due to security fencing around the quay making it inaccessible (see Appendix D). Sections of the 100m survey buffer north and east of the site could not be accessed due to the presence of livestock in fields and private residential buildings with associated gardens. Binoculars were used to survey inaccessible areas where possible, however, some field signs would not have been visible due to these constraints.

A section of the upstream 250m survey buffer for the otter survey could not be directly accessed due to the quay being inaccessible. Binoculars were utilised to search for any signs of otter, however, field signs would not have been visible due to these constraints

### 3 BASELINE ECOLOGICAL CONDITIONS

#### 3.1 Statutory Designated Sites

No statutory designated sites are present within the site boundary. However, three designated sites are present within a 5km radius of the site as detailed in Table 3-1.

**Table 3-1: Statutory Designated Sites**

Site Name	Designation <sup>1</sup>	Distance and Orientation	Features	Ecologically Connected to the Site
Moray Firth	SAC	Adjacent to site	Subtidal sandbanks, bottlenose dolphin ( <i>Tursiops truncatus</i> ) and aggregations of non-breeding birds, including Common Scoter ( <i>Melanitta nigra</i> ), Eider ( <i>Somateria mollissima</i> ), Goldeneye ( <i>Bucephala clangula</i> ), Great Northern Diver ( <i>Gavia immer</i> ).	Via the marine environment
Cromarty Firth	RAMSAR/SSSI /SPA	Approx. 0.59km west	Intertidal mudflats and sandflats, non-breeding birds, including Bar-Tailed Godwit ( <i>Limosa lapponica</i> ), Greylag Goose ( <i>Anser anser</i> ), Red-Breasted Merganser ( <i>Mergus serrator</i> ), Redshank ( <i>Tringa totanus</i> ), Curlew ( <i>Numenius arquata</i> ), Dunlin ( <i>Caladris alpina</i> ) and other waterfowl assemblage and breeding birds including Common Tern ( <i>Sterna hirundo</i> ).	Via the marine environment
Rosemarkie to Shandwick Coast	SSSI	Approx. 0.76km east	Maritime cliffs, geological features and breeding birds, including Cormorant ( <i>Phalacrocorax carbo</i> ).	Via the marine environment

##### 3.1.1 Non-Statutory Designated Sites

No non-statutory designated sites exist within the site boundary, or within a 5km radius of the site.

#### 3.2 Habitats

##### 3.2.1 Ancient Woodland Inventory Sites

No areas of ancient woodland are present within the site. However, three areas are present within a 2km radius of the site boundary as detailed in Table 3-2:

**Table 3-2: Ancient Woodland Inventory Sites**

Site name	Distance and Orientation	Designation <sup>2</sup> (Ancient Woodland Categories)
Unnamed Woodland	Approx. 0.74km north	Long-Established (of Plantation Origin) (LEPO)

<sup>1</sup> SAC (Special Area of Conservation), SPA (Special Protection Area), RAMSAR (Wetland of International Importance), SSSI (Site of Special Scientific Interest), NNR (National Nature Reserve)

<sup>2</sup> Definition of antiquity categories, available from: <http://www.snh.org.uk/publications/on-line/advisorynotes/95/95.html>. ASNO: Sites shown as woodland on all available map sources from 1750 onwards and as semi-natural woodland on the 1750 'Roy' maps. LEPO: Sites shown as plantation woodland in c.1860 but not shown as woodland at all in 1750 or shown as plantation on these maps. These are woods that were apparently planted before 1860

Site name	Distance and Orientation	Designation <sup>2</sup> (Ancient Woodland Categories)
Unnamed Woodland	Approx. 1.5km south	Ancient (of Semi-Natural Origin) (ASNO)
Unnamed Woodland	Approx. 1.5km south	LEPO

The Phase 1 Habitat Map can be found in Appendix C and Photographs in Appendix E.

The habitat types and boundary features within the site are:

### 3.2.2 Phase 1 Habitats

A total of 17 Phase 1 Habitat types, including boundary features, were identified on the site and are listed below.

- A2.1 Dense Scrub;
- A2.2 Scattered Scrub;
- A3.1 Broadleaved Parkland/Scattered Trees;
- B2.2 Semi-Improved Neutral Grassland;
- B4 Improved Grassland;
- C3.1 Tall Ruderal Vegetation;
- H1.1 Intertidal Mud/Sand;
- H3 Shingle/Gravel Above High-Tide Mark;
- H6.5 Dune Grassland;
- H6.8 Open Dune;
- J1.3 Ephemeral/Short Perennial;
- J2.4 Fence;
- J2.5 Wall;
- J3.5 Sea Wall;
- J3.6 Buildings;
- J4 Bare Ground; and
- J5 Other Habitat.

### 3.2.3 Dense Scrub

Scrub is seral or climax vegetation that is dominated by locally native shrubs, usually less than 5m tall and occasionally with a few scattered trees. Dense scrub is located in the south east of the site and consists of sea buckthorn (*Hippophae rhamnoides*), with marram grass (*Ammophila arenaria*) scattered along the southern aspect of the stand (Photograph 1).

### 3.2.4 Scattered Scrub

Scattered scrub is present along the northern and eastern boundaries of the site as well as within the east of the site. Species include dog rose (*Rosa canina*), broom (*Cytisus scoparius*), gorse (*Ulex europaeus*), sea buckthorn, elder (*Sambucus nigra*) and sycamore (*Acer pseudoplatanus*) saplings (Photograph 2).



### 3.2.5 Broadleaved Parkland/Scattered Trees

Broadleaved scattered trees comprise areas of trees where 10% or less of the canopy is coniferous and tree cover is less than 30% of the area. Several sycamore trees are present in the south east of the site and the specimens range from mature to semi-mature (Photograph 3).

### 3.2.6 Semi-Improved Neutral Grassland

Semi-improved grasslands are transition categories made up of grasslands which have been modified by artificial fertilisers, slurry, intensive grazing, herbicides or drainage, and consequently have a range of species which is less diverse and natural than unimproved grasslands. Neutral grasslands are those which are typically enclosed and usually more intensively managed. This habitat is present in the north and west of the site. Previous management, through commercial land use and grazing from browsing species, including rabbits and deer, is likely to have contributed to these areas being low in species diversity. The dominant grass species are cock'sfoot (*Dactylis glomerata*), false oat grass (*Arrhenatherum elatius*) and tufted hair grass (*Deschampsia cespitosa*), with common knapweed (*Centaurea nigra*), common ragwort (*Jacobaea vulgaris*) and creeping thistle frequently dispersed throughout the sward. Common nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), creeping buttercup (*Ranunculus repens*) and spear thistle (*Cirsium vulgare*) are occasionally present. (Photograph 4).

### 3.2.7 Improved Grassland

Improved grasslands are those meadows and pastures which have been so affected by heavy grazing, drainage, or the application of herbicides, inorganic fertilisers, slurry or high doses of manure that they have lost many of the species expected in an unimproved sward. They have a limited range of grasses and a few common forbs. This habitat is present in the south east and west of the site, where it appears to have undergone regular disturbance via grazing animals. The dominant grass species are cock'sfoot, false oat grass and Yorkshire fog (*Holcus lanatus*). Common dandelion (*Taraxacum officinale*), creeping buttercup and common chickweed (*Stellaria media*) are occasional and common mouse-ear (*Cerastium fontanum*) and common field speedwell (*Veronica persica*) are rare (Photograph 1).

### 3.2.8 Tall Ruderal Vegetation

This category comprises stands of tall perennial or biennial dicotyledons, usually more than 25cm high. Tall ruderal vegetation is present in multiple areas within the site and species include common nettle, creeping thistle and umbellifer species (Photograph 5).

### 3.2.9 Intertidal Mud/Sand

There are small areas of sand within the east and west of the site and a band of sand along the southern boundary of the terrestrial habitat within the site where it meets the Cromarty Firth (Photograph 6).

Intertidal sand is classified as an Annex 1 type 1140 mudflats and sandflats not covered by seawater at low tide.

### 3.2.10 Shingle/Gravel Above High-Tide Mark

A band of shingle/gravel habitat is present within the south of the site (Photograph 7).

Shingle/gravel above the high-tide mark is classified as an Annex 1 type 1220 perennial vegetation of stony banks.

### 3.2.11 Dune Grassland

All grasslands occurring on consolidated and flattened dunes are classified under dune grassland habitat. This habitat is present in a small, isolated areas in the east of the site and is classified as an Annex 1 type 2130 fixed dunes with herbaceous vegetation ('grey dunes'). The dominant grass species are cock'sfoot (*Dactylis glomerata*), false oat grass (*Arrhenatherum elatius*) and tufted hair grass (*Deschampsia cespitosa*), with common knapweed (*Centaurea nigra*), common ragwort (*Jacobaea vulgaris*) and creeping thistle frequently dispersed throughout the sward. Common nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), creeping buttercup (*Ranunculus repens*) and spear thistle (*Cirsium vulgare*) are occasionally present. Marram grass is scattered throughout the sward (Photograph 8).

### 3.2.12 Open Dune

This category comprises the three early successional phases of dune formation.

Fore dune: unstable, usually low ridges of sand on the foreshore, often with a very open plant cover. Marram grass may be present in small quantities but is not dominant.

Yellow dune: partially stabilised ridges of sand lying between fore and grey dunes, with a marked but incomplete plant cover, nearly always dominated by marram grass, although lyme grass (*Leymus arenarius*) may be common.

Grey dune: stable ridges of sand, almost completely vegetated. The vegetation is very variable in species composition; marram grass is usually present but not dominant, and mosses and lichens may be frequent. Grey dune is distinguished from fixed dune by being markedly hilly or undulating, and by the sand not being fully consolidated.

A small isolated section of open dune is present in the north east of the site and is classified as an Annex 1 type 2130 fixed dunes with herbaceous vegetation ('grey dunes'). It is predominantly grey dune, due to the high cover of vegetation and variation in cover of marram grass. The sand was not fully consolidated and was also hilly in nature. The dominant grass species was false oat grass, with glittering wood-moss (*Hylocomium splendens*) being abundant and sand sedge (*Carex arenaria*), red fescue (*Festuca rubra*), Yorkshire fog and neat feather moss (*Pseudoscleropodium purum*) being frequent. Cock'sfoot, yarrow, heath bedstraw (*Galium saxatile*), harebell (*Campanula rotundifolia*), mouse-ear hawkweed (*Hieracium pilosella*) and big shaggy moss (*Rhytidiadelphus triquetrus*) are occasional and thyme-leaved speedwell (*Veronica serpyllifolia*) is rare. Marram grass was also present, being more frequent in the southern section of this habitat (Photograph 9).

### 3.2.13 Ephemeral/Short Perennial

This habitat consists of short, patchy associations typical of derelict urban sites, quarries and railway ballast. Land is free draining and usually shallow stony soils are present. Vegetation lacks clear dominant species but consists of a mixture of low-growing plants often less than 25cm high. This habitat is present in multiple areas within the site and consists of species including springy turf moss (*Rhytidiadelphus squarrosus*), hairy bittercress (*Cardamine hirsuta*) and shining cranesbill (*Geranium lucidum*), which are dominant in places, with white clover (*Trifolium repens*), young common dandelion, young yarrow (*Achillea millefolium*) and spear thistle being abundant. Broadleaved dock (*Rumex obtusifolius*), glittering wood-moss and ribwort plantain (*Plantago lanceolata*) are frequent (Photograph 1).

#### **3.2.14 Fence**

A combination of fences are located within the site and along sections of the east and west boundaries, comprising of wooden post and wire, security fencing and chain-link and cement post fencing (Photograph 1).

#### **3.2.15 Wall**

A stone wall is present within the west of the site (Photograph 10) and along the coast where it connects with the sea wall (Photograph 11).

#### **3.2.16 Sea Wall**

A sea wall constructed from artificial materials, rocks, wood and corrugated metal is present in the west of the site and extends eastward where artificial materials have been enclosed in gabion baskets (Photograph 10).

#### **3.2.17 Buildings**

Six buildings are present within the site boundary. There is a two storey, tiled pitched roof sandstone building with an associated outbuilding (also comprising of sandstone and a pitched tiled roof) and a modern roughcast extension on the south east aspect. A one storey, roughcast and metal corrugated roofed building and two one storey sandstone buildings are also present, as well as a tiled pitched roof building and a one storey stone and metal corrugated pitched roof building. Detailed descriptions and photographs are provided in Appendix F.

#### **3.2.18 Bare Ground**

Bare ground dominates the site, consisting of tarmac, gravel and rubble. A large proportion of the site has been modified and previously existing walls demolished, resulting in a large volume of compacted rubble being left behind (Photographs 10 and 12).

#### **3.2.19 Other Habitat**

A pile of rubble and stones is present in the north of the site, where the remnants of a stone built structure are also present (Target Note 1) (Photograph 13).

### **3.3 Groundwater Dependent Terrestrial Ecosystems**

No potential GWDTEs were recorded within the site boundary during the survey.

### **3.4 Invasive Non-Native Species**

No invasive non-native species were identified during the survey.

### **3.5 Faunal Species and Species Groups**

The Faunal Survey Results Map can be found in Appendix D and Photographs in Appendix E.

### 3.5.1 Disclaimer

Faunal species are transient and can move between favoured habitats regularly throughout and between years. This survey provides a snapshot of field signs present in the survey area in December 2018.

### 3.5.2 Local Records

The following is a summary of the notable local records returned from HBRG:

**Table 3-3: Local Biodiversity Records**

Species	Latin Name	Number of Records	Location (Approx.)	Date
<b>Mammals</b>				
West European hedgehog	<i>Erinaceus europaeus</i>	One	Approx. 1.7km north	2001
Brown hare	<i>Lepus europaeus</i>	One	Approx. 1.4km north	2002
Otter	<i>Lutra lutra</i>	Two – observation and evidence (spraint)	Approx. 1.3km and 1.4km east	2001 and 2014
<b>Herpetofauna</b>				
Common lizard	<i>Zootoca vivipara</i>	Three	Approx. 0.5km, 0.8km and 0.9km east	2015 and 2016

### 3.5.3 Biodiversity Action Plan and SBL Species and Habitats

The site is within the Highland Council area, which considers wider ecosystems within the HBAP and therefore does not highlight specific species and habitats of importance. The RCBAP covers the area the site is situated in and targets specific species and priority habitats. **Error! Reference source not found.** below presents the species and habitats listed on the RCBAP, UKBAP and SBL that are potentially relevant to the site:

**Table 3-4: Biodiversity Action Plan and SBL Species and Habitats**

Species	RCBAP	UKBAP	SBL
<b>Mammals*</b>			
Badger	✓		
Brown long-eared bat ( <i>Plecotus auritus</i> )	✓		
Common pipistrelle ( <i>Pipistrellus pipistrellus</i> )	✓	✓	✓
Soprano pipistrelle ( <i>Pipistrellus pygmaeus</i> )	✓	✓	✓
Daubenton's bat ( <i>Myotis daubentonii</i> )	✓	✓	✓
Natterer's bat ( <i>Myotis nattereri</i> )	✓	✓	✓
Brown hare ( <i>Lepus europaeus</i> )	✓		✓
West European hedgehog ( <i>Erinaceus europaeus</i> )	✓	✓	✓
Otter	✓	✓	✓
Minke whale ( <i>Balaenoptera acutorostrata</i> )	✓	✓	✓
Harbour porpoise ( <i>Phocoena phocoena</i> )	✓	✓	✓
Bottlenose dolphin	✓	✓	✓
Grey seal ( <i>Halichoerus grypus</i> )	✓		
Common (harbour) seal	✓		
<b>Birds*</b>			
Skylark ( <i>Alauda arvensis</i> )	✓	✓	✓
Wigeon ( <i>Anas penelope</i> )	✓		
Twite ( <i>Acanthis clavirostris</i> )	✓		
House Sparrow ( <i>Passer domesticus</i> )	✓		
Swallow ( <i>Hirundo rustica</i> )	✓	✓	✓

Species	RCBAP	UKBAP	SBL
Tree Sparrow ( <i>Passer montanus</i> )	✓	✓	✓
Fish*	RCBAP	UKBAP	SBL
Atlantic salmon ( <i>Salmo salar</i> )	✓	✓	✓
Brown trout ( <i>Salmo trutta</i> )	✓	✓	✓
Cod ( <i>Gadus morhua</i> )	✓		
Herring ( <i>Clupea harengus</i> )	✓		
Mackerel ( <i>Scomber scombus</i> )	✓		
Habitats	RCBAP	UKBAP	SBL
Sea and Coast	✓	✓	✓

\*Marine mammals, fish and birds are covered in further detail in the scoping report.

### 3.5.4 NBN Atlas

A summary of reported sightings of species potentially relevant to the site within a 2km radius is provided in Table 3-5 below:

**Table 3-5: Species Records from NBN Atlas**

Species*	Orientation	Date	Comments
Brown hare	One sighting (north of site)	08/07/2002	No information
West European hedgehog	One sighting (north of site)	23/09/2001	No information
Otter	One sightings (east and south)	05/2014	Field evidence (spraint) and actual sighting

## 3.6 Protected Species

### 3.6.1 Bats

No records of bats within a 2km radius of the site were returned from the desk study.

Two sycamore trees with PRFs are present within the site and located at NH79528 68907 (tree 1; Photograph 14) and NH 79561 68905 (tree 2; Photograph 15). Tree 1 was classified as negligible in accordance with Table 2-2; storm damage has created PRFs, however, all of them are upward facing making them prone to filling with water and as such unsuitable for roosting bats. This tree is also isolated from other vegetation leaving it exposed and lacking connectivity. Tree 2 is an ivy (*Hedera helix*) covered sycamore which may provide some opportunities for individual roosting bats. As such tree 2 was assessed as having low potential for roosting bats in accordance with Table 2-2.

Six buildings are present within the site boundary. The roughcast building with the red corrugated metal roof is to be retained and will not to be included in any works, therefore only the remaining five buildings have been assessed.

The buildings within the site are considered to offer potential for summer roosting bats, as per Table 2-2, due to the presence of PRFs, via cracks in mortar between brickwork, gaps in lintels above doorframes, broken tiles, gaps under lead flashings, gaps behind boards covering windows, gaps being fascia boards, missing harling and rough cast above windows, cracks in chimney stacks, and ivy covered aspects. Despite the presence of PRFs, the buildings have been classified as offering low suitability for summer roosting bats due to their isolated

coastal location and limited connecting terrestrial habitat (see Table 2-1). The buildings do not offer habitat for maternity roosting bats, only opportunistic individuals, due to the size of the cavities present.

All five buildings are considered to offer low potential for hibernating bats as per Table 2-1, as they have features suitable for roosting, are derelict in nature and as such could provide constant cool temperatures during the hibernation season. A detailed description of each building with photographs is provided in Appendix F.

The site offers limited terrestrial habitat which connects to adjacent features out with the site, therefore the site is assessed as offering low potential for commuting and foraging bats. The dense scrub and scattered trees would provide limited foraging habitat which does not connect to the wider area.

### 3.6.2 Otter

Two records of otter were returned from the desk study, east and south east of the site boundary. Spraint was identified along the Cromarty Firth coast and an observational sighting was reported in grassland adjacent to a quarry. No evidence of otter was identified during the survey.

The marine environment of the Moray Firth and Cromarty Firth provide suitable commuting and foraging habitat for otter, where they could obtain varied foraging resources such as Atlantic salmon (*Salmon salar*), brown trout (*Salmo trutta*), flatfish and eels, crustaceans and occasionally wading birds. Otters that inhabit coastal habitats utilise inshore areas which are shallow, for foraging and commuting.

In general, coastal otter habitats range from open, low-lying coastal habitat to sheltered wooded inlets. The dense scrub, within the site, adjacent to the shore, provides opportunities for rest sites and sheltered commuting. Otters will also utilise terrestrial habitats, including rough grassland, for resting and breeding holts. Otters may also utilise other mammal species' burrows for resting sites. Multiple burrows were present within the dense scrub, likely attributed to rabbit (*Oryctolagus cuniculus*), due to their small size, lack of spoil heaps and circular shapes, which otter could utilise for resting.

Overall the site has some suitable habitat for commuting, foraging and resting otter, however, the site is highly frequented by members of the public and dog walkers, which reduces its suitability.

### 3.6.3 Badger

No records of badger were returned from the desk study and no evidence of badger was found during the survey.

Suitable habitat for sett creation is lacking due to the site predominantly consisting of bare ground. Gorse and sea buckthorn are known to provide opportunities for sett creation, however, due to the isolated nature of this vegetation it is not considered likely.

The semi-improved grassland and berry producing scrub habitats within the site offer secondary foraging resources and the small area of improved grassland offers a limited primary foraging habitat as a source of earthworms, which comprise the majority of badgers' diet. Broadleaved woodland, arable fields and short mown grassland are present in the wider area which provide a primary foraging resource for badger.

Fragmented habitat is present within the site in the form of dense scrub and scattered scrub which provide some connecting habitat to the wider landscape.

### 3.6.4 Birds

No birds' nests were identified during the survey.

Multiple bird species were observed while undertaking the survey, which included: Wren (*Troglodytes troglodytes*), Great Tit (*Parus major*), Robin (*Erithacus rubecula*), Jackdaw (*Corvus monedula*), Herring Gull (*Larus argentatus*) and Black-headed Gull (*Chroicocephalus ridibundus*).

The Birds of Conservation Concern (BOCC) is a list of species which have been assessed against a set of criteria to place each on one of three lists (green, amber and red) to indicate an increasing level of conservation concern.

Wren, Great Tit, Robin and Jackdaw are listed on the BOCC Green List.

Black-headed Gull feature on the BOCC Amber List and Herring Gull on the BOCC Red List.

## **4 FURTHER SURVEY AND LICENSING**

### **4.1 Further Survey and Licensing**

#### **4.1.1 Habitats**

Although the Phase 1 Habitat Survey was completed outside of the optimal survey period for vegetation, it is deemed unnecessary to undertake further surveys of Annex 1 habitats within the site. This is due to the Annex 1 habitats (intertidal sand/mud, shingle/gravel above high –tide mark, dune grassland and open dune habitat) identified on site not being classified as viable due to the very small areas which they extend and the fragmented/isolated nature of each. As such, no further habitat surveys are required.

#### **4.1.2 Bats**

The five buildings assessed within the site boundary are classified as providing low potential for summer roosting bats and low potential for hibernating bats.

Winter hibernation surveys of the buildings should be completed, consisting of two visits, one in mid-January and one in mid- February, including a detailed internal inspection up to ladder height of any PRFs which may provide hibernating opportunities for bats.

One bat activity survey is also required on each building, between May and August, to determine the presence/absence of summer roosting bats.

If during the hibernation surveys and/or bat activity survey a roost/evidence of bats is identified or bat activity suggests that a roost may be present, further surveys would be required.

If the ivy covered tree is to be felled or subjected to arboricultural operations to facilitate development, an elevated inspection to search for roosting bats will be required prior to works commencing.

The requirement for a licence from SNH to disturb or destroy a bat roost will need to be re- assessed following the above surveys.

#### **4.1.3 Otter and Badger**

No evidence of otter or badger was found during the survey. Limited suitable habitat is present for badger within the site, however suitable habitat exists within and adjacent to the site for otter.

Ecological data is considered valid for a period of 12 months. Providing that ground works commence before December 2019 then no further update to the baseline data in relation to these species is considered necessary other than pre-works checks for otter, to locate any resting sites that may require a licence to disturb. If the site boundary was to change, further survey work for these protected and notable species may be required.

#### **4.1.4 Nesting Birds**

As suitable habitat for nesting birds is present within the site, no building demolition or vegetation removal should be undertaken during the bird breeding season (March-August), otherwise a nesting bird survey will need to be undertaken immediately prior to the works.



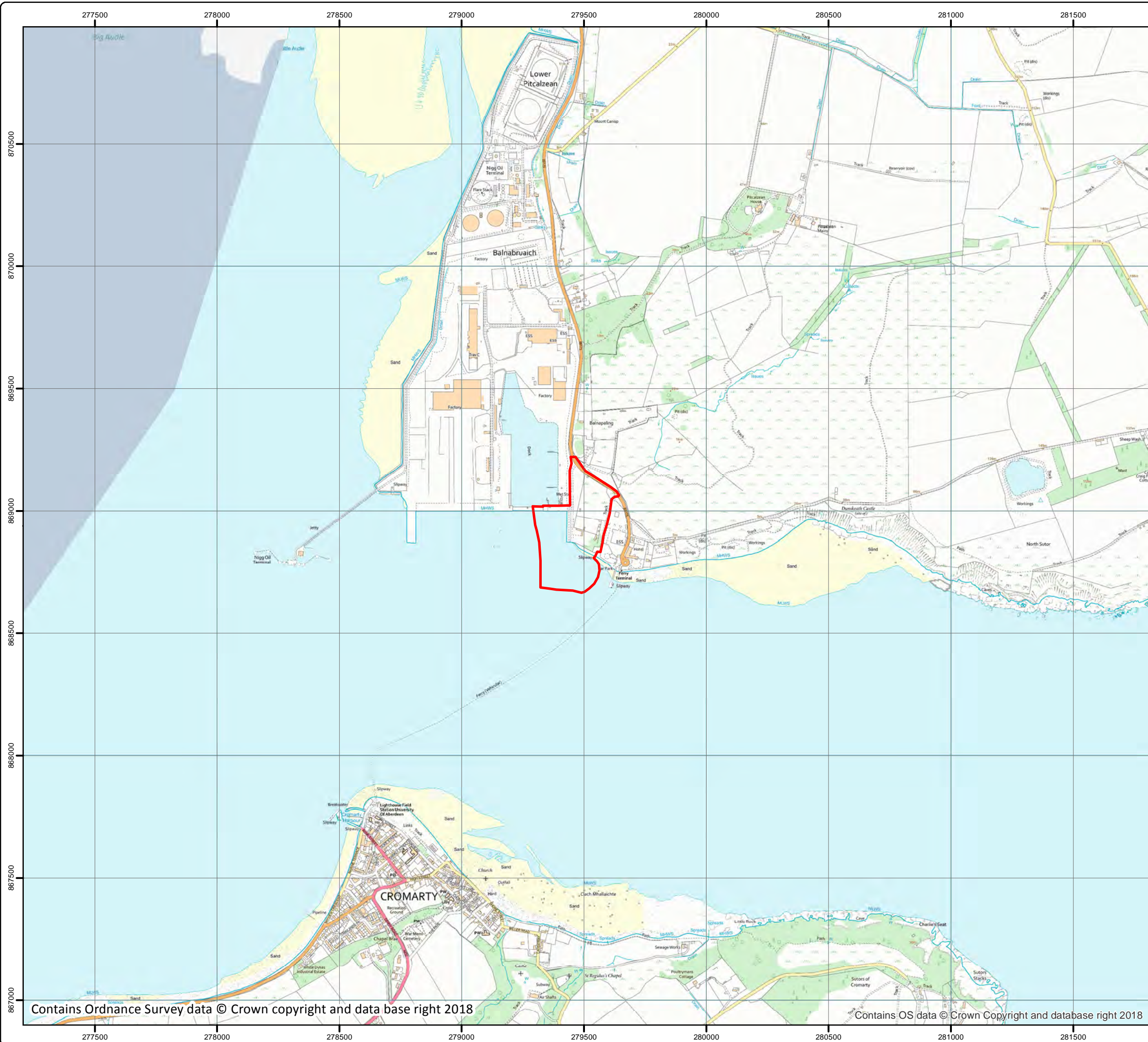
If an active nest is discovered the building cannot be demolished or the vegetation removed until the young have fledged and the nest is no longer active.

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## **APPENDICES**

## **A SITE LOCATION PLAN**



Legend

 Site Boundary

Do not scale this map

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Project  
Nigg East Quay

Title  
Figure 1 - Site Location Plan

Status  
FINAL

Drawing No. 671906-001	Revision
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Scale 1:15,000	A3	Date 12 Feb 2019
Drawn SMC	Checked JEP	Approved MH



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## **B PROTECTED SPECIES LEGISLATION SUMMARY**

### **Bats and Otter**

A European Protected Species (EPS) is a species listed in the EC Directive (92/43) The Conservation of Natural Habitats and of Wild Flora and Fauna (the “Habitats Directive”), which is transposed into UK law through the Conservation (Natural Habitats &c.) Regulations 1994 (the “Habitat Regulations”) as amended by The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007. Under this legislation an EPS (*e.g.* all bat species) are protected from:

- (a) Deliberate or reckless capture, injuring or killing;
- (b) deliberate or reckless
  - (i) harassment of an animal or group of animals;
  - (ii) disturbance of such an animal while it is occupying a structure or place which it uses for shelter or protection;
  - (iii) disturbance of such an animal while it is rearing or otherwise caring for its young;
  - (iv) obstructing access to a breeding site or resting place of such an animal, or otherwise denying the animal use of the breeding site or resting place;
  - (v) disturbance of such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs; or
  - (vi) disturbing such an animal 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;
- (c) deliberate or reckless taking or destroying the eggs of such an animal; or,
- (d) damaging or destroying a breeding site or resting place of such an animal.
- (e) any person:
  - (i) possessing or controlling;
  - (ii) transporting;
  - (iii) selling or exchanging; or
  - (iv) offering for sale or exchange,

any live or dead animal or part of an animal or anything derived from such an animal which has been taken from the wild and which is of a species or subspecies listed in Annex IV(a) to the Habitats Directive – unless the animal from which the part or the thing in question is derived, was lawfully taken from the wild (*i.e.* taken from the wild in the European Union without contravention of appropriate domestic legislation and before the implementation date of the Habitats Directive (in that Country *e.g.* 1994 in UK) or if it was taken from elsewhere).

### **European Protected Species Licensing**

For a licence to be issued these three tests must be satisfied:

- That the development is 'in the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment';
- That there is 'no satisfactory alternative'; and
- That the derogation (*i.e.* any permission/licence granted) is 'not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range'.

To obtain a licence a Method Statement is required that identifies the activities to be undertaken, the location of all resting sites (*e.g.* bat roosts), the potential effects and details of the proposed mitigation.

## **Badger**

Under the Protection of Badgers Act (1992), as amended by the Nature Conservation (Scotland) Act 2004, it is an offence to:

- Kill, injure or take a badger;
- Have in possession a dead badger or any part of a badger;
- Cruelly ill-treat a badger; and
- Damage, destroy, interfere or obstruct a badger sett or disturb a badger whilst it is occupying a sett.
- 

Where an offence is committed the individual (as well as the body corporate, Scottish partnership or, as the case may be, unincorporated association) is guilty of the offence and is liable to be proceeded against and punished accordingly.

In some cases licenses may be issued by SNH to enable certain otherwise illegal activities to take place. With respect to development-related activities, licenses can be issued where there is likely to be damage or disturbance to a badger sett, for social, economic or environmental reasons. Licenses may only be issued for this purpose provided that:

- The activity authorised by the licence will contribute to significant social, economic or environmental benefit; and
- There is no other satisfactory solution.

## **General Breeding Birds**

All wild bird species in the UK are protected from killing, injury and taking under the Wildlife and Countryside Act 1981, as amended. It is an offence to take, damage or destroy a nest while in use or being built, and to take or destroy the eggs of any nesting bird.

Birds listed on Schedule 1 of the Act are provided additional protection. It is an offence, with certain exceptions, to:

- Intentionally kill, injure, or take (handle) any wild Schedule 1 bird;
- Intentionally take, damage or destroy any nest whilst in use or being “built” by a Schedule 1 bird;
- Intentionally take or destroy a wild Schedule 1 bird egg;
- Have in one’s possession or control a wild Schedule 1 bird (dead or alive), or egg, (unless one can show that it was obtained legally);
- Intentionally or recklessly disturb any wild Schedule 1 bird whilst “building” a nest or whilst in, on, or near a nest containing eggs or young; and
- Intentionally or recklessly disturb any dependent young of a Schedule 1 bird.

Licences can be granted by SNH to permit otherwise illegal acts; however licences cannot be issued for the removal of Schedule 1 birds to facilitate development.

*Note: The above information constitutes a summary only. Please refer to original legislation for full information*

## **C      PHASE 1 HABITAT SURVEY MAP**





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Legend

- Site Boundary
- TargetNote

JNCC Phase 1 Habitat Code

- A2.1 Dense/Continuous Scrub
- A2.2 Scattered Scrub
- A3.1 Parkland/Scattered Broad-leaved Trees
- B2.2 Neutral Semi-Improved Grassland
- B4 Improved Grassland
- C3.1 Tall Ruderal Vegetation
- H1.1 Intertidal Mud/Sand
- H3 Shingle above High Tide Mark
- H6.5 Dune Grassland
- H6.8 Open Dune - Grey Dune
- J1.3 Ephemeral/Short Perennial
- J2.4 Fence
- J2.5 Wall
- J3.5 Sea Wall
- J3.6 Building
- J4 Bare Ground
- J5 Other Habitat

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Title

Figure 4 - Phase 1 Habitat Survey Map

Status

FINAL

Drawing No.

671906-004

Revision

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1:2,200

A3

Date

12 Feb 2019

Drawn

ED

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JEP

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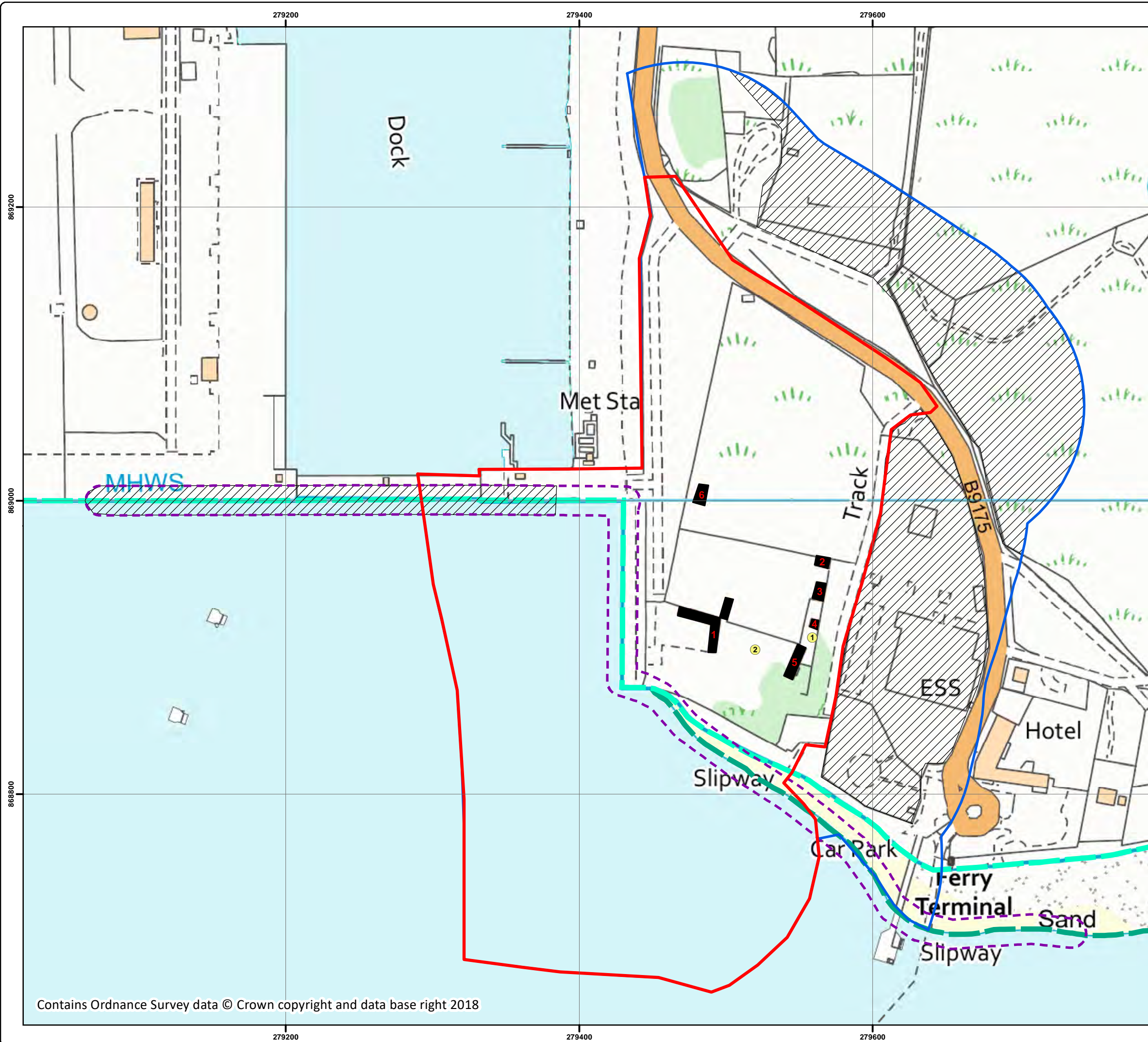
CP



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## **D      PROTECTED SPECIES SURVEY RESULTS**





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Legend

- Site Boundary
- 100m Survey Buffer
- 250m Survey Buffer
- Inaccessible Areas
- Buildings
- Trees With Potential Roost Features
- MHWS
- MLWS

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Project  
Nigg East Quay

Title  
Figure 5 - Protected Species Survey Area

Status  
FINAL

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## E PHOTOGRAPHS



Photograph 1: Scattered scrub, ephemeral/short perennial habitat, improved grassland and fencing



Photograph 2: Dense scrub



Photograph 3: Scattered broadleaved trees



Photograph 4: Semi-improved neutral grassland



Photograph 5: Tall ruderal vegetation



Photograph 6: Intertidal sand



Photograph 7: Shingle above high tide mark



Photograph 8: Dune grassland



Photograph 9: Open dune (grey dune)



Photograph 10: Wall, sea wall, semi-improved grassland and bare ground



Photograph 11: Wall and intertidal sand



Photograph 12: Bare ground



Photograph 13: Stone pile





Photograph 14: Tree 1 – Sycamore with storm damage



Photograph 15: Tree 2 – Sycamore covered in ivy



## F DETAILED BUILDING DESCRIPTIONS

Building No.		Description and PRFs	Roosting Bat Potential	Hibernation Potential
1		<p>Two storey sandstone and mortar building, with a pitched tiled roof. A small flat roofed, roughcast extension is present on the south east aspect of the building. A one storey sandstone and pitched roofed outbuilding is attached to the north east of the building. A section of the roof in the outbuilding has collapsed. The roof of the west aspect is missing as are several of the window panes and doors leaving sections exposed. Some of the windows have been boarded up.</p> <p>PRFs include: missing tiles on roof, loose mortar between sandstone blocks, gaps behind boarded up windows, gaps under flashings, gaps behind fascia boards, missing harling/roughcast above windows, missing glass in windows.</p>	Low	Low
2		<p>Stone built structure with missing roof, windows and doors. The four walls of the structure are still in place, however are very exposed.</p> <p>PRFs include: gaps in mortar, gaps above wooden lintels above windows.</p>	Low	Low

3		<p>One storey sandstone and tiled pitched roof building. Glass is missing from windows and doors are missing. The compacted rubble present within the site reaches up to the top of the windows of the building.</p> <p>PRFs include: loose and missing tiles, gaps under tops of windows, cracks in chimney stack and under tiles and loose mortar between sandstone blocks.</p>	Low	Low
4		<p>One storey metal corrugated roofed stone building. A large hole is present in the roof and the doors are open on both the north and south aspects.</p> <p>PRFs include: gaps in lintel in doorframe and gaps in loose mortar.</p>	Low	Low
5		<p>One storey, sandstone building with a tiled pitched roof and harled north and south aspects. Three chimney stacks are present and glass in windows is missing as are the doors. The rubble adjacent reaches up to the roof of the building. Ivy covers the south aspect. Multiple areas of the roof have collapsed.</p> <p>PRFs include: missing harling, gaps in corner of roof where tiles missing and flashings broken, lifted and missing tiles, gaps in cracks in chimney stacks and within ivy growing on south aspect.</p>	Low	Low

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## **Marine Scotland - Licensing Operations Team Scoping Opinion**

**Nigg Energy Park East Quay (per Envirocentre),  
construction and formation of new East Quay and laydown  
area, Nigg Energy Park, Cromarty Firth**

**THE MARINE WORKS (ENVIRONMENTAL IMPACT ASSESSMENT)  
(SCOTLAND) REGULATIONS 2017 (AS AMENDED)**

**SCOPING OPINION FOR THE PROPOSED MARINE LICENCE APPLICATIONS  
TO CONSTRUCT WORKS, TO CARRY OUT DREDGING AND TO DEPOSIT  
DREDGE SPOIL WITHIN THE SCOTTISH MARINE AREA.**



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## 1. Executive Summary

This is the scoping opinion adopted by the Scottish Ministers, under regulation 14 of The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) (“the 2017 MW Regulations”), as to the scope and level of detail of information to be provided in the Environmental Impact Assessment report (“EIA report”) for the proposed construction of Nigg East Quay, Cromarty Firth (“the proposed works”). The scoping opinion has been requested by Envirocentre on behalf of the applicant, Global Energy Group (“the applicant”).

This scoping opinion is based on the information provided in the applicant’s request, dated 05 February 2019, for the Scottish Ministers to adopt a scoping opinion. The request included the submission of a [Scoping Report](#). The Scottish Ministers have consulted on the scoping report and the responses received have been taken into account in adopting this scoping opinion. The matters addressed by the applicant in the scoping report have been carefully considered and use has been made of professional judgement (based on expert advice from stakeholders) and experience in order to adopt this opinion.

Detailed information is provided in the specialist topic sections. Matters are not scoped out unless specifically addressed and justified by the applicant and confirmed as being scoped out by the Scottish Ministers. Table 1 summarises the Scottish Ministers’ advice on whether topics are to be scoped in or out.

**Table 1: The Scottish Ministers’ opinion as to whether topics are to be scoped in or out.**

<b>Topic</b>	<b>Reason for scoping in / out</b>
<b>Landscape &amp; Visual</b>	No marine consideration however assessment in EIA report required for planning.
<b>Terrestrial Ecology (Including bats)</b>	Not a marine concerns however assessment of bats will be required in the EIA report for planning.
<b>Marine Ecology</b>	Scoped IN. Assessment required of impacts on designated sites, priority marine features and cetacean species which may be present in the vicinity of the works.
<b>Ornithology</b>	Scoped IN. Assessment required of potential indirect impacts on designated sites.
<b>Cultural Heritage and Archaeology</b>	Scoped IN. Uncertainty about the potential impacts of the proposed works on marine archaeology means that further assessment is required.
<b>Airborne Noise</b>	No marine concerns however this is to be included to assess terrestrial impacts required for planning.

<b>Water Environment and Coastal Processes</b>	Scoped IN. Potential for impacts on the local water environment and coastal processes, including tidal current, wave action, and associated sediment transport processes.
<b>Traffic and Transport</b>	Scoped IN. Issues raised by Transport Scotland require to be addressed through a transport assessment.
<b>Population and Human Health</b>	No marine concerns however this is to be included to assess socio-economic impacts required for planning
<b>Climate Change</b>	Scoped OUT. The Construction Environmental Management Plan ("CEMP") and Water Environment and Coastal Processes chapter will cover climate change effects.
<b>Natural Disaster</b>	Scoped OUT. The proposed development is not located in an area of high natural disaster potential.
<b>Air Quality</b>	Scoped OUT. Effect on air quality from transport movements covered in Traffic and Transport chapter.
<b>Navigation and Vessel Movements</b>	Scoped IN. High amount of vessel traffic in the area which requires further assessment.
<b>Cumulative Impacts</b>	Scoped OUT. Cumulative impacts to be assessed for each receptor in the specialist chapters of the EIA report.

For the avoidance of doubt, the adoption of this scoping opinion by the Scottish Ministers does not preclude the Scottish Ministers from requiring the applicant to submit additional information in connection with any EIA report submitted with their application for a marine licence relative to the proposed works.

In the event that an application is not submitted by the applicant for the proposed works within 12 months of the date of this scoping opinion, the Scottish Ministers recommend that the applicant seeks further advice from them regarding the potential to update the scoping opinion.

## **2. Introduction**

### **2.1 Background to scoping opinion**

2.1.1 We refer to your email of 05 February 2019 requesting a scoping opinion from the Scottish Ministers, under Regulation 14 of the 2017 MW Regulations. Your request included a [Scoping Report](#), which contained a description of the location of the works, including a plan sufficient to identify the area in which the works are proposed to be sited, and a description of the nature and purpose of the proposed works and their likely impact on the environment. The Scottish Ministers consider that they have been provided with sufficient information to adopt a scoping opinion.

### **2.2 The requirement for Environmental Impact Assessment**

2.2.1 Under the 2017 MW Regulations, the Scottish Ministers, as the consenting authority, must not grant a regulatory approval for an EIA project unless an environmental impact assessment has been carried out in respect of that project and in carrying out such assessment the Scottish Ministers must take the environmental information into account. The works described in your scoping report fall under Schedule 2, paragraphs 1(e) and 10(g) of the 2017 MW Regulations. The works exceed the threshold for paragraph 1(e) described in column 2 of schedule 2 of the MW Regulations. On consideration of the selection criteria set out in schedule 3 of the MW Regulations you determined that the environmental effects of the works were likely to be significant and thus should be subjected to an EIA.

### **2.3 The content of the scoping opinion**

2.3.1 In regards to your request for a scoping opinion on the proposed content of the required EIA report, the Scottish Ministers have, in accordance with the 2017 MW Regulations, considered the documentation provided to date and consulted with the appropriate consultation bodies (see Appendix I) in reaching their scoping opinion.

2.3.2 The EIA process is vital in generating an understanding of the biological, chemical and physical processes operating in and around the proposed works' location and those that may be impacted by the proposed activities. We would however state that references made within the scoping opinion with regard to the significance of impacts should not prejudice the outcome of the EIA process. It is therefore expected that these processes will be fully assessed in the EIA report unless scoped out.

### **3. Description of works**

#### **3.1 Background to the works**

3.1.1 The proposal by the applicant is to construct a new quay, carry out land reclamation and associated dredging and dredge spoil deposit activities as part of the redevelopment of the East quay within Nigg harbour. The project comprises of the following main components in the Scottish marine area:

- Construction of a new east quay, plan area 250m by 50m (0.88ha), constructed using perimeter piling to create a new quay wall;
- Associated fendering and rock armouring;
- Dredging of approximately 140,000m<sup>3</sup> to achieve a minimum sea bed level at the main west facing berth of 12m below chart datum to facilitate the proposed development;
- Sea water extraction for fire-fighting capability
- Re-use of approximately 70,000m<sup>3</sup> of dredged materials within the quay structure;
- Deposit of dredged material (approximately 70,000m<sup>3</sup>) within the Sutors licenced disposal site;

### **4. Aim of this scoping opinion**

#### **4.1 The scoping process**

4.1.1 Scoping provides the first identification, and likely significance, of the environmental impacts of the proposal and the information needed to enable their assessment. The scoping process is designed to identify which impacts will or will not need to be addressed in the EIA report. This includes the scope of impacts to be addressed and the method of assessment to be used. The scoping process also allows consultees to have early input into the EIA process, to specify their concerns and to supply information that could be pertinent to the EIA process. In association with any comments herein, full regard has been given to the information contained within the documentation submitted with the scoping opinion request.

4.1.2 The Scottish Ministers have also used this opportunity to provide advice in relation to the licensing requirements, in addition to the EIA requirements (see Appendix II).

## **5. Consultation**

### **5.1 The consultation process**

5.1.1 On receipt of the scoping opinion request documentation, the Scottish Ministers, in accordance with the 2017 MW Regulations, initiated a 30 day consultation process, which commenced on 18 July 2018. The following bodies were consulted:

- Association of Salmon Fishery Boards
- *Cromarty Forth Port Authority*
- Ministry of Defence
- Fisheries Office Aberdeen
- *Historic Environment Scotland (“HES”)*
- *Highland Council*
- Marine Safety Forum
- Marine Planning and Policy
- Maritime and Coastguard Agency
- Moray Firth Partnership
- *Northern Lighthouse Board (“NLB”)*
- Royal Society for the Protection of Birds Scotland
- *Royal Yachting Association Scotland (“RYA”)*
- *Scottish Environment Protection Agency (“SEPA”)*
- Scottish Fishermen’s Federation
- Scottish Fishermen’s Organisation
- *Scottish Natural Heritage (“SNH”)*
- *Scottish Water*
- Scottish Wildlife Trust
- The Crown Estate
- Nigg and Shandwick Community Council
- Kilmurie and Logie Easter Community Council
- *Transport Scotland*
- UK Chamber of Shipping
- Visit Scotland
- Whale and Dolphin

### **5.2 Responses received**

5.2.1 From the list above a total of 9 responses were received from those listed in italics. The purpose of the consultation was to obtain advice and guidance from each consultee or advisor as to which potential effects should be scoped in or out of the EIA.

5.2.2 The Scottish Ministers are satisfied that the requirements for consultation have been met in accordance with the 2017 MW Regulations. The sections below highlight issues which are of particular importance with regards to the EIA report and any marine licence application. Full consultation responses are attached in Appendix I and each should be read in full for detailed requirements from individual consultees. The Scottish Ministers expect all consultee concerns to be addressed in the EIA report unless otherwise stated.



## **6. Contents of the EIA report**

### **6.1 Requirements of the 2017 MW Regulations**

6.1.1 An EIA report must be prepared in accordance with regulation 6 of the 2017 MW Regulations.

6.1.2 The 2017 MW Regulations require that the EIA report is prepared by competent experts and must be accompanied by a statement from the applicant outlining the relevant expertise or qualifications of those experts.

6.1.3 The EIA report must be based on this scoping opinion and must include the information that may be reasonably required for reaching a reasoned conclusion, which is up to date, on the significant effects of the works on the environment, taking into account current knowledge and methods of assessment.

6.1.4 A gap analysis template is attached at Appendix III to record the environmental concerns identified during the scoping process. This template should be completed and used to inform the preparation of the EIA report.

### **6.2 Non-Technical Summary**

6.2.1 The EIA report must contain a Non-Technical Summary (“NTS”) which should be concise and written in a manner that is appealing to read and easily understood. The NTS should highlight key points set out in the EIA report and must include (at least) the following:

- a description of the works comprising information on the site, design, size and other relevant features of the works;
- a description of the likely significant effects of the works on the environment;
- a description of the features of the works and any measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- a description of the reasonable alternatives studied by the applicant, which are relevant to the works and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the works on the environment; and
- a summary of the information provided under paragraphs 1 to 9 of Schedule 4 of the 2017 MW Regulations.

### **6.3 EU Guidance**

6.3.1 [EU guidance on the preparation of an EIA Report](#) identifies the following qualities of a good EIA report:

- A clear structure with a logical sequence, for example describing existing baseline conditions, predicted impacts (nature, extent and magnitude), scope for mitigation, agreed mitigation measures, significance of unavoidable/residual impacts for each environmental topic.
- A table of contents at the beginning of the document.
- A description of the consent procedure for the works and how EIA fits within it.
- Reads as a single document with appropriate cross-referencing.
- Is concise, comprehensive and objective.
- Is written in an impartial manner without bias.
- Includes a full description and comparison of the alternatives studied.
- Makes effective use of diagrams, illustrations, photographs and other graphics to support the text.
- Uses consistent terminology with a glossary.
- References all information sources used.
- Has a clear explanation of complex issues.
- Contains a good description of the methods used for the studies of each environmental topic.
- Covers each environmental topic in a way which is proportionate to its importance.
- Provides evidence of effective consultations (if some consultations have already taken place).
- Provides basis for effective consultations to come.
- Makes a commitment to mitigation (with a programme) and to monitoring.
- Has a NTS which does not contain technical jargon.
- Contains, where relevant, a reference list detailing the sources used for the description and assessments included in the report.

## **6.4 Mitigation**

6.4.1 Within the EIA report it is important that all mitigating measures are:

- clearly stated;
- accurate;
- assessed for their environmental effects;
- assessed for their effectiveness;
- fully described with regards to their implementation and monitoring, and;
- described in relation to any consents or conditions.

6.4.2 The EIA report should contain a mitigation table providing details of all proposed mitigation discussed in the various chapters. Refer to Appendix I for consultee comments on specific baseline assessment and mitigation.

6.4.3 Where potential environmental impacts have been fully investigated but found to be of little or no significance, it is sufficient to validate that part of the assessment by detailing in the EIA report:

- the work that has been undertaken;
- what this has shown i.e. what impact, if any, has been identified; and
- why it is not significant.

## **6.5 Design Envelope**

6.5.1 The exact nature of the work that is needed to inform the EIA may vary depending on the design choices. Where flexibility in the design envelope is required, this must be defined within the EIA report and the reasons for requiring such flexibility clearly stated. To address any uncertainty the EIA report must consider the potential impacts associated with each of the different scenarios. The criteria for selecting the worst case, and the most likely scenario, along with the potential impacts arising from these, must also be described. The Scottish Ministers will determine the application based on the worst case scenario. The EIA will reduce the degree of design flexibility required and the detail will be further refined in a Construction Method Statement ("CMS") to be submitted to the Scottish Ministers, for their approval, before works commence. Please note however, the information provided in Section 10 below regarding multi-stage regulatory consent. The CMS will freeze the design of the project and will be reviewed by the Scottish Ministers to ensure that the worst case scenario described in the EIA report is not exceeded.

## **7. Interests to be considered within the EIA report**

### **7.1 Introduction**

7.1.1 The scoping report considered the likely impacts on the environment under the headings and topics addressed below. This section also contains a summary of the main points raised by consultees and the Scottish Ministers' opinion on whether EIA topics should be scoped in or out. The consultation responses are contained in Appendix I and the applicant is advised to carefully consider these responses and use the advice and guidance contained within them to inform the EIA report.

### **7.2 Landscape and Visual**

7.2.1 The applicant assesses the site and setting of the proposed development and identifies key visual receptors that require consideration. Following an assessment of each, they conclude that the only significant adverse effects during the construction phase could be to passengers on the Nigg Ferry however these effects would be short term. The applicant proposes that the operational effects of the development would result in smaller magnitude effects than those during the construction phase and so are not likely to be significant. The applicant therefore concludes that landscape and visual interests should not be subject to assessment as part of an EIA.

7.2.2 SNH advise there are no national landscape designations relevant to this proposal although the sea and coast are within the East Ross Special Landscape Area (SLA) and the site is a major feature within the SLA. They understand that advice on landscape aspects will be provided by The Highland Council. The consultation response received from the Highland Council regarding the marine aspect of the works did not refer to landscape and visual impacts.

7.2.3 The Scottish Ministers are content that there will be no significant impact on landscape and visuals from a marine perspective but understand that this will be considered in the EIA report from a terrestrial planning perspective.

### **7.3 Terrestrial Ecology**

7.3.1 The applicant proposes that based on the baseline data gathered from the ecological survey and desk study carried out, terrestrial ecology should be scoped out of the EIA report. The scoping report includes mitigation measures which have been identified as part of the design which will further reduce impacts on terrestrial habitat. Further targeted assessments will be undertaken for bats, which will accompany the application to the Council. A standalone report on bats will however be included within the EIA 'Other Issues' chapter.

7.3.2 In their consultation response, SNH have stated that all bat species found in Scotland are classified as European Protected Species (“EPS”). Dunskeath House provides a suitable habitat for bats and the building maybe supporting roosting bats. They have recommended that a bat survey of Dunskeath house is included in the EIA report and that if bats are present there will be a need to apply for an EPS licence from SNH.

7.3.3 The disturbance of bats is related to the terrestrial aspect of the works and not the marine works. The Scottish Ministers are content that it will be considered by the Highland Council through the planning process.

## **7.4 Marine Ecology**

7.4.1 The applicant has sub-divided marine ecology into designated sites, marine mammals, fish and intertidal and benthic ecology to assess the baseline condition. They have then assessed the potentially significant effects during construction and post-completion. The applicant concludes that the Moray Firth Special Area of Conservation (“SAC”) and the Dornoch Firth and Morrich More SAC should be scoped in. Based on the assessment, they also propose to scope in marine mammals and migratory fish species but scope out marine fish species and intertidal and benthic ecology.

7.4.2 In their consultation response SNH agree with the applicant that the proposed works could affect the bottlenose dolphin and subtidal sandbank features of the Moray Firth SAC and the common seal feature of the Dornoch Firth and Morrich More SAC. They identify the potential impacts on each of the sites and the points which are required to be addressed in the EIA report. The SNH consultation response is included in appendix one. All points identified in this response should be addressed in the EIA report. In addition to the designated sites, they also identify that in addition to bottlenose dolphins, there may be other species of cetacean present. The EIA report must address the potential of underwater noise to impact bottlenose dolphins, harbour porpoise and minke whale. SNH highlight that an EPS licence is likely to be required from Marine Scotland for disturbance to cetaceans.

7.4.3 The Highland Council support the need for an assessment of the potential impacts on the Moray Firth SAC. They also identify that there are a number of priority marine features in the area including horse mussel beds as well as the Cromarty Firth Ramsar site and site of special scientific interest (“SSSI”) that should be assessed.

7.4.4 The Scottish Ministers concur with the view that marine ecology should be scoped in to the EIA report to address marine mammals, migratory fish and also

benthic ecology to address the points raised by the consultees.

## **7.5 Ornithology**

7.5.1 In the scoping report, the applicant has provided detailed data on the bird population as a baseline and has identified the potential for displacement or disturbance of birds during construction activities. The applicant asserts that by applying the proposed mitigation they consider that there would be no likely significant effects on the bird populations. Based on this they conclude that ornithology should not require further assessment in the EIA however, as part of the Habitat Regulations Appraisal the Cromarty Firth Special Protection Area (“SPA”) and Moray Firth proposed SPA (“pSPA”) (and its qualifying species) will be assessed to ensure that none of the designations or their qualifying species would be negatively impacted by the proposed development.

7.5.2 SNH comment in their consultation response that they do not anticipate any direct impacts and they do not consider that the proposed development will lead to significant additional disturbance or disruption to feeding and roosting birds in the Cromarty Firth SPA and Ramsar site. It is possible, however, that various indirect effects could arise, such as the construction of the quay wall and dredging and disposal operations could affect local sediment movements with implications for the intertidal habitats of Nigg Bay. This in turn could affect feeding potential for the qualifying bird interests. Similarly, lighting at the work site may affect bird movements to and from the adjacent intertidal areas. They provide a list of topics which should be addressed within the EIA report. This list is available within the SNH response in Appendix I.. SNH also identify that there could be an impact on the Moray Firth pSPA and that the EIA report should consider the effects of the proposed works on long-tailed ducks, eiders and divers (red throated and great northern) which are qualifying interests of the pSPA.

7.5.3 The Highland Council also require consideration of the Cromarty Firth SPA Ramsar Site and SSSI and the Moray Firth pSPA. On this basis, they recommend that ornithology should be scoped in.

7.5.4 The Scottish Ministers agree with the opinion of SNH and the Highland Council that ornithology should be scoped in to the EIA report to address the impacts identified.

## **7.6 Cultural Heritage and Archaeology**

7.6.1 The applicant identifies two known heritage assets within the site and considers the potential impact on these. The applicant concludes that the site is of low archaeological potential, and suggests that no significant effects are anticipated

upon any designated heritage assets. On this basis, the applicant suggests that that cultural heritage and archaeology can be scoped out of the EIA report.

7.6.2 In their consultation response, HES state that in this instance they are uncertain about the potential impacts of the proposal on marine and terrestrial cultural heritages assets. They identify a number of terrestrial heritage assets within their remit in close proximity to the development but suggest that consideration should also be given to potential impacts on marine archaeology. Any bathymetric, seabed survey or investigations carried out within the development area should be assessed for heritage interests. Therefore, they recommend that cultural heritage and archaeology be scoped in to the EIA report.

7.6.3 Although the identified heritage assets are terrestrial and therefore will be covered by the Highland Council through the planning process, the absence of consideration of marine archaeology means that the Scottish Ministers agree with HES that cultural heritage and archaeology should be scoped in.

## **7.7 Airborne Noise**

7.7.1 The applicant proposes to include a noise assessment as part of the EIA and will consider the potential for noise generated by the proposed development to impact upon existing residential receptors during both the construction and operational phases.

7.7.2 There were no specific references to airborne noise in any of the consultation responses with regards to the marine works however the Scottish Ministers understand that this will be included in the EIA report to be assessed by the Highland Council through the planning process.

## **7.8 Water Environment and Coastal Process**

7.8.1 The applicant acknowledges that although the proposed development is similar to the South Quay extension and West Finger Jetty developments, the current proposal raises the potential for impacts on the local water environment and coastal processes, including tidal current, wave action, and associated sediment transport processes. Although information from earlier developments may form the basis of the assessment water environment and coastal processes should be scoped in to the EIA. The findings of the assessment should be used to develop appropriate mitigation plans.

7.8.2 In their consultation response, the Highland Council support the need for a coastal process assessment to look at coastal squeeze in the Cromarty Firth. This assessment should include detailed modelling of the level of change with regard to

coastal squeeze. They also request that modelling of the dredge impacts be carried out to assess the impact on nearby shellfish aquaculture sites. SEPA highlight that the land reclamation has the potential to alter wave direction and local geomorphology characteristics such as increasing erosion which in turn may increase flood risk. They request that this is assessed in the EIA report along with proposed mitigation measures for pollution prevention.

7.8.3 The Scottish Ministers concur with the assessments proposed by the applicant in the scoping report and the requirements of the consultees that water environment and coastal process assessments should be scoped in to the EIA report.

## **7.9 Traffic and Transport**

7.9.1 The applicant has identified potential impacts to traffic and transport from a desktop study and further informed by a site visit in January 2019. They have concluded that further studies and traffic surveys are required to demonstrate that there will be no significant effects from the proposed works. The applicant proposes to include these assessments in the EIA report however considers that it is unlikely that a full transport assessment would be required.

7.9.2 In their consultation response, Transport Scotland support the view of the applicant with regards to the inclusion of traffic and transport within the EIA report. They specifically request that the following are considered in the assessment:

- All construction and demolition activities associated with the proposed development including details of anticipated traffic associated with the operational phase
- Traffic should be assessed in percentage terms against existing traffic patterns.
- Cumulative impacts from committed developments should be considered.
- All HGV's transporting construction material to and from the site should be sheeted and require passing through a wheel washing facility prior to exiting the proposed development site
- A worst case scenario of trunk road network impacts in relation to the quantity of re-usable dredge material and the source of any additional material.
- IEMA guidelines, guidelines from the Institution of Highway Engineers and Transport Scotland should be followed.
- Impacts on the A9(T)/B9175 junction should be considered. Baseline traffic count data should be requested from Transport Scotland to inform this assessment.
- For the assessment of accidents, baseline data should be requested from Transport Scotland. If necessary, an assessment of any abnormal loads
- The CEMP should include the following information:



- Envisaged number and type of vehicle movements associated with each phase of development
- Proposed construction programme, including anticipated number of vehicles per day by vehicle type
- Proposed site operating hours during the construction period
- Outcomes and detailed plans from any required swept paths assessment
- Proposed mitigation measures supported by detailed plans as necessary

7.9.3 The Scottish Ministers agree with the applicant and Transport Scotland that traffic and transport should be scoped in to the EIA report and that the assessments identified by Transport Scotland in their consultation response should be undertaken. This will be considered by the Local Authority through the planning process.

## **7.10 Population and Human Health**

7.10.1 The applicant asserts that Human health is a loose and wide term for a number of components that influence public health including pollution, amenity and opportunities gained or lost by direct land-take. Given noise assessment is scoped in to the EIA and a landscape and visual appraisal will be carried out, it is considered that the impacts upon human health can be derived from the outcomes of these assessments, and that the overall health of the local population is not likely to be significantly affected by the proposed development.

7.10.2 Population and human health were not specifically identified by the consultees in their responses. The Scottish Ministers agree with the view of the applicant that any marine aspect of population and human health will be assessed as part of other receptors however assessment of the socio-economic impact will be included in the EIA report for planning purposes.

## **7.11 Climate Change**

7.11.1 The applicant proposes that the development would not result in a significant effect upon climate given the nature of the development. Any increase in emissions will be contained within a detailed CEMP. Discussion of the vulnerability of the project to climate change concerned with the water environment, including flood risk and wave overtopping due to increases in sea level, will be covered within the Water Environment and Coastal Processes chapter.

7.11.2 The Scottish Ministers support the view of the applicant that climate change will be covered in the water environment and coastal processes chapter and can be scoped out of the EIA report as a specific chapter.

## **7.12 Natural Disasters**

7.12.1 The applicant states that the proposed development is not located within an area of significant seismic activity, nor are climatic factors prone to creating disasters such as tsunamis, hurricanes or catastrophic flooding. Accordingly, consideration of natural disasters is scoped out of the EIA.

7.12.2 The Scottish Ministers are content with the assessment provided by the applicant in their scoping report and in light of the fact that no concerns were raised by the consultees, have concluded that natural disasters can be scoped out of the EIA report.

## **7.13 Air Quality**

7.13.1 The applicant has stated in the scoping report that a qualitative discussion of air quality would form part of the Other Issues chapter, with particular reference to dust and its management via the CEMP.

7.13.2 In their consultation response, Transport Scotland comment that air pollution is covered in section 4.9 of the scoping report. As such the Scottish Ministers are content that air quality is included in the Traffic and Transport chapter and therefore have concluded that air quality can be scoped out of the EIA report.

## **7.14 Navigation and Vessel Movements**

7.14.1 The applicant has proposed that a standalone chapter on navigation and vessel movements is scoped out of the EIA report. Discussion of navigation would be included within the Other Issues chapter. This would include an assessment of the impacts of dredging upon vessel movements, and protocol including notices to mariners, updates of admiralty charts and exclusion areas during construction.

7.14.2 In their consultation response, the NLB request regular communications to be maintained with regards to marking and lighting during both construction and operational stages of the proposed development.

7.14.3 The Scottish Ministers are of the opinion that due to the already busy nature of the Nigg basin within which the proposal is located, navigation and vessel movements should be scoped in.

## **7.15 Cumulative Assessment**

7.15.1 The applicant acknowledged that there may be cumulative interactions with

other terrestrial and marine based developments which are committed through the planning and marine licencing system. The developments identified in the scoping report are Ardersier, Invergordon Phase 4 and Nigg Bay Aberdeen. However, they propose to address this under each of the relevant receptors and have determined that cumulative assessment should be scoped out of the EIA report.

7.15.2 In their consultation response, SNH specifically note the Conservation (Natural Habitats, &c.) Regulations 1994 as amended, (the “Habitats Regulations”) require proposals to be considered “in combination with other plans or projects” SNH highlight there maybe cumulative impacts of vessel movements for example and that the EIA should therefore take into account other marine developments in the area, in particular Invergordon.

7.15.3 The Scottish Ministers advise that the applicant contacts SNH, in addition to the approaches listed in the scoping report, to identify projects with potential cumulative effects. In general however, the Scottish Ministers are supportive of the applicants approach to assess cumulative impacts for each receptor in each chapter of the EIA and thus conclude that a standalone chapter on cumulative assessment can be scoped out of the EIA report.

## **8. Marine Planning**

### **8.1 Background**

8.1.1 The development of projects subject to EIA should be in accordance with the UK Marine Policy Statement and the National Marine Plan (“NMP”).

### **8.2 The UK Marine Policy Statement 2011**

8.2.1 The UK Administrations share a common vision of having clean, healthy, safe, productive and biologically diverse oceans and seas. Joint adoption of a UK-wide Marine Policy Statement provides a consistent high-level policy context for the development of marine plans across the UK to achieve this vision. It also sets out the interrelationship between marine and terrestrial planning regimes. It requires that when the Scottish Ministers make decisions that affect, or might affect, the marine area they must do so in accordance with the Statement.

### **8.3 Scotland’s NMP 2015**

8.3.1 Developed in accordance with the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 (as amended), the NMP provides a comprehensive statutory planning framework for all activities out to 200 nautical miles. This includes policies for the sustainable management of a wide range of marine industries. The Scottish Ministers must make authorisation and enforcement decisions, or any other decision that affects the marine environment, in accordance with the NMP. The NMP sets out a presumption in favour of sustainable development and use of the marine environment when consistent with the policies and objectives of the Plan.

### **8.4 Application and EIA Report**

8.4.1 It should be noted that any changes produced after the EIA report is submitted may require further environmental assessment and public consultation.

## **9. Multi-Stage Regulatory Approval**

### **9.1 Background**

9.1.1 The 2017 MW Regulations contain provisions regulating the assessment of environmental impacts. A multi-stage approval process arises where an approval procedure comprises more than one stage, one stage involving a principal decision and one or more other stages involving an implementing decision(s) within the parameters set by the principal decision. While the effects which works may have on the environment must be identified and assessed at the time of the procedure relating to the principal decision, if those effects are not identified or identifiable at the time of the principle decision, assessment must be undertaken at the subsequent stage.

9.1.2 The definition in the 2017 MW Regulations is as follows: *“application for multi-stage regulatory approval” means an application for approval, consent or agreement required by a condition included in a regulatory approval where (in terms of the condition) that approval, consent or agreement must be obtained from the Scottish Ministers before all or part of the works permitted by the regulatory approval may be begun*”.

9.1.3 A marine licence, if granted, by the Scottish Ministers for your works at Nigg Energy Park East Quay, may have several conditions attached requiring approvals etc. which fall under this definition, for example the approval of a CMS.

9.1.4 When making an application for multi-stage approval the applicant must satisfy the Scottish Ministers that no significant effects have been identified in addition to those already assessed in the EIA report. In doing so, the applicant must account for current (meaning at the time of the multi-stage application) knowledge and methods of assessment which address the likely significant effects of the works on the environment so to enable the Scottish Ministers to reach a reasoned conclusion which is up to date.

9.1.5 If during the consideration of information provided in support of an application for multi-stage regulatory approval the Scottish Ministers consider that the works may have significant environmental effects which have not previously been identified in the EIA report (perhaps due to revised construction methods or updated survey information), then information on such effects and their impacts will be required. This information will fall to be dealt with as additional information under the 2017 MW Regulations, and procedures for consultation, public participation, public notice and decision notice of additional information will apply.

## **10. Judicial review**

All decisions may be subject to judicial review. A judicial review statement should be made available to the public.

## **11. Gaelic Language**

If the proposed works are located in an area where Gaelic is spoken, the applicant is encouraged to adopt best practice by publicising details of the proposed works in both English and Gaelic.

Signed

[Redacted]

**Louise Msika**

**20 May 2019**

Authorised by the Scottish Ministers to sign in that behalf.

## **Appendix I: Consultee Responses**

Cromarty Forth Port Authority



## Cameron J (Jacqueline)

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**From:** Calum Slater <calum@cfpa.co.uk>  
**Sent:** 27 March 2019 16:08  
**To:** MS Marine Licensing  
**Cc:** Rose M (Malcolm) (MARLAB)  
**Subject:** Nigg Energy Park EIA Scoping

To whom it may concern

Although we were not given the pleasure of being consultees for the EIA scoping document provided for the Nigg Energy Park development, from what we have seen of the report there is was nothing we wish to add.

As the statutory Harbour Authority, it would be very much appreciated if we could be included within any future circulation of documents for the proposed development at Nigg Energy Park as part of the consultation process.

Should you wish to discuss, please give me a call.

Kind regards

Calum Slater



**Calum Slater | General Manager**

**Port Office, Shore Road, Invergordon IV18 0HD**

**tel:** 01349 852308 | **fax:** 01349 853181 | **mob:** 07747 805 567 | **web:** [www.cfpa.co.uk](http://www.cfpa.co.uk)

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## Historic Environment Scotland



HISTORIC  
ENVIRONMENT  
SCOTLAND

ÀRAINNEACHD  
EACHDRAIDHEIL  
ALBA

By email to:

[MS.MarineLicensing@gov.scot](mailto:MS.MarineLicensing@gov.scot)

Marine Scotland  
Marine Laboratory  
375 Victoria Road  
Aberdeen  
AB11 9DB

Longmore House  
Salisbury Place  
Edinburgh  
EH9 1SH

[Alison.Baisden@hes.scot](mailto:Alison.Baisden@hes.scot)

T: 0131 668 8575

Our case ID: 300035852

25 March 2019

Dear Sir/Madam

**Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017  
Nigg Energy Park, East Quay  
EIA Scoping Report**

Thank you for your consultation which we received on 26 February about the above scoping report. We have reviewed the details in terms of our historic environment interests. This covers world heritage sites, scheduled monuments and their settings, category A-listed buildings and their settings, inventory gardens and designed landscapes, inventory battlefields and historic marine protected areas (HMPAs).

The Highland Council's archaeology and conservation advisory service will also be able to offer advice on the scope of the cultural heritage assessment. This may include heritage assets not covered by our interests, such as unscheduled archaeology, and category B- and C-listed buildings.

**Proposed Development**

We understand that the proposals are for the construction and formation of a new East Quay and associated laydown area, situated at Nigg Energy Park near Cromarty.

**Scope of Assessment**

We have reviewed the EIA Scoping Report for the proposals and, in this instance, are uncertain about the potential impacts of the proposals on marine and terrestrial cultural heritage assets. We would therefore recommend that further assessment is undertaken in order to inform the scope of the Environmental Impact Assessment (EIA).

We note, for example, that a number of terrestrial heritage assets within our remit are located in proximity to the proposed development. These include *Dunskeath Castle* (Scheduled Monument, Index no. 3319), *Cromarty House* (Inventory Designed Landscape, GDL120) and Category A listed buildings located in north Comarty. We would therefore recommend that further assessment should be informed by a considered analysis of the setting of each heritage asset, and underpinned by visualisations where impacts have the potential to be significant.

Historic Environment Scotland – Longmore House, Salisbury Place, Edinburgh, EH9 1SH

Scottish Charity No. **SC045925**

VAT No. **GB 221 8680 15**



Consideration should also be given to the potential for impacts on marine archaeology. We would recommend that any desk-based assessment and survey work undertaken should inform the scope of an EIA. We would also expect that any bathymetric, seabed survey or investigations carried out within the development area should be assessed for heritage interests.

We would welcome further engagement with the developer as the proposals progress.

### **Further information**

Guidance about national policy can be found in our 'Managing Change in the Historic Environment' series available online at [www.historicenvironment.scot/advice-and-support/planning-and-guidance/legislation-and-guidance/managing-change-in-the-historic-environment-guidance-notes](http://www.historicenvironment.scot/advice-and-support/planning-and-guidance/legislation-and-guidance/managing-change-in-the-historic-environment-guidance-notes).

Guidance about the EIA process, including a link to our EIA Handbook, can also be found online at <https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/environmental-assessment/environmental-impact-assessment/>.

Technical advice is available on our Technical Conservation website at <http://conservation.historic-scotland.gov.uk/>.

We hope this is helpful. Please contact us if you have any questions about this response. The officer managing this case is Alison Baisden and they can be contacted by phone on 0131 668 8575 or by email on [Alison.Baisden@hes.scot](mailto:Alison.Baisden@hes.scot).

Yours faithfully

**Historic Environment Scotland**

Highland Council

Email response:MS.MarineLicensing@gov.scot

Please ask for:

Direct Dial:

E-mail:

OurRef:

Date:

Sarah Lamb

01955608265

sarah.lamb@highland.gov.uk

19/00929/MAR

4 March 2019

Dear Sir/Madam

### **MS-LOT Licensing Development Works at Nigg Energy Park, East Quay – Scoping Report**

Thank you for consulting us on 26<sup>th</sup> February 2019 regarding the scoping report for the above works.

### **Coastal Planner response: 27/02/2019**

The extensive scale of the proposal will require very careful consideration regarding impacts on the various designated sites within or adjacent to it, as well as on wider biodiversity. In particular, the Moray Firth SAC, especially around the mouth of the Suters as a key transit area for the dolphins. A detailed Appropriate Assessment will be required.

The proposal lies adjacent to the proposed Moray Firth SPA (pSPA) and the Cromarty Firth SPA. Section 4.5.3. notes that “from the data obtained, the proposed development is considered unlikely to cause significant effects....”. This data and any accompanying assessment should be supplied which outlines the justification for this conclusion; this can then be used to inform the Appropriate Assessment.

Table 4.7 should include the Moray Firth pSPA.

The proposal lies adjacent to the Cromarty Firth Ramsar site, as well as the SSSI. Section 4.5 does not appear to include any information regarding the baseline or likely impacts on the Ramsar; this is a concern given the potential for significant disturbance, therefore it's of the opinion that ornithology should not be scoped out.

There are also a number of PMFs in the area (e.g. horse mussel beds); assessment of the impact upon these designated sites/species and appropriate mitigation will likely mirror those for the SPA, pSPA and SAC in some cases. However, as these wider biodiversity aspects (i.e. Ramsar, SSSI, PMFs) may not be considered in the information provided to inform the AA, they should be assessed in the EIAR. It would be helpful if the EIAR also includes a summary of the information to inform the AA, but the information for inform the AA should be a separate, stand-alone document.

The area of land claimed from the sea will add to further coastal squeeze in the Cromarty Firth. The cumulative impacts with recent and any proposed works current within the planning/licencing system with Cromarty Firth ports should be considered. The dimensions of the quay do not appear to be included therefore the EIAR should include detailed modelling of the level of change with regard to coastal squeeze.

The dredge disposal site should be clarified and modelling of dredge impacts should include an assessment of any potential impacts on the relatively nearby large shellfish sites.

Appendix B appears to only focus on terrestrial species and does not include the qualifying features in the numerous adjacent designated sites. Whilst the summary notes there are no statutory designated sites within the proposal area, Natura requirements include the need to consider the potential impacts, not matter how far away they are. Given the potential for significant disturbance and thus likely significant effects, this appears to be a significant omission.

Yours faithfully

Sarah Lamb  
Case Officer

Northern Lighthouse Board



# Northern Lighthouse Board

Your Ref: Nigg Energy Park – East Quay  
Our Ref: AL/OPS/ML/C8\_03\_089

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Marine Scotland – Marine Planning & Policy  
Scottish Government  
Marine Laboratory  
375 Victoria Road  
Aberdeen  
AB11 9DB

26 February 2019

## PART 4, REGULATION 14 (2) OF THE MARINE WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) (SCOTLAND) REGULATIONS 2017 (AS AMENDED) ('THE EIA REGULATIONS')

Thank you for your e-mail correspondence dated 26 February 2019 regarding the Scoping Report submitted by **Envirocentre Limited** on behalf of **Global Energy Nigg Limited**, in relation to their proposed development of East Quay, at the Nigg Energy Park, Cromarty Firth.

Northern Lighthouse Board has no objections to the scoping report and recommends the following:

- **Global Energy Nigg Ltd** maintain regular communication with NLB with regard to navigational marking and lighting covering both the construction and operational stage of the development.

Yours sincerely  
[Redacted]

Peter Douglas  
Navigation Manager

### Privacy Statement

NLB take seriously the protection of your privacy and confidentiality, and understand that you are entitled to know that your personal data will not be used for any purpose unintended by you. In line with our document retention schedules, copies of this correspondence will be retained on our live internal system in line with our legislative requirements and obligations, before being archived as required for conformance with our data Protection Policy and the associated Data Retention Schedules. Archived copies may be retained indefinitely in the public interest. Our Privacy Notice can be accessed via the following link: <https://www.nlb.org.uk/Terms/Privacy/>

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5 March 2019

Marine Scotland Licensing Operations Team  
Scottish Government  
Marine Laboratory,  
375 Victoria Road,  
Aberdeen,  
AB11 9DB

[MS.MarineLicensing@gov.scot](mailto:MS.MarineLicensing@gov.scot)

Dear Madam/Sir,

**Global Energy Nigg (Per Envirocentre Ltd) - Development Works at Nigg Energy Park, East Quay**

I have read the scoping report on the above project on behalf of RYA Scotland and can confirm that recreational boating can be scoped out of the EIA.

Yours faithfully.  
[Redacted]



Dr G. Russell FRMetS MCIEEM  
Planning and Environment Officer, RYA Scotland

Scottish Environmental Protection Agency

Our ref: PCS/164102  
Your ref:

If telephoning ask for:  
Aden McCorkell

20 March 2019

Marine Scotland  
Scottish Government  
Marine Laboratory  
375 Victoria Road  
Aberdeen  
AB11 9DB

By email only to: [ms.marinelicensing@gov.scot](mailto:ms.marinelicensing@gov.scot)

Dear Sir/Madam

**Marine (Scotland) Act 2010  
Development Works  
East Quay, Nigg Energy Park, Nigg**

Thank you for consulting SEPA on the scoping opinion for the above development proposal which SEPA received on 26 February 2019. We would welcome engagement with the applicant at an early stage to discuss any of the issues raised in this letter.

We would welcome the opportunity to comment on the draft Environmental Impact Assessment Report (EIAR). Please note that we can process files only of a maximum size of 25MB and therefore, when the EIAR is submitted, we would ask that it be divided into appropriately sized and named sections.

**1. Works below Mean High Water Springs**

- 1.1 For works below Mean High Water Springs, we generally do not provide site specific advice on works that will be regulated under The Marine (Scotland) Act 2010 or Harbours Acts. Instead, please refer to our standing advice on marine consultations within guidance document [SEPA standing advice for The Department of Energy and Climate Change and Marine Scotland on marine consultations](#).
- 1.2 We note the proposals to re-use dredging spoil within the quay and possible onshore. We would specifically highlight our advice in Section 3.3 and 3.4 within the guidance document [SEPA standing advice for The Department of Energy and Climate Change and Marine Scotland on marine consultations](#) with regards the re-use of dredged material and remind the applicant to consider the potential risk of contaminants being present in the spoil.

**2. Site layout**



Chairman  
Bob Downes

Chief Executive  
Terry A'Hearn

**SEPA Dingwall Office**  
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Dingwall Business Park, Dingwall IV15 9XB  
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- 2.1 All maps must be based on an adequate scale with which to assess the information. This could range from OS 1: 10,000 to a more detailed scale in more sensitive locations. Each of the maps below must detail all proposed upgraded, temporary and permanent site infrastructure. This includes all temporary or permanent access tracks, excavations, buildings, borrow pits, pipelines, site compounds, laydown areas, storage areas and any other built elements.
- 2.2 Existing built infrastructure must be re-used or upgraded wherever possible. The layout should be designed to minimise the extent of new works on previously undisturbed ground. A comparison of the environmental effects of alternative locations or layouts may be required.

### **3. Surface water drainage**

- 3.1 Surface water runoff must be treated by sustainable drainage systems (SUDS) therefore it is important to ensure that adequate space to accommodate SUDS is incorporated within the site layout.
- 3.2 The proposals should meet the treatment requirements of [CIRIA C753](#). A site plan showing the proposed SUDS treatment train for both temporary and permanent works must be submitted. Different areas of the development will require different levels of treatment. For example, run-off from car parking or marshalling areas will require greater treatment than roof run-off.
- 3.3 The Simple Index Approach calculation (Section 26.7.1 of the guidance) should be used for the lower risk areas within the site. For yard areas, refuelling areas or areas where there is a higher pollution risk, a detailed risk assessment (Section 26.7.3 of CIRIA C753) must be submitted. We are likely to regulate discharges from high risk areas under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (As Amended) (CAR).
- 3.4 In addition there may be existing surface water drainage outfalls in the locality. Any redevelopment provides an opportunity to upgrade the treatment of these discharges and bring them in line with current practice. All existing surface water discharges and their treatment systems must be shown on a site map.
- 3.5 Comments on the acceptability of post-development runoff rates for flood control should be sought from the local authority flood prevention unit, and not from SEPA. Comments from Scottish Water should be sought where the SUDS proposals would be adopted by them. We encourage the design of SUDS to Sewers for Scotland Second Edition standards and the adoption of SUDS features by Scottish Water as we are of the view that this leads to best standards and maintenance.

### **4. Flood risk**

- 4.1 All of the proposed sites lie within the medium likelihood (0.5% annual probability or 1 in 200 year) flood extent of the SEPA Flood Maps and may therefore be at medium to high risk of flooding. However as these proposals are for the redevelopment and extension of the existing yard area then we would consider these as being a water compatible use, and have to be located within the functional floodplain for operational reasons.
- 4.2 We noted that there may be some form of land reclamation to increase the quay area. Due to the low vulnerability of the proposed land use we would be unlikely to have any issue with the marshalling area being situated on reclaimed land.

- 4.3 However land reclamation has the potential to alter wave direction and local geomorphology characteristics such as increasing erosion. These changes may increase flood risk, and therefore the risk of increasing flood risk should be assessed. Whilst Marine Scotland will advise on the coastal geomorphic aspects of these assessments we can provide flood risk advice.
- 4.4 All new development, including development on reclaimed land, should be above the estimated 1 in 200 year flood level for the area, unless that particular aspect of the proposal needs to be lower for operational reasons. This will enable the developments to be more resilient during times of flood or storm events. We would also recommend the use of water resistant materials and forms of construction as appropriate.
- 4.5 The estimated 1 in 200 year flood level is 3.37mAOD based on extreme still water level calculations using the Coastal Flood Boundary (CFB) Method. This does not take into account the potential effects of wave action, funnelling or local bathymetry at this location. We would recommend a minimum 600mm freeboard is added to the CFB levels to allow for modelling uncertainties.

## **5. Existing waste water outfalls**

- 5.1 There may be existing waste water outfalls at the site. All existing outfalls should be identified and details of how each will be accommodated included on the site plans.

## **6. Pollution prevention during construction**

- 6.1 *One of our key interests in relation to developments is pollution prevention measures during the periods of construction, operation, maintenance, demolition and restoration. All proposed mitigation should be detailed within a suitably robust schedule of mitigation.*
- 6.2 The schedule of mitigation should be supported by the above site specific maps and plans. These must include reference to best practice pollution prevention and construction techniques (for example, limiting the maximum area to be stripped of soils at any one time) and regulatory requirements. They should set out the daily responsibilities of ECOWs, how site inspections will be recorded and acted upon and proposals for a planning monitoring enforcement officer. Please refer to the [Guidance for Pollution Prevention \(GPPs\)](#).
- 6.3 During the Major Pre-Application meeting, the applicant sought our advice on how to protect the water quality of the Cromarty Firth in relation to this development. Provided the above pollution prevention measures are implemented then the firth's water quality should not be significantly impacted.

## **7. Regulatory advice for the applicant**

- 7.1 Authorisation is required under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) for any discharges or engineering works in or in the vicinity of inland surface waters (other than groundwater) or wetlands. Inland water means all standing or flowing water on the surface of the land (e.g. rivers, lochs, canals, reservoirs).
- 7.2 Management of surplus peat or soils may require an exemption under The Waste Management Licensing (Scotland) Regulations 2011. Proposed crushing or screening will require a permit under The Pollution Prevention and Control (Scotland) Regulations 2012.

7.3 A Controlled Activities Regulations (CAR) construction site licence will be required for management of surface water run-off from a construction site, including access tracks, which:

- is more than 4 hectares,
- is in excess of 5km, or
- includes an area of more than 1 hectare or length of more than 500m on ground with a slope in excess of 25°

7.4 See SEPA's [Sector Specific Guidance: Construction Sites \(WAT-SG-75\)](#) for details. Site design may be affected by pollution prevention requirements and hence we strongly encourage the applicant to engage in pre-CAR application discussions with a member of the regulatory services team in your local SEPA office.

7.5 Details of regulatory requirements and good practice advice for the applicant can be found on the [Regulations section](#) of our website. If you are unable to find the advice you need for a specific regulatory matter, please contact a member of the operations team in your local SEPA office at: Graesser House, Fodderty Way, Dingwall Business Park, Dingwall IV15 9XB Tel: 01349 862021.

If you have any queries relating to this letter, please contact me by telephone on 01349 860353 or e-mail at [planning.dingwall@sepa.org.uk](mailto:planning.dingwall@sepa.org.uk).

Yours sincerely

Aden McCorkell  
Senior Planning Officer  
Planning Service

*Disclaimer*

*This advice is given without prejudice to any decision made on elements of the proposal regulated by us, as such a decision may take into account factors not considered at this time. We prefer all the technical information required for any SEPA consents to be submitted at the same time as the planning or similar application. However, we consider it to be at the applicant's commercial risk if any significant changes required during the regulatory stage necessitate a further planning application or similar application and/or neighbour notification or advertising. We have relied on the accuracy and completeness of the information supplied to us in providing the above advice and can take no responsibility for incorrect data or interpretation, or omissions, in such information. If we have not referred to a particular issue in our response, it should not be assumed that there is no impact associated with that issue. For planning applications, if you did not specifically request advice on flood risk, then advice will not have been provided on this issue. Further information on our consultation arrangements generally can be found on our [website planning pages](#).*



## Scottish Natural Heritage

Planning Ref:	18/01459/PREAPP
Proposal Name	Construction of new quay with associated dredging and change of use of adjacent countryside land including Dunskeath House
Date of Meeting	4 <sup>th</sup> April 2018
Date of Response	18 <sup>th</sup> April 2018

### Response

#### DESIGNATED SITES

The proposal could affect the Moray Firth Special Area of Conservation (SAC), the Dornoch Firth and Morrich More SAC, the Cromarty Firth Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI), the proposed Moray Firth SPA and European Protected Species (EPS). Information on the special features and conservation objectives for these designated sites can be found [here](#).

The requirements of the Conservation (Natural Habitats, &c.) Regulations 1994, as amended, (the "Habitats Regulations") will apply in this case. See [here](#) for a summary of the legislative requirements.

#### Moray Firth SAC – dolphins

##### Impacts

- The Sutors area is the most used location for the most dolphins within the SAC and the wider North East Scotland dolphin population.
- The proposal has the potential to affect the dolphins through underwater noise and disturbance associated with the construction and operation of the port.
- The main activities likely to result in noise or disturbance are piling, dredging and disposal activities and vessel movements.

##### What the ES/HRA should address

- We recognise that this is a design and build proposal however the ES should still describe in as much detail as possible at this time what is envisaged regarding piling. Specifically, what type of piling will be deployed (impact and/or vibro) and the relative split between these, the size and number of the piles, the time of the year when piling is likely to occur and for how long. Underwater sound profiles showing how noise will propagate into the waters of the surrounding SAC should be provided. Previous sound modelling carried out for the South quay development in 2013/14 will be helpful in this regard.
- The ES should describe in as much detail as possible what is envisaged regarding the dredge and disposal operations, in terms of the volumes of material involved and the timing of the works.
- The ES should describe the expected increase in vessel movements associated with

both the construction and operational phases. Previous modelling on vessel movements carried out by the University of Aberdeen in 2011<sup>1</sup> will be helpful. The ES should clarify whether anticipated increased vessel movements are broadly in line with the assumptions made in the 2011 model and, if not, then additional modelling may be required.

#### Possible mitigation/enhancement

- We recommend that a Marine Mammal Protection Plan is drawn up. This should include:
  - A robust noise assessment which looks at the likely source levels, their range and likely impacts on the various marine mammals likely to be present.
  - Planned monitoring and mitigation, for example use of Marine Mammal Observers, soft starts, bunds, vessel movements, etc. This should identify mitigation options including compliance with the '[Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise](#)'.
- All disposal of dredged material associated with the works should be undertaken in accordance with the standard dredging best practice protocol applied by Marine Scotland for all dredging operations in the Moray Firth.
- We encourage the applicant to liaise with the University of Aberdeen on monitoring noise levels and cetacean presence/absence during the construction phase in particular. The University have expertise and equipment that will be useful for the applicant - a better understanding of the nature and consequences of the proposal will help to both inform this and future port developments at Nigg.

#### **Moray Firth SAC – subtidal sandbanks**

##### Impacts

- The potential impacts on marine habitats and the associated benthic communities relate to dredging and disposal operations and coastal construction works including:
  - Risk of pollution from mobilising contaminated sediments or site run-off.
  - Potential alteration to extent, distribution and composition of marine habitats and species as a result of changes in hydrographic/coastal processes.
  - Smothering/increases in suspended sediment.

##### What the ES/HRA should address

- The ES should describe in as much detail as possible the proposed dredge and disposal operations. This should include a BPEO providing an analysis of all disposal options available, including the potential for beneficial use in the East Quay development and/or the wider area.
- Sediment modelling to assess potential alteration to extent, distribution and composition of marine habitats and species as a result of changes in hydrographic/ coastal processes. We advise that the previous sediment modelling carried out for the South Quay development, together with any monitoring data held by Marine Scotland, should be sufficient for this application.
- The qualifying habitats and species associated with the subtidal sandbank feature and the [Priority Marine Features](#) that are associated with these habitats should be the focus of the assessment.

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<sup>1</sup> SNH Commissioned Report 468: The development of a framework to understand dolphin behaviour and from there predict the population consequences of disturbances for the Moray Firth bottlenose dolphin population.

#### Possible mitigation/enhancement

- The applicant may wish to prepare a dredging plan integrated within the construction environmental management plan and the operational environment management plan, reflecting industry best practice. This would set out how dredge/disposal operations will take place in relation to the subtidal sandbanks and the other designated features.
- We recognise that any dredging plan should be considered in context with the long history of dredging and disposal operations at the Sutors and that past disposal at this location does not appear to have had any lasting adverse impacts.

#### **Dornoch Firth and Morrich More SAC - common seal**

##### Impacts

- Common seals occur in the Cromarty Firth, particularly at haul outs near Foulis. This is less than 50km from the Dornoch Firth and Morrich More SAC and common seals are a qualifying interest of that site. There is therefore connectivity between that SAC and the common seals that occur in the Cromarty Firth and the waters around Nigg.
- The proposal has the potential to affect common seals through underwater noise and disturbance associated with the construction phase of work.

##### What ES needs to address

- The ES needs to consider the likely impact of underwater noise and disturbance associated with the construction phases on common seals.

#### Possible mitigation/enhancement

- The Marine Mammal Protection Plan (see 'mitigation/enhancement section of the Moray Firth – SAC Dolphins' section above) should include the common seal interest.

#### **Cromarty Firth SPA and Ramsar site – birds**

##### Impacts

We do not anticipate any direct impacts and we do not consider that the proposed development will lead to significant additional disturbance or disruption to feeding and roosting birds in the SPA. It is possible, however, that various indirect effects could arise, including:

- The construction of the quay wall and dredging and disposal operations could affect local sediment movements with implications for the intertidal habitats of Nigg Bay. This in turn could affect feeding potential for the qualifying bird interests.
- Lighting at the work site may affect bird movements to and from the adjacent intertidal areas.

##### What the ES/HRA should address

- The ES should include sediment modelling studies to assess the possible effect of reduced bird feeding habitat available on Nigg Bay from changes in sedimentation as a result of maintenance and capital dredging. There should be sufficient information in terms of sediment dynamic assessments and/or mitigation measures to demonstrate that the proposals will not adversely affect the integrity of the SPA. We advise that the

previous sediment modelling carried out for the South Quay development, together with any monitoring data held by Marine Scotland, should be sufficient for this application.

- The ES should consider the effects of lighting at the work site and how this may affect bird movements to and from the adjacent intertidal areas.
- The ES should consider the effects on common terns. The actions that would be taken by the developers should terns become a problem for the work force should be described. Terns can become highly territorial and protective of their nests and young from April through to July inclusive and this has been a significant issue for Global Energy Nigg and other energy-related facilities in the past.

#### Possible mitigation/enhancement

- Tight zonation of construction and operational activities, coupled with screening, directional lighting etc.
- Arrangements for disposal of spoil to avoid enhanced erosion/accretion of and damage to intertidal foraging areas used by waders. Re-use of dredged material should be deployed as far as possible.

### **Cromarty Firth Ramsar site – habitats**

#### Impacts

- The potential for capital and maintenance dredging to result in changes in sedimentation patterns affecting intertidal habitats (and bird food supplies).

#### What the ES/HRA should address

- See comments under 'Cromarty Firth SPA and Ramsar site – birds'.

#### Possible mitigation/enhancement

- See comments under 'Cromarty Firth SPA and Ramsar site – birds'.

### **Proposed Moray Firth SPA**

#### Impacts

- The dredge disposal element of the proposal is within the pSPA and there is therefore the potential for this to disturb the qualifying, wintering bird species.
- The main species that occur within the vicinity, from October through to March, are long-tailed ducks, eiders and divers (red throated and great northern). Whilst these species do occur in the Sutors area, they are generally further out to sea and their abundance is low at the disposal site.

#### What the ES/HRA should address

- The ES should consider the effects of disposal operations on long-tailed ducks, eiders and divers (red throated and great northern).

### **Cromarty Firth SSSI**

#### Impacts

- The Cromarty Firth is designated for its wintering bird interests (addressed under the 'Cromarty Firth SPA and Ramsar site – birds' section above) and for the mudflat, sandflat and saltmarsh habitats present. [Priority Marine Features](#) may also be associated with these habitats. Dredging and disposal may smother these coastal habitats and disrupt the processes on which they depend.

#### What the ES/HRA should address

- The ES should describe how the mudflat, sandflat and saltmarsh habitats might be affected by the dredging and disposal activities. The comments above under 'Moray Firth Ramsar site – habitats' are pertinent.

#### Possible mitigation/enhancement

- See comments in the 'Moray Firth Ramsar site – habitats' section above.

### **European Protected Species**

#### **Cetaceans**

##### Impacts

- There are a number of cetacean EPS species present in the Moray Firth. In addition to bottlenose dolphins, the main species that are likely to be affected by this proposal are porpoise and minke whale. Others may be in the vicinity but are likely to be transient in nature, occur in low numbers and any impacts could be reduced through following mitigation identified for bottlenose dolphin.
- Construction activities can cause disturbance to cetaceans.

#### What ES needs to address

- The ES should assess the potential impact of underwater noise on bottlenose dolphins, harbour porpoise and minke whale.

#### Possible mitigation/enhancement

- An EPS license is likely to be required from Marine Scotland.

#### **Bats**

##### Impacts

- All bat species found in Scotland are classed as EPS. The protection extends to bat roosts. A bat roost is any structure or place that a bat, or group of bats, uses for shelter or protection. As bats return to the same places every year, a bat roost is protected even if no bats are present. Dunskeath House provides a suitable habitat for bats and the building may support roosting bats.

#### What ES needs to address

- The ES should include a bat survey of Dunskeath house.

#### Possible mitigation/enhancement

- If bats are present then the applicant will need to apply for a licence from us to permit development to proceed that might otherwise result in an [offence in relation to bats](#).

### Landscape

- There are no national landscape designations relevant to this proposal although the sea and coast are within the East Ross Special Landscape Area (SLA) and the site is a major feature within this SLA. We understand that advice on landscape aspects will be provided by The Highland Council.

### Cumulative effects

- The [Conservation \(Natural Habitats, &c.\) Regulations 1994 as amended, \(the "Habitats Regulations"\)](#) require proposals to be considered "in combination with other plans or projects".
- There may be cumulative impacts of vessel movements associated with this proposal in combination with other development proposals close by. The ES should therefore take into account other marine developments in the area which use the same waters as the vessels associated with this development, in particular vessels associated with the proposed harbour development at Invergordon. Collaboration between the applicant and the Port of Cromarty Firth to look at vessel movements associated with these two proposals together would provide a useful way forward.

Key Points	Assessments to be carried out and/or submitted with application
<ul style="list-style-type: none"> <li>• The key natural heritage issues are likely to be impacts on designated features of European importance especially bottlenose dolphins and potentially subtidal and intertidal habitats and the knock on effects of this for wintering birds.</li> <li>• Establishing the potential implications for the integrity of the features will depend, in particular, on the quality and outcome of further assessments of the dredging and disposal of materials, underwater noise from piling and other activities and vessel movements.</li> <li>• It is likely that the impacts on these features can be addressed through design and mitigation.</li> <li>• Further information is required on cumulative effects and how the impacts of the proposed development will be assessed in combination with other existing or proposed developments.</li> </ul>	<ul style="list-style-type: none"> <li>• Assessment of the type and duration of piling to be deployed.</li> <li>• Underwater sound profiles showing how noise from piling activities will propagate into the surrounding waters.</li> <li>• Assessment of the dredge and disposal operations, in terms of the volumes of material and the timing of the works. This should include a BPEO.</li> <li>• Sediment modelling to assess potential alteration to extent, distribution and composition of marine habitats and species as a result of changes in hydrographic/ coastal processes.</li> <li>• Assessment of a change in vessel movements associated with both the construction and operational phases of the proposal.</li> <li>• Assessment of the effects of lighting at the work site and how this may affect bird movements to and from the adjacent intertidal areas.</li> <li>• Assessment of how to deal with common terns should they become a problem for the work force.</li> <li>• EPS licenses will/may be required for</li> </ul>

	cetacean species and bats. <ul style="list-style-type: none"> <li>Assessment of cumulative effects, especially in relation to vessel movements.</li> </ul>
--	--

Organisation	Scottish Natural Heritage
Name	Ben Leyshon
Position	Operations Officer
Email	<a href="mailto:Ben.leyshon@hotmail.co.uk">Ben.leyshon@hotmail.co.uk</a>
Phone	01463 7001613

*Please attach any additional information as a separate file and send to  
[majorpreapps@highland.gov.uk](mailto:majorpreapps@highland.gov.uk)*



## Cameron J (Jacqueline)

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**From:** Nathan McLaughlan <Nathan.McLaughlan@nature.scot>  
**Sent:** 27 March 2019 14:46  
**To:** MS Marine Licensing  
**Subject:** Consultation Response – Nigg Energy Park – Construction of new East Quay including dredging and piling  
**Attachments:** Major Pre-Application Advice Service - 4 April 2018 - Global Energy Nigg - South Quay - SNH Response - 18 April 2018.docx

Dear MS-LOT

### **Consultation Response – Nigg Energy Park – Construction of new East Quay including dredging and piling**

Thank you for consulting us on the above proposal. We have previously provided pre-application advice, and responded to a screening request (19/00632/SCRE) and scoping request (19/00629/SCOP) for the planning application.

Our pre-application advice (attached) dated April 2018 is still applicable. We outlined the likely significant effects to the environment with regards to our interests. The screening and scoping information provided by the applicant demonstrates this advice has been considered. As stated previously in our pre-app advice the applicant should consider the impacts of the development on the following designated sites:

- Moray Firth Special Area of Conservation (Bottlenose dolphins and sub-tidal sandbanks)
- Dornoch Firth and Morrich More SAC (Common Seal)
- Cromarty Firth Special Protection Area (all species)
- Cromarty Firth Ramsar site (habitats)
- Proposed Moray Firth SPA (all species)
- Cromarty Firth Site of Special Scientific Interest (intertidal habitats)

The development should consider the following European protected species:

- All species of cetacean
- Bats

Our pre-application advice contains details of specific issues the ES should address, and possible mitigation/enhancement that could be included.

Should you have any further questions please feel free to contact me.

Kind regards,

Nathan

**N.B. my email address has now changed to [Nathan.mclaughlan@nature.scot](mailto:Nathan.mclaughlan@nature.scot)**

**Nathan McLaughlan** | Operations Officer

Scottish Natural Heritage | Fodderty Way | Dingwall Business Park | Dingwall | IV15 9XB | t: 01463 701610  
Dualchas Nàdair na h-Alba | Slighe Fhodhraitidh | Pairc Gnothachais Inbhir Pheofharain | Inbhir Pheofharain | IV15 9XB

[nature.scot](http://nature.scot) – Connecting People and Nature in Scotland – [@nature\\_scot](https://twitter.com/nature_scot)

Scottish Water

5<sup>th</sup> March 2019

Marine Scotland  
Scottish Government 375 Victoria Road  
Aberdeen  
AB11 9DB



Development Operations  
The Bridge  
Buchanan Gate Business Park  
Cumbernauld Road  
Stepps  
Glasgow  
G33 6FB

Development Operations  
Freephone Number - 0800 3890379  
E-Mail - [DevelopmentOperations@scottishwater.co.uk](mailto:DevelopmentOperations@scottishwater.co.uk)  
[www.scottishwater.co.uk](http://www.scottishwater.co.uk)

Dear Sir Madam

**IV19 Cromarty Nigg Energy Park Site At**  
**OUR REFERENCE: 773727**  
**PROPOSAL: Development Works at Nigg Energy Park**

**Please quote our reference in all future correspondence**

Scottish Water has no objection to this planning application; however, the applicant should be aware that this does not confirm that the proposed development can currently be serviced and would advise the following:

- There is sufficient capacity at our water treatment works to service this development. However, a water impact assessment may be required to understand what impact the proposed new development will have on existing services. Should the impact assessments identify network mitigation measures, these must be funded and carried out by the developer(s).
- We would ask that the developer completes a Pre Development Enquiry (PDE), providing some more specific detail of any commercial development. Early engagement with Scottish Water is advised.  
[www.scottishwater.co.uk/business/connections/connecting-your-property/new-development-process-and-applications-forms/pre-development-application](http://www.scottishwater.co.uk/business/connections/connecting-your-property/new-development-process-and-applications-forms/pre-development-application)

**The applicant should be aware that we are unable to reserve capacity at our water and/or waste water treatment works for their proposed development. Once a formal connection application is submitted to Scottish Water after full planning permission has been granted, we will review the availability of capacity at that time and advise the applicant accordingly.**

**Infrastructure within boundary**

According to our records, the development proposals impact on existing Scottish Water assets.

The applicant must identify any potential conflicts with Scottish Water assets and contact our Asset Impact Team directly at [service.relocation@scottishwater.co.uk](mailto:service.relocation@scottishwater.co.uk).

The applicant should be aware that any conflict with assets identified may be subject to restrictions on proximity of construction.

#### **Scottish Water Disclaimer**

*"It is important to note that the information on any such plan provided on Scottish Water's infrastructure, is for indicative purposes only and its accuracy cannot be relied upon. When the exact location and the nature of the infrastructure on the plan is a material requirement then you should undertake an appropriate site investigation to confirm its actual position in the ground and to determine if it is suitable for its intended purpose. By using the plan you agree that Scottish Water will not be liable for any loss, damage or costs caused by relying upon it or from carrying out any such site investigation."*

#### **Drinking Water Protected Areas**

A review of our records indicates that there are no Scottish Water drinking water catchments or water abstraction sources, which are designated as Drinking Water Protected Areas under the Water Framework Directive, in the area that may be affected by the proposed activity.

#### **Surface Water**

For reasons of sustainability and to protect our customers from potential future sewer flooding, Scottish Water will **not** accept any surface water connections into our combined sewer system.

There may be limited exceptional circumstances where we would allow such a connection for brownfield sites only, however this will require significant justification taking account of various factors including legal, physical, and technical challenges. However it may still be deemed that a combined connection will not be accepted. Greenfield sites will not be considered and a connection to the combined network will be refused.

In order to avoid costs and delays where a surface water discharge to our combined sewer system is proposed, the developer should contact Scottish Water at the earliest opportunity with strong evidence to support the intended drainage plan prior to making a connection request. We will assess this evidence in a robust manner and provide a decision that reflects the best option from environmental and customer perspectives.

#### **General notes:**

- **Scottish Water asset plans can be obtained from our appointed asset plan providers:**

**Site Investigation Services (UK) Ltd**  
**Tel: 0333 123 1223**  
**Email: [sw@sisplan.co.uk](mailto:sw@sisplan.co.uk)**  
**[www.sisplan.co.uk](http://www.sisplan.co.uk)**

- Scottish Water's current minimum level of service for water pressure is 1.0 bar or 10m head at the customer's boundary internal outlet. Any property which cannot be adequately serviced from the available pressure may require private pumping arrangements to be installed, subject to compliance with Water Byelaws. If the developer wishes to enquire about Scottish Water's procedure for checking the water pressure in the area then they should write to the Customer Connections department at the above address.
- If the connection to the public sewer and/or water main requires to be laid through land out-with public ownership, the developer must provide evidence of formal approval from the affected landowner(s) by way of a deed of servitude.
- Scottish Water may only vest new water or waste water infrastructure which is to be laid through land out with public ownership where a Deed of Servitude has been obtained in our favour by the developer.
- The developer should also be aware that Scottish Water requires land title to the area of land where a pumping station and/or SUDS proposed to vest in Scottish Water is constructed.
- **Please find all of our application forms on our website at the following link <https://www.scottishwater.co.uk/business/connections/connecting-your-property/new-development-process-and-applications-forms>**

#### **Next Steps:**

- **Single Property/Less than 10 dwellings**  
For developments of less than 10 domestic dwellings (or non-domestic equivalent) we will require a formal technical application to be submitted directly to Scottish Water or via the chosen Licensed Provider if non domestic, once full planning permission has been granted. Please note in some instances we will require a Pre-Development Enquiry Form to be submitted (for example rural location which are deemed to have a significant impact on our infrastructure) however we will make you aware of this if required.

- **10 or more domestic dwellings:**  
For developments of 10 or more domestic dwellings (or non-domestic equivalent) we require a Pre-Development Enquiry (PDE) Form to be submitted directly to Scottish Water prior to any formal Technical Application being submitted. This will allow us to fully appraise the proposals.

Where it is confirmed through the PDE process that mitigation works are necessary to support a development, the cost of these works is to be met by the developer, which Scottish Water can contribute towards through Reasonable Cost Contribution regulations.

- **Non Domestic/Commercial Property:**  
Since the introduction of the Water Services (Scotland) Act 2005 in April 2008 the water industry in Scotland has opened up to market competition for non-domestic customers. All Non-domestic Household customers now require a Licensed Provider

to act on their behalf for new water and waste water connections. Further details can be obtained at [www.scotlandontap.gov.uk](http://www.scotlandontap.gov.uk)

- **Trade Effluent Discharge from Non Dom Property:**

Certain discharges from non-domestic premises may constitute a trade effluent in terms of the Sewerage (Scotland) Act 1968. Trade effluent arises from activities including; manufacturing, production and engineering; vehicle, plant and equipment washing, waste and leachate management. It covers both large and small premises, including activities such as car washing and launderettes. Activities not covered include hotels, caravan sites or restaurants.

If you are in any doubt as to whether or not the discharge from your premises is likely to be considered to be trade effluent, please contact us on 0800 778 0778 or email [TEQ@scottishwater.co.uk](mailto:TEQ@scottishwater.co.uk) using the subject "Is this Trade Effluent?". Discharges that are deemed to be trade effluent need to apply separately for permission to discharge to the sewerage system. The forms and application guidance notes can be found using the following link <https://www.scottishwater.co.uk/business/our-services/compliance/trade-effluent/trade-effluent-documents/trade-effluent-notice-form-h>

Trade effluent must never be discharged into surface water drainage systems as these are solely for draining rainfall run off.

For food services establishments, Scottish Water recommends a suitably sized grease trap is fitted within the food preparation areas so the development complies with Standard 3.7 a) of the Building Standards Technical Handbook and for best management and housekeeping practices to be followed which prevent food waste, fat oil and grease from being disposed into sinks and drains.

The Waste (Scotland) Regulations which require all non-rural food businesses, producing more than 50kg of food waste per week, to segregate that waste for separate collection. The regulations also ban the use of food waste disposal units that dispose of food waste to the public sewer. Further information can be found at [www.resourceefficientscotland.com](http://www.resourceefficientscotland.com)

If the applicant requires any further assistance or information, please contact our Development Operations Central Support Team on 0800 389 0379 or at [planningconsultations@scottishwater.co.uk](mailto:planningconsultations@scottishwater.co.uk)

Yours sincerely

**Angela Allison**

[Angela.Allison@scottishwater.co.uk](mailto:Angela.Allison@scottishwater.co.uk)

Transport Scotland

## A9 - Nigg Energy Park East Quay - Scoping - Highland

PREPARED FOR: Denise Angus/Alan Kerr – Transport Scotland  
PREPARED BY: Owen O'Reilly  
REVIEWED BY: Andrew Donaldson  
APPROVED BY: Andrew Donaldson  
DATE: March 2019  
PROJECT NUMBER: 650718

### Introduction

The pre-application consultation request, dated 28 February 2019, associated with the proposed Nigg Energy Park has been passed to Jacobs as Development Planning and Management Advisor and Auditor to Transport Scotland.

The comments provided within this response are based on the supporting documentation available via the South Lanarkshire planning portal, particularly the EIA Scoping Report prepared by Global Energy Nigg Limited, dated February 2019.

### Planning History

In regard to the planning history associated with the proposed development site, the EIA Scoping Report advises the following development since the approval of the Nigg Development Masterplan (dated March 2013) by the Council:

- “In May 2013, an application to MSLOT and the Council (reference 13/01825/FUL and amended by 13/04695/FUL) was submitted regarding an extension to the south quay harbour and berthing facilities at Nigg Energy Park, to accommodate large rig structures and floating production, storage and offloading vessels (FPSOs). The South Quay development was subject to a full EIA and was duly approved. Construction was completed in 2015 and the facility is now fully constructed and fully utilised, and in great demand with the Applicant’s North Sea oil and energy sector clients”; and
- “Subsequent applications have come forward in the intervening period between May 2013 and time of writing in January 2019, including:
  - “Extension of Assembly Shop 7 (17/05176/FUL);
  - “Extension to Assembly Shop 4 to join Fabrication Shop 7 including erection of new buildings (17/03411/FUL); and
  - “Installation of hardstanding, compound area and welfare area, fuel tanks and delivery pipes (15/02216/FUL), as amended by 15/03325/FUL”.

Jacobs acknowledge that these applications have been decided by the Council with decision of Application Permitted given in each case. Additionally, Jacobs note that the EIA Scoping Report advises that “the concept of an East Quay was identified within the Nigg Masterplan as a potential access option to the sea”.

### Development Proposals

The EIA Scoping Report advises that the proposed development consists of the following elements:

- “A proposed east quay of plan area 250m by 50m (0.88ha) constructed using perimeter piling to retain locally dredged material as infill;



- “Associated fendering and rock armouring;
- “Dredging (method to be determined) of approximately 140,000m<sup>3</sup> to achieve a minimum sea bed level at the main west facing berth of 12m below chart datum to facilitate the proposed development;
- “High level lighting to quayside in accordance with Port Regulations;
- “Sea water extraction for fire-fighting capability;
- “Re-use of approximately 70,000m<sup>3</sup> of dredged materials within the quay structure (quantities to be determined and material characterisation and sampling to be agreed with MSLOT);
- “Disposal of excess suitable dredged material (approximately 70,000m<sup>3</sup>) within The Sutors licenced disposal site;
- “Demolition and removal of buildings on site associated with the former Dunskeath House;
- “Preparatory groundwork and associated landscaping for provision of a laydown area for handling and temporary storage of plant and renewable energy components;
- “Access provision from the B1975; and
- “Security lighting and fencing associated with the laydown area”.

## Development Access

Access to the proposed development from the trunk road network will be provided via the A9(T)/B9175 junction. In regard to construction traffic associated with the proposed development, the EIA Scoping Report advises that “road access to construct the quay would be limited as, apart from the concrete for the cope and the final crushed rock topping, the materials would probably arrive at the site by sea”. In consideration of this Jacobs note that the preferred source for crushed rock is the Castle Craig Quarry located to the east of the site, which would not require trunk road or B9175 access for the transport of material to the proposed development site.

Jacobs also note that in addition to the transport of material for the construction of the proposed East Quay, it is advised that “following Building Warrant approval the existing buildings and stonework walls would be demolished and unsuitable materials would be removed off site to an approved disposal site”.

Jacobs would advise that the transport and traffic assessment should consider all construction and demolition activities associated with the proposed development and include details of anticipated traffic associated with the operational stage. Additionally, all HGVs transporting construction material to and from the site should be sheeted and require passing through a wheel washing facility prior to exiting the proposed development site and that this should be conditioned as part of any consent awarded by the Council.

## Assessment Methodology

### Study Area

Section 4.9.2 of the EIA Scoping Report advises that the study area for the proposed development will encompass the public road network in the vicinity of the East Quay in addition to the site access route connecting to the wider strategic road network. This includes the B9175 and the A9(T) and is considered appropriate by Jacobs.

### Impact Significance

In regard to the assessment of the significance of any impacts associated with the proposed development, Jacobs would advise that IEMA Guidelines should be followed, in addition to appropriate guidelines from the Institution of Highways and Transportation and Transport Scotland.

Jacobs acknowledge that Section 4.9 of the EIA Scoping Report advises that the assessment will consider the following aspects in regard to the effects of construction traffic on the public road network:

- Noise and Vibration;
- Air pollution;
- Severance;
- Driver delay;
- Pedestrian delay and amenity;
- Accidents and safety;
- Dust and dirt; and
- Hazardous loads.

Jacobs acknowledge that it is envisaged that approximately 70,000m<sup>3</sup> of dredged material may be reused in the construction of the quay and that required crushed rock may be sourced from the nearby Castlecraig Quarry. However, Jacobs note that the quantities of reusable dredged material are to be confirmed and Castlecraig Quarry is noted as a preferred source. In the absence of confirmation that sufficient material can be sourced from Castlecraig Quarry and sufficient evidence to support the anticipated volume of reusable dredged material, Jacobs would advise that a worst-case scenario should be adopted in the assessment of trunk road network impacts.

In regard to this, it is advised that traffic associated with the proposed development should be assessed in percentage terms against existing traffic patterns to determine where further assessment may be required. This assessment should also consider cumulative impacts from committed developments utilising the same public road network. Committed developments to be considered should be agreed with the Council.

The following IEMA Guidance rules should be adopted in the traffic and transport assessment:

- Rule 1: Include highway links where flows are predicted to increase by more than 30% (10% if affecting a sensitive area) or where the number of heavy goods vehicles (HGVs) is predicted to increase by more than 30%; and
- Rule 2: Include any other specifically sensitive area where traffic flows are predicted to increase by 10% or more.

Jacobs acknowledge that these rules are referenced within the EIA Scoping Report and that “mitigation measures will be identified and incorporated into the development proposals where an effect is deemed to be Significant (prior to any mitigation)”. Considering this, the following assessment methodology is advised:

- “The magnitude of effects arising from the increase in traffic volumes is categorised as follows:
  - “Substantial: above 90% increase in existing traffic levels (or 70% at sensitive receptors);
  - “Moderate: between 60% and 90% increase in existing traffic levels (or between 40% and 70% at sensitive receptors);
  - “Slight: between 30% and 60% increase in existing traffic levels (or 10% and 40% at sensitive receptors); and
  - “Negligible: under 30% increase in existing traffic levels (or under 10% at sensitive receptors)”.
- “The determination of the magnitude of the effects will be undertaken by reviewing the characteristics of the proposed development, establishing the parameters of the road traffic that has the potential to cause an effect, and quantifying these effects against the criteria set out above”.

- “For the purposes of this assessment, the sensitivity of the road links within the study area to changes in traffic levels will be evaluated on a scale of “low”, “medium” and “high”, based on their usage by pedestrians and cyclists and the size of communities through which the road section passes”

The proposed methodology is considered appropriate by Jacobs.

### Baseline Data

The EIA Scoping Report advises that “in order to establish the baseline traffic flows, new traffic surveys will be undertaken to supplement existing data and accident records will be sought for route within the study area. A review of the road capacities within the study area will also be undertaken by reference to the DMRB”, and that it is proposed “to commission two automatic traffic counts (ATCs) along the B9175 and make use of publicly available annual average daily traffic (AADT) flows from the Department for Transport (DfT) traffic counts and / or Transport Scotland traffic counters (along the trunk road network). The ATCs will record the traffic volumes, classifications and speeds during a neutral week for the road link(s) within the identified study area”.

Jacobs would advise that the assessment should consider impacts on the A9(T)/B9175 junction impacts and that DfT traffic count data is not considered to be a sufficient source for the assessment of trunk road impacts. Baseline traffic count data informing the assessment should be requested from Transport Scotland or additional surveys to be commissioned by the applicant.

In regard to the assessment of accidents, it is advised that [www.crashmap.co.uk](http://www.crashmap.co.uk) is not considered to be an adequate resource by Transport Scotland and that baseline data to be use in the assessment of trunk road network accidents should be requested from Transport Scotland via [accidentdatarequests@transport.gov.scot](mailto:accidentdatarequests@transport.gov.scot).

### Traffic Management Plan

The EIA Scoping Report proposes the inclusion of a draft Construction Environmental Management Plan (CEMP) within the EIA Report in addition to a Schedule of Mitigation highlighting mitigation measures committed to by the applicant. It is advised that the Schedule of Mitigation will inform the draft CEMP and that “the draft CEMP would be closely linked to the Schedule of Mitigation and provide regulators with the site-specific details of how the mitigation measures would be implemented. Should the applications be approved, this would then be cross-checked by the contractor and further detail added, and it is anticipated that a final CEMP would be secured by condition”. Jacobs consider the proposed approach appropriate.

Jacobs would advise that while the CEMP is focused on the management of construction traffic, reference should be made to anticipated operational traffic and any associated measures required to support this. The following details, though not exclusively, should be provided within the CEMP:

- Envisaged number and type of vehicle movements associated with each phase of development;
- Proposed construction programme, including anticipated number of vehicles per day by vehicle type;
- Proposed site operating hours during the construction period;
- Outcomes and detailed plans from any required swept paths assessment; and
- Proposed mitigation measures supported by detailed plans as necessary.

### Abnormal Loads

Jacobs note that the EIA Scoping Report does not discuss the need for abnormal loads associated with the proposed development but would advise that should any such loads be required, these are required to be appropriately assessed. The anticipated route for any envisaged abnormal loads from port of entry (PoE) to the proposed development site should be provided for approval by the Council in consultation with Transport Scotland.

It is advised that the following elements should be provided within any required abnormal loads assessment:

- Establish number and dimensions of abnormal loads and transporting vehicle, i.e. weight limits, length etc.;
- Establish all trunk roads to be used by abnormal load vehicles;
- Undertake a route review considering the horizontal and vertical alignment of the preferred route(s), defining locations where a detailed swept path assessment is required;
- Identified key organisations to be consulted along the proposed routes;
- Initial consideration of: The maximum axle loading on structures in consultation with the relevant roads agencies; clear heights in consultation with utility providers and transport agencies; roadworks or closures that could affect the passage of the loads; underground services on the proposed route; satisfaction of Police Scotland and local authorities to the proposed route(s); lay-by areas that can be utilised for temporary parking; and lay-bys that can be used to let traffic pass slow moving abnormal loads;
- Any other obstruction that may restrict transportation of abnormal loads;
- Supporting Swept Path Assessment;
- Details of measures to mitigate abnormal load movements;
- Drawings required for proposed improvements;
- Geometry and visibility at access point(s) to/from trunk road, if direct access is required;
- Accident record at access point(s) to/from trunk road, if direct access is required; and
- Abnormal load management plan introducing measures that could help reduce the impact of abnormal load convoys.

## **Appendix II: Licensing Process**

### Application

The application letter must detail how many licences are being sought, what marine licensable activities are proposed and what legislation the application is being made under.

Applicants are required to submit two hard copies of the EIA report together with an electronic copy in a user-friendly PDF format which will be placed on the Scottish Government website. If requested to do so by the Scottish Ministers, the applicant must send to the Scottish Ministers such further hard copies of the EIA report as requested. Applicants may be asked to issue the EIA report directly to consultees and in which case consultee address lists should be obtained from the Scottish Ministers.

### Requirement for Public Pre-Application Consultation ("PAC")

From 6<sup>th</sup> April 2014, applications received for certain activities are subject to a public pre-application consultation requirement. Activities affected will be large projects with the potential for significant impacts on the environment, local communities and other legitimate uses of the sea. This requirement allows local communities, environmental groups and other interested parties to comment on proposed works in their early stages and before an application for a marine licence is submitted.

The Marine Licensing (Pre-application Consultation) (Scotland) Regulations 2013 can be accessed via:

<http://www.legislation.gov.uk/ssi/2013/286/made>

Guidance on marine licensable activities subject to Pre-application Consultation can be obtained at:

<http://www.gov.scot/Topics/marine/Licensing/marine/guidance/preappconsult>

The licensing authority reserves the right not to accept an application in the absence of an acceptable PAC report.

### Pre-Dredge Sampling

Please note that if it is intended to dispose of any dredged material at sea, adequate pre-dredge sample analysis must be submitted in support of the EIA report and marine licence dredging application. The licensing authority reserves the right not to accept an application in the absence of acceptable sediment analysis data.

Please refer to the pre-dredge sampling guidance provided in Appendix IV.

### Ordnance Survey ("OS") Mapping Records

Applicants are requested at application stage to submit a detailed OS plan showing the site boundary and location of all deposits and onshore supporting infrastructure in a format compatible with The Scottish Government's Spatial Data Management Environment ("SDME"), along with appropriate metadata. The SDME is based around

Oracle RDBMS and ESRI ArcSDE and all incoming data should be supplied in ESRI shape file format. The SDME also contains a metadata recording system based on the ISO template within ESRI ArcCatalog (agreed standard used by The Scottish Government); all metadata should be provided in this format.

### Advertisement

Where the applicant has provided the Scottish Ministers with an EIA report, the applicant must publish their proposals in accordance with Regulation 16 of the 2017 MW Regulations and ensure that a reasonable number of copies of the EIA report are available for inspection at any place named in the publication. Licensing information and guidance, including the specific details of the adverts to be placed in the press, can be obtained from the Scottish Ministers. If additional information is submitted further public notices will be required.

### EPS licence

European Protected Species ("EPS") are animals and plants (species listed in Annex IV of the [Habitats Directive](#)) that are afforded protection under [The Conservation \(Natural Habitats, &c.\) Regulations 1994](#) (as amended) and [The Offshore Marine Conservation \(Natural Habitats, &c.\) Regulations 2007](#) (as amended). All cetacean species (whales, dolphins and porpoise) are European Protected Species. If any activity is likely to cause disturbance or injury to a European Protected Species a licence is required to undertake the activity legally.

A licence may be granted to undertake such activities if certain strict criteria are met:

- there is a licensable purpose;
- there are no satisfactory alternatives, and;
- the actions authorised will not be detrimental to the maintenance of the population of the species concerned at favourable conservation status in their natural range.

Applicants must give consideration to the three fundamental tests and should refer to the [guidance on the protection of marine European Protected Species](#) for more detailed information in relation to Scottish Inshore Waters. Applicants may choose to apply for an EPS licence following the determination of the EIA application and once construction methods have been finalised, however it is useful to include a shadow EPS assessment within the EIA report.

Please note that basking sharks are also afforded protection under the Wildlife & Countryside Act 1981 (as Amended by the Nature Conservation (Scotland) Act 2004).

### **Appendix III: Gap Analysis**



Applicant to complete:

Consultee	No.	Point for inclusion	EIA report Section	Justification
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**THE TOWN AND COUNTRY PLANNING (ENVIRONMENTAL  
IMPACT ASSESSMENT) (SCOTLAND) REGULATIONS 2017**

**SCOPING OPINION**

<b>Applicant:</b>	Global Energy Nigg Ltd
<b>Agent (contact details):</b>	GH Johnston Building Consultants Per: Alan Ogilvie Willow House Stoneyfield Business Park Inverness IV2 7P
<b>Project:</b>	Construction of new east quay including dredging and piling, and the formation of laydown area for handling and temporary storage of north sea oil related and renewable energy components
<b>Project Address:</b>	Land 80M NE Of Dunskeath Nigg

This response is given without prejudice to the Planning Authority's right to request information in connection with any statement, whether Environmental Statement (ES) or not, submitted in support of any future application. These views are also given without prejudice to the future consideration of and decision on any planning application received by the Council.

The Highland Council request that any Environmental Statement (ES) submitted in support of an application for the above development take the comments highlighted below into account; many of which are already acknowledged within the Scoping Report submitted. In particular, the elements of this report as highlighted in parts 3, 4 and 5 should be presented as three distinct elements.

**1.0 Description of the Development.**

The description of development for an ES is often much more than would be set out in any planning application. An ES must include: -

- a description of the physical characteristics of the whole development and the full land-use requirements during the operational, construction and decommissioning phases. A plan with eight figure OS Grid co-ordinates for all main elements of the proposal should be supplied.
- a description of the main characteristics of the production processes, for instance, nature and quantity of the materials used;
- the risk of accidents, having regard in particular to substances or technologies used;
- an estimate, by type and quantity, of expected residues and emissions (water, air and soil

pollution, noise, vibration, light / flicker, heat, radiation, etc.) resulting from the operation of the development.

- The estimated cumulative impact of the project with other consented or operation development.

## 2.0 Alternatives

A statement is required which outlines the main development alternatives studied by the applicant and an indication of the main reasons for the final project choice. This is expected to highlight some or all of the following: -

- locational criteria and economic parameters used in the initial site selection.
- the environmental effects of the different options examined

## 3.0 Environmental Elements Affected

3.1 The ES must provide a description of the aspects of the environment likely to be significantly affected by the development. The following paragraphs highlight some principal considerations.

3.2 **Land Use:** - The ES should recognise the existing land uses affected by the development having particular regard for The Highland Council's Development Plan and other supplementary planning policies. This is not instead of but in addition to the expectation of receiving a Planning Statement in support of the application itself which, in addition to exploring compliance with the Development Plan, should look at Scottish Planning Policy and Planning Advice Notes which identify the issues that should be taken into account when considering significant development.

3.3 **Population:** - The ES should estimate who may be affected by the development, in all or in part, which may required individual households to be identified, local communities or a wider socio economic groupings such as tourists & tourist related businesses, recreational groups, economically active, etc. The application should include relevant economic information connected with the project, including the potential number of jobs, and economic activity associated with the procurement, construction, operation and decommissioning of the development.

3.4 **Community Assets:** - The ES needs to recognise any community assets that are currently in operation. In this regard the applicant, when submitting a future application, will need to demonstrate what interests they have identified and the outcomes of any consultations with relevant authorities.

3.5 **Nature Conservation Sites:** - The ES should address the likely impacts on the nature conservation interests of all the designated sites in the vicinity of the proposed development. It should provide proposals for any mitigation that is required to avoid these impacts or to reduce them to a level where they are not significant. In this instance, consideration should be given to the impacts of the proposed development on the following designated sites:

- Moray Firth Special Area of Conservation (Bottlenose dolphins and sub-tidal sandbanks)
- Dornoch Firth and Morrich More Special Area of Conservation (Common Seal)
- Cromarty Firth Special Protection Area (all species)
- Cromarty Firth Ramsar site (habitats)
- Proposed Moray Firth Special Protection Area
- Cromarty Firth Site of Special Scientific Interest (intertidal habitats)

3.6 **Habitats / Biodiversity:** - The ES should provide an account of the habitats present on the proposed development site. It should identify rare and threatened habitats, and those protected by European or UK legislation, or identified in national or local Biodiversity Action Plans.

- 3.7 **Birds and Animals:** - The ES should provide a baseline survey of the bird and animals (mammals, reptiles, amphibians, etc) interest on site. It needs to be categorically established which species are present on the site, and where, before a future application is submitted. The presence of protected species such as Schedule 1 Birds or European Protected Species must be included and considered as part of the planning application process, not as an issue which can be considered at a later stage. The ES should in particular consider the following:
- All species of cetacean
  - Bats
- 3.8 **Plants / Trees / Forestry:** - The ES should provide a baseline survey of the plants (and fungi) and trees present on the site to determine the presence of any rare or threatened species albeit it is accepted that the likelihood is low given the present land use of the site.
- 3.9 **Soil / Borrow Pits:** - The ES should fully describe the likely significant effects of the development on the local geology. Proposals should demonstrate construction practices that help to minimise the use of raw materials and maximise the use of secondary aggregates and recycled or renewable materials.
- 3.10 **Water Environment:** - The ES needs to address surface water drainage, flood risk and pollution prevention during construction. Please refer to the detailed advice provided by SEPA.
- 3.11 **Fish and other Aquatic Interests:** - The ES needs to address the aquatic interests within local watercourses, including down stream interests that may be affected by the development, for example increases in silt and sediment loads resulting from construction works; pollution risk / incidents during construction; obstruction to upstream and downstream migration both during and after construction; disturbance of spawning beds / timing of works; and other drainage issues. The ES should evidence consultation input from the local fishery board(s) where relevant.
- 3.12 **Water Abstraction:** - The need for, and information on, abstractions of water supplies for concrete works or other operations should also be identified. The ES should identify whether a public or private source is to be utilised. If a private source is to be utilised, full details on the source and details of abstraction need to be provided.
- 3.13 **Noise:** - The ES needs to address existing air quality and the general qualities of the local environment including background noise, sunlight, prevailing wind. In this instance the ES should cover:

#### **Construction Noise**

A construction noise assessment will be required in the following circumstances:

- Where it is proposed to undertake work, which is audible at the site boundary, outwith the hours Mon-Fri 8am to 7pm; Sat 8am to 1pm OR
- Where noise levels during the above periods are likely to exceed 75dB(A) for short term works or 55dB(A) for long term works. Both measurements to be taken as a 1hr LAeq at the curtilage of any noise sensitive receptor (generally long term work is taken to be more than 6 months)

#### **Operational Noise**

It is noted that the noise consultant acting for Global has been provided with advice in this regard by Environmental Health – this is summarised in the attached consultation response.

- 3.14 **Climatic Factors:** - The ES needs to address all relevant climatic factors which can greatly influence the impact range of many of the preceding factors on account of seasonal changes affecting, rainfall, sunlight, prevailing wind direction, etc.

3.15 **Cultural Heritage:** - The ES needs to identify all designated sites which may be affected by the development either directly or indirectly. This will require you to identify: -

- the architectural heritage (Conservation Areas, Listed Buildings) and
- the archaeological heritage (Scheduled Monuments),
- the landscape (including designations such as National Parks, National Scenic Areas, Areas of Great Landscape Value, Gardens and Designed Landscapes and general setting of the development.
- the inter-relationship between the above factors.

At the time of writing, no response has been received from the Council's Historic Environment Team however this can be forwarded to you when available.

3.16 **LVIA:** - The Council expects the ES to consider the landscape and visual impact of the development. The Council makes a distinction between the two. While not mutually exclusive, these elements require separate assessment and therefore presentation of visual material in different ways. It is the Council's position that it is not possible to use panoramic images for the purposes of visual impact assessment. The Council, while not precluding the use of panoramic images, require single frame images with different focal lengths taken with a 35mm format full frame sensor camera – not an 'equivalent.' The preferred focal lengths are 50mm and 75mm. The former gives an indication of field of view and the latter best represents the scale and distance in the landscape i.e. a more realistic impression of what we see from the viewpoint. These images should form part of the ES and not be separate from it. I have provided advice to the Landscape Consultant acting on behalf of the applicant on proposed viewpoints, as follows:

Proposed Viewpoint	Receptors	Approximate distance to site
1. Nigg Ferry	Visitors & recreational users	0.5 km
2. Cromarty shore	Residents & visitors	1.1 km
3. Dunskeath Castle	Visitors & recreational users	1.2 km
4. Minor road, North Sutor	Road users	2.2 km
5. Sutors of Cromarty viewpoint	Visitors & recreational users	2.3 km
6. A9, Lower Tullich	Road users	6.5 km
7. Invergordon/Saltburn	Residents	7.4 km
8. Newhall Point	Residents	8.6 km

3.21 The purpose of the selected and agreed viewpoints shall be clearly identified and stated in the supporting information. For example, it should be clear that the VP has been chosen for landscape assessment, or visual impact assessment, or cumulative assessment, or sequential assessment, or to show a representative view or for assessment of impact on designated sites, communities or individual properties.

3.22 Viewpoints within 5 kilometres of a development shall be precisely identified on an A4 size Ordnance Survey extract at 1:25000 scale. The position of the development and the proposed field of view of photography shall be shown on the map. Viewpoints located more than 5km from a development shall be identified on an A4 size Ordnance Survey extract at 1:50,000 scale and the development and the proposed field of view of photography shall be shown on the map. The Council may also specify on a large scale plan an exact viewpoint position that they wish to be used and provide a reference photograph

3.23 **Roads Infrastructure:** - Transport Planning interests will relate largely to the impact of development traffic on the Council maintained road network and its users during the construction phase of the project.

A Transport Assessment (TA), or section on traffic and transportation, within the Environmental Statement for the project will be required. This should be carried out in accordance with the Highland Council's Guidance on the Preparation of Transport Statements – as noted in the pre-application advice provided previously. This is expanded upon in the attached response from Transport Planning.

#### 4.0 Significant Effects on the Environment

4.1 Leading from the assessment of the environmental elements the ES needs to describe the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from: -

- the existence of the development;
- the use of natural resources;
- the emission of pollutants, the creation of nuisances and the elimination of waste,

4.2 The potential significant effects of development must have regard to: -

- the extent of the impact (geographical area and size of the affected population);
- the trans-frontier nature of the impact;
- the magnitude and complexity of the impact;
- the probability of the impact;
- the duration, frequency and reversibility of the impact.

4.3 The effects of development upon baseline data should be provided in clear summary points.

4.4 The Council requests that when measuring the positive and negative effects of the development a four point scale is used advising any effect to be either strong positive, positive, negative or strong negative.

4.5 The applicant should provide a description of the forecasting methods used to assess the effects on the environment.

#### 5.0 Mitigation

5.1 Consideration of the significance of any adverse impacts of a development will of course be balanced against the projected benefits of the proposal. Valid concerns can be overcome or minimised by mitigation by design, approach or the offer of additional features, both on and off site. A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment must be set out within the ES statement and be followed through within the application for development.

5.2 The mitigation being tabled in respect of a single development proposal can be manifold. Consequently the ES should present a clear summary table of all mitigation measures associated with the development proposal. This table should be entitled draft Schedule of Mitigation. As the development progresses to procurement and then implementation this carries forward to a requirement for a Construction Environmental Management Document (CEMD) and then Plan (CEMP) which in turn will set the framework for individual Construction Method Statements (CMS). Further guidance can be obtained at [http://www.highland.gov.uk/NR/ronlyres/485C70FB-98A7-4F77-8D6B-ED5ACC7409C0/0/construction\\_environmental\\_management\\_22122010.pdf](http://www.highland.gov.uk/NR/ronlyres/485C70FB-98A7-4F77-8D6B-ED5ACC7409C0/0/construction_environmental_management_22122010.pdf) This is currently under review by a working party led by SEPA working through Heads of Planning Scotland but for the time being remains relevant.

5.3 The implementation of mitigation can often involve a number of parties other than the developer.

In particular local liaison groups involving the local community are often deployed to assist with phasing of construction works – abnormal load deliveries, construction works to the road network. It should be made clear within the ES or supporting information accompanying a planning application exactly which groups are being involved in such liaison, the remit of the group and the management and resourcing of the required effort.

## **Technical Appendix 4.1**





## **Nigg East Quay**

### **Technical Appendix 4.1: Marine Mammal Protection Plan**



**June 2019**

# Nigg East Quay

## Technical Appendix 4.1: Marine Mammal Protection Plan

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Document number: 8749

Project number: 671906

Status: Final

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Reviewer: Kathy Dale and Craig Potter

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A	Proposed Site Location and Layout
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# 1 INTRODUCTION

## 1.1 Remit

EnviroCentre Limited was commissioned on behalf of Global Energy Nigg Limited to develop a Marine Mammal Protection Plan (MMPP). The MMPP is required to inform an Environmental Impact Assessment (EIA) in relation to a proposed new development, comprising the construction and formation of a new East Quay and associated laydown area, situated at Nigg Energy Park approximately 1.5km north of Cromarty. Please see Appendix A: Proposed Site Location and Layout.

The MMPP is required to assess and manage the risks of causing injury or disturbance to marine mammals (cetaceans and seals), as a result of proposed piling and dredging operations, in response to the scoping opinion of The Highland Council (Comhairle na Gàidhealtachd) (25th March 2019). Within which, section 3 highlights environmental elements that the Environmental Impact Assessment Report (EIAR) should address:

*3.5 'Nature Conservation Sites: - The ES should address the likely impacts on the nature conservation interests of all the designated sites in the vicinity of the proposed development. It should provide proposals for any mitigation that is required to avoid these impacts or to reduce them to a level where they are not significant. In this instance, consideration should be given to the impacts of the proposed development on the following designated sites:*

- *Moray Firth Special Area of Conservation (Bottlenose dolphins and sub-tidal sandbanks)*
- *Dornoch Firth and Morrich More Special Area of Conservation (Harbour seal)*
- *Cromarty Firth Special Protection Area (all species)*
- *Cromarty Firth Ramsar site (habitats)*
- *Proposed Moray Firth Special Protection Area*
- *Cromarty Firth Site of Special Scientific Interest (intertidal habitats)'*

*3.7 'Birds and Animals – The ES should provide a baseline survey of the birds and animals (mammals, reptiles, amphibians etc.) interest on site. It needs to be categorically established which species are present on the site, and where, before a future application is submitted. The presence of protected species such as Schedule 1 Birds of European Protected Species must be included and considered as part of the planning application process, not as an issue which can be considered at a later stage. The ES should in particular consider the following:*

- *All species of cetacean*
- *Bats*

This MMPP, which includes a site specific Marine Mammal Risk Assessment (MMRA), provides a detailed method statement in order to inform a European Protected Species (EPS) disturbance licence application. An EPS licence is likely required from Marine Scotland prior to the commencement of any construction works (18/01459/PREAPP 18/04/2019). The Marine Scotland 'Guidance for Scottish Inshore Waters: The Protection of Marine European Protected Species from injury and disturbance (2014)' was consulted to inform this document.

## 1.2 Project Overview

The Nigg fabrication yard was established in 1972 and consists of approximately 70 hectares (ha) of land reclaimed from the eastern edge of Nigg Bay.

In May 2013, an application to Marine Scotland Licencing Operations Team (MSLOT) and the Council (reference 13/01825/FUL and amended by 13/04695/FUL) was submitted regarding an extension to the south quay harbour and berthing facilities at Nigg Energy Park, to accommodate large rig structures and floating production, storage and offloading vessels (FPSOs). The South Quay development was subject to a full EIA and was duly approved. Construction was completed in 2015 and the facility is now fully constructed and fully utilised, and in great demand with the Applicant's North Sea oil and energy sector clients. To keep up with this demand, which is likely to increase in the coming years, Global has considered the east quay expansion for some time but the potential was limited due to the lack of available land to the east of the present site. However, with the purchase of Dunskeath House and associated land, the proposed development is now viable.

Extending Nigg Energy Park to include the contiguous Dunskeath lands is regarded as a practical and safe option for handling and storing renewables and North Sea oil components, which would arrive, be assembled and ultimately leave by sea. The alternative considered was to expand into vacant land to the east on the other side of the B9175 public road but this was ultimately rejected in favour of the current proposal.

## **1.3 The Proposed Development**

### **1.3.1 Outline Description**

The proposed development contains the following:

- A proposed east quay of plan area 250m by 50m (0.88ha) constructed using perimeter piling to retain locally dredged material as infill, with concrete cope;
- Dredging (via suction dredging, with barge mounted excavator used if needed) of approximately - 165,000m<sup>3</sup> to achieve a minimum sea bed level at the main west facing berth of 12m below chart datum to facilitate the proposed development;
- High level lighting to quayside in accordance with Port Regulations
- Sea water extraction for fire-fighting capability
- Re-use of between 15,000m<sup>3</sup> and 30,000m<sup>3</sup> of dredged materials within the quay structure;
- Disposal of excess suitable dredged material (150,000m<sup>3</sup> maximum within The Sutors licenced disposal site at the mouth of the Cromarty Firth);
- Demolition and removal of buildings on site associated with the former Dunskeath House;
- Preparatory groundwork and associated landscaping for provision of a crushed rock laydown area for handling and temporary storage of plant and renewable energy components;
- A landscaped bund of 2m height formed from reclaimed material on the eastern and northern extents of the laydown area
- Access provision from the B1975; and
- Security lighting and fencing associated with the laydown area.

Further details of these component parts including the methodology relating to their construction are contained within section 2.3 of the EIAR.

### **1.3.2 East Quay Project Sequence**

The proposed development is scheduled to begin in Q4 2019. The sections below set out a brief description of engineering works in sequence. Further information can be viewed within Volume 2 of the EIAR. This project sequence is expected to occur over a period of 10 months.

It should be noted that final construction methods will be selected by the contractor. Should these construction methods exceed what has been assessed within this MMPP and the wider EIA, subsequent, supplementary assessment may be required.

### **1.3.3 Quay Phase 1 – Creation of Structures, including piling**

#### *1.3.3.1 Combi-Wall, King Piles and Sheet Piles*

A combi-type quay wall structure design has been identified as a suitable robust, earth-retaining structure resistant to the bending movements and stresses typical of a port/marine environment. The structure is comprised of steel sheet pile sections which are founded by vibrating hammer to depths of 2-4m into the seabed/bedrock together with steel king piles, spaced at 3m intervals around the sea perimeter. The king piles extend deeper into the base material, offering greater bearing and integrity of structure. The king piles will be secured to the wall structure with steel tie rods.

It is possible that two piling rigs will be utilised to allow for an efficient piling phase, reducing the need for unnecessary construction noise and disturbance out-with the scheduled program of construction works. The rigs will be both land and water-based (via a temporary shore-side bund at the northern end of the new quay, and floating barge, respectively). This would allow the piling equipment to operate in dry conditions at most tidal states.

Vibrating hammer will be the primary method used to drive the piles, but given the risk of encountering dense layers of sea bed material there may be the need for a minimum degree of impact-piling.

#### *1.3.3.2 Tie Rods and Anchor Walls*

At the north end of structure, approximately within the first 100m, and at the south wall, the main wall sections will be anchored by tie rods that are fixed to a dedicated anchor wall behind. The anchor wall is formed by profiled steel sheet pile sections driven into the infill material using a vibrating hammer.

### **1.3.4 Quay Phase 2 – Dredging and Disposal**

This stage will involve dredging up to 165,000m<sup>3</sup> of material to create the required final sea bed levels at the proposed berths. Some dredged material would be used to infill the quay structure (approximately 15,000m<sup>3</sup>), with the remainder (approximately 150,000m<sup>3</sup>) to be disposed at The Sutors licenced disposal facility at the mouth of the Cromarty Firth.

Marine ground investigations have confirmed that seabed material is predominantly comprised of loose to firm sands and gravels and is consequently suitable for removal by suction dredging. This method involves a specialised vessel lowering dredge pumps and hoses to the seabed to remove material.

Where dense pockets are encountered, a hydraulic excavator mounted upon a pontoon barge may be used. The arising material can either be brought ashore and stockpiled ahead of use as infill to the new quay, or deposited directly within the footprint of the quay or disposed of to the Sutors licensed disposal site (depending upon the contractor's construction methods/phasing).

## 2 MARINE MAMMAL BASELINE

### 2.1 Sources of Baseline Information

Baseline information, to determine how marine mammals utilise the zone of influence of the proposed works, was collated from the following sources:

- The Joint Nature Conservation Committee (JNCC)<sup>1 & 2</sup>;
- Seawatch Foundation<sup>3</sup>;
- Scottish Natural Heritage (SNH)<sup>4, 5 & 6</sup>;
- Whale and Dolphin Conservation (WDC)<sup>7</sup>;
- Highland Biological Recording Group (HBRG)<sup>8</sup>;
- Aberdeen University Lighthouse Field Station; and
- Scottish Government Designated Sites: Seal Haul out Sites<sup>9</sup>.

#### 2.1.1 Disclaimer

It should be noted that the baseline is limited by the reliability of third party information and the geographical availability of biological and/or ecological records and data. The absence of species from biological records cannot be taken to represent actual absence. Species distribution patterns should be interpreted with caution as they may reflect survey/reporting effort rather than actual distribution.

### 2.2 Designated Sites

Table 2-1 details statutory designated sites that are considered to be ecologically connected to the site in terms of marine mammals. Please see Appendix B: Designated Sites Boundaries.

**Table 2-1: Marine Designated Sites**

Site Name	Designation	Distance and Orientation	Comment
Moray Firth	Special Area of Conservation (SAC)	Adjacent to the south of the site	Designated for bottlenose dolphin ( <i>Tursiops truncatus</i> ) and subtidal sandbanks.

<sup>1</sup> JNCC Statutory Nature Conservation Agency Protocol for Minimising the Risk of Injury to Marine Mammals from Piling Noise (2010) available at: [http://jncc.defra.gov.uk/pdf/JNCC\\_Guidelines\\_Piling%20protocol\\_August%202010.pdf](http://jncc.defra.gov.uk/pdf/JNCC_Guidelines_Piling%20protocol_August%202010.pdf) last accessed 19/03/2019

<sup>2</sup> Reid, J B, Evans, P G H, and Northridge, S P. JNCC Atlas of Cetacean Distribution in north-west European waters (2003) available at: <http://jncc.defra.gov.uk/page-2713#download> last accessed 02/04/2019

<sup>3</sup> Seawatch Foundation Cetaceans of Western Scotland available at: <http://seawatchfoundation.org.uk/wp-content/uploads/2012/07/WesternScotland.pdf> last accessed 02/04/2019

<sup>4</sup> SNH About Scotland's Nature: Marine Mammals available at: <http://www.snh.gov.uk/about-scotlands-nature/species/mammals/marine-mammals/> 02/04/2019

<sup>5</sup> SNH Site Condition Monitoring of bottlenose dolphins within the Moray Firth Special Area of Conservation 2014-2016 (2018) available online at: <https://www.nature.scot/snh-research-report-1021-site-condition-monitoring-bottlenose-dolphins-within-moray-firth-special> last accessed 02/04/2019

<sup>6</sup> SNH Seals in Scotland available at: <http://www.snh.org.uk/publications/on-line/naturalliscottish/seals/sealsinscotland.asp> last accessed 19/03/2018

<sup>7</sup> WDC species guides available at: <http://uk.whales.org/species-guide> last accessed 19/03/2019

<sup>8</sup> HBRG available at: [www.hbrg.org.uk/](http://www.hbrg.org.uk/) last accessed 09/04/2019

<sup>9</sup> Scottish Government seal Haul-out maps available at: <http://www.gov.scot/Topics/marine/marine-environment/species/19887/20814/maps> last accessed 19/03/2018

Site Name	Designation	Distance and Orientation	Comment
Ardersier (MF-001 <sup>10</sup> )	Seal haul-out site	Approximately 12km south	Key site based on August breeding survey counts
Cromarty Firth (MF-005)	Seal haul-out site	Approximately 13km west	Key site based on August breeding survey counts
Findhorn (MF-003)	Seal haul-out site	Approximately 25km south east	Key site based on August breeding survey counts
Dornoch Firth and Morrich More	SAC	Approximately 36km north east	Harbour seal ( <i>Phoca vitulina</i> ), otter, reefs, dune grassland,
Beauly (MF-002)	Seal haul-out site	Approximately 42km south west	Key site based on August breeding survey counts

## 2.3 Cetacean Distribution and Sightings

The following species of cetacean are found in UK waters:

- Harbour porpoise (*Phocoena phocoena*)
- Northern right whale (*Balaena glacialis*)
- Minke whale (*Balaenoptera acutorostrata*)
- Sei whale (*Balaenoptera borealis*)
- Blue whale (*Balaenoptera musculus*)
- Fin whale (*Balaenoptera physalus*)
- Humpback whale (*Megaptera novaeangile*)
- Bottlenose dolphin
- Risso's dolphin (*Grampus griseus*)
- White-beaked dolphin (*Lagenorhynchus albirostris*)
- Atlantic White-sided dolphin (*Lagenorhynchus acutus*)
- Common dolphin (*Delphinus delphis*)
- Striped dolphin (*Stenella coeruleoalba*)
- Northern bottlenose whale (*Hyperoodon ampullatus*)
- Cuvier's beaked whale (*Ziphius cavirostris*)
- Sowerby's beaked whale (*Mesoplodon bidens*)
- True's Beaked Whale (*Mesoplodon mirus*)
- Orca (*Orcinus orca*)
- False Killer Whale (*Pseudorca crassidens*)
- Long-finned Pilot Whale (*Globicephala melas*)
- Sperm Whale (*Physeter macrocephalus* (*P. catodon*))

All species of dolphin, porpoise and whale are European Protected Species (EPS); and are included in the Scottish Biodiversity List (SBL) and the UK Biodiversity Action Plan (UKBAP).

The following species are considered to be relevant to the site:

<sup>10</sup> Moray Firth (MF) 001 – List of Seal Haul-out sites across Scotland available at: <https://www2.gov.scot/Topics/marine/marine-environment/species/19887/20814/haulouts/list> last accessed 29/03/2019



### 2.3.1 Bottlenose Dolphins: Moray Firth SAC

The Moray Firth SAC comprises an area of 151,274ha. It extends from the estuary north of Inverness, along the eastern coast to Lossiemouth and the northern coast to Helmsdale. The qualifying features for this site are subtidal sandbanks and bottlenose dolphins. The Moray Firth SAC supports the only known resident population of bottlenose dolphin in the North Sea and is one of only two UK sites designated for the species as a primary qualifying feature. The north east of Scotland population is estimated to comprise approximately 200 individuals. Bottlenose dolphins are present within the Moray Firth year round, although abundance and distribution varies between summer and winter with the number of animals peaking in the summer months; and animals appearing more dispersed and ranging further down the east coast in winter. Although dolphins are found throughout the Moray Firth they seem to prefer certain parts of the Inner Firth, the southern Moray Firth coastline and the mouth of the Cromarty Firth. The population also ranges outside of the Moray Firth, with small groups regularly occurring off the Aberdeenshire, Fife and East Lothian coasts and occasionally as far as Northumberland. The SAC is adjacent to the site boundary.

SNH monitors and reports on the condition of the bottlenose dolphin population in the SAC every six years. The most recent report was produced by the University of Aberdeen, who have been carrying out research on the population since 1989, in collaboration with the Sea Mammal Research Unit at the University of St Andrews. The abundance of dolphins along the East Coast was estimated by mark-recapture analysis<sup>11</sup> of photo-identification data; and the usage of the SAC was estimated by using Passive Acoustic Monitoring (PAM). C-PODs<sup>12</sup> were deployed at the Cromarty Sutors (approximately 2.8km south east of the site), Chanonry Point (approximately 18km south of the site); and Lossiemouth (approximately 45km east of the site).

The main findings of the report were:

- Mark-recapture photograph analysis indicated that the estimated number of individual dolphins using the SAC during the summer of 2016 was 103, which is over half of the estimated 200 bottlenose dolphins which frequent the coastal North Sea off Scotland.
- Despite inter-annual variability, the number of animals using the SAC between 2001 and 2016 appears to be stable.
- A Bayesian capture-recapture<sup>13</sup> assessment of the total abundance of the east coast population suggests that this population is increasing.
- During the period of 2001-2015, >50% of the population used the SAC in most years.
- PAM from 2011-2016 highlighted that there was inter-annual and seasonal variation in the amount of time, and number of days, dolphins spend at three long-term monitoring sites in the SAC (as listed above). There was a summer peak occurrence at all sites (in particular the site at The Cromarty Sutors), however dolphins were also frequently present during the winter months.
- The east coast of Scotland bottlenose dolphin population remains small and potentially vulnerable. Nevertheless as a result of the data collected, it was assessed that no change be made to the SAC condition status (Favourable (recovered)). This was also the case according to the previous assessment in 2010.

Since August 2018, Seawatch Foundation have received 255 records of bottlenose dolphin sightings between Nigg and Lossiemouth. The closest of which being submitted in October 2018, when 10 individuals were observed off the coast of Cromarty, within 1.5km of the site.

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<sup>11</sup> Mark-recapture analysis is undertaken to estimate the number of bottlenose dolphins using the SAC, and captures unique, identifiable marks on individual dolphins, in order to track them over long periods of time.

<sup>12</sup> C-PODs are PAM instruments that detect toothed whales, dolphins and porpoises by identifying echo-location sounds they produce.

<sup>13</sup> The Bayesian mark-recapture method is undertaken to estimate the population of bottlenose dolphins along the entire coastline; and uses a similar approach to the mark-recapture method; however only uses information on whether or not an individual was seen in each year.

Chanonry Point, approximately 17km south of Nigg, is a well-known bottlenose dolphin hotspot. PAM is ongoing in this area to monitor the status of the SAC feature. Between 2011 and 2016, during the summer months (May – September), the percentage of days that dolphins were detected was over 90%.

Bottlenose dolphins are protected as features of the SAC whether in the site or not, thus any animals within the zone of influence should be considered to be a part of the SAC.

### **2.3.2 Harbour Porpoise**

Harbour porpoises are the most commonly sighted species in Scotland. They are seen all year round with a peak in summer, when they are known to breed. Areas which are particularly important for the harbour porpoise include: Mousa Sound, in Shetland; Inner Hebrides; Outer Moray Firth and Firth of Clyde. These areas, as well as many others, are thought to be crucial for feeding, breeding and calving.

During the PAM within the SAC, Harbour porpoise were detected regularly at Chanonry Point, only rarely at Lossiemouth, and at an intermediate level at the Cromarty Sutors. Recent sightings submitted to Seawatch Foundation indicate that harbour porpoise are more frequently observed along the Moray Coast, in areas such as Hopeman, Covesea and Burghead, approximately 30km east of the site. Between February 21<sup>st</sup> and 24<sup>th</sup> 2019, 52 Harbour porpoise sighting records were submitted to Seawatch Foundation between Covesea and Burghead.

Two harbour porpoise were observed by EnviroCentre ecologists during the first bat hibernation survey on 17<sup>th</sup> January 2019, approximately 1km south of the site in the Cromarty Firth (off Cromarty).

### **2.3.3 Occasional Cetacean Visitors**

In August 2017, a pod of 30 long-finned pilot whale travelled up the Moray Firth to North Kessock, approximately 32km south west of the proposed development. The sighting was extremely rare, however important to note, as if they become stressed, entire pods of pilot whales are known to beach themselves.

Two orca were identified near Chanonry Point (approximately 17km south west of the proposed development site) in January 2019. A pod of six orca were identified in the Moray Firth in 2016, approximately 11km north west of Findhorn (and approximately 20km south east of the proposed development). Orca may occur in coastal regions to feed on breeding seals.

An individual humpback whale was observed in the Moray Firth in 2016 and 2017. In 2016, one individual was identified from Sutors of Cromarty, approximately 2.5km south east of the proposed development; and in 2017 two individuals were observed from between Hopeman and Burghead, approximately 32km south east along the Moray coast.

### **2.3.4 Seals**

Both harbour seal (also known as common seal) and grey seal can be seen all around Scotland on many of the offshore islands and along much of the mainland coast. Because seals range widely in their search for food, single seals of either species might be spotted anywhere along the Scottish coastline. The harbour seal pupping season is between June and July in Scotland; and they undertake an annual moult at a haul-out site between July and September. The grey seal pupping season is between September and December on remote beaches or islands; and their annual moult is undertaken between December and March.

The Dornoch Firth and Morrich More SAC is designated for its population of harbour seal which is currently classed as 'Unfavourable – declining' (2013)<sup>14</sup>. The SAC comprises an area of 8701.22ha and extends along the Dornoch Firth from Bonar Bridge in the west, to the mouth of the estuary in the east to Dornoch. The Dornoch Firth is the most northerly large estuary in Britain and supports a significant proportion of the inner Moray Firth population of the Harbour seal. The seals, which utilise sand-bars and shores at the mouth of the estuary as haul-out and breeding sites, are the most northerly population to utilise sandbanks. Their numbers represent almost 2% of the UK population.

The development lies approximately 15km south of the SAC, which is within the range of observed harbour seal movements between haulout areas (the locations on land where seals come ashore to rest) and also well within the 'normal' range of foraging trips.

There is a designated haulout site at Ardersier, approximately 12km south of the proposed development site. This site holds 20% of the Moray Firth population of harbour seal and is seen as the most important haulout for this species not only in the Moray Firth but on the east coast of Scotland. The average moult counts (during August) are around 200 animals and this has been steady since 1992. The location is also used for pupping with a count undertaken in June 2011 having 216 adult harbour seal and 28 mean number of pups (56 pups was higher figure). The location is also used by large numbers of grey seal; 204 animals during the June count in 2011 and 297 during the August count 2010. Harbour seals routinely travel 40-50km from their haul-out sites to forage and prefer more sheltered waters, meaning harbour seals are more likely to be encountered in The Moray Firth than grey seals, which prefer offshore feeding areas, however both species could be present in proximity to the site.

Both species of seal are afforded protection under the Marine (Scotland) Act 2010/The Protection of Seals (Designation of Haul-Out Sites) (Scotland) Order 2014. Additionally, harbour seals feature on the SBL and UKBAP.

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<sup>14</sup> Site details for Dornoch Firth and Morrich More SAC available at:  
[https://gateway.snh.gov.uk/sitelink/siteinfo.jsp?pa\\_code=8242#features](https://gateway.snh.gov.uk/sitelink/siteinfo.jsp?pa_code=8242#features) last accessed 25/01/2019

## 3 MARINE MAMMAL RISK ASSESSMENT

### 3.1 Activities Affecting Marine Mammals

#### 3.1.1 Underwater Noise Producing Activities

Underwater noise modelling was commissioned as part of this assessment and was appraised to inform this document. Please refer to Irwin Carr Consulting report: 'Technical Appendix 4.2: Underwater Noise Assessment Nigg East Quay' which details the methods and findings of the underwater noise modelling.

There are a number of proposed activities which will introduce underwater noise into the marine environment. These include: impact piling, vibratory piling, dredging and vessel movement.

The Marine Scotland 'Guidance for Scottish Inshore Waters: The Protection of Marine European Protected Species from Injury and Disturbance' defines what disturbance means to cetaceans as: 'Changes in behaviour which may not appear detrimental in the short-term, but may have significant long-term consequences. Additionally the effects may be minor in isolation, but may become more significant in accumulation'. Disturbance may be identified via the following behaviour:

- Changes in (direction or speed of) swimming or diving behaviour;
- Bunching together or females shielding calves;
- Certain surface behaviours such as tail splashes and trumpet blows; and
- Moving out of a previously occupied area.

The following negative effects are linked to disturbance:

- Displacement from important feeding areas;
- Disruption of feeding;
- Disruption of social behaviours such as communication, calving, breeding, nursing, resting and feeding; and
- Increased risk of injury or mortality;
- Increased vulnerability of an individual or population to predators or physical stress; and
- Changes to regular migration pathways to avoid human interaction.

At this stage the exact details of the equipment to be used are not known, and will be confirmed upon appointing contractors. As a result, the data to inform the noise models has been interpolated from similar construction projects, in-house work undertaken by Irwin Carr Consulting and a review of the literature. This means that the results are based on a presumption that the works at Nigg East Quay will be carried out using equipment that produces similar noise levels to the examples used to inform the model. The three construction methods below are considered the most significant:

#### 1. Impact Piling

Impact piling activities will likely produce the loudest noise during construction. Despite only a few strikes being required to set a pile, this type of piling has a higher chance of causing injury than other types of noise with similar energy. This is because the sound impulse has a very fast 'rise time' i.e. how quickly an acoustic impulse "rises" from the background noise. This means animals in the vicinity of the noise source have no time to react/adapt to the noise, and consequently increases the risk of acute hearing injury. For the most part piles will be installed into pre-drilled holes by vibration. Where sediment proves too hard for this approach impact piling will be carried out. Should the impact hammer be required to set a pile, a

maximum of 1 hour 12 minutes (2880 strikes) is anticipated over a 12 hour period (noise producing activities are restricted to 07.00-19.00 daily).

## **2. Vibratory Piling**

Two methods of vibratory piling will be undertaken to install both HZ-M King piles and AZ Sheet piles. The underwater noise model has assumed a daily maximum use of this machinery of 3 hours and 6 hours, respectively.

## **3. Dredging**

The removal of sediment by either suction or lifting of loose material from the seabed will be undertaken via one or both of the following methods:

- Suction dredging involves and removing sediments via suction. Suction dredging is considered to be noisier due to the amount of moving parts under water; and more time is spent in deeper water where the noise propagates further. The noise model is based on data for the suction dredger, to represent a worst-case scenario.
- Backhoe dredgers are diggers which will be situated on barges and are suitable for removing soft sediment at shallow depths.

Cetaceans rely on their hearing for foraging, navigation and mating. The impact of noise to a population level is difficult to determine, however the expected impact on an individual animal's hearing ability and potential damage that could be caused by noisy activities during construction is assessed by modelling representative scenarios, taking into account environmental variables and the animal's hearing capabilities.

### **3.1.2 Increased vessel movement**

During construction, there will be a small increase in vessel movement in and out of the port; the increase in vessel capacity at Nigg East Quay will also lead to an increase in vessel traffic post-construction. Construction related marine vessel movements can be significant over a relatively short period of time. For example for the constructed South Quay development, the construction vessel movement numbers were estimated as 482<sup>15</sup> over around a six month construction period. The vessel movements for the proposed development are anticipated to be similar or less than that required to construct the South Quay.

The increase in the number of vessels travelling through to Nigg East Quay, both during construction and operation, would increase the risk of collision with marine mammals, potentially resulting in death or injury to individuals.

### **3.1.3 Dredge Disposal: The Sutors**

The Sutors is a favoured habitat of bottlenose dolphins, therefore there is a risk of injury or disturbance during dredge disposal at the licenced disposal site.

### **3.1.4 Cumulative Impacts**

In-combination effects of additional developments underway in the Moray Firth (and further afield) have the potential to impact species of marine mammal utilising the Moray Firth.

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<sup>15</sup> South Quay Extension, Grontmij Vessel Management Programme, February 2014

The following developments will be ongoing during the construction phase of Nigg East Quay and have the potential to cause in combination effects on marine mammals:

- Port of Cromarty Firth - Invergordon Service Base Phase 4 Development – Marine Licences consented in August 2018;
- Ardersier Port Ltd – Whiteness (Ardersier) Redevelopment of Former Fabrication Yard – Planning Permission in Principle granted by Highland Council in February 2019 (18/04552/PIP), Marine Licences (construction and capital dredge) pending; and
- Aberdeen Harbour Board – Aberdeen Harbour Expansion (Nigg Bay) – Marine Licences (dredging and construction) consented in November 2016.

Bottlenose dolphins associated with the Moray Firth SAC are known to also utilise the coast off Aberdeen, therefore if underwater noise producing activities are occurring at both sites simultaneously, two of their key habitats would be subject to increased disturbance and/or risk of injury or death. Similarly, the developments at both Invergordon and Ardersier would cause an increased risk of underwater noise disturbance injury or death.

During the operation of Nigg East Quay, Invergordon and Ardersier there is likely to be an increase in the number of vessels traveling through the Moray Firth SAC and surrounding waters. This could cause an increased risk of collision with marine mammals. Consultation has been undertaken with various organisations involved in these projects, regarding vessel movement, information received includes:

- Invergordon Phase 4: Minimal construction vessel movements anticipated (seven more bulk carriers and four more coaster deliveries expected). Construction dredging likely to be complete by August 2019.
- Ardersier – Following renewal of consents for Ardersier in early 2019, a construction programme has not been defined as yet.
- Aberdeen Harbour Expansion – The dredging programme is due to complete in February 2020 with quay construction work and breakwater marine works programmed until July 2020.

### 3.2 Underwater Noise Model

The way in which noise affects marine mammals is dependent on several factors, including the type of noise generated, the noise level, the species of marine mammal and the distance between the animal and the source of the noise. The National Oceanic and Atmospheric Administration (NOAA) describes how different groups of marine mammals hear and are affected by sounds, which can be found in the '*Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing*'<sup>16</sup>. The effects can be described as either a Permanent Threshold Shift (PTS), where an animal experiences irreversible damage to their hearing which can in turn affect their ability to forage and reproduce and in extreme circumstances result in death; or a Temporary Threshold Shift (TTS) which an animal can recover from, but may experience 'masking' which reduces its ability to communicate with other animals and locate prey, resulting in fatigue<sup>17</sup>.

Please read this section in conjunction with Section 3 of Irwin Carr Consulting report: 'Technical Appendix 4.2: Underwater Noise Assessment Nigg East Quay'. For ease of reference, figures comprising key risk maps taken from the report are included for each species.

The exact measurement of the noise levels that will be reached during construction are not yet known, therefore have been predicted for the purposes of underwater noise modelling (Technical Appendix 4.2), based on Irwin Carr's in-house experience and published literature. High impact (worst case) parameters, provided by project engineers, will be used to design mitigation to account for all eventualities. The noise levels used to conduct the

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<sup>16</sup> NOAA guidance available at: <http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm> last accessed 22/05/18

<sup>17</sup> JNCC UK Marine Noise Registry: Information Document available at: [http://jncc.defra.gov.uk/pdf/MNR\\_Draft\\_InfoDoc\\_V1\\_20160808.pdf](http://jncc.defra.gov.uk/pdf/MNR_Draft_InfoDoc_V1_20160808.pdf) last accessed 06/06/2018

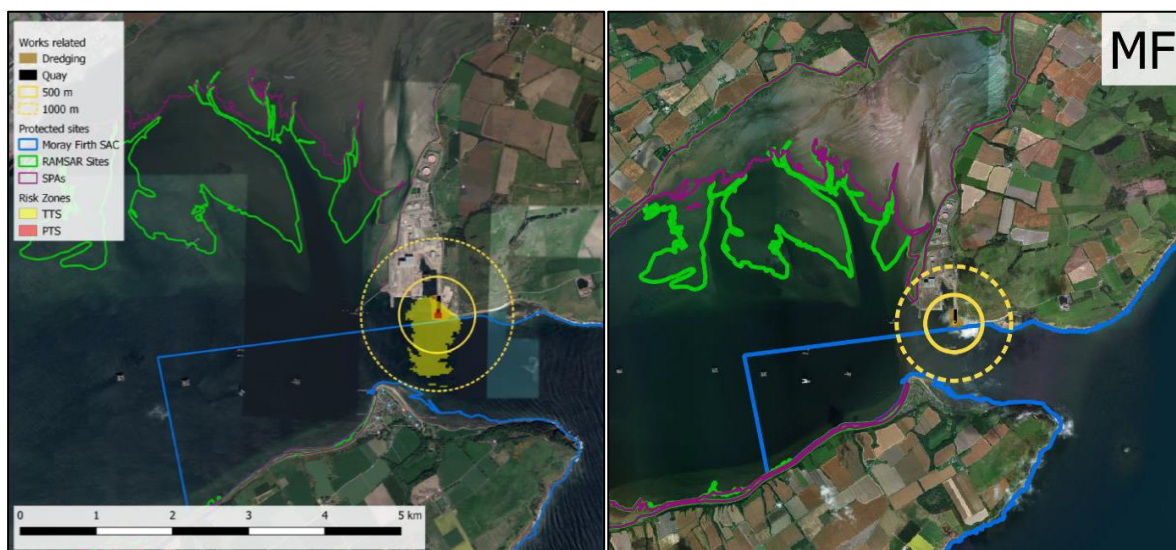
model have been compared to the recorded received noise levels<sup>18</sup> during similar construction activities, for the period of construction of the South Quay (2014) within Nigg Energy Park. The noise levels received at a distance of 812m from impact piling were recorded as 133.4 dB re 1  $\mu\text{Pa}^2\text{s}$ . The underwater noise model indicates that at ~812m from the source of the noise, the noise is predicted to be 125-135 dB re 1  $\mu\text{Pa}^2\text{s}$ <sup>19</sup>; therefore it is anticipated that the noise levels resulting from construction of Nigg East Quay will be comparable to those resulting from the construction of the South Quay. However there will be slight discrepancies due to the marginally different (more sheltered) location of the South Quay.

### 3.2.1 Bottlenose Dolphin

The underwater noise model indicates that none of the potential impact piling situations demonstrated present a PTS risk to bottlenose dolphin further than approximately 150m from the source of the noise. This is including the high impact situation (Figure 1) of 1 hour 12 minutes of impact piling per 12 hour period, with an animal remaining stationary throughout. It is unlikely impact piling will be required for this long in any given day and/or that an animal would remain in the area for the duration.

A more likely situation (still assuming the high impact noise levels emitted) presuming an animal would be stationary for 1 minute, there is no risk of PTS to bottlenose dolphins presented (Figure 1). The works are also proposed for the winter months, during which dolphins are observed using the SAC less than during the summer months.

In the same high impact situation, the TTS risk zone extends approximately 1km, across towards Cromarty, meaning the strait is almost 'blocked' by noise disturbance. However this is again assuming that an animal will be stationary for over an hour, which is extremely unlikely. Assuming the high impact noise levels for 1 minute (Figure 1), the TTS risk zone would be approximately <50m. In either the high impact or low impact situations, the TTS risk does not extend to the Sutors, a preferred feeding area for bottlenose dolphins.

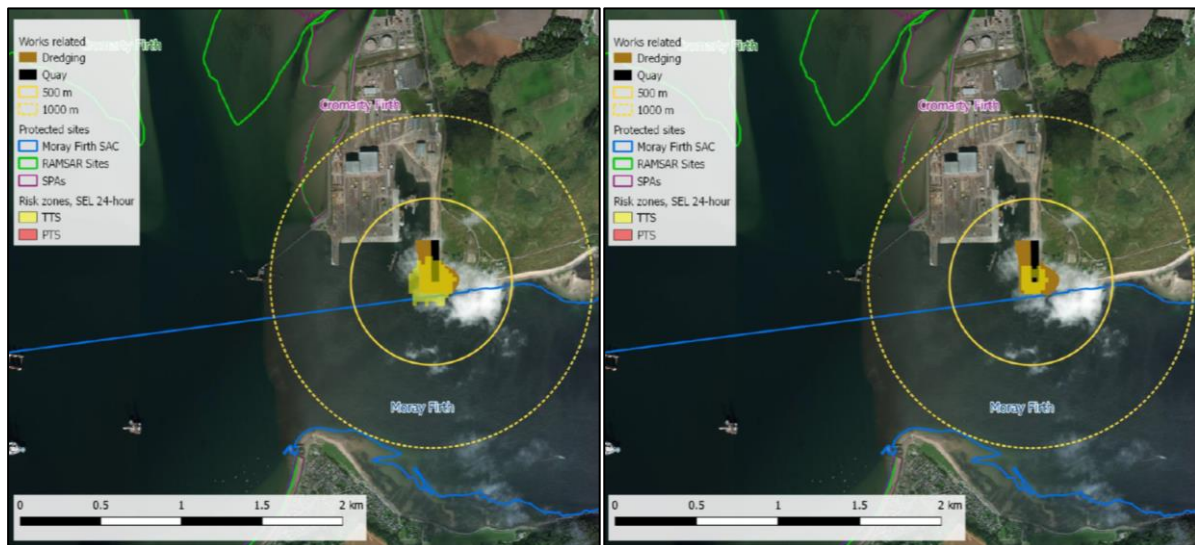


**Figure 1: Impact piling risk zones for bottlenose dolphin during the high impact scenario for 1 hour 12 minutes (left), and the high impact scenario for 1 minute (right)**

<sup>18</sup> Graham, I. M., E. Pirotta, N. D. Merchant, A. Farcas, T. R. Barton, B. Cheney, G. D. Hastie, and P. M. Thompson. 2017. Responses of bottlenose dolphins and harbour porpoises to impact and vibration piling noise during harbour construction. *Ecosphere* 8(5):e01793. 10.1002/ecs2.1793

<sup>19</sup> Figure 8 of *Technical Appendix 4.2 Underwater Noise Assessment Nigg East Quay* displays the noise levels anticipated over 1 hour 12 minutes of impact piling, therefore representing the sound exposure level for the duration. So that a direct comparison could be made between the two studies the sound exposure level was calculated for a single strike (subtract  $10 \cdot \log(n\_strikes)$ ), as the Graham et al publication presents exposure levels for a single strike.

The high impact situation modelled for vibratory piling (HZ-M vibration piling for 3 hours per day and AZ sheet vibration piling for 6 hours per day), showed no risk of PTS to bottlenose dolphin, and a TTS zone of <100m for both methods of vibratory piling (Figure 2).



**Figure 2: Vibratory piling risk zones for bottlenose dolphin during the high impact scenario for HZ-M piles (left), and the high impact scenario for AZ sheet piles (right)**

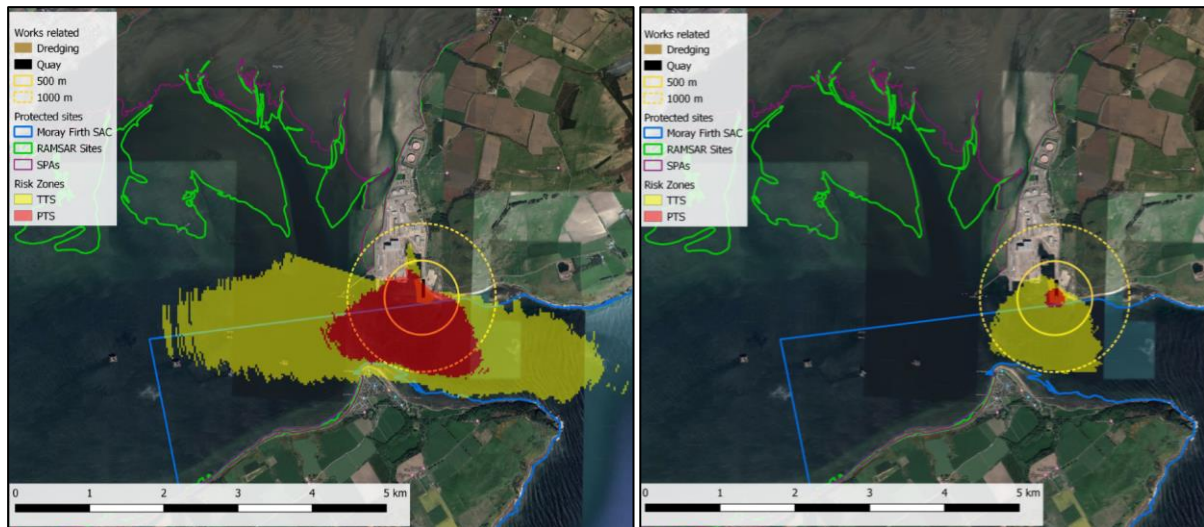
The high impact scenario modelled for dredging, showed no risk of PTS to bottlenose dolphin, and a TTS zone of <100m. Because the noise source here is mainly from the vessel, a familiar noise in the Cromarty Firth, it is considered bottlenose dolphins would continue using the strait, largely unaffected by the noise resulting from dredging activities.

### 3.2.2 Harbour Porpoise

The underwater noise model indicates that the risk zone for PTS has the potential to extend out to >1km from the source of the noise, during high impact situations (Figure 3). This is assuming 1 hour 12 minutes of impact piling per 12 hour period, with an animal remaining stationary throughout. It is highly unlikely impact piling will be required for this long in any given day and/or that an animal would remain in the area for the duration. A more likely situation (still assuming the high impact noise levels emitted) presuming an animal would be stationary for 1 minute, the PTS risk zone is reduced to approximately 200m (Figure 3).

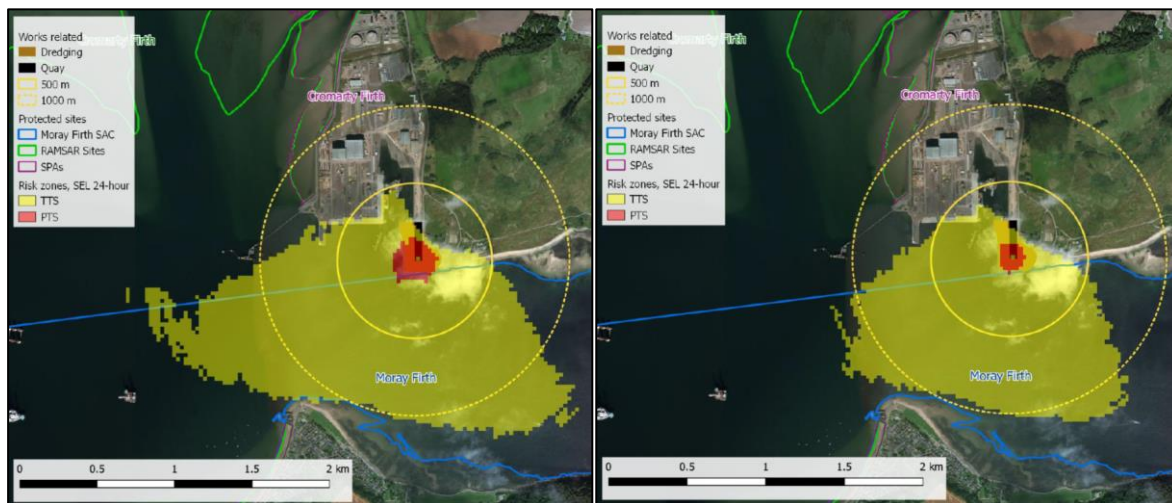
In the same high impact situations (Figure 3), the TTS risk zone extends approximately >2km, across to Cromarty and out into the main channel of the Moray Firth past the Cromarty Sutors, meaning the strait is 'blocked' by noise disturbance. Assuming the high impact noise levels for 1 minute the TTS risk zone would be approximately 1km, therefore the strait would still be blocked by noise disturbance. Given that impact piling is not considered to be required often, due to the soft nature of the sediments, the TTS risks are assessed to be tolerable with appropriate mitigation.





**Figure 3: Impact piling risk zones for harbour porpoise during the high impact scenario for 1 hour 12 minutes (left), and the high impact scenario for 1 minute (right)**

The high impact situation modelled for vibratory piling (HZ-M vibration piling for 3 hours per day and AZ sheet vibration piling for 6 hours per day), showed minimal risk of PTS to bottlenose dolphin (<50m from the source of the noise). The TTS risk zones for these situations would be approximately 1km, therefore 'blocking' the strait with noise disturbance (Figure 16 and 18, Technical Appendix 4.2). It is not considered necessary to conduct an MMO protocol prior to vibratory piling due to there being no risk of PTS, however a soft start will be undertaken to allow animals to move away from the noise before it is emitted at full power.



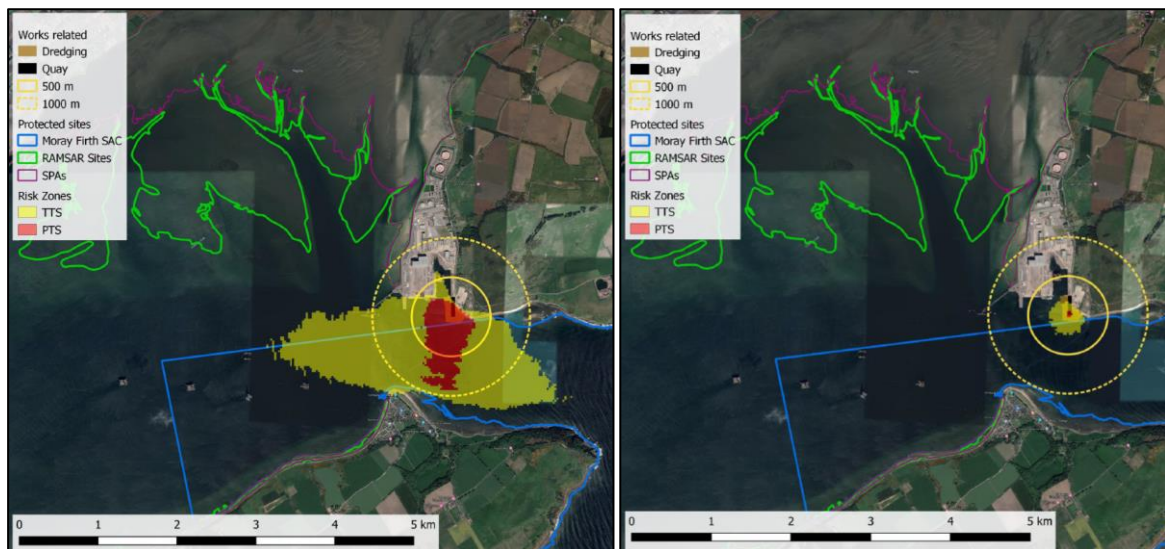
**Figure 4: Vibratory piling risk zones for harbour porpoise during the high impact scenario for HZ-M piles (left), and the high impact scenario for AZ sheet piles (right)**

The high impact scenario modelled for dredging, showed a risk of PTS to harbour porpoises out to approximately 300m, and a TTS zone of approximately 1km, however this model assumes an animal would be in the vicinity for 12 hours which is extremely unlikely. Because the noise source here is mainly from the vessel, a familiar noise in the Cromarty Firth, it is considered harbour porpoises would continue using the strait, largely unaffected by the noise resulting from dredging activities.

### 3.2.3 Seals

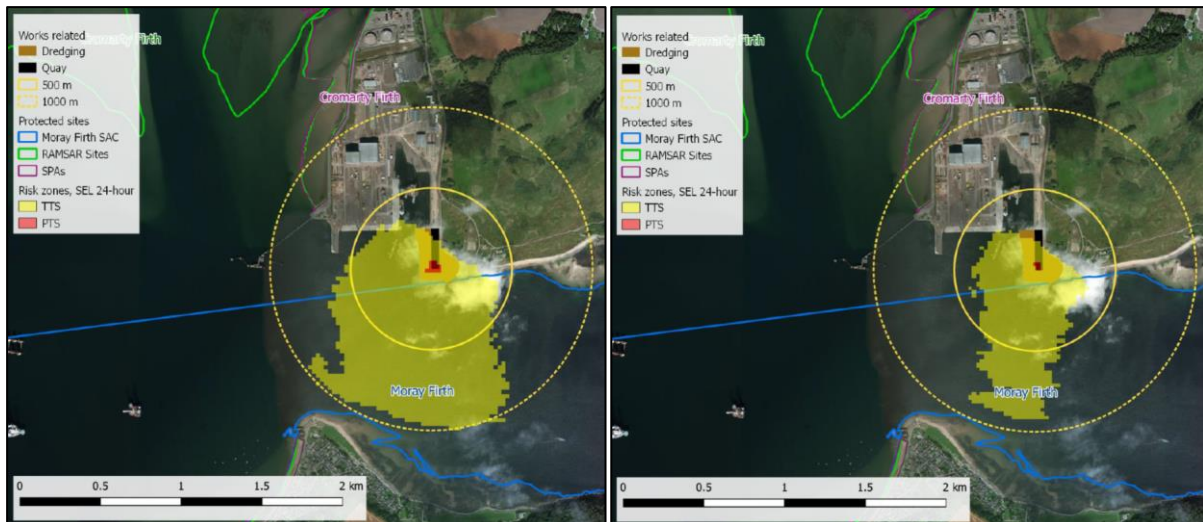
The underwater noise model indicates that there is a risk of PTS to seals, which extends ~1km across the strait, however this is modelled on the worst case scenario of 1 hour, 12 minutes of piling over a 12 hour period (Figure 5). It is highly unlikely a seal would be stationary for this length of time in the vicinity of increased underwater noise; the nearest haul-out site is approximately 12km south at Ardersier. It is also unlikely that 1 hour 12 minutes of continuous impact piling would be required during the course of construction works; and if 1 hour 12 minutes of impact piling was required over a 12 hour period, it would likely be spread out, meaning seals would have the opportunity to commute through the strait during times the impact hammer was not operational. A more likely situation (still assuming the worst case in terms of noise emitted), presuming an animal would be stationary for 1 minute, the PTS risk zone is approximately <100m (Figure 5).

The TTS risk zone in the high impact situation, extends to approximately 1.5km (Figure 5) across to Cromarty, meaning the strait is 'blocked' by noise disturbance. However this is again assuming that an animal will be stationary for over an hour, which is extremely unlikely. Assuming the high impact noise levels for 1 minute of impact piling (Figure 5), the TTS risk zone would be approximately 500m, with certain areas experiencing TTS up to approximately 1km.



**Figure 5: Impact piling risk zones for harbour and grey seals during the high impact scenario for 1 hour 12 minutes (left), and the high impact scenario for 1 minute (right)**

The high impact parameters of the vibratory piling model showed small risk zones of PTS (<50m) and a TTS risk zone of approximately 1km and ~900m during HZ-M vibration piling and AZ sheet vibration piling, respectively (Figure 6). The low impact situations display no PTS risk zones; and TTS risk zones of approximately <300m for both methods.



**Figure 6: Vibratory piling risk zones for harbour porpoise during the high impact scenario for HZ-M piles (left), and the high impact scenario for AZ sheet piles (right)**

The high impact situation modelled to represent dredging operations showed no risk of PTS to seals, and a TTS zone of <100m. Because the noise source here is mainly from the vessel, a familiar noise in the Cromarty Firth, it is considered seals would continue using the strait, largely unaffected by the noise resulting from dredging activities.

Because the nearest seal haul-out sites are 12km and 15km away, the risk of above ground noise as a result of impact piling, vibratory piling and/or dredging is considered unlikely.

### 3.3 Assessment of Risk

#### 3.3.1 Impact Piling, Vibratory Piling and Dredging

To summarise, for all hearing groups and without mitigation, impact piling produces larger impact zones than vibratory piling. The MMO protocol, detailed below, includes a mitigation exclusion zone of 500m. Assuming the 10-20 minute soft-start is implemented, gradually ramping up power of the impact hammer, animals will have the opportunity to flee the area before impact piling at full power commences. One minute of impact piling at full power would cause PTS out to a maximum distance of ~200m (Harbour porpoise, Figure 3). The MMO will scan the water within a 500m radius, for a minimum of 30 minutes prior to piling commencing, confirming an absence of marine mammals. Therefore the risks of any species of marine mammal experiencing PTS are low.

The results of the monitoring<sup>20</sup> of noise levels during the construction of the South Quay indicate that neither bottlenose dolphin nor harbour porpoise were excluded from sites in the vicinity of works during impact piling activities; and bottlenose dolphins were observed to spend less time in proximity to construction works, but overall were still observed regularly. This could be due to a number of factors however, such as animals being habituated to noise, which is a frequent feature of the Moray Firth; or a lower occurrence of harbour porpoises utilising the Moray Firth.

As harbour porpoise are assessed to be the most sensitive species to underwater noise as a result of the construction of Nigg East Quay, it is considered that the mitigation suggested to protect them will be effective at

<sup>20</sup> Graham, I. M., E. Pirota, N. D. Merchant, A. Farcas, T. R. Barton, B. Cheney, G. D. Hastie, and P. M. Thompson. 2017. Responses of bottlenose dolphins and harbour porpoises to impact and vibration piling noise during harbour construction. *Ecosphere* 8(5):e01793. 10.1002/ecs2.1793

protecting other species such as bottlenose dolphin, seals and any vagrant species that may be encountered during works.

It has been assessed that the primary risk from the works is to harbour porpoise; with consideration to be made for bottlenose dolphin and grey and harbour seal; and that this will be **temporary disturbance** from underwater noise associated with the **impact piling**. The noise is not predicted to cause long term negative effects on the local populations of the aforementioned species due to its short duration and adherence to the detailed Marine Mammal Mitigation Plan (MMMP) in section 4. A JNCC report<sup>21</sup> providing guidance on disturbance of European protected marine mammals suggests that for an activity to disturb a significant number of harbour porpoise it would have to continue for a considerably long period of time.

It is not considered necessary to deploy mitigation prior to vibratory piling due to there being no risk of PTS, and only small risks of TTS, however a soft start will be undertaken to allow animals to move away from the noise before it is emitted at full power.

It is not considered necessary to conduct an MMO protocol prior to dredging due to there being no risk of PTS and only small risks of TTS.

Mitigation will be designed for dredge disposal operations to prevent the disposal of material causing injury or disturbance to bottlenose dolphins that may be present in the vicinity of The Sutors.

### 3.3.2 Increased Vessel Movement

The Moray Firth has a long history of exposure to anthropogenic noise from oil and gas activities, fisheries and shipping; therefore it is likely that bottlenose dolphins and harbour porpoises using these habitats are habituated and/or may be more tolerant of vessel movement.

Bottlenose dolphins readily approach boats to bowride and harbour porpoises often live in the vicinity of vessel traffic. Reactions by porpoises to various types of vessel showed only short-term negative effects from speedboats and large ferries in a study by the Seawatch Foundation<sup>22</sup>. SNH<sup>23</sup> indicate that as harbour porpoise are naturally shy of boats, they will for the most part avoid them. It is considered that for most types of marine traffic the risk of collision with cetaceans is minimal.

Disturbance caused by an increased human presence can have a negative impact on seals, seals that are on land are usually resting to conserve energy or may be nursing young, disturbing seals into the water costs them energy, creates stress and can lead to impacts on health<sup>24</sup>. Stampeding adults can also injure pups. As the nearest seal haul-out site is 12km south at Ardersier, it is unlikely that seals will be negatively impacted by an increase in vessel movement.

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<sup>21</sup> JNCC (2008) *The Deliberate Disturbance of Marine European Protected Species – Guidance for English and Welsh Territorial Waters and the UK Offshore Marine Area*. Available at: [http://jncc.defra.gov.uk/PDF/consultation\\_epsGuidanceDisturbance\\_all.pdf](http://jncc.defra.gov.uk/PDF/consultation_epsGuidanceDisturbance_all.pdf) last accessed 25/07/2018

<sup>22</sup> Seawatch Foundation: The Harbour Porpoise in UK Waters available at: [http://seawatchfoundation.org.uk/wp-content/uploads/2012/07/Harbour\\_Porpoise.pdf](http://seawatchfoundation.org.uk/wp-content/uploads/2012/07/Harbour_Porpoise.pdf) last accessed 13/06/2019

<sup>23</sup> Scottish Natural Heritage: Inner Hebrides and the Minches Proposed SAC: Advice to Support Management available online at: <https://www.nature.scot/sites/default/files/2017-10/Consultation%20-%20Harbour%20Porpoise%20-%20Inner%20Hebrides%20and%20the%20Minches%20pSAC%20-%20Combined%20Reg%2033%20%20MOP%20-%20A1918723.pdf> last accessed 13/06/2019

<sup>24</sup> Scottish Natural Heritage: A Guide to Best Practice for Watching Marine Wildlife available online at: <https://www.nature.scot/sites/default/files/2017-06/Publication%202017%20-%20A%20Guide%20to%20Best%20Practice%20for%20Watching%20Marine%20Wildlife%20SMWWC%20-%20Part%202%20-%20April%202017%20%28A2263517%29.pdf> last accessed 13/06/2019



## 4 MARINE MAMMAL MITIGATION PLAN

The marine mammal mitigation will comprise two protocols depending on the timings of the works carried out; A standard MMO protocol as per JNCC guidance which will be implemented during impact piling operations in optimal sea states and during times of optimal visibility, and a Passive Acoustic Monitoring (PAM) protocol which will be implemented during hours of low visibility.

### 4.1 Marine Mammal Observation Protocol – Impact Piling

The Marine Mammal Observation Protocol (MMOP) will be implemented so that the impact piling works do not cause injury or unnecessary disturbance to marine mammals. Although not an EPS, as good practice and as they are known to be present in the general area, this will extend to pinnipeds including harbour seal and grey seal. This section has been designed with reference to current JNCC guidance 'Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise' (August 2010)<sup>25</sup>.

#### 4.1.1 Marine Mammal Observer

A suitably qualified Marine Mammal Observer (MMO), competent in the identification of marine mammals at sea, will be present during the impact piling. The MMO will undertake observation for marine mammals within the mitigation zone before and during impact piling and will be dedicated to that one task for the duration of any watch. The MMO will advise the contractors and crews on the implementation of the procedures set out in the agreed protocol, to ensure compliance with those procedures.

The JNCC guidance provides the following definitions of an MMO:

**MMO:** Individual responsible for conducting visual watches for marine mammals. It may be requested that observers are trained, dedicated and/or experienced.

**Trained MMO:** Has been on a JNCC recognised course.

**Dedicated MMO:** Trained observer whose role on board a vessel is to conduct visual watches for marine mammals.

**Experienced MMO:** Trained observer with three years of field experience observing for marine mammals, and practical experience of implementing the JNCC guidelines.

The MMO will be land based and will be trained. The identity and credentials of the MMO will be agreed with Marine Scotland.

#### 4.1.2 MMO Equipment

The MMO will be equipped with binoculars (10X42 or similar) and/or a spotting scope (20-60 zoom or equivalent), a copy of the agreed protocol and the Marine Mammal Recording Form (MMRF), which is a Microsoft Excel spreadsheet containing embedded worksheets named Cover Page, Operations, Effort and Sightings. A Microsoft Word document named Deck forms is also available, and the MMO may prefer to use this when observing before transferring the details to the Excel spreadsheets. Although these forms were developed for

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<sup>25</sup> It should be noted that this protocol does not document measures to mitigate disturbance effects, but has been developed to reduce to negligible levels of risk of injury or death to marine mammals in close proximity to piling operations.

seismic surveys, they can be used for piling operations, although many columns will not be applicable. The ability to determine the range of marine mammals is a key skill for MMOs, therefore a hand-held rangefinder will be used to verify the range.

All MMO forms, including a guide to completing the forms; and instructions on how to make a rangefinder are available on the JNCC website: [http://jncc.defra.gov.uk/marine/seismic\\_survey](http://jncc.defra.gov.uk/marine/seismic_survey)

#### **4.1.3 Communication**

The contractor will be responsible for the communication channels between those providing the mitigation service and the crews working on the piling. A formal chain of communication from the MMO to the contractor, who will start/stop piling, will be established. In order to confirm the chain of communication and command the MMO will attend any relevant pre-mobilisation meetings.

#### **4.1.4 Mitigation Zone**

The JNCC guidance defines the mitigation zone as a pre-agreed radius around the piling site prior to any piling. This is the area where a MMO keeps watch for marine mammals (and delays the start of activity should any marine mammals be detected). The extent of this zone represents the area in which a marine mammal could be exposed to sound that could cause injury and will be determined by factors such as the pile diameter, the water depth, the nature of the activities (for example whether drilling will also take place) and the effect of the substrate on noise transmission. The radius of the mitigation zone should be no less than 500 metres, and this is measured from the pile location. The MMO should be located on the most appropriate viewing platform to ensure effective coverage of the mitigation zone.

Due to the geography of the Cromarty Firth, in optimum visibility and sea state conditions there is potential that from an elevated vantage point, likely from the beach adjacent to the proposed quay or within Nigg Energy Park on the quay in the south west of the site (as shown in Appendix C), the MMO will be able to visually monitor the area extending across the whole strait to Cromarty; offering the benefit of monitoring the channel to identify any cetaceans or seals travelling into the Cromarty Firth from open water. This will encompass a crude 1.km radius surrounding the proposed Nigg East Quay site, however, to provide a level of mitigation appropriate to the risk and more accurate monitoring, a mitigation zone of 500m around the piling activity is proposed. This will be agreed with the regulatory authorities.

#### **4.1.5 Impact Piling Protocol**

The standard JNCC protocol is outlined below<sup>26</sup> (please see Section 4.2 for the PAM protocol to be followed during times of darkness and/or low visibility i.e. fog):

1. The MMO will not initiate this protocol during periods of darkness or poor visibility (such as fog) or during periods when the sea state is not conducive to visual mitigation (above sea state 4 is considered not conducive<sup>27</sup>) as there is a greater risk of failing to detect the presence of marine mammals<sup>28</sup>. Harbour porpoise have small dorsal fins, therefore the MMO shall take additional precautions if the sea state exceeds 2. An elevated platform for the MMO to monitor from would be beneficial when the sea state is 2 or above, the impact piling works could also be scheduled on a day where the sea is expected to be calm.

---

<sup>26</sup> There is a 'variation of standard piling protocol' allowed in the guidance if required.

<sup>27</sup> Detection of marine mammals, particularly porpoises, decreases as sea state increases. According to the JNCC guidance ideally sea states of 2 or less are required for optimal visual detection.

<sup>28</sup> There is a 'variation of standard piling protocol' allowed in the guidance if required.

2. The mitigation zone of 500m will be monitored visually by the MMO for an agreed period prior to the commencement of piling. This will be a minimum of 30 minutes.
3. The MMO will scan the waters using binoculars or a spotting scope and by making visual observations. Sightings of marine mammals will be appropriately recorded in terms of date, time, position, weather conditions, sea state, species, number, adult/juvenile, behavior, range etc. on the JNCC standard forms. Communication between the MMO and the contractor and the start/end times of the activities will also be recorded on the forms.
4. Piling will not commence if marine mammals are detected within the mitigation zone or until 20 minutes after the last visual detection. The MMO will track any marine mammals detected and ensure they are satisfied the animals have left the mitigation zone before they advise the crew to commence piling activities.
5. A soft-start will be employed, with the gradual ramping up of piling power incrementally over a set time period until full operational power is achieved. The soft-start duration will be a period of between 10 and 20 minutes, depending on machinery used. This will allow for any marine mammals to move away from the noise source.
6. If a marine mammal enters the mitigation zone during the soft-start then, whenever possible, the piling operation will cease, or at least the power will not be further increased until the marine mammal exits the mitigation zone and there is no further detection for 20 minutes.
7. When piling at full power this will continue if a marine mammal is detected in the mitigation zone (as it is deemed to have entered voluntarily<sup>29</sup>).
8. If there is a pause in the piling operations for a period of greater than 10 minutes, then the pre-piling search and soft-start procedure will be repeated before piling recommences. If a watch has been kept during the piling operation, the MMO should be able to confirm the presence or absence of marine mammals, and it may be possible to commence the soft-start immediately. If there has been no watch, the complete pre-piling search and soft-start procedure will be undertaken.

#### **4.1.6 Reporting**

As per the JNCC guidance, reports detailing the piling activity and marine mammal mitigation (the MMO reports) will be sent to Marine Scotland at the conclusion of piling activity. Reports will include:

- Completed MMRFs;
- Date and location of the piling activities;
- A record of all occasions when piling occurred, including details of the duration of the pre-piling search and soft-start procedures, and any occasions when piling activity was delayed or stopped due to presence of marine mammals;
- Details of watches made for marine mammals, including details of any sightings, and details of the piling activity during the watches;
- Details of any problems encountered during the piling activities including instances of non-compliance with the agreed piling protocols; and
- Any recommendations for amendment of the protocols.

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<sup>29</sup> The guidance states that there is no scientific evidence for this voluntary hypothesis; instead it is based on a common sense approach. Factors such as food availability may result in marine mammals approaching piling operations; in particular, the availability of prey species stunned by loud underwater noise may attract seals into the vicinity.

## **4.2 Passive Acoustic Monitoring Protocol – Impact Piling**

This protocol will be followed when works are to commence during periods of low visibility (i.e. when sea states are not conducive to visual monitoring, fog or darkness).

PAM systems can only be used to detect vocalising species of marine mammals, which includes bottlenose dolphin and harbour porpoise, and they are not as accurate as visual observations for determining range. As such, the most accurate system available will be used and the PAM Operative will factor in a realistic estimate of the range accuracy.

PAM systems will be deployed at a location in the vicinity of the proposed quay which allows uninterrupted and realistic background underwater noise measurements prior to the commencement of the activity. The hydrophones will be calibrated to receive cetacean (dolphin, porpoise and whale) calls, both whistles and clicks over a frequency range of 1 to 20kHz and 15kHz to 150kHz. Whilst less vocal, the hydrophones will also be calibrated to intercept and recognise grey seal and harbour seal, typically vocal over a frequency range of 100kHz to 150kHz.

The PAM system will be appropriately placed with sufficient spatial coverage to measure and monitor construction noise generation within the marine mammal mitigation zone. Underwater noise levels at this mitigation perimeter must be less than the values prescribed within the CEMP.

PAM activities will be carried out in consultation with the University of Aberdeen and Marine Scotland to ensure that the information collected is suitable to be assessed against the longer term studies in the wider area. The results of the PAM will be appropriately recorded and reported, and in accordance with JNCC guidance.

## **4.3 Dredging Disposal: The Sutors Mitigation Protocol**

An MMO will be present on the dredge vessel during disposal at The Sutors site. A scan of the water within an approximate 250m radius shall be undertaken prior to dredge material being disposed of to ensure there are no marine mammals, particularly bottlenose dolphin which frequently utilise this habitat, are in proximity to the vessel. The search will be conducted for a minimum of ten minutes.

## **4.4 Vessel Movement**

Speed restrictions shall be implemented on vessels travelling to and from the proposed development, and will continue throughout construction and operation. Chapter 8 of the EIAR: Other Issues includes further information regarding vessel movements and mitigation; and Technical Appendix 4.2 includes detailed mitigation. Good practice measures that will be followed include:

- Keep a safe distance. Never get closer than 100m (200m if another boat is present) if within 100m, switch the engine to neutral;
- Never drive head on to, or move between, scatter or separate marine mammals or sharks. If unsure of their movements, simply stop and put the engine into neutral;
- Spend no longer than 15 minutes near the animals;
- Special care must be taken with mothers and young;
- Maintain a steady direction and a slow 'no wake' speed; and
- Avoid sudden changes in speed.



## **4.5 Additional Good Practice Recommendations**

If any dead cetacean is observed during construction or operation, it should be reported to the Scottish Marine Animal Stranding Scheme (SMASS) ([www.strandings.org](http://www.strandings.org)) and live marine mammal strandings will be reported to British Divers Marine Life Rescue ([www.bdmlr.org.uk](http://www.bdmlr.org.uk)).

The MMO should keep a record of all marine mammal sightings, whether in the mitigation zone or not, to be issued to SNH. An understanding of the location of species is essential to appropriately assess the impacts of a proposed development and plan and target effective mitigation, therefore this data could be used to inform future projects. Biodiversity data are extremely important as, aside from use in planning and decision making, they are key to delivering state of environment reporting, education, modelling trends in species and habitat distribution, and research and policy making.

## 5 MARINE MAMMAL LICENSING

European Protected Species (EPS) are animals and plants (species listed in Annex IV of the Habitats Directive) that are afforded protection under The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) and the Conservation of Offshore Marine Habitats and Species Regulations 2017. All cetacean species (whales, dolphins and porpoise) are European Protected Species. If any activity is likely to cause disturbance or injury to a European Protected Species a licence is required to undertake the activity legally.

The licensing of Marine European Protected Species in Scotland is shared between several regulators depending on the purpose and location of the activity in question. For activities taking place within 12 nautical miles of the coast (the Scottish Territorial Sea), EPS are protected under the 1994 Regulations. For commercial activities, including geophysical or seismic surveys (including those related to oil and gas), port and harbour developments and the installation of renewable energy devices Marine Scotland (on behalf of the Scottish Ministers) is the licensing authority under the 1994 Regulations: Regulation 39 (1) (a). For activities relating to scientific research or conservation, Scottish Natural Heritage is the licensing authority.

A licence may be granted to undertake such activities if certain strict criteria are met:

- There is a licensable purpose.
- There are no satisfactory alternatives.
- The actions authorised will not be detrimental to the maintenance of the population of the species concerned at favourable conservation status<sup>30</sup> in their natural range.

The flowchart in Figure 5-1 below shows the decision-making process for licensing, taken from the Marine Scotland guidance<sup>31</sup>.

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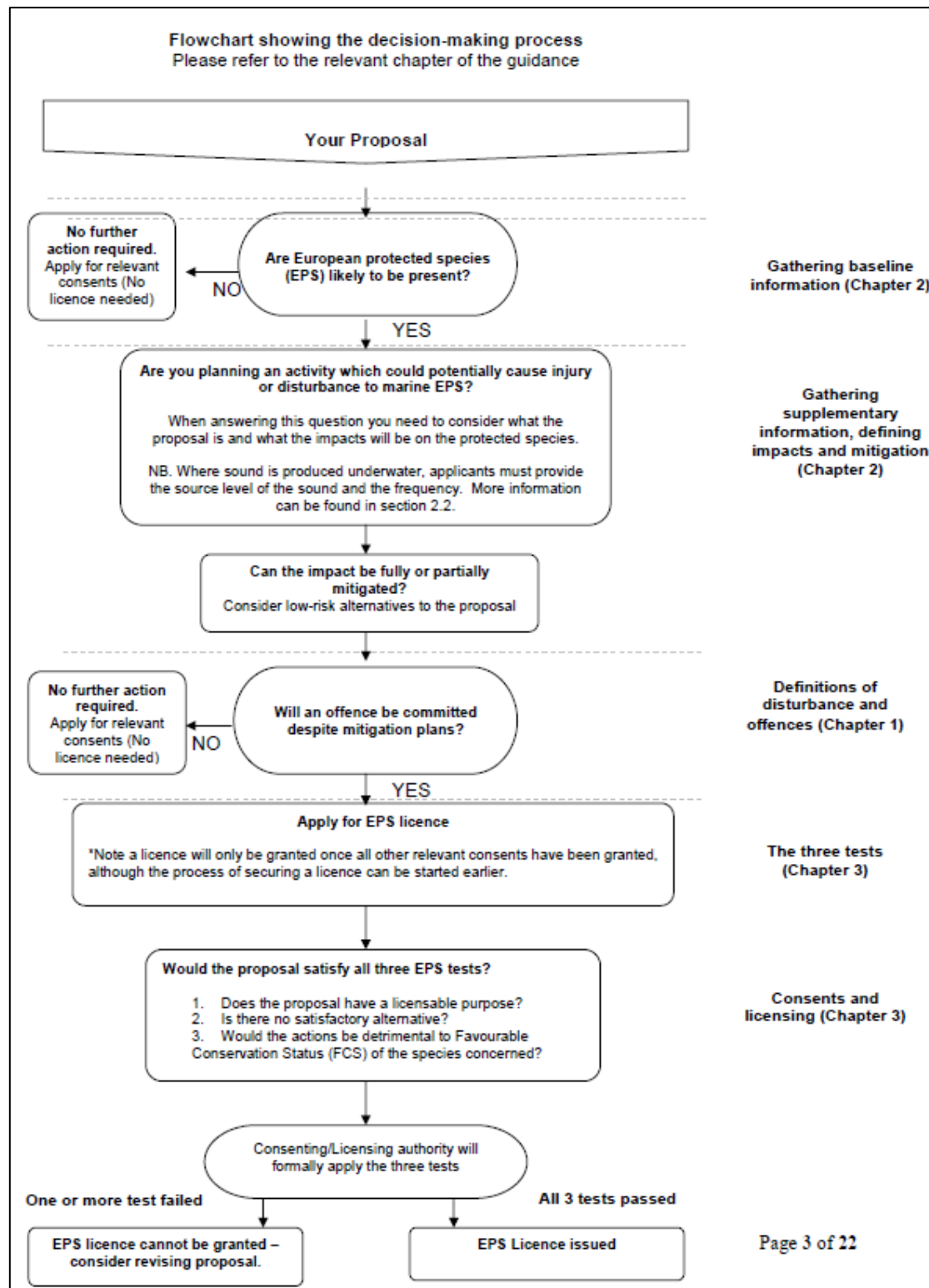
<sup>30</sup> The ultimate objective of the Habitats Directive is to ensure that the species covered reach what is called a 'Favourable Conservation Status' and that their long-term survival is deemed secure across their entire natural range within Europe. Article 1(i) of the Habitats Directive defines Favourable Conservation Status (FCS) of a species as follows:

"Conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within its natural range.

The conservation status will be taken as 'favourable' when:

- population dynamics data on the species concerned indicates that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis."

<sup>31</sup> Guidance for Scottish Inshore Waters: The Protection of Marine European Protected Species from injury and disturbance. Marine Scotland 2014.



**Figure 5-1: EPS Licencing Procedure**

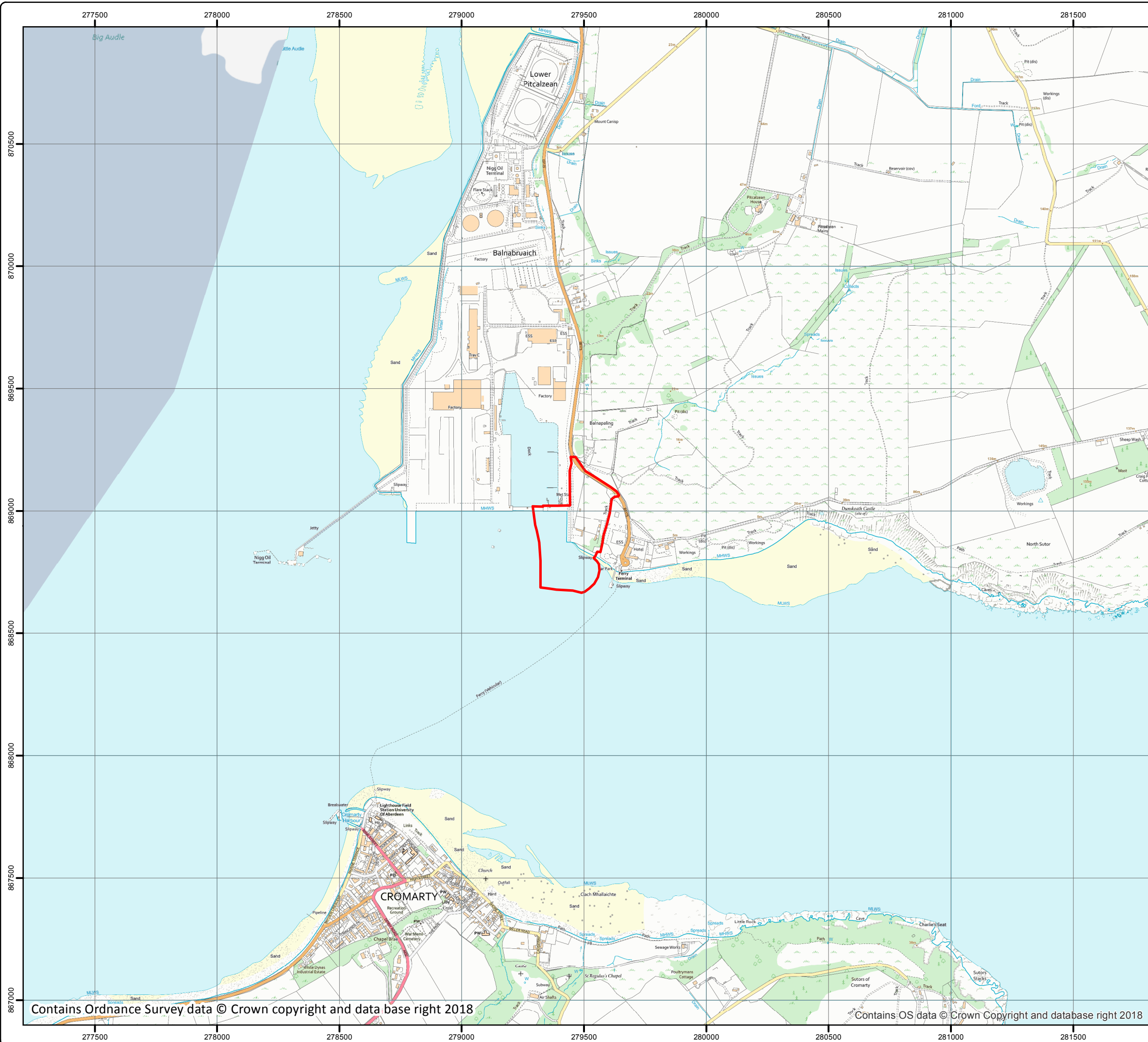
Impact piling has the potential to produce underwater noise at levels which could cause injury and disturbance to cetaceans. If the mitigation in section 5 is employed effectively, it is predicted that there will be no risk of injury, however, the mitigation measures cannot fully protect against disturbance from piling noise. As highlighted in Section 3 the risk of disturbance is greater than that of injury, with TTS (disturbance) occurring over a much wider area than PTS (injury). **Therefore an EPS licence will be required for potential disturbance from impact (hammer) piling.**

## **APPENDICES**

## **A      PROPOSED SITE LOCATION AND LAYOUT**

## **B      DESIGNATED SITES BOUNDARIES**

## **C      MARINE MAMMAL MITIGATION ZONE**



Legend

Site Boundary

Do not scale this map

Client

Global Energy Nigg Limited

Project

Nigg East Quay

Title


Figure 1.1 - Site Location Plan

Status

FINAL

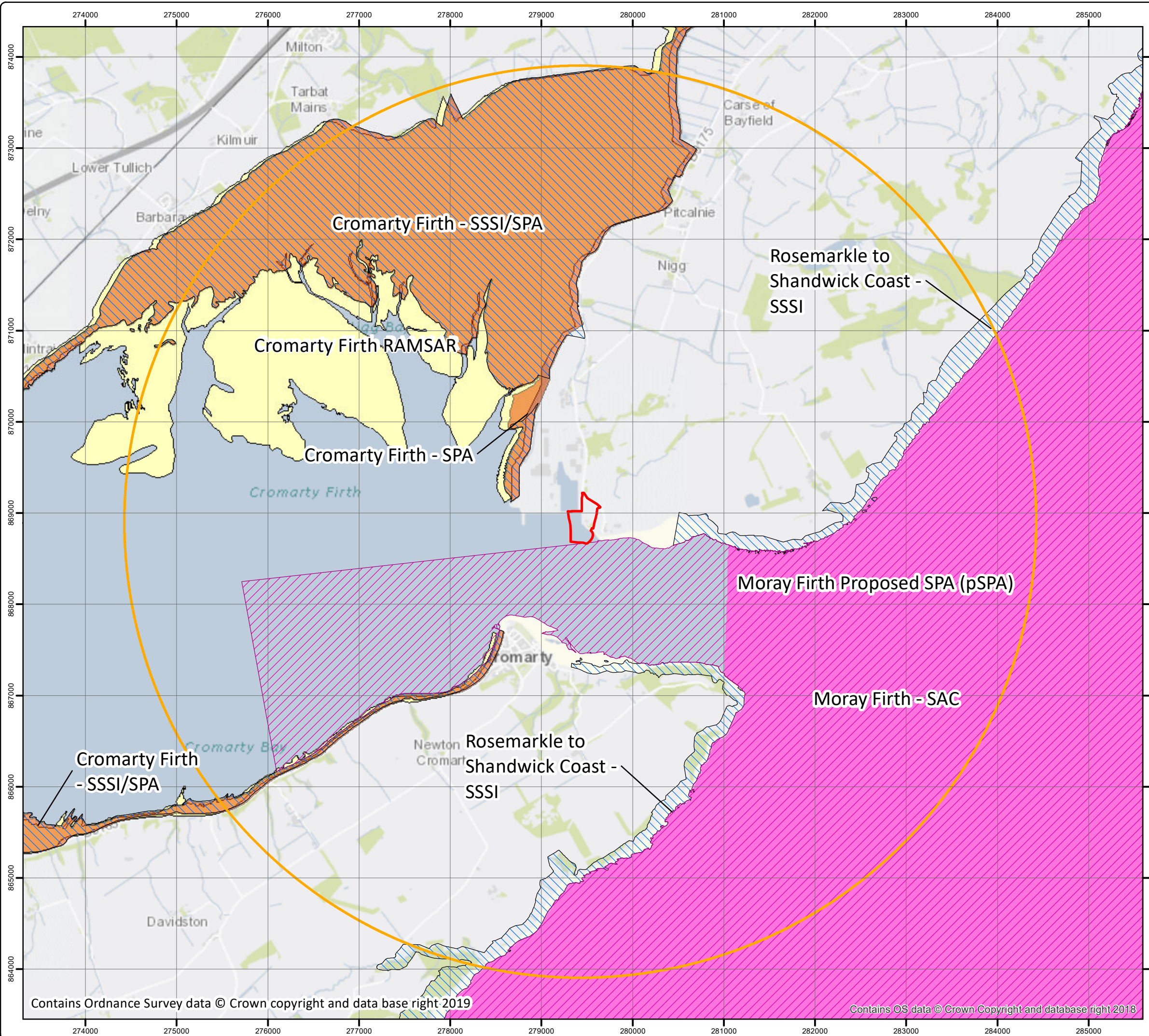
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671906-001	

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1:15,000		12 Feb 2019
Drawn	Checked	Approved
SMC	JEP	MH



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**Legend**

- 5km Buffer
- Site Boundary
- Special Areas of Conservation
- Sites of Special Scientific Interest
- Special Protection Areas
- Proposed Special Protection Areas
- RAMSAR Site

Do not scale this map

Client		
Global Energy Nigg Limited		
Project		
Nigg East Quay		
Title		
Figure 1.2 - Environmental Designations		
Status		
FINAL		
Drawing No.	Revision	
671906-003		
Scale	A3	Date
1:40,000		12 Feb 2019
Drawn	Checked	Approved
SMC	JEP	MH



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Legend

Potential Marine Mammal Observer Point

Approximate Piling Location

500m Marine Mammal Mitigation Zone

Do not scale this map

Client

Global Energy Nigg Limited

Project

Nigg East Quay

Title

Figure 4.1  
Marine Mammal Mitigation Zone, Nigg

Status

FINAL

Drawing No.

671906-034

Revision

Scale

1:8,274

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Date

13 June 2019

Drawn

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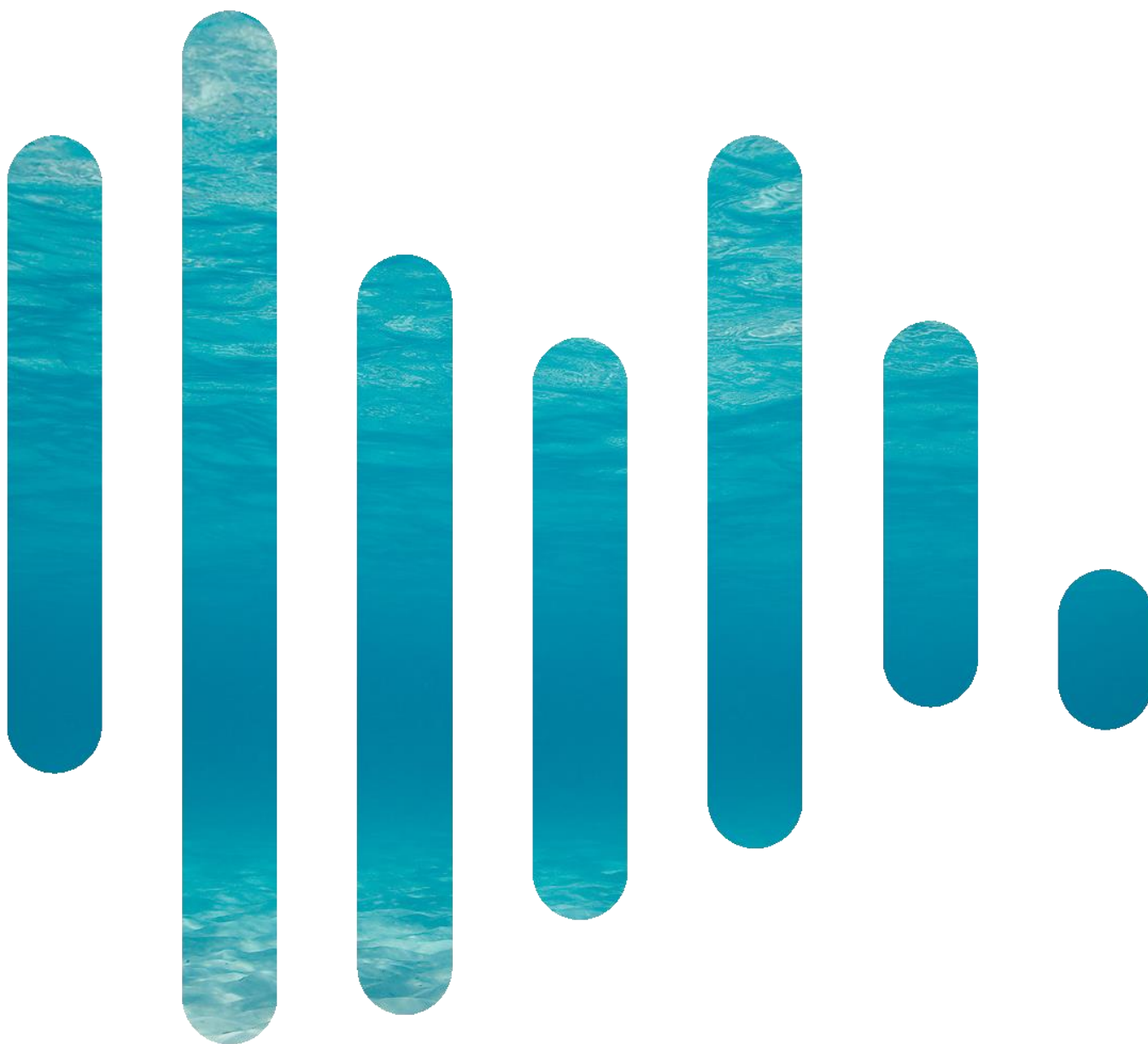
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## **Technical Appendix 4.2**



TECHNICAL APPENDIX 4.2  
UNDERWATER NOISE ASSESSMENT  
NIGG EAST QUAY

2019016 R02 (Nigg East Quay)  
05 June 2019



**PROJECT:** NIGG EAST QUAY

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**REPORT NO.:** 2019016 R02 (Nigg East Quay)

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Status:	Rev:	Comments	Date:	Author:	Reviewer:
Final	2.0		05 June 2019	Rasmus Sloth Pedersen [Redacted]	Shane Carr [Redacted]

## EXECUTIVE SUMMARY

Irwin Carr Consulting Ltd have been commissioned to undertake an underwater noise assessment of the activities relating to the proposed expansion of Nigg East Quay, located in the strait connecting Cromarty Firth with Moray Firth in the North-East of mainland Scotland.

### BRIEF DESCRIPTION OF WORK

Environmental variables (e.g. sediment, depth, water temperature, tide, salinity) were included in an acoustic propagation model to calculate transmission losses from dredging, vibration piling and impact piling. Source levels were interpolated from earlier studies and field recordings from similar equipment. A “Low impact” and a “High impact” scenario was devised to reflect the variation in prediction given the uncertainty associated with source levels, activity duration and environmental variables. Results are presented as “risk” zones, of varying negative acoustical environmental impact.

### ASSESSMENT CRITERIA

The noise field resulting from the modelling was weighted according to standardised methods (National Marine Fisheries Service, 2018) along with additional work to accommodate important fishes. We present the results as areas of risk for the animal to either experience a temporary worsening of their hearing (Temporary Threshold Shift, TTS) or permanent hearing injury (Permanent Threshold Shift, PTS).

### RESULTS AND CONCLUSION SUMMARY

Generally, the use of vibration pile driving, and quieter dredging methods (backhoe/suction/bucket dredging) serves to limit the risks to the marine fauna from the noise associated with the works. There is some concern over the noise levels in regard to the potential to deter animals from passing through the area, though these are limited to short durations (~1 hour/24 hours) during impact pile driving of the large HZ-M king piles.

We conclude that the activities are unlikely to have significant adverse impact on the local populations of marine mammals and fish, but encourage the MMO to extend their search efforts to cover the main part of the strait, should longer durations of impact piling be needed.

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## INTRODUCTION

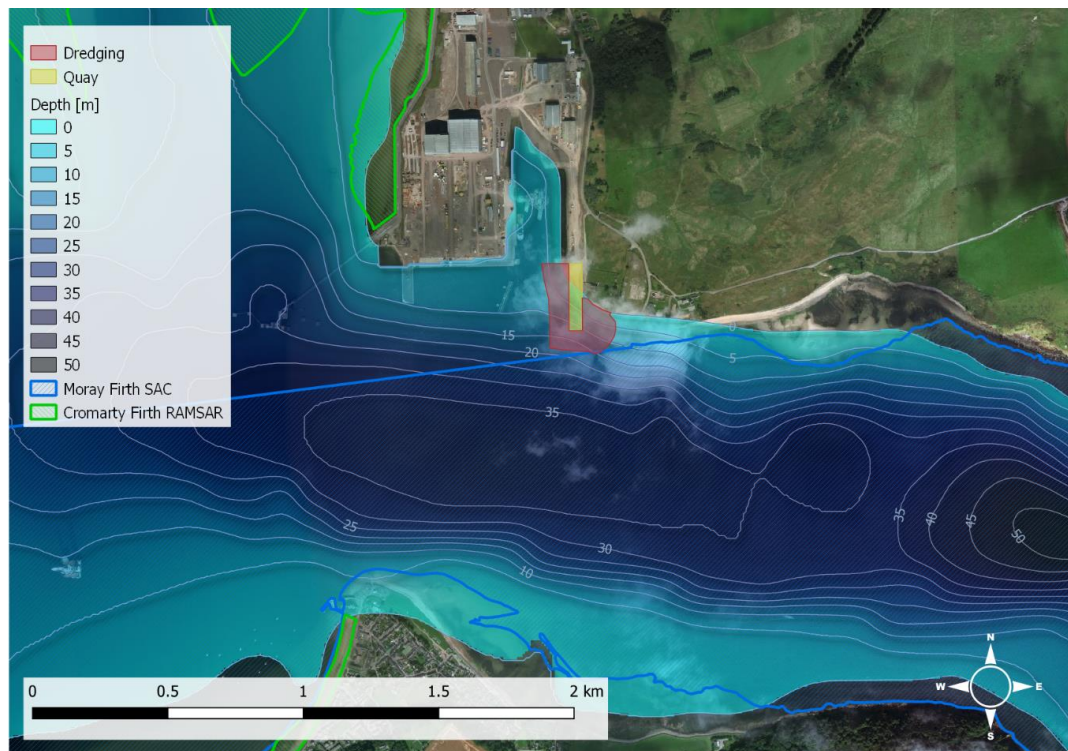
Irwin Carr Consulting Ltd have been commissioned to undertake an underwater noise assessment of the activities relating to the proposed expansion of Nigg East Quay, located in the strait connecting Cromarty Firth with Moray Firth in the North-East of mainland Scotland.

### 3.2.2 BACKGROUND

#### 3.2.2.1 Site

Nigg port sits in the mouth of the Cromarty Firth where it connects to the inner Moray Firth in Northern Scotland. The works area has multiple protected nature sites immediately next to it and especially the Moray Firth SAC<sup>1</sup> which has been primarily designated because of the resident population of Bottlenose dolphins, is important for this report.

**Figure 1. Main areas of work. Yellow area covers the new quay. Red area covers the dredged area. Multiple protected sites exist close to the harbour. Moray Firth SAC and Cromarty Firth RAMSAR site are highlighted here (blue and green outline respectively). Map centred on E: 438977; N6394920, UTM 30N (EPSG: 32630).**



The work addressed here (piling & dredging) are proposed to be undertaken over ten months, starting in December 2019 and finishing in September 2020<sup>2</sup>:

- |                  |            |
|------------------|------------|
| - Temporary bund | Month 2-3  |
| - Piling         | Month 4-9  |
| - Dredging       | Month 8-11 |

<sup>1</sup> Site summary available at:

<http://jncc.defra.gov.uk/ProtectedSites/SACselection/sac.asp?EUCode=UK0019808>

<sup>2</sup> Subject to change, but keeping in mind sensitive periods of fauna, refer to ecological impact assessment for detail.



### 3.2.2.2 Assessment criteria

#### 3.2.2.2.1 Reporting units

All references to sound pressure levels, peak pressure levels and sound exposure levels refer to a logarithmic ratio between a reported pressure or exposure and a reference pressure or exposure.

As an example, a level of 220 dB<sub>z-p</sub> (decibel zero-to-peak) is equal to a peak pressure of 100,000 Pascals (Pa) over ambient pressure, while 120 dB<sub>z-p</sub> is equal to 1 Pa over ambient pressure. To avoid dealing with these large numbers as pascals, they are converted to a decibel ratio (Table 1). Besides compressing large numbers to a smaller scale this also corresponds better to how animals are thought to perceive sound, namely as relative steps. This means that an increase from 1 to 2 Pa sounds like the same increase as from 100 to 200 Pa, even though the first step was only 1 Pa, while the second was 100 Pa. This is better reflected in a logarithmic scale where both steps are equal, here 3 dB.

However, while dBs are practical, they can be hard to compare between studies, due to vague definitions, and so we have adopted the standards set by ISO 18405-2017 (Table 1 below).

For ease of reference please see following overview for unit definition.

**Table 1: Definitions**

Unit	Definition	Comments
dB <sub>RMS</sub> ISO 18405- 2017: 3.2.1.1	$dB_{RMS} = 10 \cdot \log_{10} \left( \frac{\frac{1}{t_2 - t_1} \cdot \int_{t_1}^{t_2} p(t)^2 dt}{1 \cdot 10^{-12} Pa} \right)$	Functionally equivalent to deprecated $20 \cdot \log_{10} \left( \frac{RMS}{1 \cdot 10^{-6} Pa} \right)$
dB <sub>z-p</sub> ISO 18405- 2017: 3.2.2.1	$dB_{z-p} = 20 \cdot \log_{10} \left( \frac{Pa_{max}}{1 \cdot 10^{-6} Pa} \right)$	This assumes that $Pa_{max}$ is equal or greater than $\sqrt{Pa_{min}^2}$
dB <sub>p-p</sub> ISO 18405- 2017: 3.1.2.8	$dB_{p-p} = 20 \cdot \log_{10} \left( \frac{Pa_{max} - Pa_{min}}{1 \cdot 10^{-6} Pa} \right)$	Often <sup>3</sup> equivalent to $dB_{z-p} + 6.02 \text{ dB}$
dB <sub>SEL</sub> ISO 18405- 2017: 3.2.1.5	$dB_{SEL} = 10 \cdot \log_{10} \left( \frac{\int_{t_1}^{t_2} p(t)^2 dt}{1 \cdot 10^{-12} Pa} \right)$	For continuous sound this is equivalent to $dB_{RMS} + 10 \cdot \log_{10}(t_2 - t_1)$

Unless otherwise stated dB<sub>RMS</sub> has an averaging period of 1 second, and dB<sub>SEL</sub> for the duration of the specified event, sometimes indicated as dB<sub>SEL-time</sub>.

When source levels are presented the same units are used, and it's implicit that all source levels are given as if recorded 1 m from an omnidirectional point source.

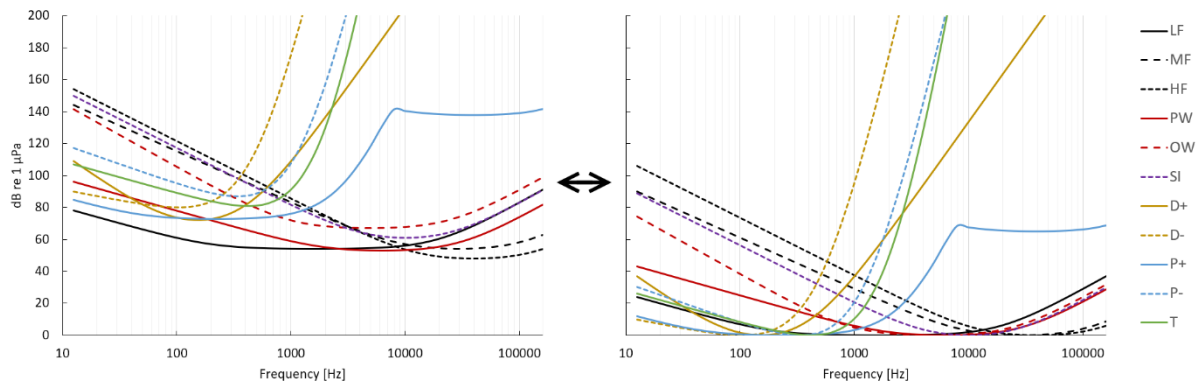
#### 3.2.2.2.2 Weighting of Noise Levels

When not reporting dB<sub>z-p</sub> or dB<sub>p-p</sub> levels, the noise levels are often weighted according to a generalised hearing sensitivity profile for ten different hearing groups. This is done to

<sup>3</sup> If maximum pulse pressure is below ambient pressure and compression and rarefaction phases are of equal size.

better reflect the actual impact on the species in question, much like dB(C) level unit for humans. Further explanation in sections below.

**Figure 2. Generalised hearing thresholds (left) for the specified hearing groups are converted into weightings (right). For non-dB<sub>z-p</sub> levels the weightings are subtracted from the noise level to give the weighted noise level (similar to dB(A) or dB(C)-weighted noise for humans). See Table 3, p.8 and Table 5, p.10 for full group names.**



### 3.2.2.2.3 Mammal Weightings

A number of marine/aquatic mammals are known to use the area around the site. All of them have good hearing and this sense is vital to their fecundity, either directly for foraging or for navigation and mating.

For the marine/aquatic mammals present we will adhere to the approach described in “Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing” (National Marine Fisheries Service, 2018), which determines impact from an assessment of area wherein the noise will induce either “Temporary Threshold Shift” (TTS) or “Permanent Threshold Shift” (PTS)<sup>4</sup> as judged by the weighted SEL level (dB<sub>SEL-24</sub>) over a typical 24-hour period or by dB<sub>z-p</sub> levels, for the different hearing groups.

These hearing groups were specified by collating available information on marine mammal hearing available and generalising their hearing sensitivity into representative groups. This grouping represents a significant research effort and are reviewed by the leading experts (academic, industrial and conservation) on the topic. Because of the large amount of work this represents, the thresholds and the methodology associated, have become de-facto standards for assessing noise impact on marine mammals and represent best available knowledge and practise.

Along with weighting curves, similar in function to the human dB(C) curves, a set of thresholds for hearing impact and injury is associated with the framework and allows for conversion of threshold exceedance into ranges with risk of impact. E.g. we might see that the PW group (true seals) has a risk of PTS at ranges shorter than 50 meters, and a risk of TTS at ranges shorter than 200 meters.

All marine mammal species are covered by the hearing groups and a full list of species in the different groups can be found in the “Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing” (National Marine Fisheries Service, 2018), but in general the groups cover the following species:

<sup>4</sup> TTS/PTS. A temporary/permanent change in hearing sensitivity caused by acoustic stimuli.



**Table 2. Hearing groups from the (National Marine Fisheries Service, 2018) framework.**

LF (Low Frequency)	All baleen whales, e.g. Fin whale and Minke whale.
MF (Middle Frequency)	Sperm whales, most dolphins (incl. Bottlenose dolphin), beaked whales and killer whales.
HF (High Frequency)	Porpoises, and a few high frequency specialist cetaceans.
PW (Phocidae, under water)	True seals, e.g. harbour seal and grey seal.
OW (Otariidae, under water)	Walruses, leopard seals, fur seals and remaining amphibious mammals <sup>5</sup> .

**Table 3. Summary of NMFS<sup>6</sup> thresholds and groups for each of the prioritised species.**

NMFS Hearing group	Species examples	Non-impulsive TTS/PTS threshold [dB <sub>SEL-24</sub> ]	Impulsive TTS/PTS threshold [dB <sub>SEL-24</sub> ]	Impulsive TTS/PTS threshold [dB <sub>Z-P</sub> ]
PW	Harbour seal, grey seal	181/201	170/185	212/218
OW	Eurasian otter	199/219	188/203	226/232
LF	Minke whale, humpback whale	179/199	168/183	213/219
MF	Common dolphin, Killer whale, Risso's dolphin, Bottlenose dolphin	178/198	170/185	224/230
HF	Harbour Porpoise	153/173	140/155	196/202

<sup>5</sup> This includes Otter and Polar bear

<sup>6</sup> National Marine Fisheries Service, US Department of Commerce.

#### 3.2.2.2.4 Mammals of Special concern

In the area of the proposed activity the primary mammals of concern are found in Table 4 below.

**Table 4. Mammals of special concern.**

Species, common name	Latin	Hearing group
Harbour Seal	<i>Phoca vitulina</i>	PW
Grey Seal	<i>Halichoerus grypus</i>	PW
Harbour Porpoise	<i>Phocoena phocoena</i>	HF
Bottlenose Dolphin	<i>Tursiops truncatus</i>	MF
Minke Whale	<i>Balaenoptera acutostrata</i>	LF
Otter	<i>Lutra lutra</i>	OW

#### 3.2.2.2.5 Fish Weightings (incl. Turtles)

There is comparatively little information available on the acoustic sensitivity of fish. This is true for both accurate audiograms as well as noise impact on behaviour, physical impact and population fecundity.

To estimate impacts for fish we have relied on large reviews to establish exposure thresholds for fish (Carlson, et al., 2007; DFO Canada, 2006; Popper, et al., 2014; Southall, et al., 2019) as per Table 5, p. 10. In summary, where limits were not proposed in the literature this meant collating information from exposure experiments and categorising it according to observed effects (i.e. death, injury, PTS, TTS, behavioural change and no observed effect) and use this to model exposure functions (as in Figure 2, p. 7) and exposure limits (Table 5, p. 10.), as well as incorporating proposed thresholds from other studies<sup>7</sup>.

We are aware that the Popper et al. 2014 report has been adopted widely, but have chosen to slightly decrease the thresholds where other experiments have documented a negative impact at a lower threshold.

<sup>7</sup> We have used the minimal threshold in all cases (leading to larger impact area).

**Table 5. Summary of thresholds used for fish. Note that Impulsive thresholds are equal for all groups. This was an effect of limited available data, making separation infeasible.**

Species	Hearing group	Non-impulsive TTS/PTS threshold [dB <sub>SEL-24</sub> ]	Impulsive TTS/PTS threshold [dB <sub>SEL-24</sub> ]	Impulsive TTS/PTS threshold [dB <sub>Zp</sub> ]
Demersal, swim-bladder assisted hearing. (e.g. Cod, haddock)	D+	185 <sup>b</sup> /207 <sup>a</sup>	185 <sup>b</sup> /207 <sup>a</sup>	181 <sup>c</sup> /205 <sup>b</sup>
Demersal, no swim-bladder assisted hearing. (e.g. Plaice, sole)	D-	186 <sup>a</sup> /210 <sup>a</sup>	186 <sup>a</sup> /207 <sup>a</sup>	181 <sup>c</sup> /206 <sup>b</sup>
Pelagic, swim-bladder assisted hearing (e.g. Herring, sprat)	P+	185 <sup>b</sup> /207 <sup>a</sup>	185 <sup>b</sup> /207 <sup>a</sup>	181 <sup>c</sup> /205 <sup>b</sup>
Pelagic, no swim-bladder assisted hearing (e.g. <i>Salmo</i> , sharks)	P-	186 <sup>a</sup> /210 <sup>a</sup>	186 <sup>a</sup> /210 <sup>a</sup>	181 <sup>c</sup> /206 <sup>b</sup>

- a. Limits from Sound Exposure Guidelines for Fishes and Turtles (Popper, et al., 2014).  
b. Limits from North American interim pile driving guidance (Carlson, et al., 2007)  
c. Limits from our work based primarily on data from (DFO Canada, 2006).

### 3.2.2.2.6 Fish Species of Special Concern

A number of fish species are of special concern in the area of the proposed activity.

**Table 6. Fish species of special concern.**

Species, common name	Latin	Hearing group
Atlantic Salmon	<i>Salmo salar</i>	P-
Brown Trout	<i>Salmo trutta</i>	P-

### 3.2.2.2.7 Threshold Interpretation

The three threshold types refer to different ways that noise can affect the hearing of an animal and are **important to keep in mind** when evaluating the results of this report:

- **Non-impulsive dB<sub>SEL-24</sub>**  
The threshold, over which an effect (TTS/PTS) occurs, taking into account **continuous**<sup>8</sup>

<sup>8</sup> Please see (National Marine Fisheries Service, 2018) for definitions of “non-impulsive” and “impulsive”. For quick reference, if a noise is shorter than 1 second and is clearly intermittent in nature, it is impulsive – otherwise, it’s continuous.

noise received by the animal over a typical 24-hour period as noise exposure level,  $dB_{SEL}$ .

When presented as a zone on a map, this refers to the area, within which, an animal would suffer the effect, if it stayed there for 24 hours (or the full duration of the activity). We thus identify areas given by this limit as areas of **TTS-risk** or **PTS-risk** respectively, i.e. an animal within the area has a risk of suffering from either TTS or PTS within the zone.

Weightings **are** applied for non-impulsive  $dB_{SEL}$ .

- **Impulsive  $dB_{SEL-24}$**

The threshold, over which an effect (TTS/PTS) occurs, taking into account **impulsive** noise received by the animal over a typical 24-hour period as noise exposure level, SEL.

When presented as a zone on a map, this refers to the area, within which, an animal would suffer the effect, if it stayed there for 24 hours (or the full duration of the activity). We thus identify areas given by this limit as areas of **TTS-risk** or **PTS-risk** respectively, i.e. an animal within the area has a risk of suffering from either TTS or PTS within this zone.

- **Impulsive  $dB_{SEL}$  “Single-impulse”**

It is sometimes useful to assess the impact of a single impulse. When we do this, we will refer to it as “Single-impulse SEL”.

Like for the  $dB_{z-p}$ , when single-impulse SEL is presented as an impact zone, this refers to the area, within which, an animal would suffer the effect acutely/instantly.

Weightings **are** applied for Impulsive  $dB_{SEL}$ .

- **Impulsive  $dB_{z-p}$**

The threshold over which an effect (TTS/PTS) occurs, taking into account **impulsive** noise received by the animal at any instant as maximal peak pressure.

When presented as a zone on a map, this refers to the area, within which, an animal would suffer the effect acutely/instantly and from just one exposure.

Weightings **are not** applied for Impulsive  $dB_{z-p}$ .

### 3.2.3 MODELLING

#### 3.2.3.1 Assumptions

Doing noise impact modelling requires us to make assumptions about a range of elements in our analysis:

- Sources
  - Sources are omnidirectional – noise is radiate in all directions with equal intensity  
This is not true for most sources, but as we are interested in a conservative estimate of impact, we use the direction of maximal intensity to represent the source.
  - The source noise is consistent over time – that is, we can represent the noise from the source by taking a “snapshot” of the noise and then assume that this is representative for the whole duration of the activity. E.g. For impact piling we use one single impact and repeat it.
  - Moving sources and line sources can be represented by a line of closely spaced point sources.
- Sediment
  - The sediment profiles provided by Causeway Geotech (Causeway GeoTech, 2014) are representative for the area, and we can interpolate between sampling points to generate a complete sediment profile over the area (inverse distance interpolation). Outside the area described by the boreholes

we have used information from publicly available sediment databases (British Geological Survey, 2018)

The sediment for this site was mainly fine sand, silt and glacial deposits (moraine and some gravel).

- Water
  - The water column is well mixed with regards to temperature, salinity and pH. We might see (brief) strong salinity and temperature gradients at this site due to the strong tidal influence. We have not included detailed information about this in the model as for a scenario of this small size, those effects are unlikely to be significant.
  - Depths are from (European Marine Observation and Data Network, 2019). Resolution at this site was 118 m<sup>9</sup>.
  - Tides in this area are typically between 1 and 4 meters over Chart Datum<sup>10</sup>. Sound will tend to propagate better in deeper water, and we will thus use different tide levels in our low and high impact scenarios. For the low impact scenario we will use mean depth (half-way between low and high tide), while we'll use chart datum +4 m for the high impact scenario.
- Receivers
  - We assume that receivers will primarily move through the area, and not dwell in the area for prolonged periods. We do however present maps assuming 24-hour occupancy in the area as a worst-case example.
  - We might add a few receivers in transit through the area to show examples of received levels for such paths.

### 3.2.3.2 Software

We use the software package “dBSea<sup>11</sup>” for underwater noise propagation modelling. We have included sediment (Causeway GeoTech, 2014; British Geological Survey, 2018) as well as bathymetry (European Marine Observation and Data Network, 2019). A combination of three modelling methods were combined for this scenario:

- **dBSea Ray:** A ray tracing method that is especially suited to calculation of impulsive sources as it can accurately calculate the interference patterns important for estimation of dB<sub>z-p</sub> values.
- **dBSeaModes:** A normal modes approach suited especially to lower frequencies and shallower scenarios.
- **dBSeaPE:** Based on a wide-angle adaptation of the parabolic equation method, this method excels in most conditions, and is especially suited for lower frequencies.

### 3.2.3.3 Sources

A combination on noise sources are likely to be active at any given time during the construction, but three sources present the major contributors are the focus of this document, namely pile driving, vessel noise, and dredging.

As we have no direct measurement of the noise levels from the equipment that will be used for this project, we use two source levels for each source based primarily on data from available literature:

- **Piledriving:**  
57 separate recordings from (J. R. Nedwell, 2012; Laughlin, 2016; Matuschek &

<sup>9</sup> Representing one depth measurement per 118x118 m cell. Close to the quay we have used nautical charts to increase the resolution to 10x10 m.

<sup>10</sup> Lowest extreme tide to be expected according to prediction models.

<sup>11</sup> A simpler version of this software can be obtained for free from [www.dBSea.co.uk/download](http://www.dBSea.co.uk/download)

Betke, 2009; Peter H. Dahl, 2016; Reinhall & Dahl, 2011; The California Department of Transportation, 2007; Washinton State Department of Transportation, 2007), form the basis for our estimates.

Where no source level was given, we have, if possible, used dBSea to back-calculate levels to source levels at 1 m, taking into account the bathymetry and sediment types of the recording location. Where there was insufficient information to model the source levels, mitigation used or the recording location was >1000 m from the source, we have not used the data to estimate source levels.

Summary in Figure 3 below (p. 14).

- **Vessels:**  
We have used a noise model, (Wittekind, 2014), inhouse recordings and a large review of noise levels for various vessels (Veirs, et al., 2016) to establish vessel noise.
- **Dredging:**  
The main noise source will likely be the vessel or tug operating the barge as suction-/backhoe-/long reach excavator-dredging is comparatively quiet.

As this approach leads to estimates, we will have some uncertainty associated with the source levels. We therefore present two sets of results, one showing a “low impact scenario” and one showing a “high impact scenario”. These will be called “LOW” and “HIGH” respectively. For source levels “LOW” will use source levels corresponding to the model minus the 95 % confidence value, while for “HIGH” we add the 95 % confidence value<sup>12</sup>.

#### 3.2.3.3.1 Impact Piling

Impact piling is likely to be the noisiest activity and due to the presence of high-pressure impulses with very fast “rise-times<sup>13</sup>”, it’s also likely to have the highest acoustic impact on the fauna.

For impact piling with HZ-M king piles we here use the following levels:

**Table 7. Impact piling source levels.**

	LOW	HIGH
dB <sub>p-p</sub>	224	231
dB <sub>SEL</sub> single strike	188	196

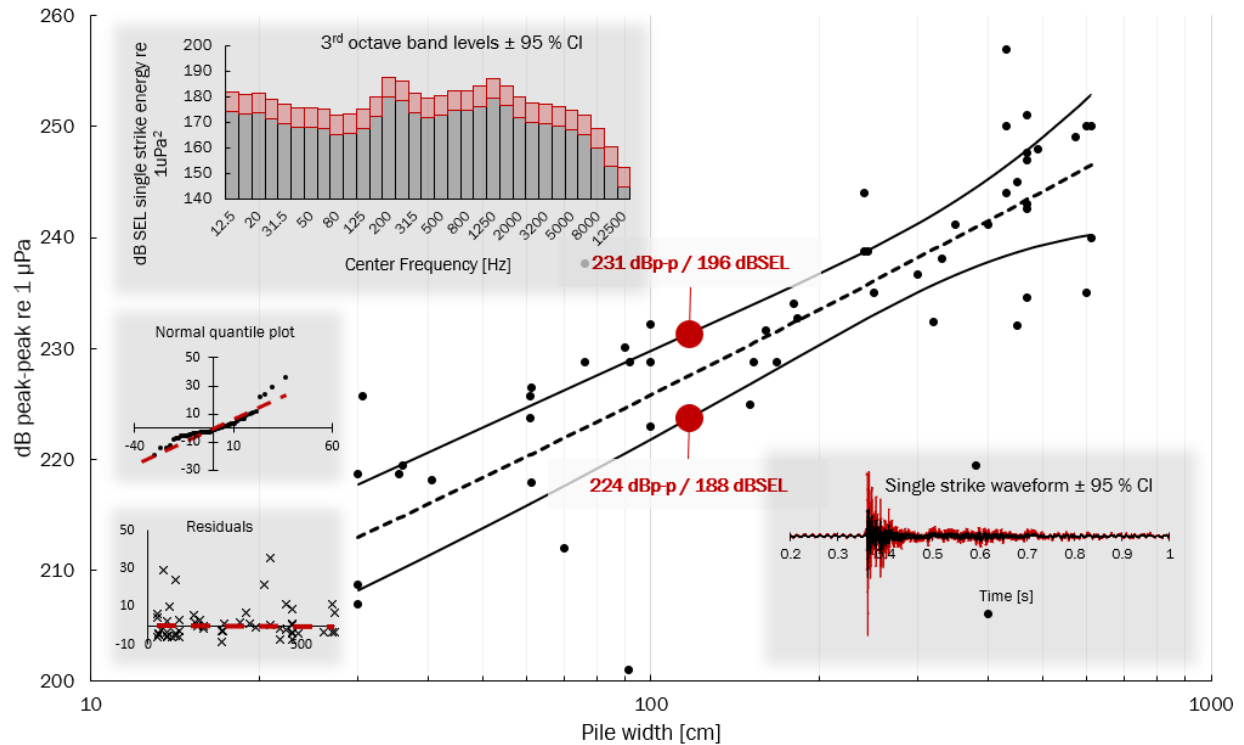
<sup>12</sup> In summary, if the piling noise can be described by a normal distribution, we will “capture” the true source level within these bounds 19 out of 20 times.

<sup>13</sup> “Rise-time” is a measure of how quickly an acoustic impulse “rises” from the background noise. A fast rise-time means that a high intensity is reached very quickly and without a slow increase in amplitude.



**Figure 3. Main plot:** Graphic summary of data used to characterise the impact piling (n=57).  $\text{dB}_{\text{p-p}}$  for a single strike in this scenario is: LOW:  $224 \text{ dB}_{\text{p-p}}$  re  $1 \mu\text{Pa}$  ( $188 \text{ dB}_{\text{SEL}}$ ) / HIGH:  $231 \text{ dB}_{\text{p-p}}$  re  $1 \mu\text{Pa}$  ( $196 \text{ dB}_{\text{SEL}}$ ). Dashed black line is modelled interpolation. Solid lines are 95 % confidence intervals of the model.

**Minor plots:** The bottom right graph is the timeseries used as representative for calculations of single strike  $\text{dB}_{\text{SEL}}$  and used for  $\text{dB}_{\text{p-p}}$  calculations, while the upper left chart shows the 3<sup>rd</sup> octave band values forming the base of the SEL calculations. (black is low estimate, red is high). Residuals and Normal quantile plot also provided.



The amount of strikes in a given day is important for the cumulative noise exposure. We therefore used upper and lower bounds for the activity as indicated by the project engineers. Note that impact piling is used only if hard substrate, which cannot be penetrated using vibration, is reached during operations.

The following table will outline the basis for our “LOW” and “HIGH” impact scenarios. Keep in mind that piling activity will be limited to the time 07.00-19.00 – a 12-hour window.

Of a 12-hour period:	LOW	HIGH
Impact piling As percent of all piling	15 %	50 %
Active piling (hammer active)	5 %	20 %
Hours, minutes <sup>14</sup>	0 hours, 5.4 min	1 hours, 12 min
No of strikes daily (1.5 sec/strike)	216	2880
<b><math>\text{dB}_{\text{SEL-daily}}</math></b>	<b>211</b>	<b>231</b>

<sup>14</sup> These times can seem rather arbitrary, but they are the consequence of converting from percentages to hours, minutes and seconds.

### 3.2.3.3.2 Vibration Piling

Most of the piling in this project will be vibration piling (vibro), where the pile is vibrated into the sediment. This form of piling has a lower likelihood of causing acute impact to marine fauna as it is more continuous in nature and does not have the same degree of impulses with rapid risetimes, characteristic of impact piling. As with the impact driven piles we do not have direct recordings of the equipment that will be used for this project, so we have interpolated from earlier recordings and available data.

Two pile types are to be vibrated into the sediment; the HZ-M king piles and the AZ sheet piles (AZ 18-700<sup>15</sup>). We use the following source levels for the two pile types.

**Table 8. Vibration piling source levels summary.**

		LOW	HIGH
HZ-M King	dB <sub>p-p</sub>	206	210
	dB <sub>SEL-1 sec</sub>	185	191
	dB <sub>SEL-daily</sub>	223	231
AZ sheet	dB <sub>p-p</sub>	200	204
	dB <sub>SEL-1 sec</sub>	179	184
	dB <sub>SEL-daily</sub>	217	227

As for the impact piling, our LOW and HIGH estimates for vibration piling are based on expected duration of the relevant activity as indicated by the project engineers.

**Table 9. Daily SEL from HZ-M king piles being vibrated**

Of a 12-hour period:	LOW	HIGH
Vibration piling As percent of all piling <sup>16</sup>	85 %	50 %
Active piling (hammer active)	15 %	50 %
Hours, minutes	1 h, 32 m	3 h, 00 m
<b>dB<sub>SEL-daily</sub></b>	<b>223</b>	<b>231</b>

<sup>15</sup> 795 mm used for source model as this is longest diagonal of the width/breath of the pile.

<sup>16</sup> In the "LOW" scenario the HZ-M King piles are mostly vibrated in.

**Table 10. Daily SEL from AZ sheet piles being vibrated**

As the probability of using an impact hammer for the sheets is considered very low, we have assumed that they can all be vibrated in. If some of the sheet piles will have to be set/driven with the use of an impact hammer, results will be similar to those from the HZ-M king piles, albeit slightly lower.

Of a 12-hour period:	LOW	HIGH
Vibration piling As percent of all piling	100 %	100 %
Active piling (hammer active)	15 %	50 %
Hours, minutes	1 h, 48 m	6 h, 00 m
<b>dB<sub>SEL-daily</sub></b>	<b>217</b>	<b>227</b>

We will use one position for piling, reflecting the location of the greatest impact of the piling (star in Figure 5, p.18). Other locations will have lower or similar impact to this location.

A part of the piling process will be done with a land-based piling plant, operating from a filled bund. This is expected to apply to the inner (northernmost) ~50 m of piling, but as noise levels are not expected to exceed those of the water-based piling plant<sup>17</sup>, this setup has not been assessed individually.

### 3.2.3.3.3 Dredging

The primary mode of dredging is expected to be suction-/bucket-/backhoe dredging from a barge, an activity with noise levels previously reported as:

Unit	Level	Notes	Source
dB <sub>RMS</sub> @ 1 meter	163	Backhoe Peak energy 35-45 Hz	(Nedwell, et al., 2008)
dB <sub>RMS</sub> @ 1 meter	179 <sup>18</sup>	Backhoe Fractured rock excavation. Peak energy 315 Hz	(Reine, et al., 2012)
dB <sub>RMS</sub> @ 1 meter	157	Backhoe Back calculated from 150 m using 15xlog(range). Grab type dredger. Peak energy 160 Hz	(Dickerson, et al., 2001)
dB <sub>RMS</sub> @ 1 meter	150-162	Grab type dredger	(Richardson, et al., 1995)

<sup>17</sup> Equal pile size and more sheltered/confined location means that noise levels are very unlikely to exceed those of the water-based piling.

<sup>18</sup> We expect no rock in this scenario and have discarded this level as being unrepresentative.

Please note:

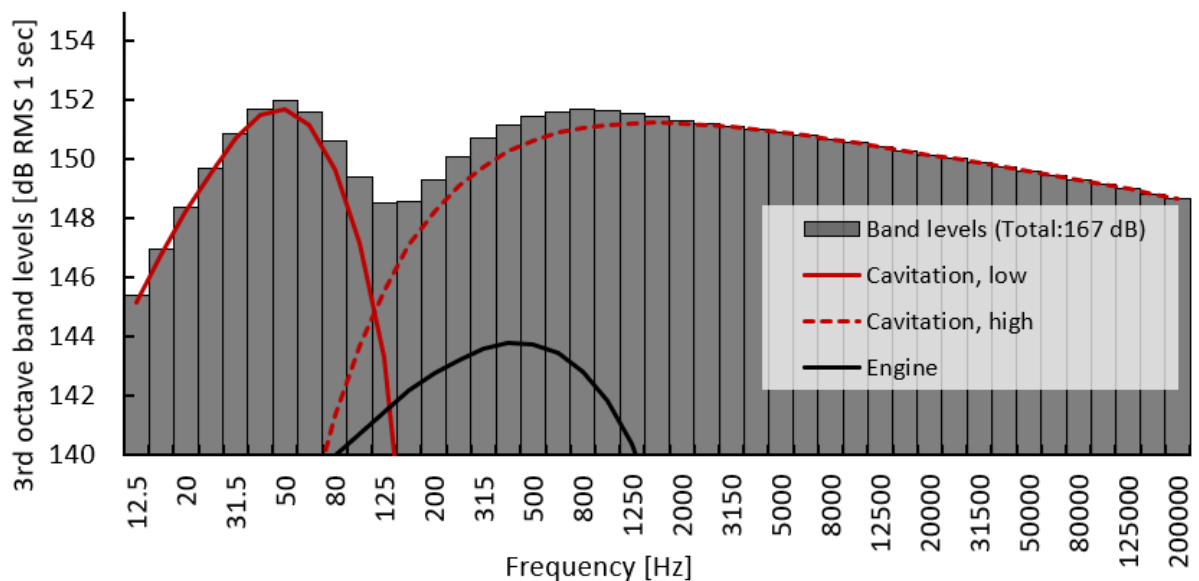
- We have excluded the 179 dB<sub>RMS</sub> source from (Reine, et al., 2012) as this was recorded during excavation of fractured rock, which we do not expect to encounter here.
- We have not included the source level measurement from two large reports (Robinson, et al., 2011; de Jong, et al., 2010) as they measure noise from large vessels (hopper capacity > 3000 m<sup>3</sup>, power > 2700 kW), with suction machinery different to the here proposed (dredge pumps and hoses rather than large booms).

The remaining levels are similar to the levels predicted for a workboat used to position a barge (Figure 4), and we will use the louder of the two to represent the dredging activity.

#### 3.2.3.3.4 Vessel

Vessel noise is based on a typical workboat for coastal barge/dredging operations<sup>19</sup>. The band levels are from a generic vessel model (Wittekind, 2014) that we have adjusted to fit data from a large review of vessel noise (n=85 tugs) (Veirs, et al., 2016).

**Figure 4. 3<sup>rd</sup> octave band levels (grey bars) of work boat used for positioning of the dredging barge for backhoe dredging. Based on model from (Wittekind, 2014) and adjusted to fit levels for tug boat from (Veirs, et al., 2016). Lines represent the contribution of cavitation and engine to the total vessel noise.**



As this noise source has a somewhat lower source level (compared to piling) we have simplified our approach to only using a single noise level for the dredging activity (no LOW/HIGH source level), but we retain the variation in depth (mean depth and max depth<sup>20</sup>) to reflect the changes in water depth.

We assume that the work boat or similar noisy equipment is running continuously during the 12-hour workday (43,200 seconds) during dredging.

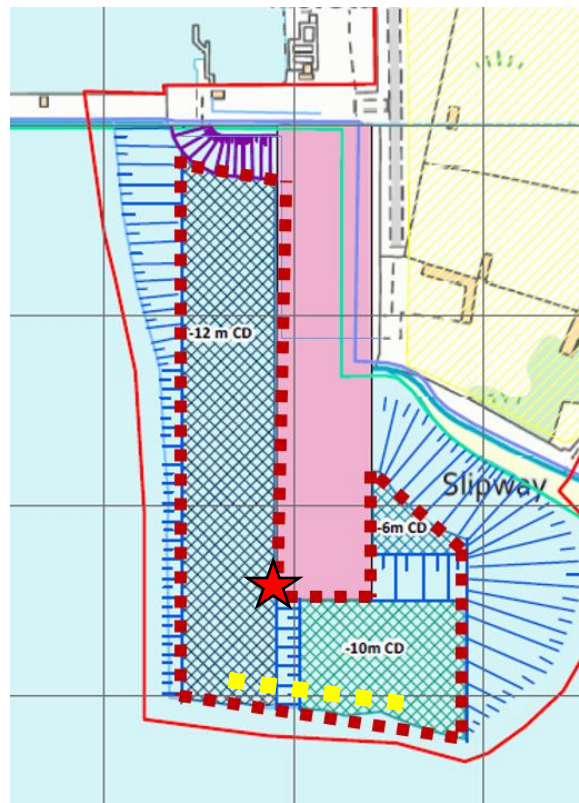
The daily noise dose from the dredging operations is then 213 dB<sub>SEL 12-hour</sub> (167 dB<sub>RMS</sub>).

<sup>19</sup> Specifications: <http://coastworks.co.uk/wp-content/uploads/2017/09/Coastworks-Challenger-spec.pdf>

<sup>20</sup> Here taken to be chart datum +4 meters (rounded from 4.3 m)

The vessel and dredging will move around the area to be dredged. To better reflect the varying position of the dredging we will let the dredger move around the dredging area for the LOW scenario (Figure 5), while for the HIGH scenario we let the dredging source move only in the deeper/outer part of the dredging area. This will then represent a worst-case scenario (more time in deeper water).

**Figure 5. Limits of dredging activities.** The dashed red line follows the outline of the proposed dredging activities and will form the basis of dredging movement for the LOW impact scenario. The Yellow dashed line will be used for the HIGH impact scenario. The star show the location used for piling predictions.



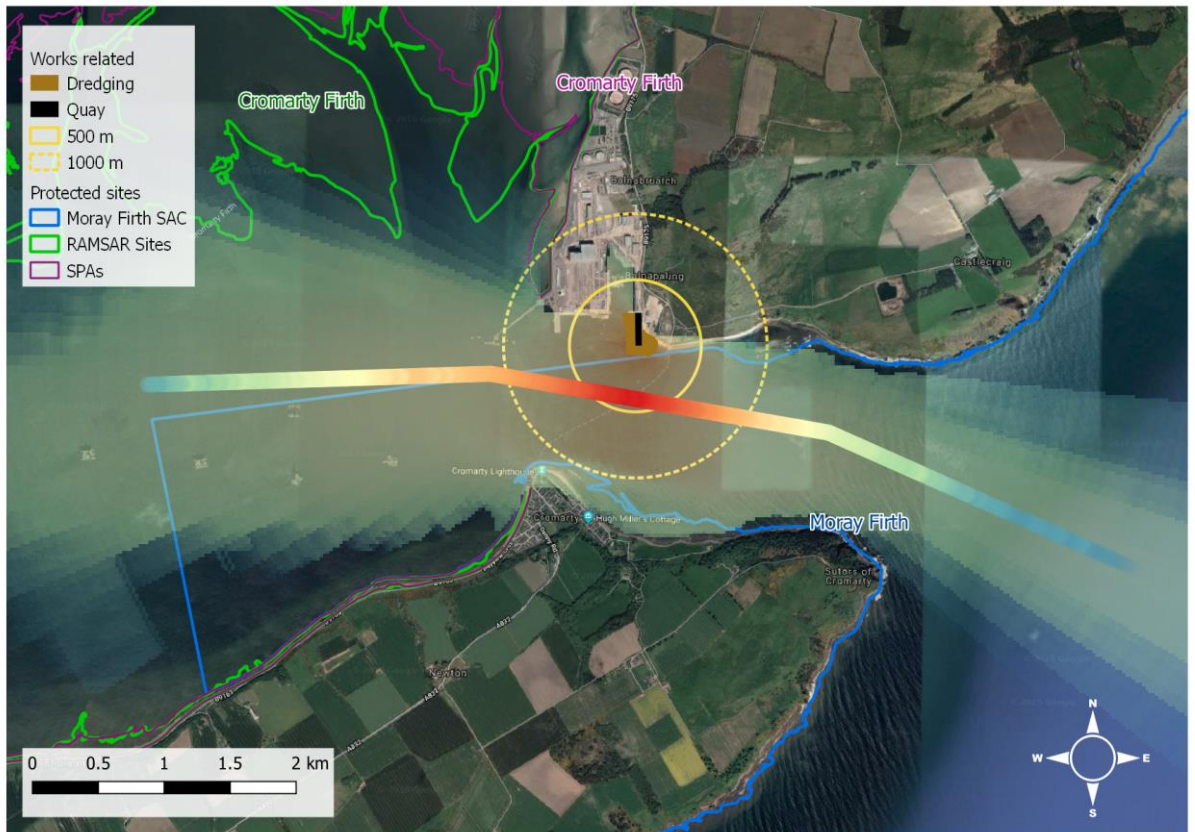
### 3.2.3.3.5 Receivers (Animals)

Apart from the standard risk zones we will provide a track of an animal moving past the area during the activities. For this we will have an animal moving at 2 m/s through the strait at its deepest part.

**Table 11. Waypoint for animal path. Eastings/Northings in UTM 30**

Waypoint	Easting	Northing
1	442739	6393200
2	440362	6394266
3	437800	6394711
4	435201	6394629

Figure 6. Example path of animal moving past the activity. Colours indicate received unweighted noise level of the receiver. See Figure 21 and Figure 22, p.34 for levels.





### 3.2.4 RESULTS

As these results represent expected noise levels and impact based on a set of assumptions about the scenario, such as sediment type and source characteristics, we expect the true impact to be within the bounds of “LOW” and “HIGH” impact scenarios. This is a statistical exercise and we would like to reiterate to the reader, that the following results are *only* representative for scenarios that reflect what has been described in section 3.2.2, Background (pp. 5-18). The main differences between the two scenarios is the source level, the activity time/pattern and the tidal level.

Here we will show an overview of the most significant maps, please see APPENDIX A for a collection of all maps<sup>21</sup>.

#### 3.2.4.1 Impact piling

For the impact piling the unweighted broadband noise levels ( $\text{dB}_{\text{SEL } 24\text{-h}}$ ) in Figure 7 and Figure 8 show the difference expected in noise levels as a consequence of the variation between scenarios “LOW” and “HIGH”.

Looking at the extend of e.g. the  $>180$  dB area (orange), it extends  $\sim 180$  m from the piling site (Figure 7), while for the HIGH impact scenario this range is  $\sim 2.6$  km (Figure 8). The cumulative noise ( $\text{dB}_{\text{SEL}}$  metric) from the impact piling has larger risk zones than the instantaneous pressure ( $\text{dB}_{\text{z-p}}$  metric). Only groups “HF” and “P-” (Harbour Porpoises and Salmon/Trout) has a risk zone large enough to show up for the  $\text{dB}_{\text{z-p}}$  metric (single strike instantaneous pressure).

##### 3.2.4.1.1 Cumulative Noise

Cumulative noise risk is not instantaneous impact, but rather the risk of impact over prolonged exposure (see section 3.2.2.2.7, p. 10 for details).

Summary of scenarios (LOW/HIGH) for impact piling of HZ-M King piles:

Scenario	Single strike $\text{dB}_{\text{SEL}}/\text{dB}_{\text{p-p}}$	Duration / strikes	Cumulative level $\text{dB}_{\text{SEL-daily}}$	Tidal level [m]
LOW	188/224	5.4 minutes / 216	211	Mean depth
HIGH	196/231	1 hour, 12 minutes / 2880	231	Chart datum +4

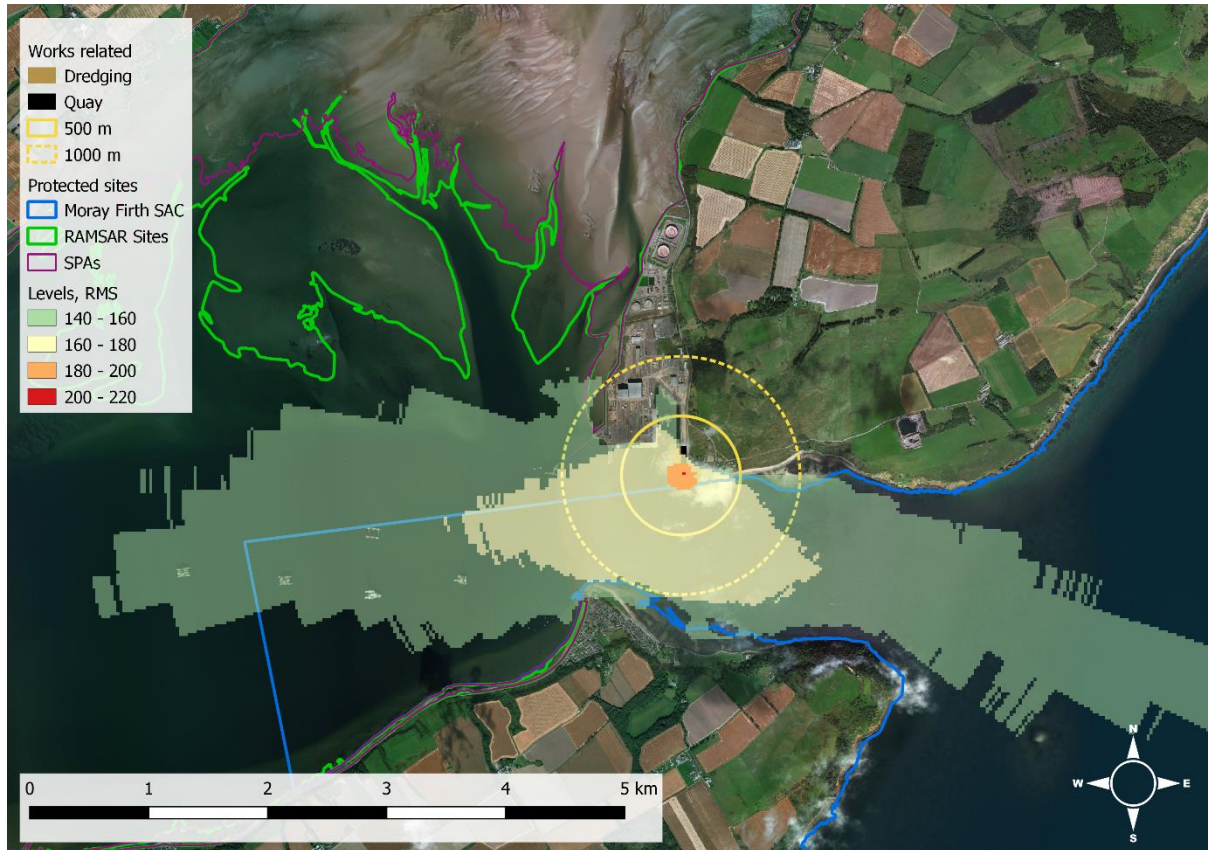
Figure 9 to Figure 12 summarises the cumulative risk of the impact piling, with Figure 11 and Figure 12 showing cumulative risk over 10 minutes and 1 minute respectively. This to give some clarity to the progression of the risk zone over time.

Given the difference in assumptions between the HIGH and LOW scenario for the impact piling the results differ by quite a bit (compare Figure 7 & Figure 8).

Risk zones for a duration of 1 min (Figure 12, p. 25) are almost completely within a 1000 m range.

<sup>21</sup> The resolution of the model was 25 m, so risk zones of radius under 12.5 m are not included.

**Figure 7. Unweighted levels (dB<sub>SEL-daily</sub>) from impact piling the HZ-M piles in the LOW impact scenario. Single strike 188 dB<sub>SEL</sub>. Duration: 5.4 minutes, 216 strikes.**



**Figure 8. Unweighted levels (dB<sub>SEL-daily</sub>) from impact piling the HZ-M piles in the HIGH impact scenario. Single strike 196 dB<sub>SEL</sub>. Duration: 1 hour, 12 minutes, 2880 strikes**

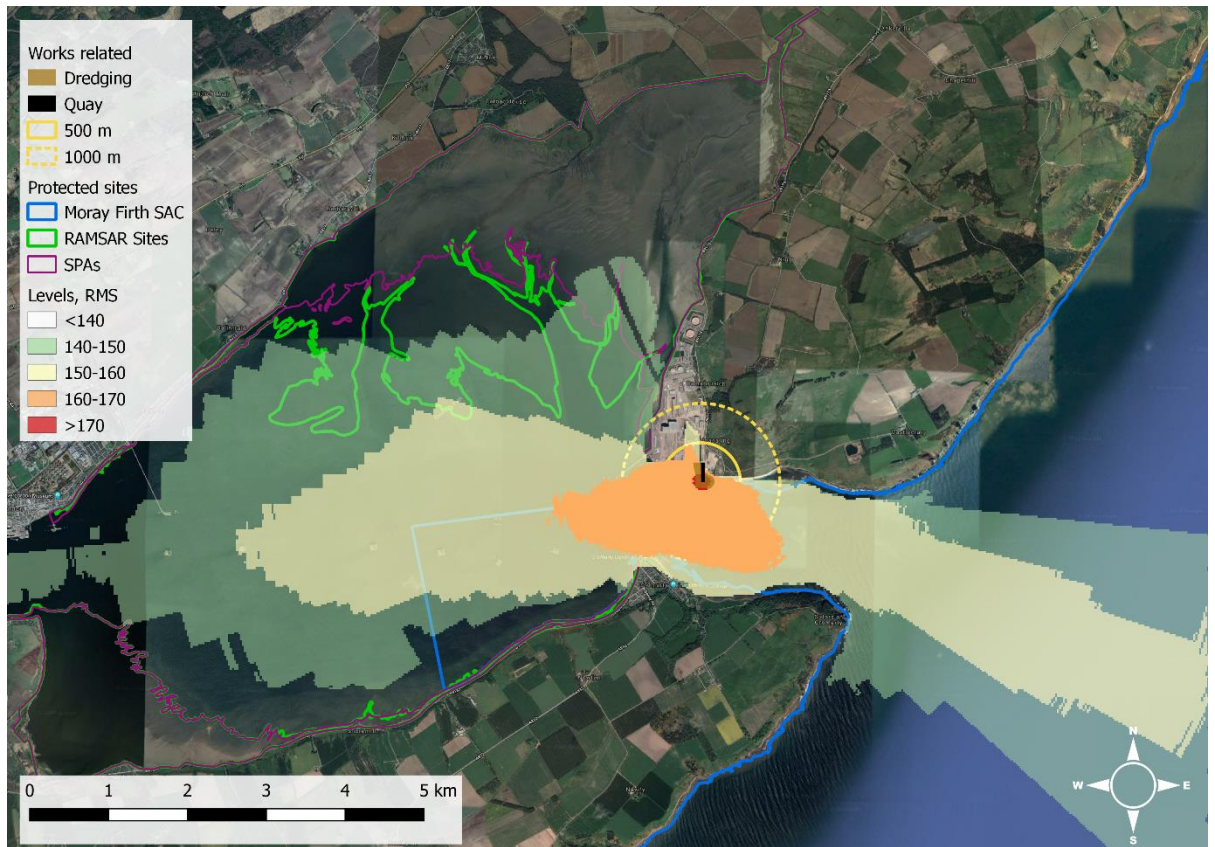




Figure 9. Risk zones from impact piling the HZ-M piles in the LOW impact scenario.  
Single strike 188 dB<sub>SEL</sub>. Duration: 5.4 minutes, 216 strikes.

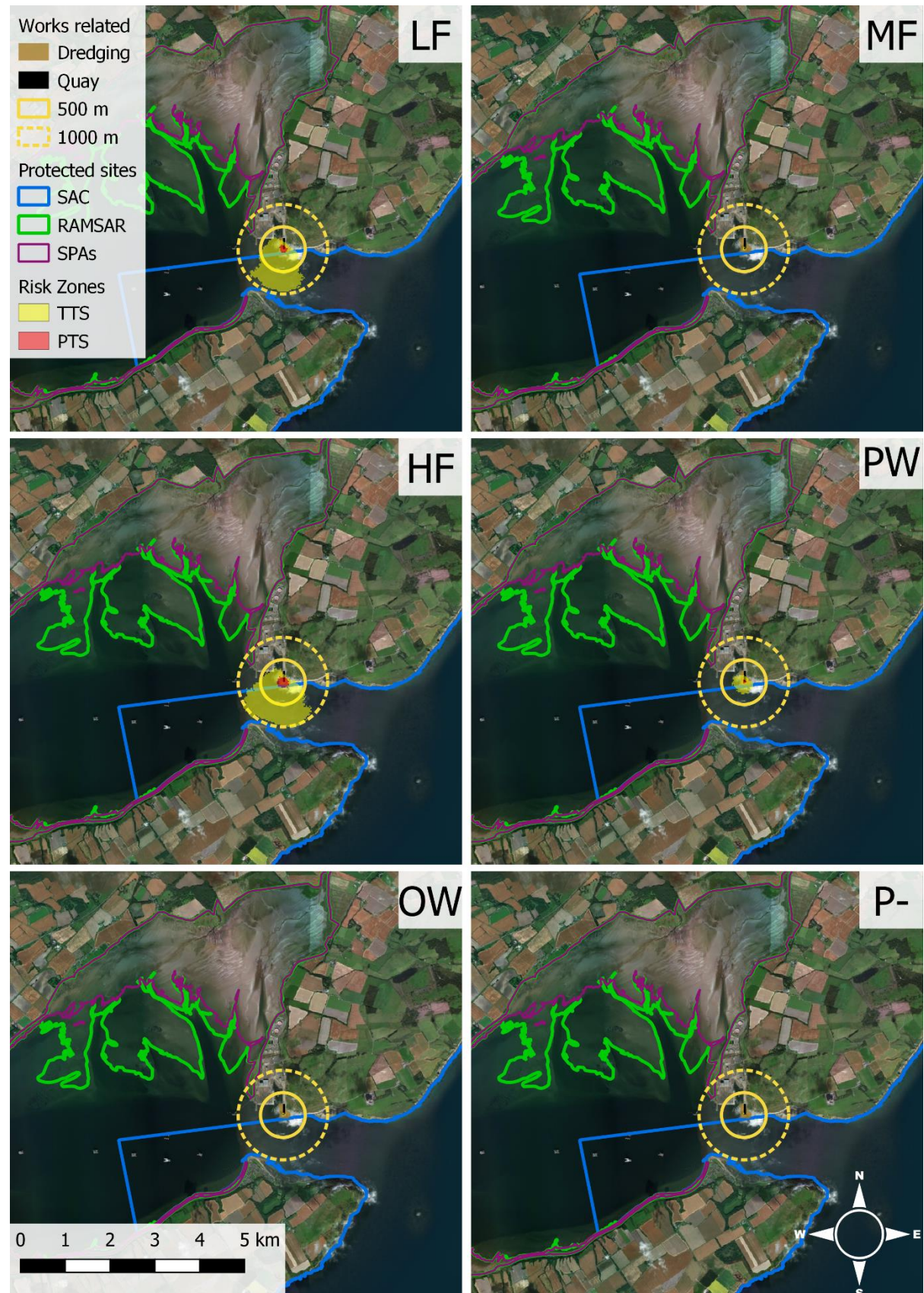
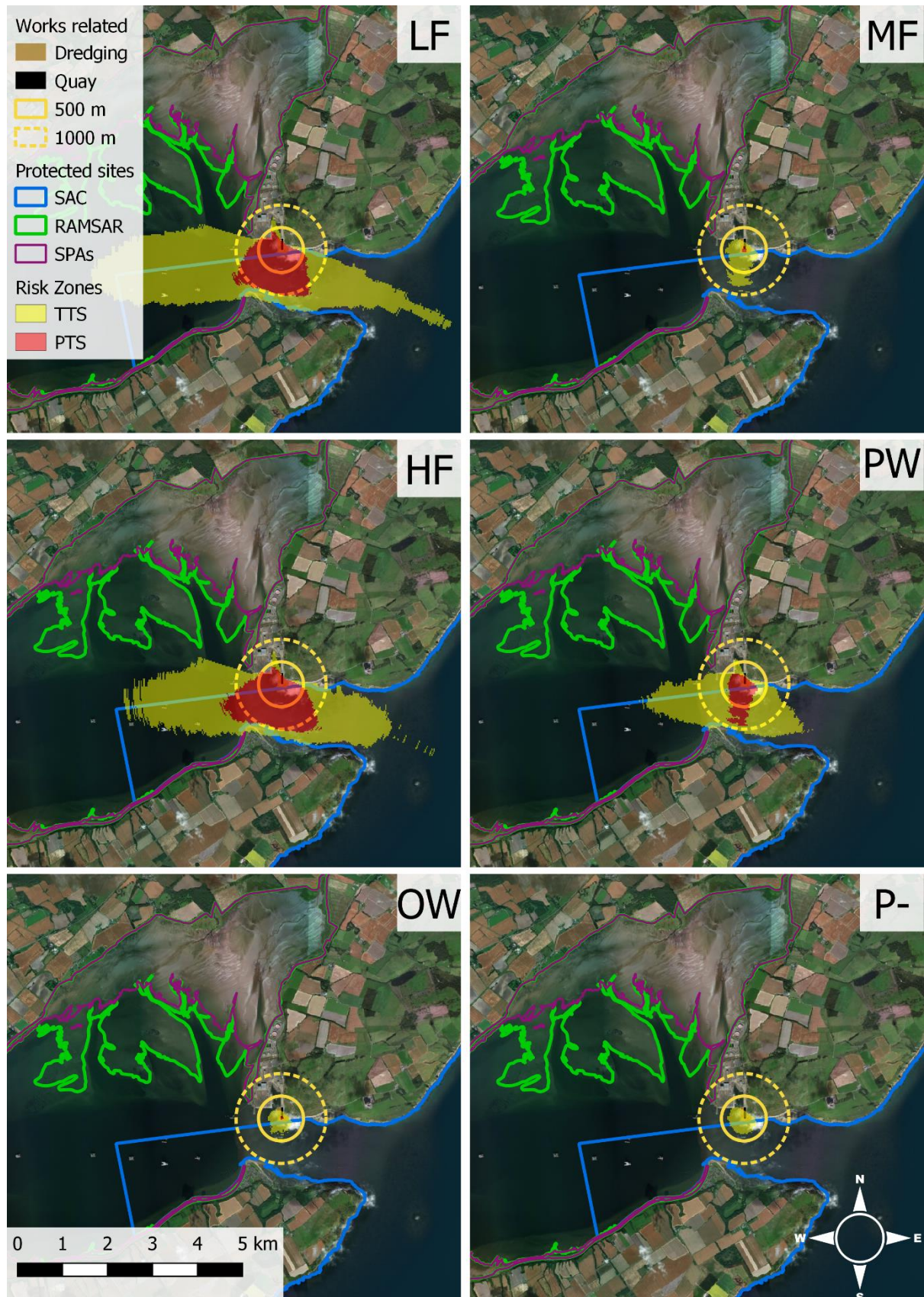




Figure 10. Risk zones from impact piling the HZ-M piles in the HIGH impact scenario. Single strike 196 dB<sub>SEL</sub>. Duration: 1 hour, 12 minutes / 2880 strikes.





**Figure 11. Risk zones from impact piling the HZ-M piles in the HIGH impact scenario.  
Single strike 196 dB<sub>SEL</sub>. Duration: 10 minutes / 400 strikes.**

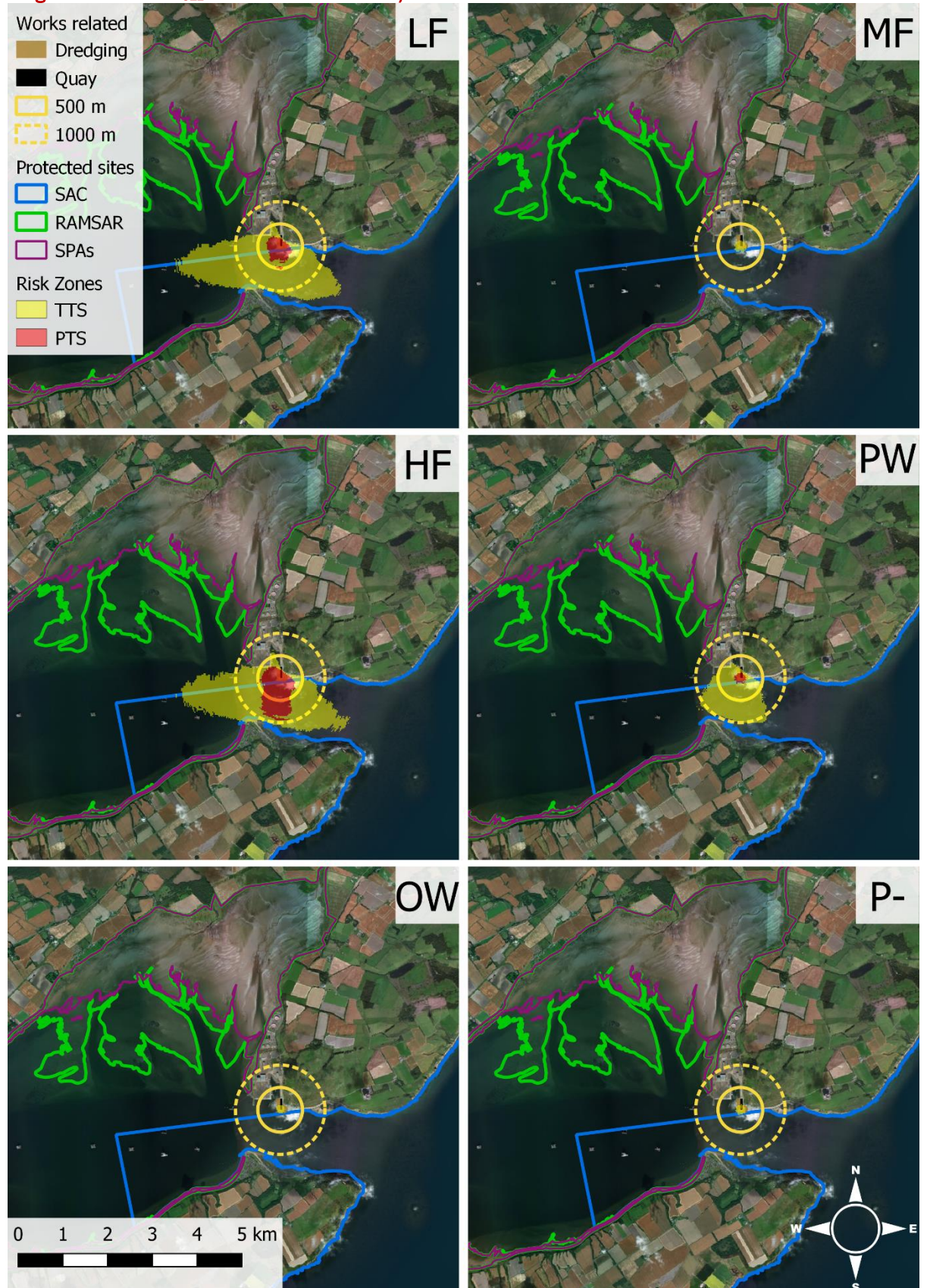
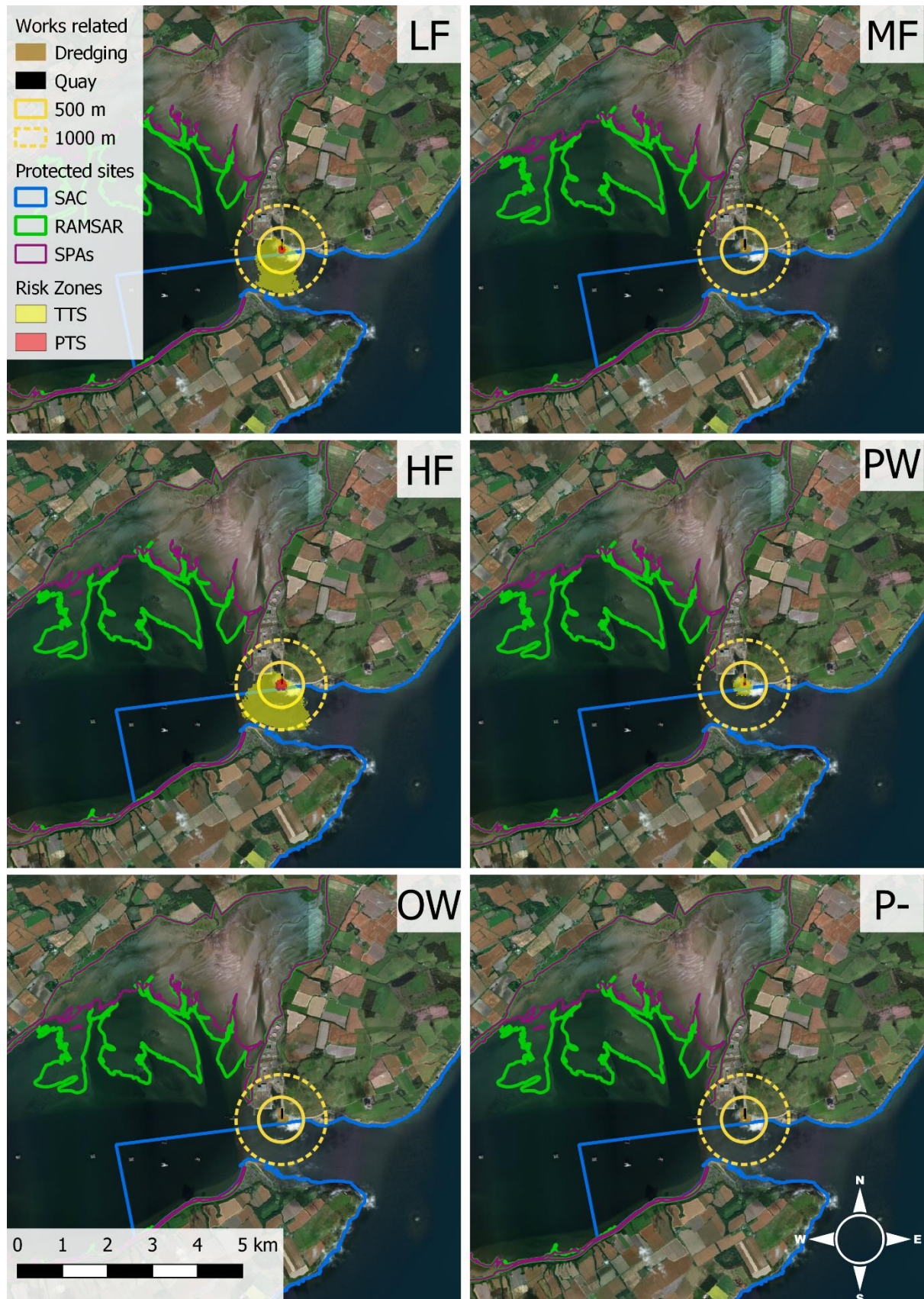




Figure 12. Risk zones from impact piling the HZ-M piles in the HIGH impact scenario.  
Single strike 196 dB<sub>SEL</sub>. Duration: 1 minute / 40 strikes.

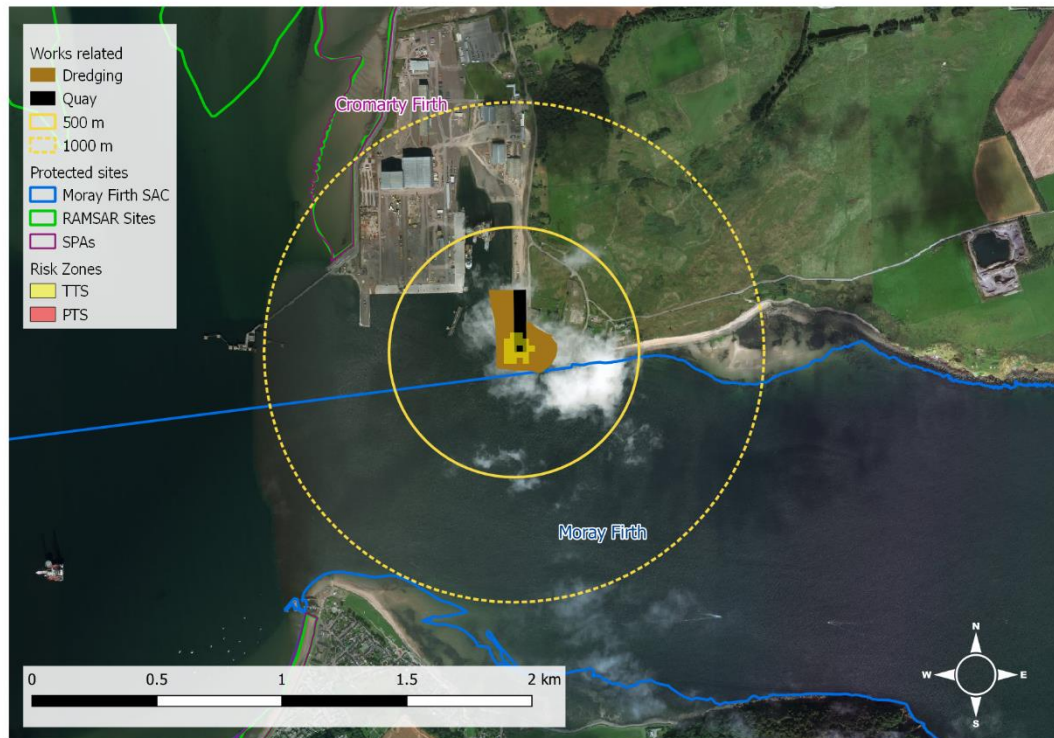




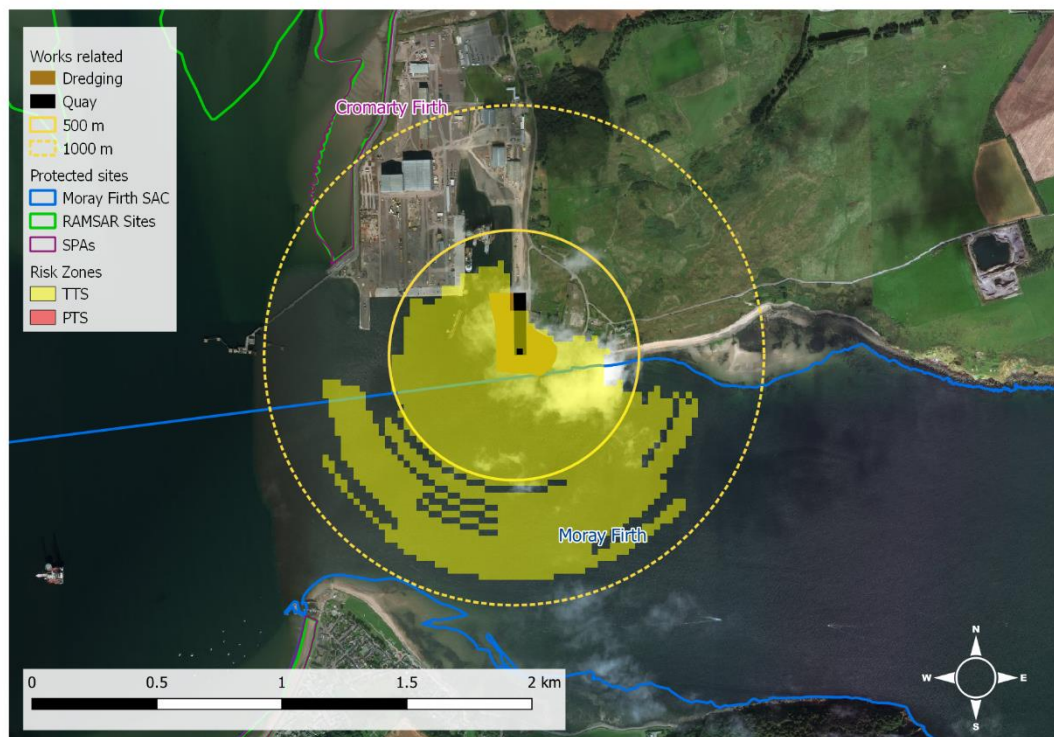
### 3.2.4.1.2 *Instantaneous Noise*

For the single strike - instantaneous pressure, only groups HF and P- risk zones were large enough to be shown, and only for the HIGH impact scenario. Group P- has a risk of instantaneous TTS up to a range of 900 m.

**Figure 13. Risk zones for HF group (Harbour Porpoise) from impact piling the HZ-M piles in the HIGH impact scenario. Single strike 231 dB<sub>p-p</sub>.**



**Figure 14. Risk zones for P- group (Salmon/Trout) from impact piling the HZ-M piles in the HIGH impact scenario. Single strike 231 dB<sub>p-p</sub>.**



### 3.2.4.2 Vibration Piling

Vibration piling is much less impulsive, and as the  $\text{dB}_{p-p}$  levels were lower than for impact piling we have not included the risk maps for that metric (nothing to show on the maps, range < 12.5 m).

**Table 12. Summary of scenarios LOW and HIGH for vibration piling.**

		LOW	HIGH
HZ-M King	Duration	1 hour, 32 min	3 hours, 0 min
	$\text{dB}_{\text{SEL-1 sec}}$	185	191
	$\text{dB}_{\text{SEL-daily}}$	223	231
AZ sheet	Duration	1 hour, 48 min	6 hours, 0 min
	$\text{dB}_{\text{SEL-1 sec}}$	179	184
	$\text{dB}_{\text{SEL-daily}}$	217	227
Tidal Level [m]		Mean depth	Chart datum +4

The daily exposure risk for groups LF, HF and PW extend beyond the 500 m range, with LF and HF groups having risk zones further away than 1000 m.



3.2.4.2.1 HZ-M King Piles, Vibration

Figure 15. HZ-M vibration, LOW impact scenario.

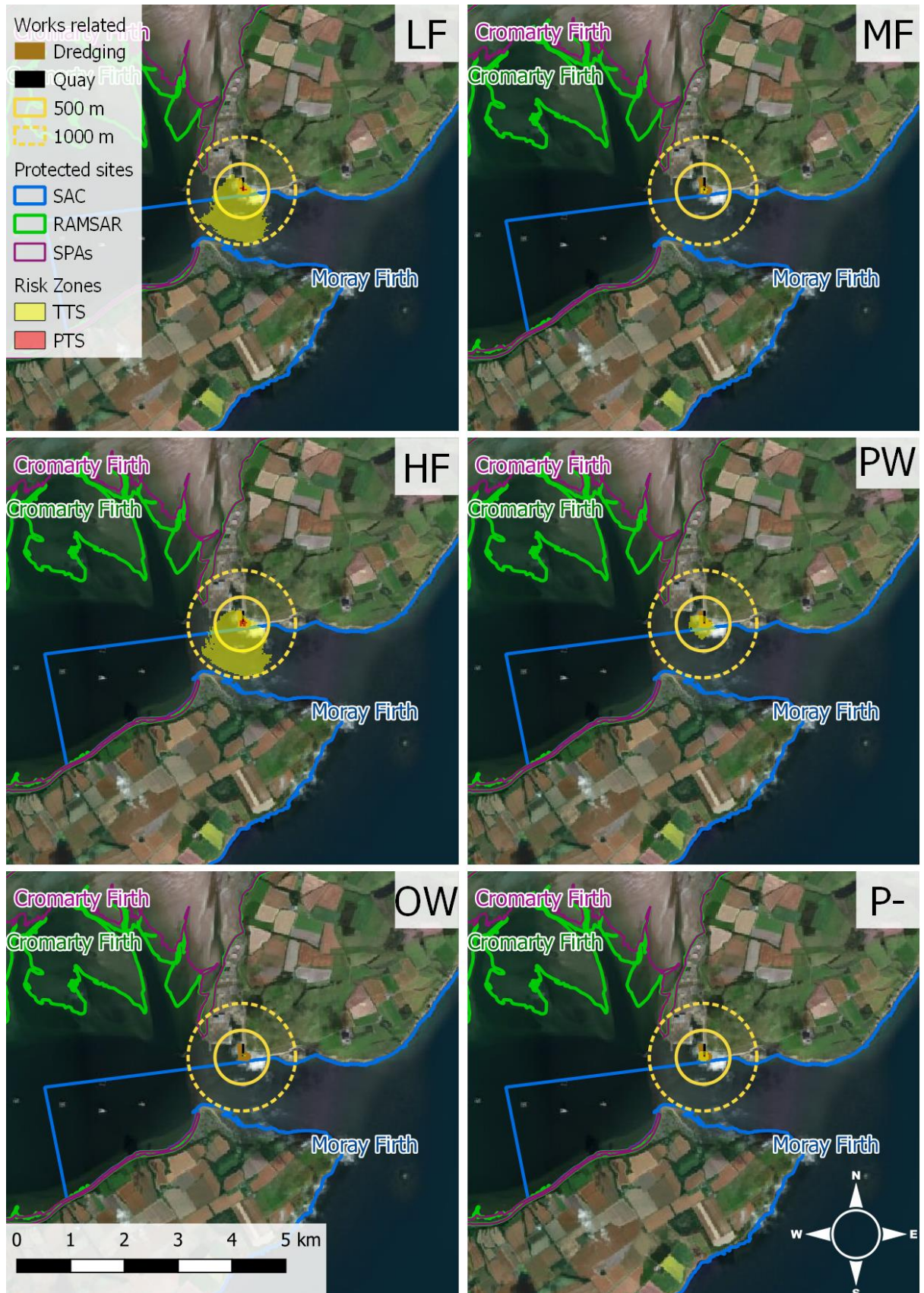
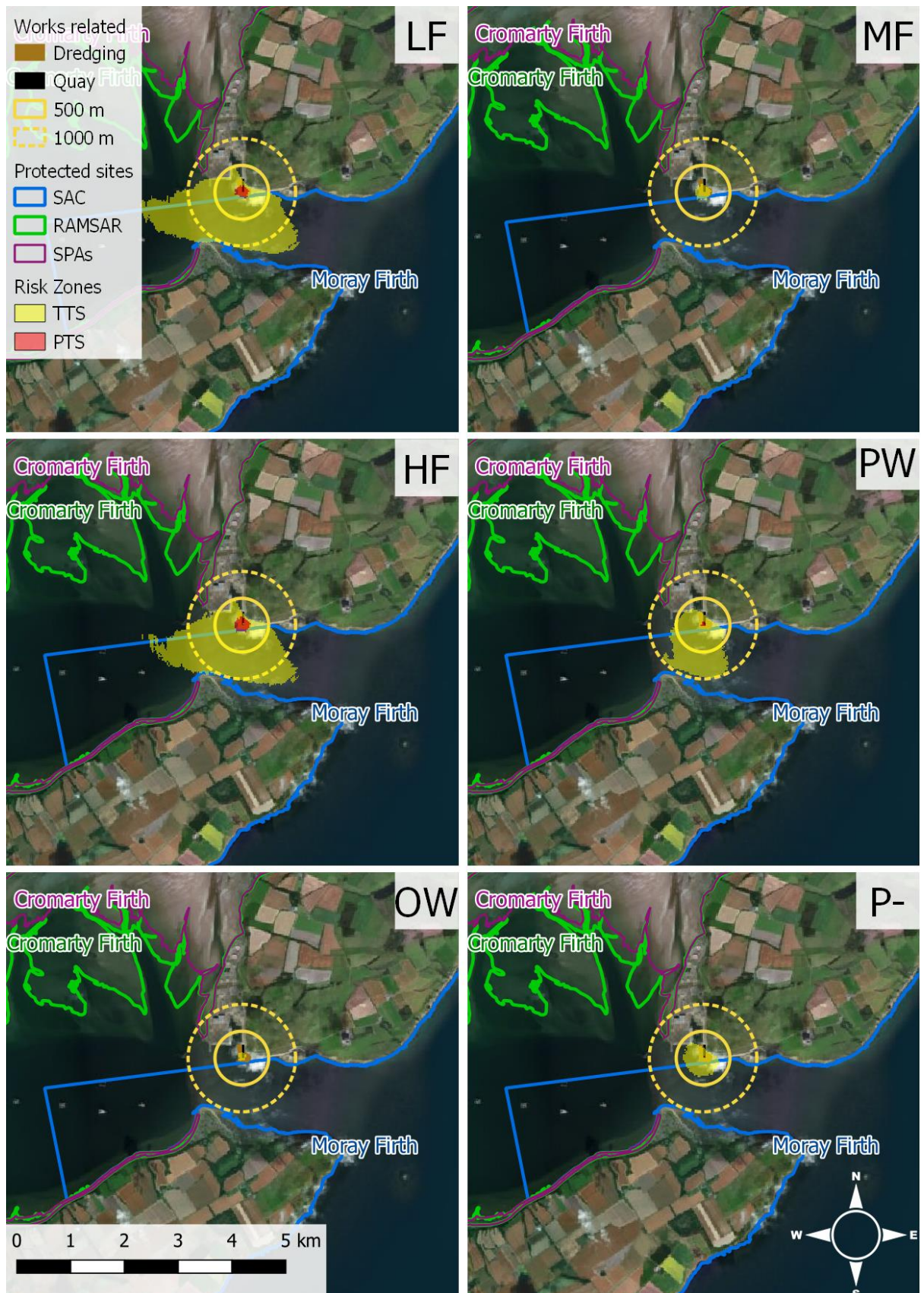




Figure 16. HZ-M vibration, HIGH impact scenario.





3.2.4.2.2 AZ Sheet Piles Vibration

Figure 17. AZ Sheet piles, vibration, LOW impact scenario.

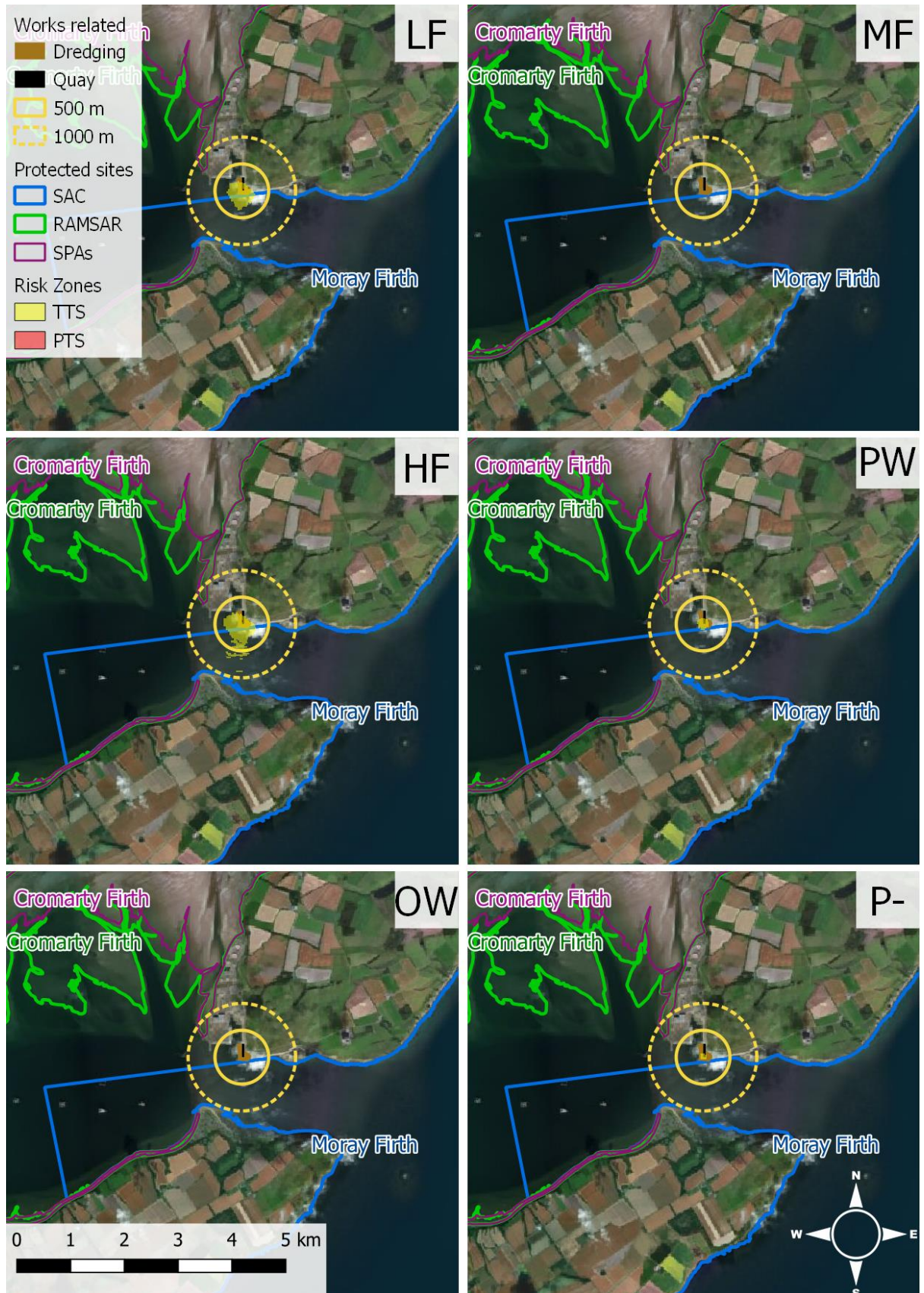
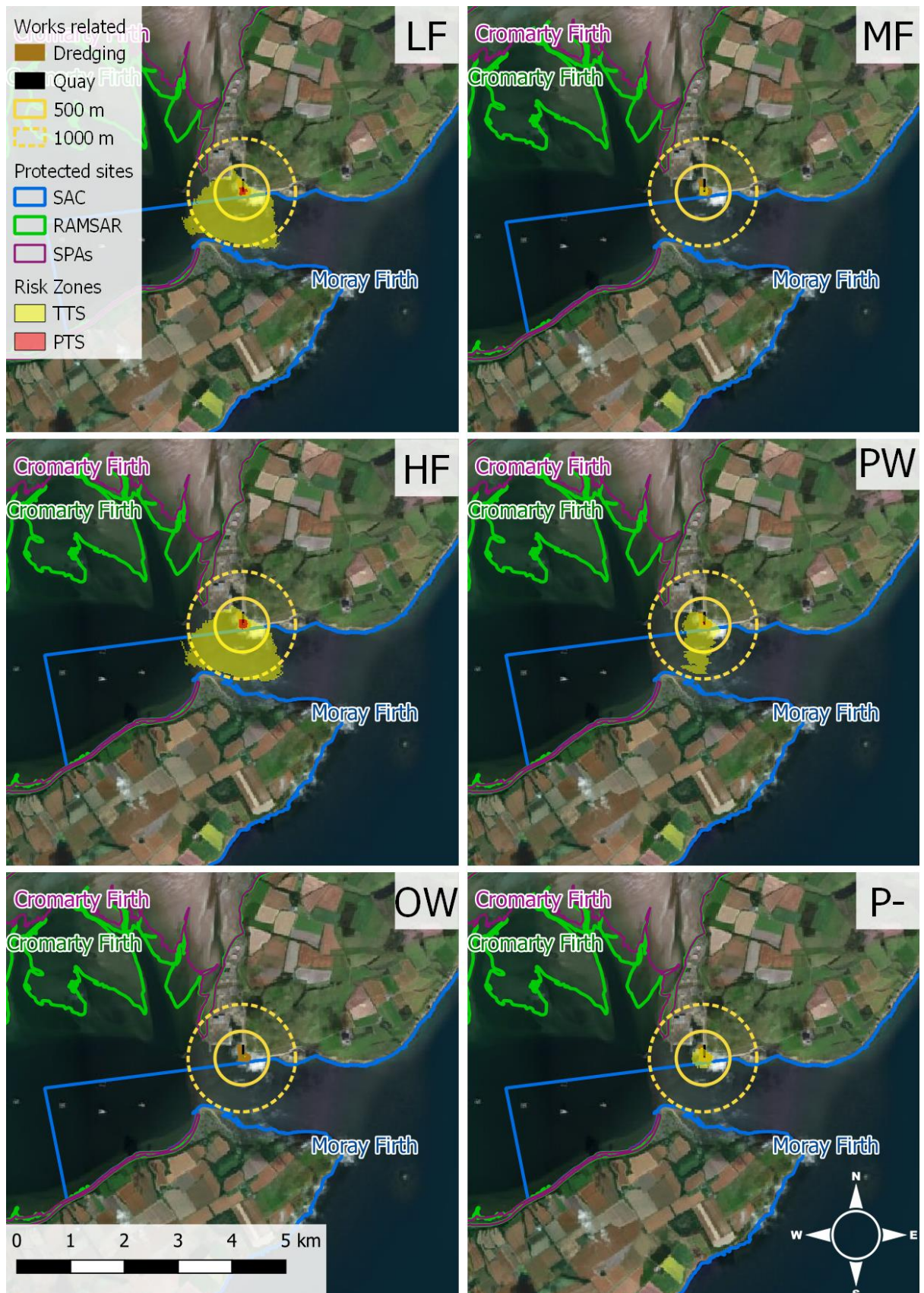




Figure 18. AZ Sheet piles, vibration, HIGH impact scenario.



### 3.2.4.3 Dredging

Due to the low variation in the dredging scenarios results, we only show the “HIGH” scenario here (See “LOW” in APPENDIX A). Both scenarios are based on the 12-hour work-day (43,200 seconds) and a source level of 213 dB<sub>SEL-daily</sub> (167 dB<sub>RMS</sub>), The tidal level and the path of the work boat being the difference between them.

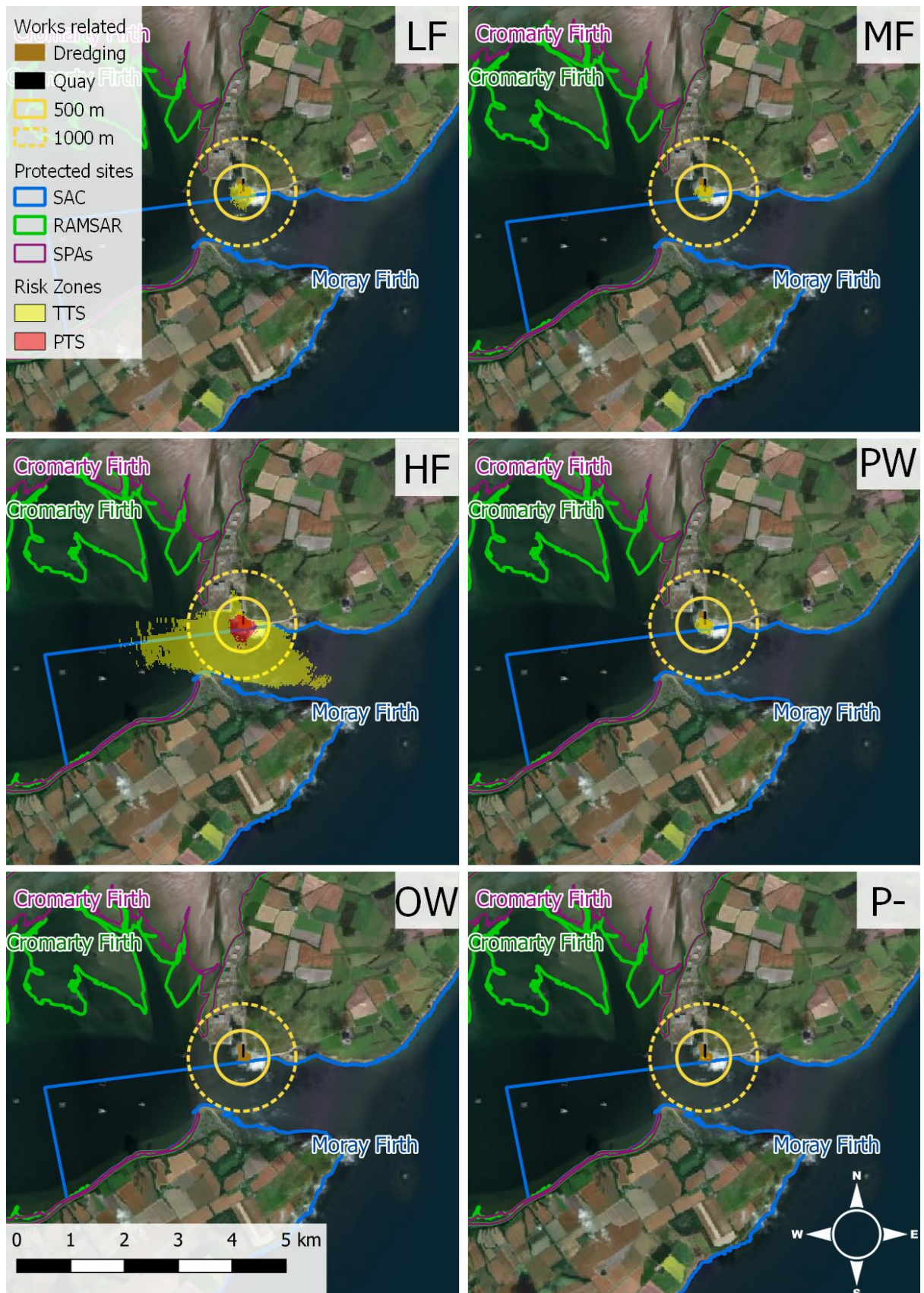
**Figure 19. Unweighted levels (dB<sub>SEL-daily</sub>) from Dredging in the HIGH impact scenario. Source level: 213 dB<sub>SEL-daily</sub> /167 dB<sub>RMS</sub>.**



Only the HF group has risk zones extending beyond 500 m, with the remaining risk zones being smaller than 500 m in diameter.



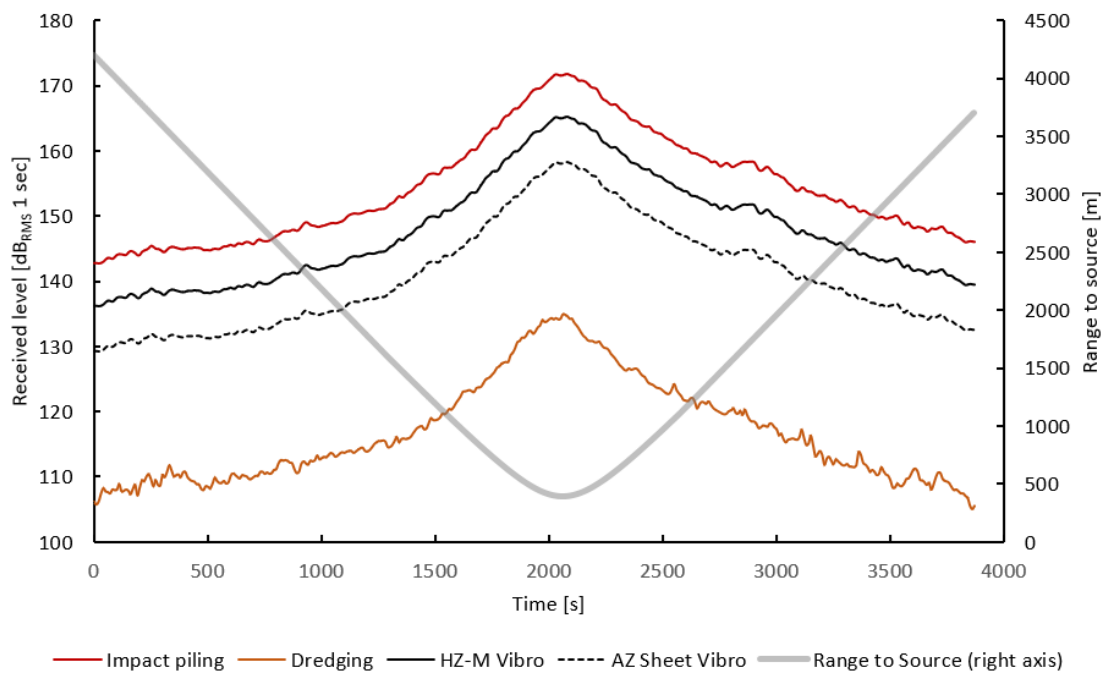
Figure 20. Dredging, summary of HIGH impact scenario.



### 3.2.4.4 Moving Receiver (Animals)

To make the interpretation of the results easier as daily noise exposure for one location is not representative of a moving animal we here present received levels for an animal swimming at 2 m/s from the inner Moray Firth, through the strait, past the noisy activity and into the Cromarty Firth (path in Figure 6, p.19).

**Figure 21.** Received levels of HIGH impact scenarios,  $\text{dB}_{\text{RMS}}$  (1-second window, unweighted), for an animal moving past the noisy activity at 2 m/s. Notice that even though  $\text{dB}_{\text{SEL-daily}}$  can be quite high (e.g. Figure 8, p.21) the instantaneous received level ( $\text{dB}_{\text{RMS}}$ ) is often lower, as the animal is not stationary.



**Figure 22.** Received SEL of HIGH impact scenarios,  $\text{dB}_{\text{SEL}}$  (unweighted), for an animal moving past the noisy activity at 2 m/s.

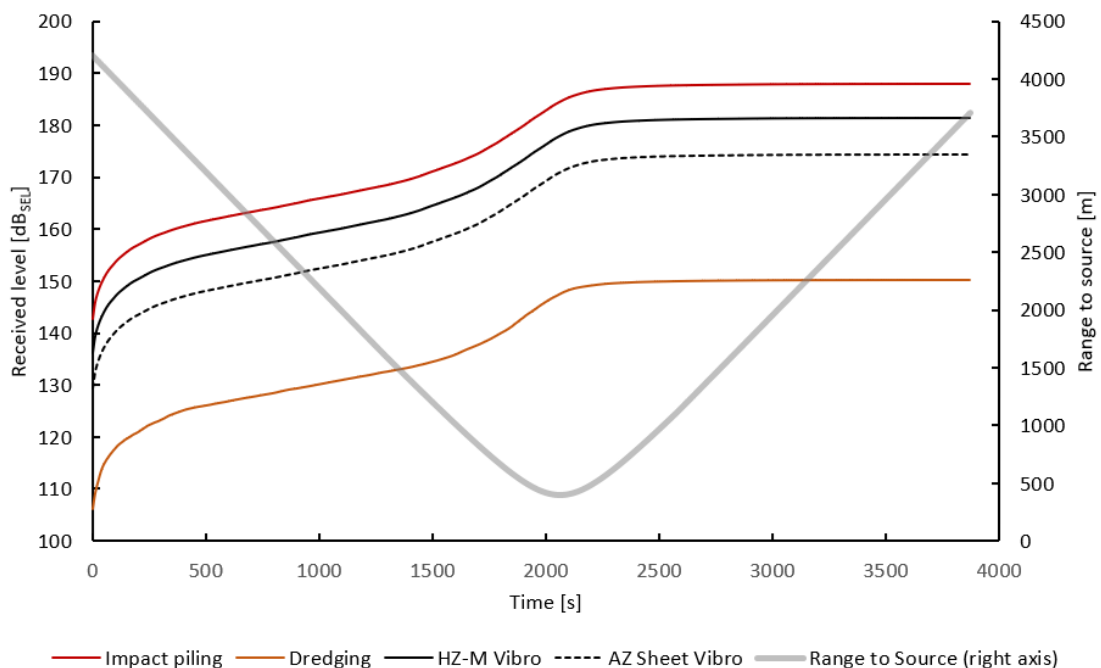
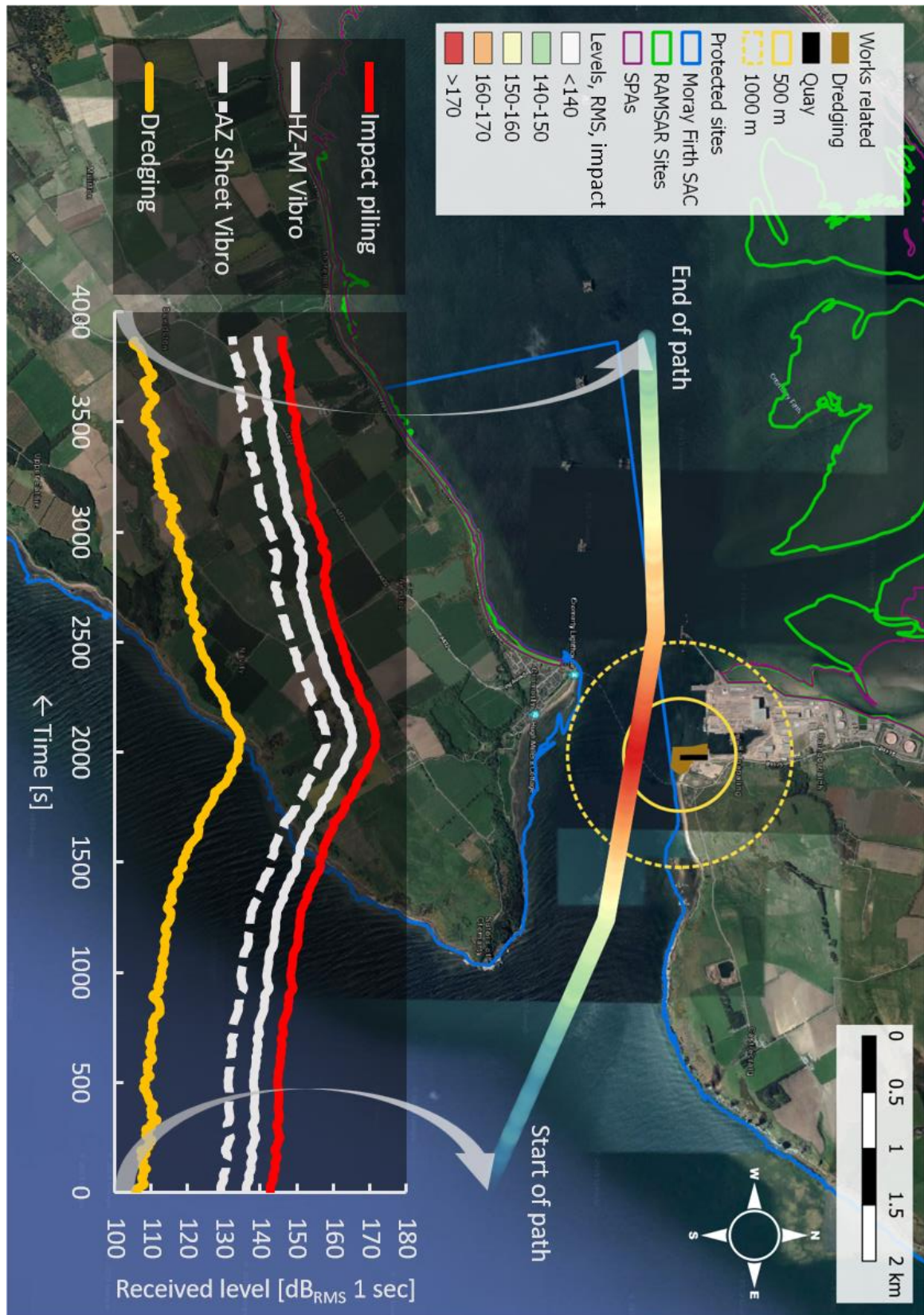




Figure 23. Received levels of HIGH impact scenarios superimposed on path map.  $dB_{RMS}$  (1-second window, unweighted), for an animal moving past the noisy activity at 2 m/s. Notice that even though  $dB_{SEL-daily}$  can be quite high (e.g. Figure 8, p.21) the instantaneous received level ( $dB_{RMS}$ ) is often lower, as the animal is not stationary. Note that time axis on graph runs right to left (to follow direction of travel).



### 3.2.5 CONCLUSIONS

All risk zones extend into the Moray Firth SAC (designated for its population of Bottlenose Dolphins, MF group). This is expected as the development is just outside the SAC. Note that for all activities the risk zone for the MF group have a very small overlap with the SAC (Figure 10, p.23 assumes stationary animals).

For the following please recall the hearing groups from section 0, p. 9 and 3.2.2.2.6, p.10 as we will refer to them by group name rather than individual species.

Please keep in mind that any risks or injuries referred to in this report are meant as injuries related to noise exposure. Other risks, such as decreased visibility or collision are not included in this assessment.

#### 3.2.5.1 Impact Piling

##### 3.2.5.1.1 *Continuous/Accumulated Noise*

Risk zones for the impact piling are the largest of the activities assessed, with daily exposure levels extending beyond 1000 m for groups LF, HF and PW in the HIGH impact scenario (Figure 10, p.23). However, these zones are based on a stationary animal that stays in the same position throughout (1 hour, 12 min).

Looking at Figure 12, p.25, showing risk zones for 1 minute of exposure and Figure 21, p.34 showing received levels for a moving animal, we see that for a non-stationary animal, will have a **low risk of sustaining any auditory injuries (PTS)** from passing the activity.

For animals in groups LF, HF and PW there is, however, a risk of temporary worsening of the hearing to ranges exceeding 1000 m. this means that animals of these groups wanting to enter the Cromarty Firth during the impact pile driving has a **risk of sustaining TTS**, provided the noise levels or the HIGH impact scenario are representative.

Implementing a soft start procedure will likely deter animals that are in the vicinity, but cannot mitigate the risk to animals travelling into the Cromarty Firth (e.g. for foraging).

We advise that the Marine Mammal Observer (MMO) verify the absence of animals to the opposite shore (Cromarty town), ~1000 m south of the site.

If this is not possible, consider deploying a hydrophone during impact piling (when piling outside the bund/cofferdam) to determine the source level, and re-evaluate risk zones based on a simple comparison with source levels used in the HIGH and LOW impact scenarios (compare single strike SEL).

If this approach is unacceptable, consider using a bubble curtain that can reduce SEL by 8-12 dB (Stokes, et al., 2010; Dähne, et al., 2017), bring the risk zones within the 500 m range and leave a less noisy “path” open along the opposite shore.

##### 3.2.5.1.2 *Instantaneous Noise*

Only group “P-”, (e.g. Salmon and Trout) have a risk zone (TTS only) beyond 50 m associated with the instantaneous pressure from the impact piling (Figure 14, p.26), and only for the HIGH impact scenario. As TTS is not a permanent injury and Salmon and Trout are not known to rely on their hearing for foraging and communication, it is our view that this effect is not significant on a population level. This conclusion is furthered by the limited use of impact piling, meaning that even in the worst case, there would be < 1 hour 15 min of this activity during any 24-hour period.

#### 3.2.5.2 Vibration piling

While the vibration piling has potential to cause TTS in multiple groups (Figure 16, p.29 & Figure 18, p.31), this requires the animals to remain stationary in the area for extended periods (>1 hour, 32 minutes). Combining this with the (unweighted) received levels shown in Figure 21, p. 34 (max 165 dB<sub>RMS</sub>) for an animal traveling through the middle of



the strait (Figure 6, p.19), it's our view that animals traveling through the area can do so without experiencing TTS (or PTS). Note that received levels will be lower if an animal chooses to take a path along the south side of the strait, further from the source.

### 3.2.5.3 Dredging

For the dredging only the HF group is at risk of injury, and only if the animal stays within the 500 m range for a considerable time (Figure 20, p.33). Note that the SEL for Dredging is mainly high due to the long duration of this activity (up to 12 hours daily) and not the source level (167 dB<sub>RMS</sub>). Given the lower source level and the received levels from Figure 21, p.34 (max 135 dB<sub>RMS</sub>), we don't find it likely that e.g. a harbour porpoise would be at risk of any TTS. Indeed, as the noise source here is mainly from the vessel, a familiar noise in this area, we don't expect the animals to be deterred from using the strait because of the noise levels from this activity.

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## **Technical Appendix 4.3**



## **Nigg East Quay**

### **Technical Appendix 4.3: Habitats Regulations Appraisal**



**June 2019**

# Nigg East Quay

## Technical Appendix 4.3: Habitats Regulations Appraisal

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Reviewer: Kathy Dale and Craig Potter

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## EXECUTIVE SUMMARY

EnviroCentre Limited has been commissioned by Global Energy Nigg Limited to undertake an Environmental Impact Assessment (EIA) for the proposed development of a new quay and associated laydown area to the south east of the existing Nigg Energy Park. The proposed development will involve the creation of a new quayside, berth and onshore laydown area. Dredging will be required to form the new berth and both impact and vibration pilling will be required to form the quayside.

The Scoping Opinion received from The Highland Council (March 2019) requested that likely impacts to designated sites are considered as part of the EIA process. As there are a number of European designated sites in proximity to the proposed works, a Habitats Regulations Appraisal (HRA) is required to determine if there will be any Likely Significant Effects (LSE).

The following sites were screened for LSE as part of the HRA process:

- Moray Firth SAC;
- Dornoch Firth and Morrich More SAC;
- Cromarty Firth SPA; and
- Moray Firth pSPA.

It was not possible to rule out LSE for all the qualifying features of the designated sites and therefore all were taken forward for Appropriate Assessment (AA). For the Moray Firth SAC an AA is required for both qualifying features, sandbanks which are slightly covered by sea water all the time, and bottlenose dolphin. For the Dornoch Firth and Morrich More SAC an AA is only required for harbour seal as there is either no connection and/or no LSE arising from the proposed development on the other qualifying features. Similarly, an AA is not required for the Greylag Goose, Osprey or Whooper Swan qualifying features of the Cromarty Firth SPA or the European Shag and Great Northern Diver qualifying features of the Moray Firth pSPA as no LSEs are predicted.

The AA found that if the mitigation detailed in Technical Appendix 4.1 of the EIAR, including a Marine Mammal Observation Protocol (MMOP) and a Passive Acoustic Monitoring (PAM) Protocol, and Volume 1, Chapter 4, Section 4.8 of the EIAR including the production of a Construction Environment Management Plan (CEMP), to be agreed with the regulatory authority prior to works commencing, are employed effectively, adverse effects on the conservation objectives of the qualifying features within the designated sites can be avoided.



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# 1 INTRODUCTION

## 1.1 Terms of Reference

EnviroCentre Limited has been commissioned by Global Energy Nigg Limited to undertake an Environmental Impact Assessment (EIA) for the proposed development of a new quay and associated onshore laydown area to the south east of the existing Nigg Energy Park. The Scoping Opinion received from The Highland Council (March 2019) requested that likely impacts to designated sites are considered as part of the EIA process. As there are a number of European designated sites in proximity to the proposed works, a Habitats Regulations Appraisal (HRA) is required to determine if there will be any Likely Significant Effects (LSE).

## 1.2 Scope of Report

It is the responsibility of the competent authority(ies) to conduct the HRA, however, this document aims to provide the information necessary for them to undertake the appraisal by:

- Providing information on the proposed works;
- Identifying European designated sites that are connected to and/or could potentially be affected by the proposed works;
- Identifying how the proposed works may affect the qualifying features of the European designated site(s), the test of LSE;
- Giving consideration to other projects that may have an 'in combination' effect on European designated sites;
- Recommending European designated sites that need to be taken forward for further assessment if LSEs to their qualifying features cannot be ruled out;
- Conducting an 'Appropriate Assessment' for those qualifying features for which LSE cannot be ruled out; and
- Proposing mitigation that would be required to avoid adverse impacts on the qualifying features of the European designated sites.

## 1.3 Report Usage

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre.

If this report is to be submitted for regulatory approval more than 12 months following the report date, it is recommended that it is referred to EnviroCentre for review to ensure that any relevant changes in data, best practice, guidance or legislation in the intervening period are integrated into an updated version of the report.

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## 1.4 Legislative Context

The Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (hereafter called the Habitats Directive) requires ‘appropriate assessment’ of plans and projects that are likely to have a significant effect on European designated Natura 2000 sites.

Article 6(3) establishes the requirement for Appropriate Assessment (AA):

*“Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site’s conservation objectives. In light of the conclusions of the assessment of the implication for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public”.*

Article 6(4) goes on to discuss alternative solutions, the test of ‘imperative reasons of overriding public interest’ (IROPI) and compensatory measures:

*“If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted”.*

Should a decision be reached to the effect that it cannot be said with sufficient certainty that the development will not have any significant effect on the Natura site, then, as stated above, it is necessary and appropriate to carry out an Appropriate Assessment of the implications of the development for the sites in view of their conservation objectives.

The EEC guidance<sup>1</sup> for Appropriate Assessment states (Section 3.2 pg. 25):

*“It is the competent authority’s responsibility to carry out the Appropriate Assessment. However, the assessment process will include the gathering and consideration of information from many stakeholders, including the project or plan proponents, national, regional and local nature conservation authorities and relevant NGOs. As with the EIA process, the Appropriate Assessment will usually involve the submission of information by the project or plan proponent for consideration by the competent authority. The authority may use that information as the basis of consultation with internal and external experts and other stakeholders. The competent authority may also need to commission its own reports to ensure that the final assessment is as comprehensive and objective as possible.*

*In this stage, the impact of the project or plan (either alone or in combination with other projects or plans) on the integrity of the Natura 2000 site is considered with respect to the conservation objectives of the site and to its structure and function.”*

### 1.4.1 Special Areas of Conservation (SACs)

SACs are designated under Article 3 of Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive). The Directive is transposed into Scottish law through the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). This network comprises Annex I

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<sup>1</sup> European Commission (2001) Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Available online at: [http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura\\_2000\\_assess\\_en.pdf](http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf) (Accessed 05/04/2019)

habitats, "natural habitat types of community interest whose conservation requires the designation of Special Areas of Conservation" and the habitats of Annex II species - "animal and plant species of community interest whose conservation requires the designation of Special Areas of Conservation". Candidate SACs (cSACs) are sites that have been submitted to the European Commission but have not yet been formally adopted. They are given the same level of protection as SACs.

#### **1.4.2 Special Protection Areas (SPAs)**

SPAs are designated under Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (the Birds Directive), transposed into Scottish law through the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). Under the Directive, Scotland is obliged to protect the habitats of birds that are vulnerable to habitat change or due to their low population numbers i.e. rarity, especially species on Annex 1 of the Directive. Aspects of habitat protection are in the context of pollution, deterioration of habitat and disturbance. SPAs, together with SACs, form what is known as the "Natura 2000 Network".

#### **1.4.3 Conservation Objectives**

The overriding objective of the Habitats Directive is to ensure that the habitats and species covered achieve 'Favourable Conservation Status' and that their long-term survival is secured across their entire natural range within the European Union (EU). In its broadest sense, FCS means that an ecological feature is being maintained in a satisfactory condition, and that this status is likely to continue into the future. Definitions as per the EU Habitats Directive are given below.

##### Favourable Conservation Status as defined by Articles 1 (e) and 1(i) of the Habitats Directive

The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- its natural range and areas it covers within that range are stable or increasing; and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- the conservation status of its typical species is favourable'.

The conservation status of a species is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' when:

- the population dynamics data on the species concerned indicate that it is maintaining itself on a long term basis as a viable component of its natural habitats; and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Site-specific conservation objectives define the desired condition or range of conditions that a habitat or species should be in, in order for these selected features within the site to be judged as favourable. At site level, this state is termed 'favourable conservation condition.' Site conservation objectives also contribute to the achievement of the wider goal of biodiversity conservation at other geographic scales, and to the achievement of favourable conservation status at national level and across the Natura 2000 network.

## 2 METHOD

### 2.1 The Habitats Regulations Appraisal Process

HRA is a four-stage process with specific issues and tests outlined at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required. The stages are summarised in Table 2-1.

**Table 2-1 Key Stages in the HRA Process**

<b>Stage 1</b>	
<b>Screening for Likely Significant Effect (LSE)</b>	<ul style="list-style-type: none"> <li>- Identify European sites in and around the project area.</li> <li>- Examine conservation objectives of the interest feature(s) (where available).</li> <li>- Review plan policies and proposals and consider potential effects on Natura 2000 sites (magnitude, duration, location, extent).</li> <li>- Examine other plans and programmes that could contribute to 'in combination' effects.</li> </ul>
	<ul style="list-style-type: none"> <li>- If no effects likely – report no likely significant effect. No further assessment is required.</li> <li>- If effects are judged likely or uncertainty exists – the Precautionary Principle applies, proceed to Stage 2.</li> </ul> <p>Note: In line with the ruling of the 'People over Wind' case<sup>2</sup> no measures designed within the project purely to avoid or reduce harmful effects on a Natura site are considered at this stage.</p>
<b>Stage 2</b>	
<b>Appropriate Assessment (AA)</b>	<ul style="list-style-type: none"> <li>- Complete additional scoping work including the collation of further information on sites as necessary to evaluate effects in light of conservation objectives.</li> <li>- Agree scope and method of AA with the competent authority.</li> <li>- Consider how the project 'in combination' with other projects will interact when implemented (the Appropriate Assessment).</li> <li>- Consider how effects on integrity of the site could be avoided by changes to the project and the consideration of alternatives.</li> <li>- Develop mitigation measures (including timescale and mechanisms).</li> <li>- Report outcomes of AA including mitigation measures.</li> </ul>
	<ul style="list-style-type: none"> <li>- If the project will not adversely affect European site integrity proceed with plan.</li> <li>- If effects or uncertainty remain following the consideration of alternatives and development of mitigation proceed to Stage 3.</li> </ul>
<b>Stage 3</b>	
<b>Alternative Solutions</b>	<ul style="list-style-type: none"> <li>- Consider alternative solutions, delete from project or modify.</li> <li>- Consider if priority species/habitats affected - identify 'imperative reasons of overriding public interest' (IROPI), economic, social, environmental, human health, public safety (only applicable in highly exceptional circumstances).</li> </ul>
<b>Stage 4</b>	
<b>Imperative Reasons of Overriding Public Interest (IROPI)</b>	<ul style="list-style-type: none"> <li>- Stage 4 is the main derogation process of Article 6(4) which examines whether there are IROPI for allowing a plan or project that will have adverse effects on the integrity of a Natura 2000 site to proceed in cases where it has been established that no less damaging alternative solution exists.</li> <li>- The extra protection measures for Annex I priority habitats come into effect when making the IROPI case. Compensatory measures must be proposed and assessed. The Commission must be informed of the compensatory measures. Compensatory measures must be practical, implementable, likely to succeed, proportionate and enforceable, and they must be approved by the Minister.</li> </ul>

<sup>2</sup> Court of Justice of the European Union case C-323/17 *People over Wind and Sweetman v Coillte Teoranta*.

## 2.2 Screening

With reference to the SNH Guidance<sup>3</sup> the screening stage determines whether Appropriate Assessment is required by:

- Determining whether a project (or plan) is directly connected with or necessary to the conservation management of any European sites;
- Describing the details of the project (or plan) proposals and other projects that may cumulatively affect any European sites;
- Describing the characteristics of relevant European sites; and
- Appraising likely significant effects of the proposed project on relevant European sites.

The guidance gives the following definition of LSE:

*“The test of significance is where a plan or project could undermine the site’s conservation objectives. The assessment of that risk (of ‘significance’) must be made in the light, amongst other things, of the characteristics and specific environmental conditions of the site concerned.”*

*“A likely effect is one that cannot be ruled out on the basis of objective information. The test is a ‘likelihood’ of effects rather than a ‘certainty’ of effects. Although some dictionary definitions define ‘likely’ as ‘probable’ or ‘well might happen’, in the Waddenzee case the European Court of Justice ruled that a project should be subject to Appropriate Assessment **“if it cannot be excluded, on the basis of objective information, that it will have a significant effect on the site, either individually or in combination with other plans and projects”**. Therefore, ‘likely’, in this context, should not simply be interpreted as ‘probable’ or ‘more likely than not’, but rather whether a significant effect can objectively be ruled out.”*

## 2.3 Appropriate Assessment

The Appropriate Assessment establishes whether or not a project’s LSE identified during the screening stage will have an adverse effect on the integrity of the affected site with regard to its conservation objectives. Based on the guidance provided by SNH the effects of the proposal on the designated sites’ qualifying features will be determined by:

- Gathering information required to assess impacts (from site documents, scientific literature, EU and UK guidance on impact assessment and impact assessments from similar projects);
- Predicting the type and nature of impacts e.g. direct or indirect, short or long term;
- Assessing whether there will be adverse effects on the integrity of the site as defined by the conservation objectives and the status of the site. The Precautionary Principle must be applied at this stage. If it cannot be demonstrated with supporting evidence that there will be no adverse effects then adverse effects will be assumed; and
- Ascertaining if it is possible to mitigate adverse effects.

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<sup>3</sup> Scottish Natural Heritage (2015) Habitats Regulations Appraisal of Plans. Guidance for Plan-Making Bodies in Scotland. Version 3.0. Available online at: <https://www.nature.scot/sites/default/files/2018-09/Habitats%20Regulations%20Appraisal%20of%20Plans%20-%20plan-making%20bodies%20in%20Scotland%20-%20Jan%202015.pdf> (Accessed on 05/04/2019)

## 3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

### 3.1 Site Location and Description

The site is centred at Ordnance Survey Grid Reference (OSGR) NH 79527 69016, south east of the Nigg Energy Park, at an elevation of 5m above sea level. The total area of the site is approximately 11.27ha. The site comprises the former Dunskeath House lands and associated buildings, now derelict, and coastal waters. The area above Mean Low Water Springs (MLWS) within the site boundary is approximately 4.78ha.

The site is dominated by bare ground with areas of dense and scattered scrub, grassland, tall ruderal vegetation and broadleaved trees. Sand and shingle above the high tide mark are also present in the south of the site and a sea wall exists in the west.

The Nigg Oil Terminal is located to the immediate north of Nigg Energy Park, with the B9175 and Fearn Peninsula to the east, the area where the Cromarty Firth meets the Moray Firth to the south (known as 'The Sutors'), and Nigg Bay to the west (also part of the Cromarty Firth). Adjacent to the south-east of the site, the Cromarty Ferry crosses the entrance to the firth to the west of The Sutors in the summer season (from May to September). Access to the facility can be gained from the B9715.

Coastal superficial deposits in the vicinity of the site are marine beach deposits, gravel, sand and silt formed up to 3 million years ago during the Quaternary Period. Immediately inland wind-blown sand deposits are present, also of the Quaternary Period, with glacial till present further inland.

### 3.2 Proposed Development Description

The proposed development comprises the following:

- A proposed east quay of plan area 250m by 50m (0.88ha) constructed using perimeter piling to retain locally dredged material as infill, with concrete cope;
- Potential rock armouring;
- Dredging (via suction dredging, with barge mounted excavator used if needed) of approximately 165,000m<sup>3</sup> to achieve a minimum sea bed level at the main west facing berth of 12m below Chart Datum (CD) to facilitate the proposed development;
- High level lighting to quayside in accordance with Port Regulations;
- Sea water extraction for fire-fighting capability;
- Re-use of between 15,000m<sup>3</sup> and 30,000m<sup>3</sup> of dredged materials within the quay structure;
- Disposal of excess suitable dredged material (up to 150,000m<sup>3</sup>) within The Sutors licenced disposal site at the mouth of the Cromarty Firth;
- Demolition and removal of buildings on site associated with the former Dunskeath House;
- Preparatory groundwork and associated landscaping for provision of a crushed rock laydown area for handling and temporary storage of plant and renewable energy components;
- A landscaped bund of 2m height formed from reclaimed material on the eastern and northern extents of the laydown area;
- Access provision from the B1975; and
- Security lighting and fencing associated with the laydown area.

The proposed development is scheduled to begin in Q4 2019, with an estimated timetable of approximately 253 days from initial contractor mobilisation to completion, therefore a programme of approximately 10 months construction period is anticipated. Loosely, activities for the provision of the new quay can be broken into four stages, with outline timescales as follows:



- Phase 1: Creation of structures (including piling) - Month 1 to Month 7;
- Phase 2: Dredging - Month 5 to Month 9;
- Phase 3: Concrete works and service installation – Month 6 to Month 9; and
- Phase 4: Surface layer and testing – Month 8 – Month 10.

Full details of the construction methods can be found in section 2.3 of Chapter 2: Proposed Development within Volume 1 of this EIAR.

### **3.3 In-Combination Effects**

Pre-application advice received from The Highland Council (18/01549/PREAPP) requested that in-combination effects from the proposed harbour development at Invergordon be considered within the EIA. The developments at Aberdeen Harbour and Ardersier have also been identified as having the potential to have in-combination effects with the proposed development.

## 4 SCREENING FOR APPROPRIATE ASSESSMENT

### 4.1 Method

For LSE to arise there must be a risk enabled by having a 'source' (e.g. construction works at a proposed development site), a 'receptor' (e.g. a European site or its qualifying interests), and a pathway between the source and the receptor (e.g. mobile species travelling between the proposed development site and a European site). The identification of a pathway does not automatically mean that LSE will arise. The likelihood of LSE will depend upon the characteristics of the source (e.g. duration of construction works), the characteristics of the pathway (e.g. what species and the number individuals travelling between the two sites) and the characteristics of the receptor (e.g. the sensitivities of the European site and its qualifying interests).

SNH guidance<sup>4</sup> states that sites with mobile species should be considered within the screening process where there is a significant ecological link between the designated site and the proposed development site. It is also necessary to consider sites which are part of the same coastal ecosystem where the proposed development may affect coastal processes.

The following European designated sites were identified in The Highland Council's Scoping Opinion (March 2019) as having the potential to be impacted by the proposed development and so have been considered within the screening for Appropriate Assessment. The location of the designated sites in relation to the proposed development is shown in Appendix A.

### 4.2 Designated Sites

#### 4.2.1 Moray Firth SAC

The Moray Firth SAC is located adjacent to the proposed development site. It encompasses the Moray Firth as well as the Beaully, Cromarty and Dornoch Firths. It extends eastwards as far as Lossiemouth in the south and East Helmsdale in the north. It covers 151,274 ha and is primarily designated for its resident bottlenose dolphin (*Tursiops truncatus*) population.

#### 4.2.2 Dornoch Firth and Morrich More SAC

The Dornoch Firth and Morrich More SAC is situated to the north of the proposed development site. It spans from Inver Bay in the south east, to Bonar Bridge in the west and Dornoch Point in the north east. It comprises a variety of intertidal and coastal habitats including estuaries, sandbanks, reefs, saltmarsh, dynamic and fixed sand dunes as well as coastal heath. It is designated for a range of habitats as well as otter (*Lutra lutra*) and common seal (*Phoca vitulina*).

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<sup>4</sup> Scottish Natural Heritage (2015) Habitats Regulations Appraisal of Plans. Guidance for Plan-Making Bodies in Scotland. Version 3.0. Available online at: <https://www.nature.scot/sites/default/files/2018-09/Habitats%20Regulations%20Appraisal%20of%20Plans%20-%20plan-making%20bodies%20in%20Scotland%20-%20Jan%202015.pdf> (Accessed on 05/04/2019)

#### **4.2.3 Cromarty Firth SPA**

The Cromarty Firth SPA is situated to the east of the proposed development site. It incorporates the coastal areas of the Cromarty Firth from Nigg Bay in the north east to the mouth of the River Conon in the west and round to Cromarty in the south east. It is designated for breeding and over wintering birds.

#### **4.2.4 Moray Firth pSPA**

The Moray Firth pSPA is situated to the east of the proposed development site. It includes the Beaully and Moray Firths in the west and stretches eastward to Portsoy in the south. In the north it encompasses the mouth of the Dornoch Firth and the coastline up to Berriedale. It includes a variety of coastal and marine habitats that provide an important foraging resource for the wintering sea birds and breeding shags (*Phalacrocorax aristotelis*), for which it is designated.

## 4.3 Screening Assessment

The screening assessment for LSE of the proposed development on the qualifying features of the European designated sites are shown in Table 4-1 below.

**Table 4-1 Screening Assessment for LSE of the Proposed Development**

Site Name (Distance to Proposed Development <sup>5</sup> )	Qualifying Features	Likely Significant Effect (LSE)	Screening Assessment
Moray Firth SAC (okm)	Sandbanks which are slightly covered by sea water all the time	<p>Pathway identified.</p> <p>It is possible that dredging and the disposal of dredged material during the construction phase of the proposed development could result in the release of sediment and/or contaminants that could temporarily affect the physical structure of the sandbanks and/or result in death, injury or damage to the flora and fauna that inhabit them. Dredging and increased vessel movement could also result in the spread of Invasive Non-Native Species (INNS)</p> <p>In the longer term there is the potential that the placement of hard infrastructure and the alterations in bathymetry as a result of capital dredging could affect the coastal processes that form the sandbanks.</p> <p>These impacts could increase in magnitude, extent and duration when considered with the other developments listed in section 3.3 above.</p> <p>LSE cannot be ruled out for this habitat.</p>	<b>Screened in.</b>
	Bottlenose dolphin	<p>Pathway identified.</p> <p>During the construction phase of the proposed development, bottlenose dolphin may be impacted by underwater noise as a result of vibration and impact piling, rock armour placement, vessel movements and dredging. The possible effects of underwater noise on dolphins include temporary or permanent threshold</p>	<b>Screened in.</b>

<sup>5</sup> Distance is measured from the closest points around the coastlines rather than 'as the crow flies'.

Site Name (Distance to Proposed Development <sup>5</sup> )	Qualifying Features	Likely Significant Effect (LSE)	Screening Assessment
		<p>shifts in hearing, disturbance (masking and/or habitat avoidance) and, in extreme cases, intense noise can lead to the injury or death of individuals.</p> <p>During the construction and operation phases any pollutants released into the water (as a result of dredged sediments, spilled material from vessels and spillage from onshore storage of fuel or chemicals) could have temporary impacts on dolphins either directly, or indirectly if prey items are affected. Toxic pollutants could result in habitat avoidance, injury or death of individuals and/or reduced prey availability leading to loss of condition.</p> <p>An increased number of vessels travelling through the SAC, both during construction and once the quay is in operation, could increase the risk of collision, resulting in death or injury to individuals.</p> <p>An increase in the number of vessels during the operation phase could also lead to an increase in continuous low level underwater noise. This is unlikely to result in physical trauma but could lead to habitat displacement if individuals avoid areas with higher noise levels. An increase in continuous low level noise could also affect dolphins indirectly if their prey are affected.</p> <p>These impacts may increase in magnitude, extent and duration when considered with the other developments listed in section 3.3 above.</p> <p>LSE cannot be ruled out for bottlenose dolphin.</p>	
Dornoch Firth and Morrich More SAC (13km)	<p>Habitats including:</p> <ul style="list-style-type: none"> <li>Atlantic decalcified fixed dunes (<i>Calluno Ulicetea</i>)</li> </ul>	<p>Pathway identified.</p> <p>These coastal habitats are hydrologically connected to the proposed development site via the Moray Firth coastal waters.</p> <p>It is possible that any pollutants released into the water during the construction phase (as a result of dredged sediments, spilled material from vessels and spillage from onshore storage of fuel, chemicals or construction</p>	Screened out.

Site Name (Distance to Proposed Development <sup>5</sup> )	Qualifying Features	Likely Significant Effect (LSE)	Screening Assessment
	<ul style="list-style-type: none"> <li>• Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>)</li> <li>• Coastal dunes with <i>Juniperus</i> spp.</li> <li>• Decalcified fixed dunes with <i>Empetrum nigrum</i></li> <li>• Embryonic shifting dunes</li> <li>• Estuaries</li> <li>• Fixed dunes with herbaceous vegetation ("grey dunes")</li> <li>• Humid dune slacks</li> <li>• Mudflats and sandflats not covered by seawater at low tide</li> <li>• Reefs</li> <li>• <i>Salicornia</i> and other annuals colonising mud and sand</li> <li>• Sandbanks which are slightly covered by sea water all the time</li> <li>• Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes")</li> </ul>	<p>material) could be transported to these habitats and cause injury or death to the flora and fauna which inhabit them. However, the predominant wave action in the Moray Firth is from the north east to the south west, so the location of the Dornoch Firth and Morrich More SAC c.13km north of the proposed development greatly reduces the likelihood of high volumes of pollutants being received there. The risk to these SAC habitats is therefore considered to be negligible.</p> <p>Similarly, whilst there is potential for the proposed development to alter coastal processes, which form the habitats within the SAC, as a result of hard infrastructure and alterations to bathymetry, the predominant wave action and distance between the proposed development and designated site reduce the risk to negligible.</p> <p>No LSEs are predicted for the habitats in the Dornoch Firth and Morrich More SAC.</p>	

Site Name (Distance to Proposed Development <sup>5</sup> )	Qualifying Features	Likely Significant Effect (LSE)	Screening Assessment
	Otter ( <i>lutra lutra</i> )	<p>Pathway identified.</p> <p>The proposed development site is within feasible commuting distance for otter residing within the Dornoch Firth and Morrich More SAC.</p> <p>It is possible that commuting, foraging and resting otter within the vicinity of the proposed development could experience disturbance from increased human presence, noise, artificial lighting and vibration during the construction and operational phase. However, it is considered that there is sufficient resource for otters within the SAC in terms of foraging, commuting and resting habitat that disturbance experienced outside the SAC would have a negligible impact.</p> <p>No LSEs are therefore predicted for otter within the Dornoch Firth and Morrich More SAC.</p>	Screened out.
	Harbour seal ( <i>Phoca vitulina</i> )	<p>Pathway identified.</p> <p>Harbour seals are mobile species known to range up to 50km from haul out sites in search of food<sup>6</sup>. It is therefore possible that individuals from the SAC could forage in the waters in the vicinity of the proposed development.</p> <p>During the construction phase harbour seals may be impacted by underwater noise as a result of vibration and impact piling, rock armour placement, vessel movements and dredging. The possible effects of underwater noise include temporary or permanent threshold shifts in hearing, disturbance (masking and/or habitat avoidance) and, in extreme cases, intense noise can lead to the injury or death of individuals.</p> <p>During the construction and operation phases any pollutants released into the water (as a result of dredged sediments, spilled material from vessels and spillage from onshore storage of fuel or chemicals) could have temporary impacts on harbour seal either directly, or indirectly if prey items are affected. Toxic pollutants</p>	Screened in.

<sup>6</sup> SNH. Habitats Regulations Appraisal (HRA) on the Moray Firth – A guide for developers and regulators. Accessed online at: <https://www.nature.scot/habitats-regulations-appraisal-hra-moray-firth-guide-developers-and-regulators> on 28/05/2019



Site Name (Distance to Proposed Development <sup>5</sup> )	Qualifying Features	Likely Significant Effect (LSE)	Screening Assessment
		<p>could result in habitat avoidance, injury or death of individuals and/or reduced prey availability leading to loss of condition.</p> <p>An increased number of vessels travelling through foraging areas, both during construction and once the quay is in operation, could increase the risk of collision, resulting in death or injury to individuals.</p> <p>An increase in the number of vessels during the operation phase could also lead to an increase in continuous low level underwater noise. This is unlikely to result in physical trauma but could lead to habitat displacement if individuals avoid areas with higher noise levels. An increase in continuous low level noise could also affect harbour seal indirectly if their prey are affected.</p> <p>These impacts may increase in magnitude, extent and duration when considered with the other developments listed in section 3.3 above.</p> <p>LSE cannot be ruled out for harbour seal.</p>	
Cromarty Firth SPA (1km)	Bar-tailed Godwit ( <i>Limosa lapponica</i> ) (breeding)	<p>Pathway identified.</p> <p>There are hydrological connections between the Cromarty Firth SPA and the proposed development site. Bar-tailed Godwit from within the SPA may also utilise habitat outside the SPA such as the rocky foreshore within the proposed development area for roosting.</p> <p>Bar-tailed Godwit could be impacted during the construction and/or operational phases if pollutants are released into the water (as a result of dredged sediments, spilled material from vessels and spillage from onshore storage of fuel or chemicals). This could impact them directly or indirectly if prey items (mainly marine worms and crustaceans) are affected. This could result in death or injury of individual and loss of condition and breeding success if prey items are affected.</p>	Screened in.

Site Name (Distance to Proposed Development <sup>5</sup> )	Qualifying Features	Likely Significant Effect (LSE)	Screening Assessment
		<p>Alterations to sediment deposition within Cromarty Firth as a result of capital dredging and placement of hard infrastructure could impact coastal habitats such as intertidal mud and sandflats which house prey items for the Bar-tailed Godwits. This could lead to reduced habitat quality, movement of habitat and/or habitat loss.</p> <p>As there is already considerable noise and artificial lighting from the existing Nigg Energy Park, any additional noise and lighting during the construction and operation of the proposed development is unlikely to result in disturbance to Bar-tailed Godwit already utilising the site.</p> <p>LSE cannot be ruled out for Bar-tailed Godwits</p>	
	Common Tern ( <i>Sterna hirundo</i> ) (breeding)	<p>Pathway identified.</p> <p>There are hydrological connections between the Cromarty Firth SPA and the proposed development site. Common Tern from within the SPA may utilise coastal water within the vicinity of the site for foraging (mainly for sand eel). They may also utilise areas of hardstanding or artificial platforms within the proposed development area for nesting or roosting.</p> <p>Common Tern could be impacted during the construction and/or operational phases directly if pollutants are released into the water (as a result of dredged sediments, spilled material from vessels and spillage from onshore storage of fuel or chemicals). This could impact them directly or indirectly if prey items (mainly marine worms and crustaceans) are affected. This could result in death or injury of individual and loss of condition and breeding success if prey items are affected.</p> <p>Alterations to sediment deposition within Cromarty Firth as a result of capital dredging and placement of hard infrastructure could impact sand and shingle beaches which are utilised for nesting. This could lead to reduced suitability, or loss, of nesting sites.</p> <p>Disturbance to foraging birds within the vicinity of the proposed development during construction and operation is considered to be negligible as there is already considerable noise and light generated at the adjacent Nigg Energy Park.</p>	<b>Screened in.</b>

Site Name (Distance to Proposed Development <sup>5</sup> )	Qualifying Features	Likely Significant Effect (LSE)	Screening Assessment
		There is a risk that birds nesting in the vicinity could be disturbed both during construction and operation phases. In particular once the laydown area is in place, it could attract nesting birds from the SPA.  LSE cannot be ruled out for Common Tern.	
	Greylag Goose ( <i>Anser anser</i> ) (over-winter)	Pathway not identified.  Greylag Geese may utilise some coastal habitats such as saltmarsh and mudflats, they predominantly utilise agricultural fields and freshwater bodies for foraging and roosting. These habitats are unlikely to be affected by the proposed development works and there is no pathway for impacts to occur.  No LSE is therefore predicted for Greylag Geese.	Screened out.
	Osprey ( <i>Pandion haliaetus</i> ) (breeding)	Pathway identified.  Ospreys may utilise the coastal waters in the vicinity of the proposed development to forage for fish such as sea trout. There is potential for them to be impacted during the construction and/or operational phases if pollutants are released into the water (as a result of dredged sediments, spilled material from vessels and spillage from onshore storage of fuel or chemicals). As they do not spend time loafing on the water, any impacts are likely to be indirect, via prey items.  It is considered that as Osprey also forage in freshwater environments, any impact to prey availability within the coastal water surrounding the proposed development site would be negligible. There is no suitable nesting habitat within the vicinity of the proposed works.  No LSE is predicted for Osprey.	Screened out.
	Whooper Swan ( <i>Cygnus cygnus</i> ) (over-winter)	Pathway not identified.  Whooper Swans may utilise some coastal habitats such as saltmarsh and mudflats, however, they predominantly utilise agricultural fields and freshwater bodies for foraging and roosting. These habitats are	Screened out.

Site Name (Distance to Proposed Development <sup>5</sup> )	Qualifying Features	Likely Significant Effect (LSE)	Screening Assessment
		unlikely to be affected by the proposed development works. There is therefore no pathway for impacts to occur.  No LSE is therefore predicted for Greylag Geese.	
	<p>Waterfowl Assemblage (over-winter) includes the above over wintering species plus:</p> <ul style="list-style-type: none"> <li>• Curlew (<i>Numenius arquata</i>)</li> <li>• Dunlin (<i>Calidris alpina alpina</i>)</li> <li>• Knot (<i>Calidris canutus</i>)</li> <li>• Oystercatcher (<i>Haematopus ostralegus</i>)</li> <li>• Pintail (<i>Anas acuta</i>)</li> <li>• Red-breasted Merganser (<i>Mergus serrator</i>)</li> <li>• Redshank (<i>Tringa totanus</i>)</li> <li>• Scaup (<i>Aythya marila</i>)</li> <li>• Wigeon (<i>Anas penelope</i>)</li> </ul>	<p>Pathway identified.</p> <p>The Cromarty Firth SPA is hydrologically connected to the proposed development site and birds from the SPA may utilise coastal waters and the rocky foreshore within the development area for foraging and roosting.</p> <p>Birds could be impacted during the construction and/or operational phases directly if pollutants are released into the water (as a result of dredged sediments, spilled material from vessels and spillage from onshore storage of fuel or chemicals). This could impact them directly or indirectly if prey items are affected. This could result in death or injury of individual and loss of condition and breeding success if prey items are affected.</p> <p>Alterations to sediment deposition within Cromarty Firth as a result of capital dredging and placement of hard infrastructure could impact coastal habitats such as intertidal mud and sandflats which house prey items for some of the species. This could lead to reduced habitat quality, movement of habitat and/or habitat loss.</p> <p>As there is already considerable noise and artificial lighting from the existing Nigg Energy Park, any additional noise and lighting during the construction and operation of the proposed development is unlikely to result in disturbance for species already utilising the site.</p> <p>LSE cannot be ruled out for the waterfowl assemblage.</p>	Screened in.

Site Name (Distance to Proposed Development <sup>5</sup> )	Qualifying Features	Likely Significant Effect (LSE)	Screening Assessment
Moray Firth pSPA (1.9km)	European Shag ( <i>Phalacrocorax aristotelis</i> ) (breeding and non-breeding)	<p>Pathway identified.</p> <p>The Moray Firth pSPA and the proposed development site are hydrologically connected.</p> <p>Shag could potentially utilise the open water and the rocky foreshore within and near to the proposed development, however, their activity within the pSPA is concentrated from Brora in the north to around Portsoy in the south<sup>7</sup>. As these areas are c. 50 km and 80 km from the proposed development site it is considered that any impacts on birds would be negligible.</p> <p>No LSE predicted.</p>	Screened out.
	Great Northern Diver ( <i>Gavia immer</i> ) (non-breeding)	<p>Pathway identified.</p> <p>The Moray Firth pSPA and the proposed development site are hydrologically connected.</p> <p>Great Northern Diver may utilise open water within or in the vicinity of the proposed development for foraging and loafing, however, the distribution within the Moray Firth is concentrated within the Dornoch Firth and Spey Bay<sup>8</sup>. These are c. 13km and 50km from the proposed development site. It is anticipated that at these distances there would be negligible impacts to birds from the proposed development.</p> <p>No LSE is predicted for Great Northern Diver.</p>	Screened out.
	Red-throated Diver ( <i>Gavia stellata</i> ) (non-breeding); Slavonian Grebe ( <i>Podiceps auritus</i> ) (non-breeding);	Pathway identified.	Screened in.

<sup>7</sup> SNH. Habitats Regulations Appraisal (HRA) on the Moray Firth – A guide for developers and regulators. Accessed online at: <https://www.nature.scot/habitats-regulations-appraisal-hra-moray-firth-guide-developers-and-regulators> on 28/05/2019

<sup>8</sup> SNH. Habitats Regulations Appraisal (HRA) on the Moray Firth – A guide for developers and regulators. Accessed online at: <https://www.nature.scot/habitats-regulations-appraisal-hra-moray-firth-guide-developers-and-regulators> on 28/05/2019

Site Name (Distance to Proposed Development <sup>5</sup> )	Qualifying Features	Likely Significant Effect (LSE)	Screening Assessment
	<p>Greater Scaup (<i>Aythya marila</i>); Common Eider (<i>Somateria mollissima</i>) (non-breeding); Long-tailed Duck (<i>Clangula hyemalis</i>) (non-breeding); Common Scoter (<i>Melanitta nigra</i>) (non-breeding); Velvet Scoter (<i>Melanitta fusca</i>) (non-breeding); Common Goldeneye (<i>Bucephala clangula</i>) (non-breeding); Red-breasted Merganser (<i>Mergus serrator</i>) (non-breeding)</p>	<p>The Moray Firth pSPA and the proposed development site are hydrologically connected. These species may utilise open water within and near the proposed development site for foraging and resting. Some may also utilise intertidal habitats such as mud flats.</p> <p>Individuals could therefore be impacted during the construction and/or operational phases directly if pollutants are released into the water (as a result of dredged sediments, spilled material from vessels and spillage from onshore storage of fuel or chemicals). This could impact them directly or indirectly if prey items are affected. This could result in death or injury of individual and loss of condition and breeding success if prey items are affected.</p> <p>As there is already considerable noise and artificial lighting from the existing Nigg Energy Park, any additional noise and lighting during the construction and operation of the proposed development is unlikely to result in disturbance for species already utilising the site.</p> <p>LSE for these species cannot be ruled out.</p>	

## 4.4 Screening Conclusion

The outcome of screening for Appropriate Assessment is to reach one of the following determinations:

- a) A Stage 2 AA of the proposed development is required if it is concluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.
- b) A Stage two AA of the proposed development is not required if it can be concluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will not have a significant effect on a European site.

Following an examination, analysis and evaluation of the relevant information including, in particular, the nature of the proposed development and the likelihood of significant effects on the Moray Firth SAC, the Dornoch Firth and Morrich More SAC, the Cromarty Firth SPA and the Moray Firth pSPA, and applying the Precautionary Principle, it is the professional opinion of the authors that at present there is insufficient information to rule out likely (or possible) significant effects to one or more of the qualifying features within all of the designated sites. An AA for the proposed development will therefore be required to ascertain whether or not the proposed works will adversely impact on the integrity of the designated sites' qualifying features.

For the Moray Firth SAC an AA is required for both qualifying features, sandbanks which are slightly covered by sea water all the time, and bottlenose dolphin. For the Dornoch Firth and Morrich More SAC an AA is only required for harbour seal as there is either no connection and/or no LSE arising from the proposed development on the other qualifying features. Similarly, an AA is not required for the Greylag Goose, Osprey or Whooper Swan qualifying features of the Cromarty Firth SPA or the European Shag and Great Northern Diver qualifying features of the Moray Firth pSPA as no LSEs are predicted.



## 5 APPROPRIATE ASSESSMENT FOR THE MORAY FIRTH SAC

### 5.1 Sandbanks which are slightly covered by sea water all the time

The AA considers whether there will be any adverse effects on sandbanks slightly covered by seawater all the time with reference to the following conservation objectives:

- To ensure for the qualifying habitat that the extent of habitat on site is maintained in the long term;
- To ensure for the qualifying habitat that the distribution of habitat within the site is maintained in the long term;
- To ensure for the qualifying habitat that the structure and function of habitat within the site is maintained in the long term;
- To ensure for the qualifying habitat that the processes supporting the habitat are maintained in the long term;
- To ensure for the qualifying habitat that the distribution of typical species of the habitat are maintained in the long term;
- To ensure for the qualifying habitat that the viability of typical species as components of the habitat are maintained in the long term; and
- To ensure for the qualifying habitat that there is no significant disturbance of typical species of the habitat in the long term.

Long term alterations to the extent, distribution, structure, function and underlying processes of sandbank habitat within the SAC could occur if capital dredging and the placement of hard infrastructure alter coastal processes. Sediment modelling carried out as part of the EIA for the previous South Quay extension at Nigg<sup>9</sup> concluded that the changes to sediment transport as a result of dredging and new quay walls would be localised in geographic extent and of small magnitude. No impact on the wider Moray Firth area was predicted. No new modelling has been carried out for the East Quay construction, however, it is considered that given the proximity and similarity of the proposed development, the conclusions would be similar. No alterations to the extent, distribution, structure, function and underlying processes of sandbank habitat are therefore predicted.

It is possible that species typical of the sandbanks (a range of species including fish, worms, crustacea and seaweeds) could alter in distribution, suffer reduced population viability and/or experience disturbance as a result of a pollution event either during the construction or operational phases of the proposed development. Additional movement of vessels within the site during construction and operation could result in invasive species being introduced to the sandbanks, outcompeting the native species. It is predicted that, if the mitigation outlined in Volume 1, Chapter 4, Section 4.8 of the EIAR is effective, any long term effects to the flora and fauna associated with this habitat will not be significant. Mitigation include the production of a Construction Environment Management Plan (CEMP) detailing pollution prevention measures and a biosecurity protocols, which will be agreed with the regulatory authority prior to works commencing.

No significant effects on the conservation objectives for this feature, alone or in-combination with projects listed in Section 3.3, are predicted.

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<sup>9</sup> Royal Haskoning DHV (2013). *Nigg Energy Park Sediment and Wave Modelling*.

## 5.2 Bottlenose Dolphin

The AA considers whether there will be any adverse effects on bottlenose dolphin with reference to the following conservation objectives:

- To ensure the population of the species as a viable component of the site is maintained in the long term;
- To ensure the distribution of the species within the site is maintained in the long term;
- To ensure the distribution and extent of habitats supporting the species are maintained in the long term;
- To ensure the structure, function and supporting processes of habitats supporting the species are maintained in the long term; and
- To ensure there is no significant disturbance to the species in the long term.

The main potential impact to bottlenose dolphins, which could cause significant disturbance, alter their distribution within the site and ultimately affect population viability, is from underwater noise. The possible effects of underwater noise on dolphins include temporary or permanent threshold shifts in hearing (TTS or PTS), disturbance (masking and/or habitat avoidance) and, in extreme cases, intense noise can lead to the injury or death of individuals.

Underwater noise modelling for the proposed development has been undertaken. The results are presented in Technical Appendix 4.2 of the EIAR and they indicate that none of the potential high impact scenarios for underwater noise present a PTS risk to bottlenose dolphin further than 150m from the source of the noise. In the highest impact scenario for TTS, the risk zone extends to approximately 1km, across to Cromarty, meaning that the strait is 'blocked' by noise disturbance. However, in this scenario it is assumed that an animal would be stationary for over an hour during impact piling, which is extremely unlikely.

If the mitigation detailed in Technical Appendix 4.1 of the EIAR, including a Marine Mammal Observation Protocol (MMOP) and a Passive Acoustic Monitoring (PAM) Protocol, is employed effectively, then it is considered unlikely that there will be significant disturbance to individuals or changes to the long-term distribution or viability of the bottlenose dolphin population in the Moray Firth. Activities generating underwater noise would be programmed in coordination with the other development projects to avoid loud noise generating activities such as impact piling occurring simultaneously within the SAC, reducing the potential for significant in-combination effects.

Adverse effects from low level underwater noise as a result of increased vessel movements are likely to be minimal. The Moray Firth, and the area around The Suters in particular, already has high levels of vessel movement associated with the existing Nigg Energy Park and port at Invergordon. It is considered that the dolphins utilising this area will already be accustomed to higher levels of background noise associated with vessels<sup>10</sup>.

An increased number of vessels travelling through the SAC during construction and operation would increase the risk of collision with bottlenose dolphins, resulting in death or injury to individuals which could impact on the wider population if repeated collisions occur. To reduce the risk of collisions a speed restriction would be placed on vessels travelling to and from the East Quay for the duration of its construction and operation.

During the construction and operation phases, the release of pollutants into the water could cause significant disturbance, alter distribution within the site and ultimately affect the population viability of bottlenose dolphin within the SAC. The release of pollutants could also affect the functioning of dolphin habitat if prey items are

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<sup>10</sup> Merchant, N.D., Pirotta, E., Barton, T.R. and Thompson, P.M. (2014) Monitoring ship noise to assess the impact of coastal developments on marine mammals. *Marine Pollution Bulletin* 78 p85-95.

adversely affected. Any impacts from a pollution event would be temporary and no significant effects are predicted if the mitigation outlined in Volume 1, Chapter 4, Section 4.8 of the EIAR is effective.

With effective mitigation, it is considered that there will be no significant long term effects on the conservation objectives for bottlenose dolphin.

## 6 APPROPRIATE ASSESSMENT FOR DORNOCH FIRTH AND MORRICH MORE SAC

### 6.1 Harbour Seal

The AA considers whether there will be any adverse effects on harbour seal with reference to the following conservation objectives:

- To ensure the population of the species as a viable component of the site is maintained in the long term;
- To ensure the distribution of the species within the site is maintained in the long term;
- To ensure the distribution and extent of habitats supporting the species are maintained in the long term;
- To ensure the structure, function and supporting processes of habitats supporting the species are maintained in the long term; and
- To ensure there is no significant disturbance to the species in the long term.

The main potential impact to harbour seal, which could cause significant disturbance, alter their distribution within the site and ultimately affect population viability, is from underwater noise. The possible effects of underwater noise on harbour seal include PTS and TTS, disturbance (masking and/or habitat avoidance) and, in extreme cases, intense noise can lead to the injury or death of individuals.

The results of underwater noise modelling conducted for the project are presented in full in Technical Appendix 4.2 of the EIAR. Under the highest impact scenario which is for impact piling, there is a risk of PTS to seals extending over 1km across The Souters which would effectively block movement of seals across the strait. This scenario assumes that individual animals would be stationary for over 1hr during continuous impact piling. It is considered that this is unrealistic. A more likely scenario, still considering the highest noise impact, would be for an animal being stationary for 1 minute during impact piling. In this case the PTS risk zone is <100m. The TTS risk zone under the highest impact scenario, with the animal stationary for 1 hour, is 1.5km. The shorter and more realistic exposure time of 1 minute gives a predicted TTS zone of 1km.

If the mitigation detailed in Technical Appendix 4.1 of the EIAR, including a Marine Mammal Observation Protocol (MMOP) and a Passive Acoustic Monitoring (PAM) Protocol, is employed effectively, then it is considered unlikely that there will be significant disturbance to individuals or changes to the long-term distribution or viability of the harbour porpoise population in the Moray Firth. Activities generating underwater noise would be programmed in coordination with the other development projects to avoid loud noise generating activities such as impact piling occurring simultaneously within the SAC, reducing the potential for significant in-combination effects.

Due to the distance between the designated site and the proposed development (c. 13km) over ground noise disturbance at haul out sites within the SAC is not expected to be an issue.

Adverse effects from low level underwater noise as a result of increased vessel movements are likely to be minimal. The Moray Firth, and the area around The Souters in particular, already has high levels of vessel movement associated with the existing Nigg Energy Park and port at Invergordon. It is considered that any harbour seals utilising this area will already be accustomed to higher levels of background noise associated with vessels<sup>11</sup>.

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<sup>11</sup> Merchant, N.D., Pirotta, E., Barton, T.R. and Thompson, P.M. (2014) Monitoring ship noise to assess the impact of coastal developments on marine mammals. Marine Pollution Bulletin 78 p85-95.

The proposed development is unlikely to result in increased traffic within the SAC, however, animals travelling outside the SAC could be exposed to increased vessel movements and therefore an increased risk of collision, resulting in death or injury to individuals which could impact on the wider population if repeated collisions occur. To reduce the risk of collisions a speed restriction would be placed on vessels travelling to and from the East Quay for the duration of its construction and operation.

During the construction and operation phases, the release of pollutants into the water is considered unlikely to affect harbour seal within the Dornoch Firth and Morrach More SAC due to the location and distance between the designated site and the proposed development and the prevailing wind and tidal directions (site located to the north, wave action predominantly from north east to south west). Individuals commuting and foraging outwith the SAC could potentially be adversely affected by a pollution event occurring during the construction or operational phases of the development. Any impacts from a pollution event would be temporary and no significant effects are predicted if the mitigation outlined in Volume 1, Chapter 4, Section 4.8 of the EIAR is effective.

With effective mitigation, it is considered that there will be no significant long term effects on the conservation objectives for harbour seal.

## **7 APPROPRIATE ASSESSMENT FOR THE CROMARTY FIRTH SPA**

### **7.1 Bar-tailed Godwit and Common Tern**

The AA considers whether there will be any adverse effects on Bar-tailed Godwit and Common Tern with reference to the following conservation objectives:

- To avoid deterioration of the qualifying habitat, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and
- To ensure for the qualifying species that the following are maintained in the long term:
  - Population of the species as a viable component of the site
  - Distribution of the species within site
  - Distribution and extent of habitats supporting the species
  - Structure, function and supporting processes of habitats supporting the species
  - No significant disturbance of the species

Overwintering Wetland Bird Survey (WeBS) Counts from the adjacent survey area – Nigg Ferry - suggest that numbers of Bar-tailed Godwit have remained low, with the five-year peak counts between 2012/13 and 2016/17 totalling three in the first year (in December), three in the second year (in February), one in year three (in February), then two in years four and five (December and February respectively). With the localised nature of the works not directly affecting the Godwits' preferred roosting or foraging habitat, it is likely that maintaining these numbers in the vicinity of the proposed works will occur, and their population as a viable component of the SPA is not considered to be affected.

Common Tern does not currently breed in the area, although birds from the SPA may forage in the waters offshore from the proposed works. Any major pollution event from the proposed works which may affect prey items of fishing terns from the SPA, and potentially tern numbers, will be fully mitigated through the Method Statements in order to minimise any negative impact, and therefore, it is considered that the population of Common Tern as a viable component of the SPA will be maintained.

The proposed works do not include any habitats on which the qualifying species are directly dependent. Therefore, it is highly unlikely that there would be any impacts as a result of the development which would directly or indirectly affect the distribution of the qualifying species within the SPA.

There will be no direct impacts on habitats within the SPA during the construction and operation of the development. Indirect impacts on supporting habitats, through lighting and/or deterioration in water quality (through sediment release/pollution), will be addressed through measures set out in relevant Method Statements. Assuming that these are implemented in full, there will be no significant impacts on the distribution or extent of the habitats which support the SAC qualifying species.

Assuming that mitigation measures proposed in the EIAR are adhered to, there will be no significant impacts on the structure, function or supporting processes of the habitats which support the qualifying species of the Cromarty Firth SPA.

The proposed works area is currently a busy, un-natural environment, with the potential to cause both visual and noise disturbance to the qualifying species. However, numbers of Bar-tailed Godwit in the area are low, and no significant disturbance to this species is predicted. Low numbers of Common Tern from the SPA may rest on the hardstanding within the proposed works area, but none is known to breed. Therefore disturbance events would

constitute the same levels as currently occur through everyday human and vehicle movements on the proposed works area. This minor level disturbance is considered to be not significant.

## 7.2 Waterfowl Assemblage

The AA considers whether there will be any adverse effects on the Waterfowl Assemblage with reference to the following conservation objectives:

- To avoid deterioration of the qualifying habitat, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and
- To ensure for the qualifying species that the following are maintained in the long term:
  - Population of the species as a viable component of the site
  - Distribution of the species within site
  - Distribution and extent of habitats supporting the species
  - Structure, function and supporting processes of habitats supporting the species
  - No significant disturbance of the species

The numbers of the qualifying species present at Nigg Ferry during the five-year WeBS survey period between 2012 and 2017 are shown below in Table 7-1.

**Table 7-1: Five-year WeBS Survey Results**

Species	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	Mean Peak
Red-breasted Merganser	4 (DEC)	0	0	2 (FEB)	2 (JAN)	2
Oystercatcher	43 (FEB)	84 (DEC)	122 (JAN)	55 (DEC)	57 (DEC)	72
Curlew	8 (FEB)	12 (FEB)	6 (JAN)	5 (DEC)	32 (FEB)	13
Redshank	7 (FEB)	4 (DEC)	6 (DEC)	2 (DEC)	12 (DEC)	6

These results (assuming that the birds were from the SPA population) amount to 1% or less for all species, except Oystercatcher, which reached a 2% mean peak of its UK threshold. None of the birds will suffer any negative direct or indirect impact from the proposed works provided the mitigation measures set out in the EIAR are adhered to, and numbers are considered likely to remain stable within the area. Therefore, the population of these species as a viable component of the Cromarty Firth SPA will remain unaffected.

The development site does not include any habitats on which the qualifying species are directly dependent, although Knot, Oystercatcher and Redshank may choose to roost on the hardstanding. Therefore, it is highly unlikely that there would be any impacts as a result of the development which would directly or indirectly affect the distribution of the qualifying species within the SPA.

There will be no direct impacts on habitats within the SPA during the construction and operation of the proposed development. Indirect impacts on supporting habitats, through lighting and/or deterioration in water quality (through sediment release/pollution), will be addressed through measures set out in relevant Method Statements. Assuming that these are implemented in full, there will be no significant impacts on the distribution or extent of the habitats which support the SPA qualifying species.



Assuming that mitigation measures set out within the EIAR are adhered to, there will be no significant impacts on the structure, function or supporting processes of the habitats which support the qualifying species of the Cromarty Firth SPA.

The proposed works area is currently a busy, un-natural environment, with the potential to cause both visual and noise disturbance to the qualifying species. Duck are extremely unlikely to be affected by the onshore construction works, and waders may be displaced from their preferred resting location, however, disturbance events would constitute the same levels as currently occur through everyday human and vehicle movements on the proposed works area, and many other areas along the coastline of the SPA. During extreme construction activities (eg. piling), mitigation proposed in the EIAR should be adhered to in order to minimise any potential impact on all species. Therefore, no significant disturbance to these species is predicted.

## 8 APPROPRIATE ASSESSMENT MORAY FIRTH pSPA

### 8.1 Waterfowl Assemblage

The AA considers whether there will be any adverse effects on the Waterfowl Assemblage with reference to the following conservation objectives:

- To avoid deterioration of the qualifying habitat thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and
- To ensure for the qualifying species that the following are maintained in the long term:
  - Population of the species as a viable component of the site
  - Distribution of the species within site
  - Distribution and extent of habitats supporting the species
  - Structure, function and supporting processes of habitats supporting the species
  - No significant disturbance of the species

The numbers of the qualifying species present at Nigg Ferry during the five-year WeBS survey period between 2012 and 2017 are shown below in Table 8-1.

**Table 8-1: Five-year WeBS Survey Results**

Species	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	Mean Peak
Eider	71 (DEC)	1 (JAN)	35 (JAN)	19 (DEC)	27 (JAN)	31
Long-tailed Duck	2 (JAN)	10 (FEB)	2 (DEC)	16 (DEC)	8 (JAN)	8
Common Scoter	1 (DEC)	0	0	0	0	0
Goldeneye	2 (JAN)	0	0	0	0	0
Red-breasted Merganser	4 (DEC)	0	0	2 (FEB)	2 (JAN)	2
Red-throated Diver	0	0	1 (FEB)	0	0	0

These results (assuming that the birds were from the pSPA population) amount to 6% of the winter peak of the Eider UK threshold, 9% of the autumn and 7% of the winter peak of the Long-tailed Duck UK threshold, and 1% of the autumn and 2% of the winter peak for Red-breasted Merganser's UK threshold. None of the birds will suffer any negative direct impact from the proposed works. Indirect impact from the proposed works (eg. through pollution events to prey items) are also considered unlikely provided the mitigation measures set out in the EIAR are adhered to. Numbers of seaduck fluctuate annually, and therefore, the population of these species as a viable component of the Moray Firth pSPA are considered to remain unaffected.

The development site does not include any habitats on which the qualifying species are directly dependent, although construction of the quay will occur within the waters of the firth. Therefore, it is highly unlikely that there would be any impacts as a result of the development which would directly or indirectly affect the distribution of the qualifying species within the pSPA.

There will be no direct impacts on habitats within the pSPA during the construction and operation of the proposed development. Indirect impacts on supporting habitats, through lighting and/or deterioration in water

quality (through sediment release/pollution), will be addressed through measures set out in relevant Method Statements. Assuming that these are implemented in full, there will be no significant impacts on the distribution or extent of the habitats which support the pSPA qualifying species.

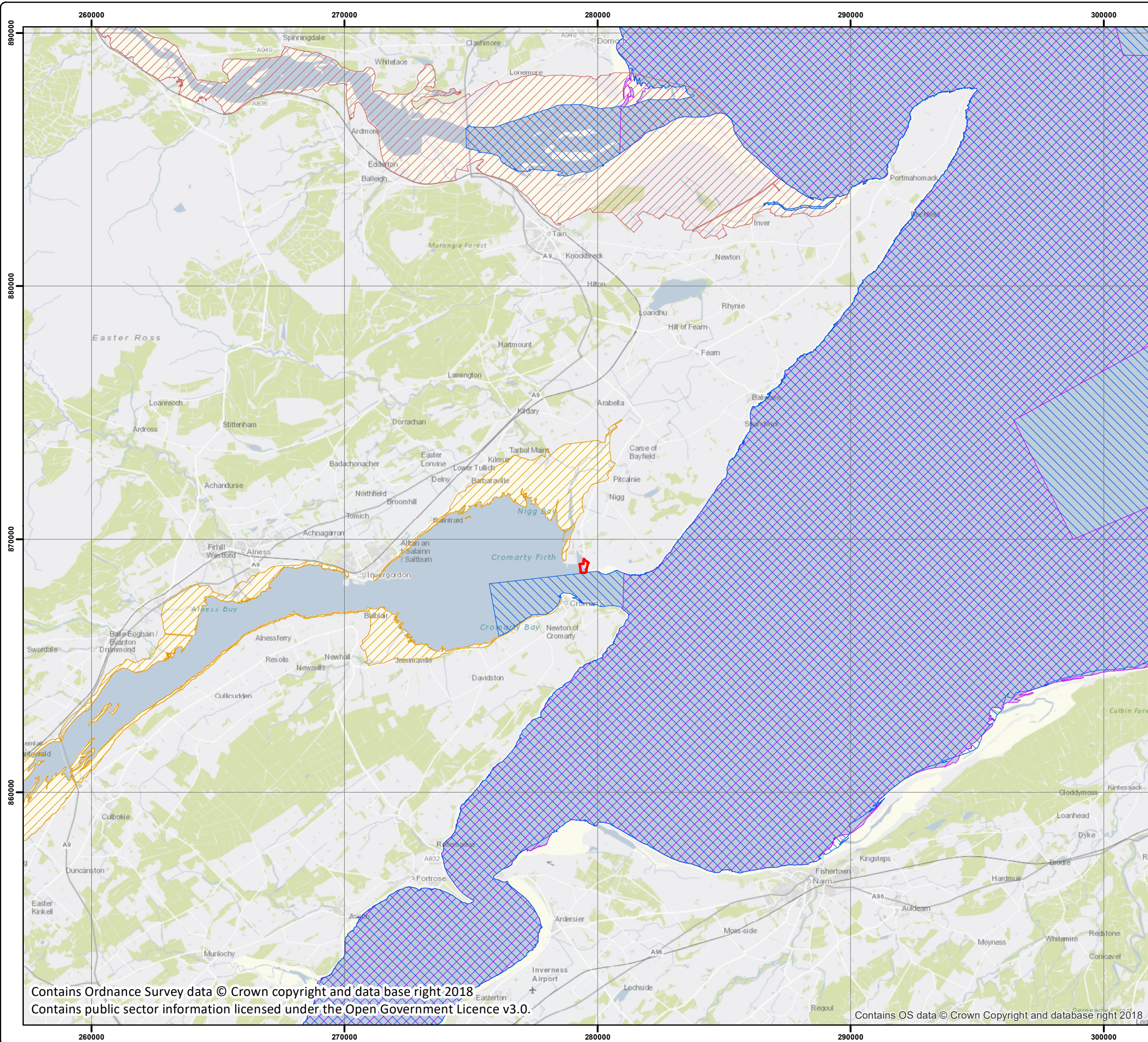
Assuming that mitigation measures set out within the EIAR are adhered to, there will be no significant impacts on the structure, function or supporting processes of the habitats which support the qualifying species of the Moray Firth pSPA.

The proposed works area is currently a busy, un-natural environment, with the potential to cause both visual and noise disturbance to the qualifying species. Duck are extremely unlikely to be affected by the onshore construction works, however, disturbance events would constitute the same levels as currently occur through everyday human and vehicle movements on the proposed works area, and many other areas along the coastline of the pSPA. During extreme construction activities (eg. piling), mitigation proposed in the EIAR should be adhered to in order to minimise any potential impact on all species. Therefore, no significant disturbance to these species is predicted.

## **APPENDICES**

## **A      LOCATION OF DESIGNATED SITES**





Legend

Site Boundary

Moray Firth SAC

Dornoch Firth and Morrich More SAC

Cromarty Firth SPA

Moray Firth pSPA

Do not scale this map

Client

Global Energy Nigg Limited

Project

Nigg East Quay

Title

HRA SPA and SAC Sites

Status

FINAL

Drawing No.

671906-020

Revision

Scale

1:145,000

A3

Date

11 April 2019

Drawn


JEP

Checked

MM

Approved

CP

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## **Technical Appendix 5.1**



## SIMPLE INDEX APPROACH: TOOL



HRW shall not be liable for any direct or indirect damage claim, loss, cost, expense or liability howsoever arising out of the use or impossibility to use the tool, even when HRW has been informed of the possibility of the same. The user hereby indemnifies HRW from and against any damage claim, loss, expense or liability resulting from any action taken against HRW that is related in any way to the use of the tool or any reliance made in respect of the output of such use by any person whatsoever. HRW does not guarantee that the tool's functions meet the requirements of any person, nor that the tool is free from errors.

- The steps set out in the tool should be applied for each inflow or 'runoff' area (ie each impermeable surface area separately discharging to a SuDS component).
- The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.
- The process that is automated in this tool is described in the SuDS Manual, Chapter 26 (Section 26.7)
- Relevant design examples are included in the SuDS Manual Appendix C.
- Each of the steps below are part of the process set out in the flowchart on Sheet 3.
- Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.
- Interception should be delivered for all upstream impermeable areas as part of the strategy for water quantity and quality control for the site. This is required in order to deliver both of the water quality criteria set out in Chapter 4 of the SuDS Manual

  DROP DOWN LIST

RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP

  USER ENTRY

USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

### STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index

- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

Runoff Area Land Use Description	Hazard Level	Pollution Hazard Indices		
		Total Suspended Solids	Metals	Hydrocarbons
Select land use type from the drop down list (or 'Other' if none applicable) →  Standard commercial yard or delivery area	Medium	0.7	0.6	0.7
Landuse Pollution Hazard Index		0.7	0.6	0.7

DESIGN CONDITIONS			
1	2	3	4
This classification is not appropriate for housing yards, berry parks, waste management areas, or chemical storage/handling zones.			

### STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the row below the drop down lists

SuDS Component Description	Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list: →  Pervious pavement (where the pavement is not designed as an infiltration component)	0.7	0.6	0.7
Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list: →  None	0	0	0
Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list: →  None	0	0	0
If the proposed SuDS components are biogeographical/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined index' and enter component descriptions and agreed user defined indices in these rows:			
Aggregated Surface Water Pollution Mitigation Index	0.7	0.6	0.7

DESIGN CONDITIONS			
1	2	3	4
SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B.			
Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at "<0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).			

Is the runoff now discharged to an infiltration component?

Yes ? [Go to Step 2B](#)  
No ? [Go to Step 2C](#)

### STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down lists

Pollution Mitigation Indices			
	Total Suspended Solids	Metals	Hydrocarbons
Select type of groundwater protection from the drop-down list: <div>→</div> <div>None</div>			
If the proposed groundwater protection is background/proprietary and/or the generic indices above are not considered appropriate, select "Proprietary protection" or "User defined indicator" and enter a description of the protection and agreed user defined index in this row:			
Groundwater Protection Pollution Mitigation Index	0	0	0

DESIGN CONDITIONS			
1	2	3	4

### STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

Combined Pollution Mitigation Indices	Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Combined Pollution Mitigation Indices for the Runoff Area	0.7	0.6	0.7

DESIGN CONDITIONS			
1	2	3	4
Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at "<0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).			

### STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (ie over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as 'Source Protection Zones'. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator or a site by site basis.

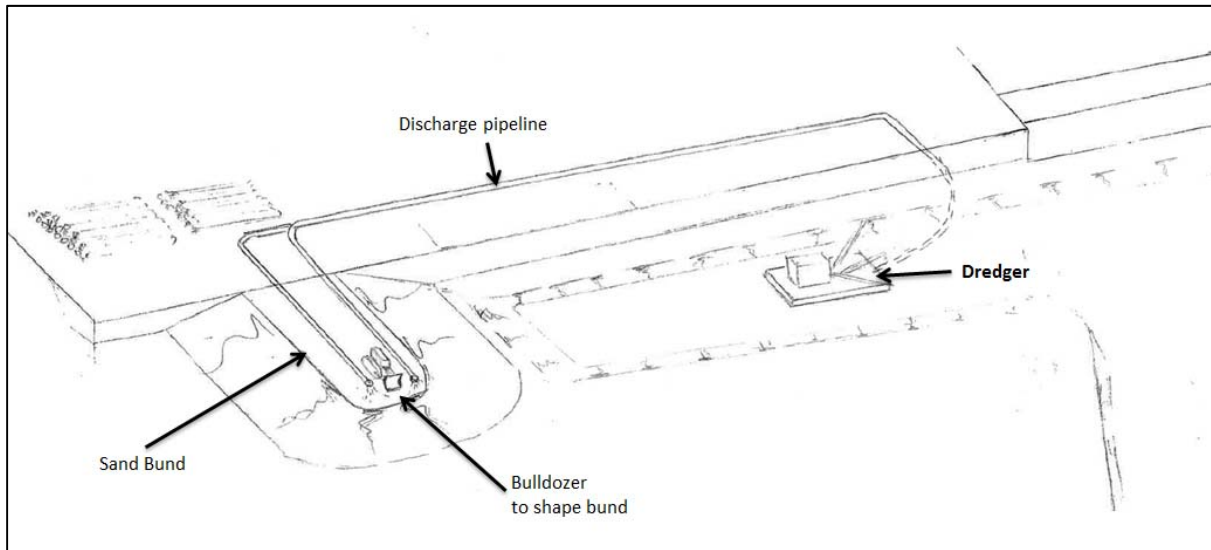
Sufficiency of Pollution Mitigation Indices	Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Sufficient	Sufficient	Sufficient	Sufficient

DESIGN CONDITIONS			
1	2	3	4
Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 of the SuDS design guidance). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered in consultation with relevant conservation bodies such as Natural England.			

Note: In order to meet both Water Quality criteria set out in the SuDS Manual (Chapter 6), Interception should be delivered for all impermeable areas wherever possible. Interception delivery and treatment may be met by the same components, but Interception requires separate evaluation.

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Standard commercial yard or delivery area	This classification is not appropriate for haulage yards, lorry parks, waste management areas, or chemical storage/handling zones			
Pollution Hazard Level	Medium				
Pollution Hazard Indices					
TSS	0.7				
Metals	0.6	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B			
Hydrocarbons	0.7				
SuDS components proposed					
Component 1	Pervious pavement (where the pavement is not designed as an infiltration component)				
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS					
Metals					
Hydrocarbons					
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation Indices					
TSS	0				
Metals	0	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England			
Hydrocarbons	0				
Combined Pollution Mitigation Indices					
TSS					
Metals					
Hydrocarbons					
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				

## **Technical Appendix 5.2**



# Nigg Energy Park

## Additional Sediment Plume Modelling

### Main Report and Appendices

Global Energy Nigg Limited

August 2013

Final Report

PB1107

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## APPENDICES

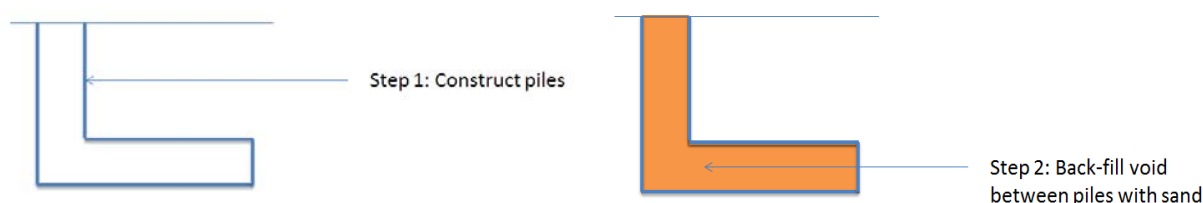
Appendix A	LITPROF Modelling of Erosion from the Construction Berm
Appendix B	Scenario 2 Modelling Results
Appendix C	Scenario 3 Modelling Results
Appendix D	Scenario 4 Modelling Results

## 1 BACKGROUND

Royal HaskoningDHV was appointed by Global Energy Nigg Ltd. to undertake sedimentation and wave modelling associated with the proposed South Quay Development at Nigg Energy Park, Cromarty Firth. This modelling was completed in May 2013 (Royal HaskoningDHV, 2013) and informed both the Environmental Statement and the maritime engineering concept design.

The proposed development involves the construction of a new 'L-shaped' quay extending seaward of the existing South Quay, together with dredging of a berthing pocket and adjacent seabed areas (referred to as Option 3C). Dredged material will be re-used as construction fill within the quay development, with the residual quantities disposed at a licensed site within the mouth of the Cromarty Firth, named The Sutors spoil ground.

The original concept design intention was for the new L-shaped quay to be constructed by first installing sheet piles using an installation vessel or jack-up barge and then back-filling the void in between the piles with dredged sand (Figure 1). During this operation, the infill material would be contained between the sheet piles and thus not exposed to marine action.

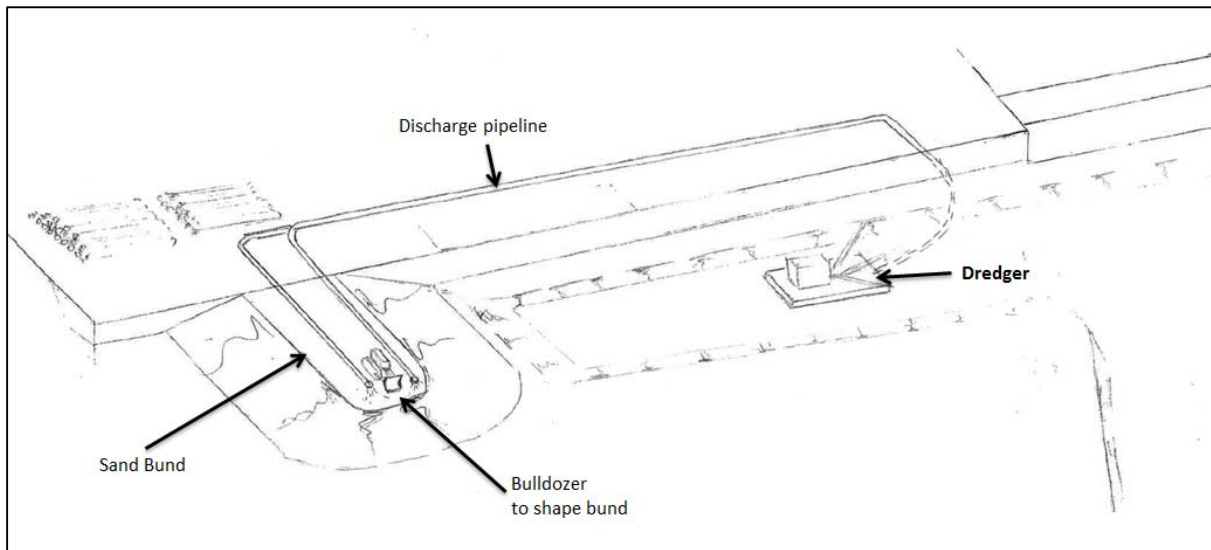


**Figure 1 - Original construction method**

During the tender process, an alternative construction method was identified which could, potentially, provide significant cost savings. This involves using the dredged material (predominantly sand) to create a berm along the alignment of the new L-shaped quay, from which land-based construction plant could install the piles through the side slopes and into the sea bed.

The berm and steel sheet piling would be constructed in stages, but always with an advanced head of material that is unconstrained by piles and therefore exposed to marine action (Figure 2). At the end of the quay construction, when all of the berm's length is contained within the sheet piles, there would be a final dredge to remove the side-slopes of the berm and achieve the desired berthing pocket depths. This material would be disposed at The Sutors spoil ground.





**Figure 2 - Alternative construction method**

The changes in suspended sediment concentrations and bed levels within the vicinity of the works and across a wider area of the Cromarty Firth and Inner Moray Firth, which may arise from the alternative construction method, need to be assessed to inform the further environmental assessments associated with the proposed alternative approach.

## 2 ASSESSMENT APPROACH

Based upon the proposed alternative construction method, there are five elements of activity that have been investigated in the assessment of a worst case scenario for this alternative approach. These are as follows:

- **Scenario 1:** Spillage losses from initial sea bed dredging activities.
- **Scenario 2:** Spillage losses during discharge of dredged material for construction of the berm.
- **Scenario 3:** Erosion of sediments from exposed sections of the berm during the sheet pile installation construction programme under 'typical' wave conditions (defined as 1 in 1 month wave events).
- **Scenario 4:** Erosion of sediments from exposed sections of the berm during the sheet pile installation construction programme under 'storm' wave conditions (defined as 1 in 1 year wave events).
- **Scenario 5:** Spillage losses from final sea bed dredging activities and disposal of remaining dredged material at The Sutors spoil ground.

The MIKE21-HD (hydrodynamic) numerical model and the MIKE21-MT (sediment plume) numerical model used in the previous modelling studies (Royal HaskoningDHV, 2013) to inform the Environmental Statement about potential effects of the original concept design intention remain suitable for use as the basis of these additional modelling assessments. These models were set up to simulate physical processes over an 18-day period to ensure coverage of a full neap-spring tidal cycle.

### 2.1 Scenario 1 Assessment

The original Environmental Statement previously assessed the effects of spillage losses from dredging activities, thereby covering Scenario 1. Scenario 5 was also covered by the previous assessments. This further assessment of effects therefore focuses on each of Scenarios 2 – 4, which represent the additional potential effects caused by the proposed alternative construction method.

### 2.2 Scenario 2 Assessment

As dredged material is pumped from the quay to form a berm, some of the sediments will remain deposited on the bed, but some will become 'spilled' into the water column and form a plume. To assess the effects of these activities, the following assumptions have been used in the sediment plume and sediment deposition modelling that was undertaken using the MIKE21-MT numerical model:

- All sediment has been released into the model domain at the 'worst case' release point, which is at the most south-westerly corner of the new L-shaped quay where the tidal currents and wave conditions are greatest (i.e. there is greatest potential for plume formation).

- The sediment characteristics have been defined according to the borehole information that is available from areas of proposed dredging for the fill material. The dredged sediment comprises the following proportions (as used in the previous modelling studies and reported in the ES):
  - Gravels 3%
  - Coarse sands 34%
  - Medium sands 42%
  - Fine sands 20%
  - Silts and clays 1%
- The release of sediments into the water column has been assumed at a rate of 1,000m<sup>3</sup>/hour for an uninterrupted period of 5 days around the timing of the peak of the spring tides (i.e. in total 120,000m<sup>3</sup> of sediment is released into the model).
- The model simulates which particles are sufficiently large to reside on the bed and which particles will become entrained as a sediment plume based on the bed shear stresses created by tidal current action.

## 2.3 Scenarios 3 and 4 Assessment

In order to determine the effect on turbidity and bed levels due to sediments becoming eroded from the exposed sections of the berm, an estimate was first needed of the erosion losses under both 'typical' wave events and 'storm' wave events. This was provided using the numerical model LITPROF, a cross-shore profile model, and the resulting sediment volumes arising from the erosion processes were then fed into the MIKE21-MT plume model, where tidal currents are incorporated, to determine the formation and fate of plumes following the wave-induced erosion episodes.

Further details of the LITPROF modelling are provided in **Appendix A**, but in summary the 'shore' was represented by a single cross section through the seaward face of the berm, taken at its position most exposed to wave action, namely the south-westerly corner of the L-shaped alignment. The characteristics of the sediments comprising the berm were defined according to the borehole information that is available from areas of proposed dredging for the fill material. The dredged sediment compositions were as previously stated for Scenario 2 (and hence remain as used in the previous modelling studies and reported in the ES).

Wave conditions corresponding to 'typical' and 'storm' events were then applied to the seaward face of the berm for a duration of 12.5 hours; this being both a suitable timescale for a wave event and the duration over which one full tidal cycle occurs. The wave conditions were applied to the seaward face of the profile under the influence of a tidally-varying water level.

A 'typical' wave condition was defined as a 1 in 1 month return period wave height, while a 'storm' wave condition was taken as a 1 in 1 year return period wave height. For each return period event, consideration was given both to waves entering the Cromarty Firth through the mouth from the North Sea and to local wind-generated waves from the prevailing south-westerly wind direction.

The results indicate that under 'typical' conditions the berm would be relatively stable, with only minor deformations in its morphological form around the low and high water marks. Changes in the berm would be greater under a 'storm' event, but again the broad form of the berm would remain stable. This is largely a function of two parameters: (i) the sediment characteristics of the dredged material being relatively coarse (with 99% of the sediments being sands or gravels); and (ii) the side-slopes of the berm being relatively shallow, at a gradient of 1:6.

Due to this finding, further sensitivity tests were performed with a wider spread of sediment gradings to cover the possibility that a greater proportion of finer material than presently envisaged actually occurs in the dredged material. This demonstrated that if a greater than envisaged proportion of fine sands, silts and clays was in the sediment distribution then the berm would be subject to greater erosion volumes, but would nonetheless still remain broadly stable in form under the wave conditions considered.

As a worst case scenario, it was assumed that the erosion would occur at the southern end of the north-south aligned section of the L-shaped quay. At this location, the eastern side of the berm would be vulnerable to waves from the North Sea and the western side of the berm would be vulnerable to local wind-generated waves from the south-west. As a worst case scenario, the wave-generated erosion values from both wave directions were combined to ensure a conservative approach (in reality it is likely that erosion during a single storm event would occur from one side of the berm only).

It was further assumed that all material eroded from the berm by wave action could potentially become entrained by tidal currents and that the greatest length of exposed berm at any one time before sheet piling was installed would be 100m on each side of the berm. Based on the worst case 'upper bound' of the sediment grading sensitivity assessments, this resulted in the following volumes being inserted into the MIKE21-MT sediment plume numerical model:

- Scenario 3 – Under a 'typical' wave event, 1,220m<sup>3</sup> of sediment is released over a period of 12.5 hours.
- Scenario 4 – Under a 'storm' wave event, 1,840m<sup>3</sup> of sediment is released over a period of 12.5 hours.

## 2.4 Scenario 5 Assessment

The original Environmental Statement previously assessed the effects of spillage losses from dredging activities and the effects associated with the disposal of sediments at The Sutors spoil ground, thereby already covering Scenario 5. Scenario 1 was also covered by the previous assessments. This further assessment of effects therefore focuses on each of Scenarios 2 – 4, which represent the additional potential effects caused by the proposed alternative construction method.

### 3 MODELLING RESULTS

Appendices B, C and D present the results from the plume modelling for Scenarios 2, 3 and 4 respectively. Results are shown as spatial plots of elevated suspended sediment concentrations (in  $\text{kg/m}^3$ ) above notional background levels. These values can be translated to units of  $\text{mg/l}$  by multiplying by a factor of  $1 \times 10^3$ .

#### 3.1 Scenario 1 Modelling Results

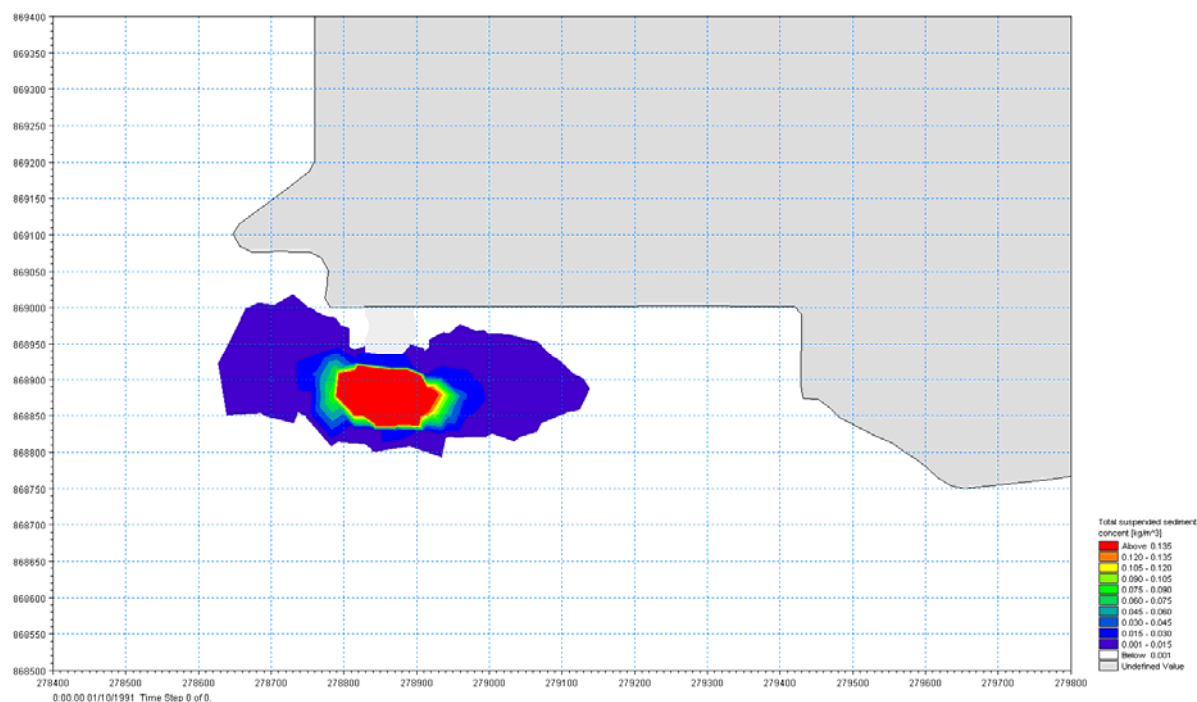
The effects of spillage losses from the initial sea bed dredging activities were addressed within the previous sediment plume and sediment deposition modelling studies. These were reported in Section 7 of the previous modelling report (Royal HaskoningDHV, 2013).

#### 3.2 Scenario 2 Modelling Results

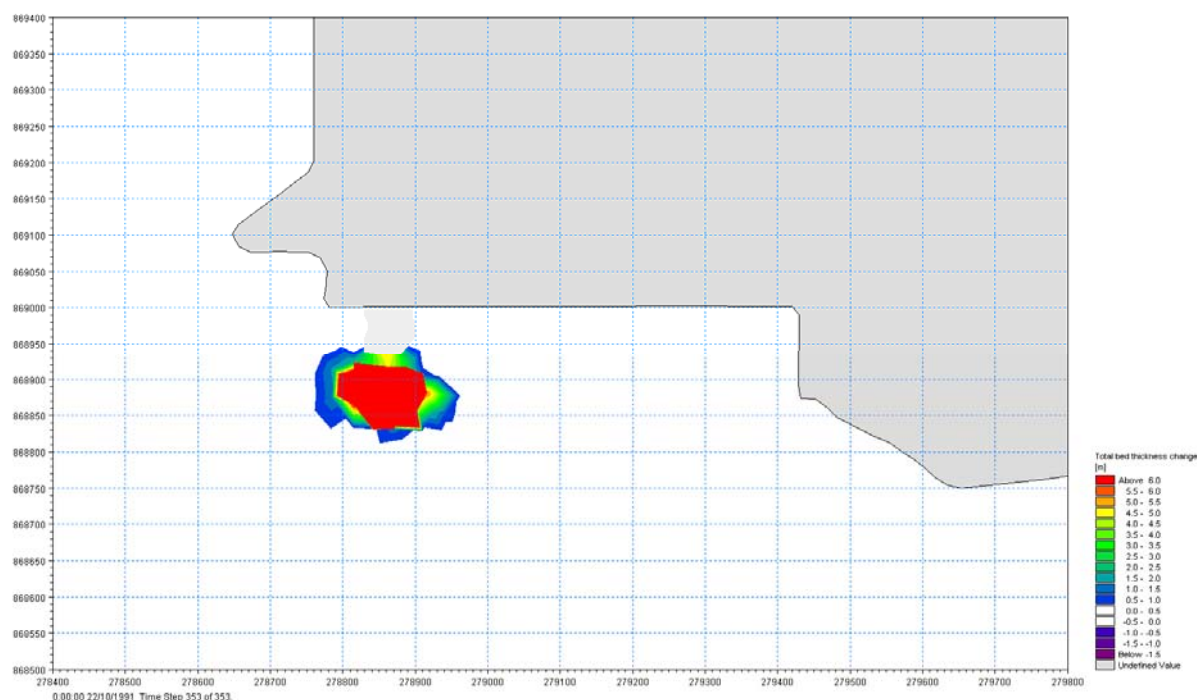
Results in **Appendix B** are plotted at hourly intervals for the first 24 hours of the simulation, followed by daily intervals thereafter until day 6, when the elevated suspended sediment concentrations return to notional background values.

It can be seen that a sediment plume is created immediately upon commencement of sediment discharging activities from the quay to form the berm. The plume remains relatively localised to the point of discharge, with a high suspended sediment concentration at its centre ( $200\text{--}600\text{mg/l}$ ), but rapidly drops to lower concentrations ( $<135\text{mg/l}$ ) with distance from the point of discharge. The shape of the plume changes through the tidal cycle, becoming more asymmetrical around times of peak flood and peak ebb currents, and more symmetrical around times of slack water. The suspended sediment concentrations within the plume remain relatively constant over time for the first 5 days of the simulation. This is due to the continuous discharge of sediment into the model during this period. The suspended sediment concentrations then reduce back to notional background values within 1 day of cessation of discharging operations.

The maximum elevated suspended sediment concentrations observed at any point during the model simulation are shown in Figure 3. This indicates that the maximum potential effects arising from the discharging activities are expected to be localised to the vicinity of the development area. The bed thickness changes at the end of the 18-day model simulation period are shown in Figure 4. This indicates that due to the relatively coarse nature of the vast majority of the dredged sediment used to form the berm, much will reside on the bed after discharge from the quay.

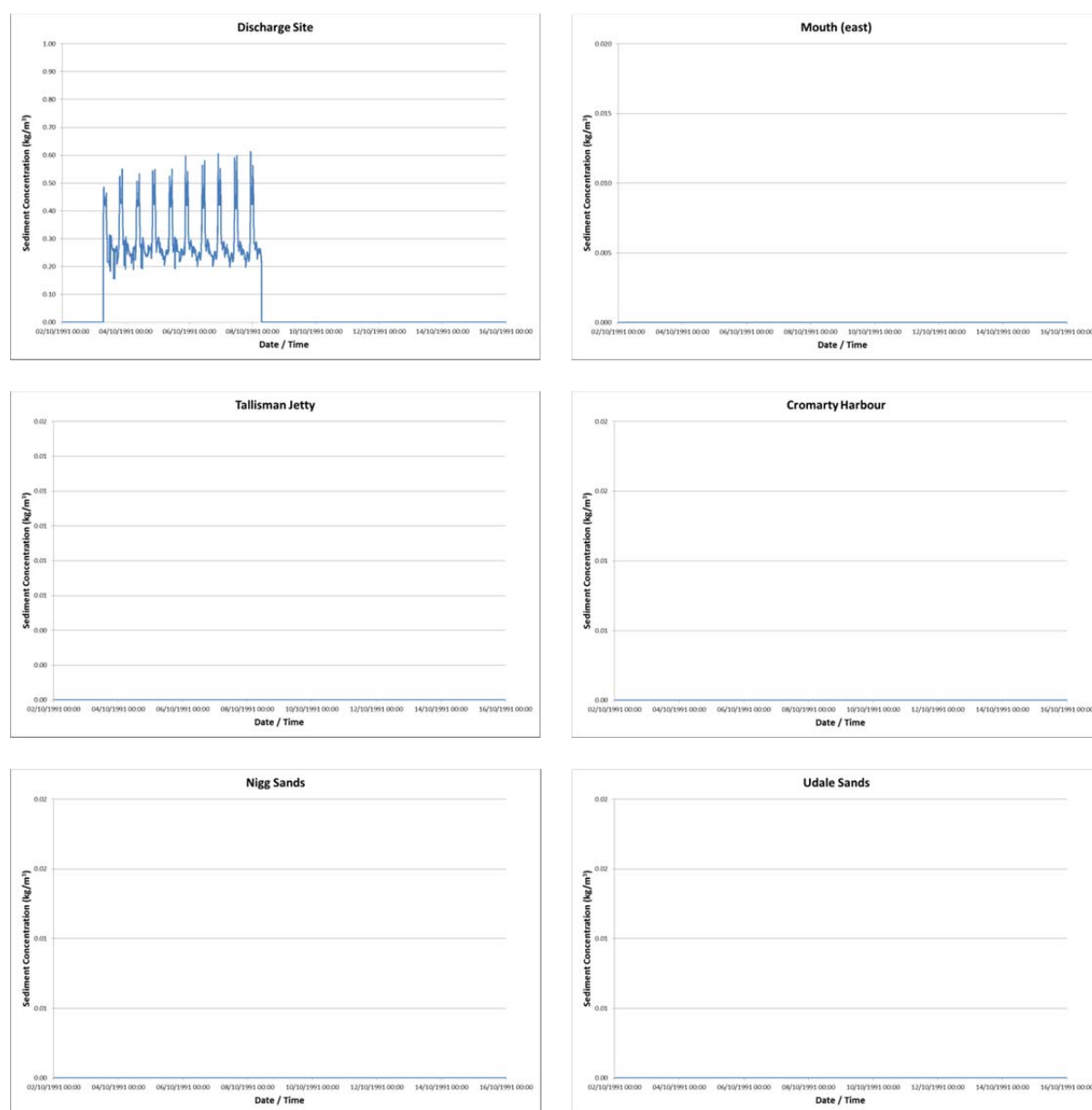


**Figure 3 - Maximum suspended sediment concentrations during release**



**Figure 4 - Bed thickness change at end of model run**

Figure 5 shows the variations in suspended sediment concentrations over time at the discharge site and at five other key locations across the wider area of interest within Cromarty Firth. This shows that at the discharge site, suspended sediment concentrations reach peak values of around 600mg/l, reducing to minimum values of around 200 – 300mg/l (depending on timing within the tidal cycle) during the five days of continuous discharging, but values drop to notional background levels almost immediately upon cessation of activities. Elevated suspended sediment concentrations are recorded at none of the other five sites selected from around the wider Cromarty Firth. These results demonstrate that the discharging activities to form a construction berm will have temporary effects only, although the elevations in suspended sediment concentrations will be high (up to 600mg/l) at points very localised to the discharging activities.



**Figure 5 – Scenario 1: Enhanced SSC Values at Various Locations**

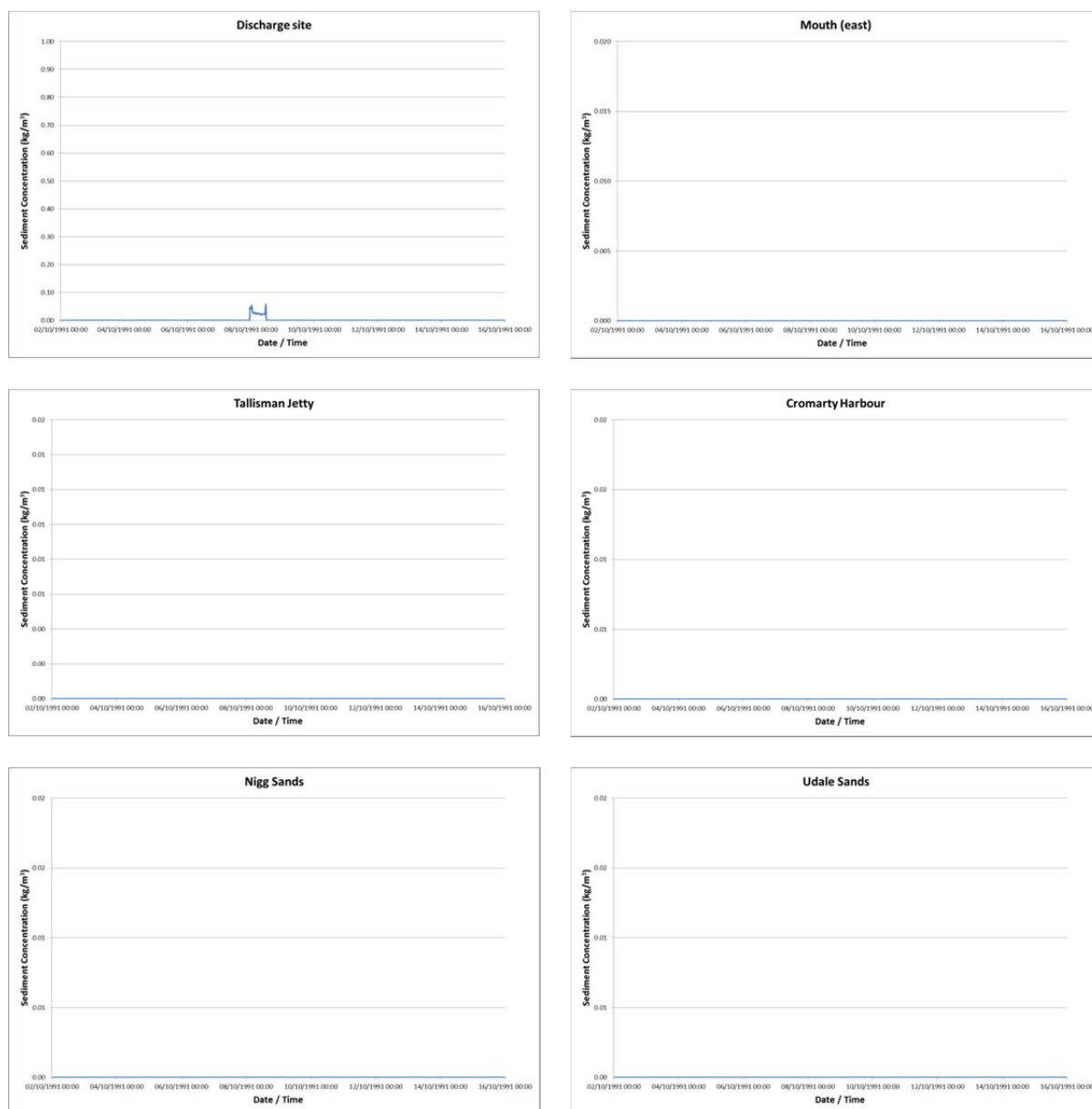


### 3.3 Scenario 3 Modelling Results

Results in **Appendix C** are plotted at hourly intervals for the first 14 hours of the simulation of effects from a 'typical' wave event. This covers the duration of the storm (12.5 hours) plus a sufficient period thereafter for the elevated suspended sediment concentrations to return to notional background values.

A localised sediment plume is created immediately upon release of the material that becomes eroded by 'typical' wave action. However, the concentrations are much lower than for Scenario 2, typically being in the range 1-30mg/l and having a short-lived peak at around 50mg/l. The suspended sediment concentrations return to notional background levels within 14 hours of release.

Figure 6 shows that at the discharge site at which the eroded sediment from a 'typical' wave event of 12.5 hours duration is released into the model, the suspended sediment concentrations become elevated for around 13.0 hours. This shows that the effects of sediment loss from the berm due to 'typical' wave conditions are temporary. The magnitude of change in suspended sediment concentrations is very low, with elevated values ranging from typically 25mg/l to 50mg/l, depending on the stage of the tidal cycle. Elevated suspended sediment concentrations are recorded at none of the other five sites selected from around the wider Cromarty Firth. These results demonstrate that the erosion losses from the construction berm during 'typical' wave conditions will have temporary, localised and very low magnitude effects only.



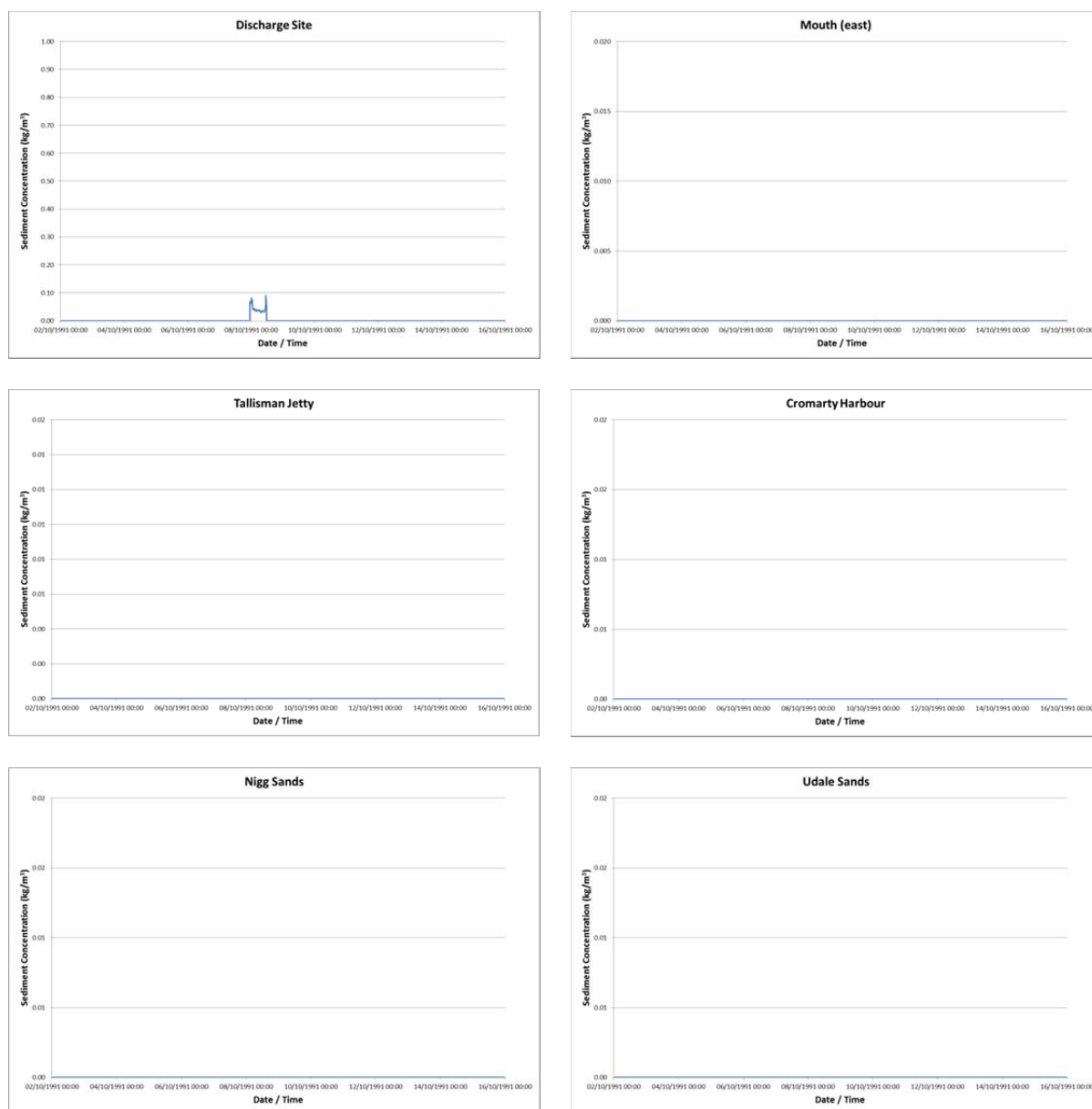
**Figure 6 – Scenario 2: Enhanced SSC Values at Various Locations**

### 3.4 Scenario 4 Modelling Results

Results in **Appendix D** are plotted at hourly intervals for the first 14 hours of the simulation of effects from a 'storm' wave event. This covers the duration of the storm (12.5 hours) plus a sufficient period thereafter to enable the elevated suspended sediment concentrations to return to notional background values.

A localised sediment plume is created immediately upon release of the material that becomes eroded by 'storm' wave action. The concentrations of sediment within the plume are slightly greater than for Scenario 3, but still remain much lower than for Scenario 2. Typically elevations in concentration are in the range 1-60mg/l but short-lived peaks of up to 80mg/l are observed on occasion. The suspended sediment concentrations return to notional background levels within 14 hours of release.

Figure 6 shows that at the discharge site at which the eroded sediment from a 'storm' wave event of 12.5 hours duration is released into the model, the suspended sediment concentrations become elevated for around 13.0 hours. This shows that the effects of sediment loss from the berm due to 'storm' wave conditions are temporary. The magnitude of change in suspended sediment concentrations is low, with elevated values ranging from typically 40mg/l to 80mg/l, depending on the stage of the tidal cycle. Elevated suspended sediment concentrations are recorded at none of the other five sites selected from around the wider Cromarty Firth. These results demonstrate that the erosion losses from the construction berm during 'typical' wave conditions will have temporary, localised and low magnitude effects only.



**Figure 6 – Scenario 2: Enhanced SSC Values at Various Locations**

### 3.5 Scenario 5 Modelling Results

The effects of spillage losses from the final sea bed dredging activities and the disposal activities at The Sutors spoil ground were addressed within the previous sediment plume and sediment deposition modelling studies. These were reported in Section 7 of the previous modelling report (Royal HaskoningDHV, 2013).

## 4 CONCLUSIONS

Modelling has shown that the effects of the alternative construction method using a berm created from dredged material are temporary in duration and, other than very locally to the point of discharge, are small in magnitude. Effects arising from construction of the berm are very much greater than effects arising from the loss of material from exposed sections of the berm during 'typical' or 'storm' wave conditions. Effects from the additional modelling the alternative construction method are less than the effects previously assessed from the disposal of dredged material at The Sutors spoil ground.

Immediately at the point of discharge of the dredged material into the water column during construction of the berm, the elevation in suspended sediment concentrations will be high (up to 600mg/l) but even this localised effect is temporary in duration, with values returning to notional background levels very soon after cessation of activities.

If these temporary and localised changes in suspended sediment concentration are deemed unacceptable in an environmental context, then mitigation in the form of silt screens may be a necessary consideration.

## 5 REFERENCES

Royal HaskoningDHV, 2013. *Nigg Energy Park: Sedimentation and Wave Modelling (Main Report & Appendices)*. May 2013. Report to Global Energy Nigg Ltd.

## **APPENDIX A**

# **LITPROF MODELLING OF EROSION FROM THE CONSTRUCTION BERM**

## LITPROF MODELLING OF EROSION FROM THE CONSTRUCTION BERM

### 1. Introduction

This appendix describes the cross-shore profile modelling of berm stability under 'typical' and 'storm' wave activity during the construction period. The modelling was undertaken using LITPROF, a computational module of the LITPACK software, which was developed by the Danish Hydraulic Institute.

LITPROF describes the cross-shore profile changes based on a time series of wave and water level events. The model is based on the assumption that longshore variations in hydrodynamic and sediment conditions are negligible and that the depth contours are parallel to the coastline. Thus the berm morphology is described solely by a single cross-shore profile.

### 2. Model Settings & Input conditions

The following model settings and input parameters were used in the LITPROF modelling.

- The berm slope is V:H = 1:6
- The seaward face (only) of the berm was represented in the model (see Figure A1)
- The sediment in the berm is predominantly non-cohesive sediment, with a median grain size diameter ( $d_{50}$ ) of 0.28mm
- The sediment gradation coefficient,  $\sigma$ , is defined by  $(d_{84}/d_{16})^{0.5}$ 
  - A value of  $\sigma = 1.35$  was used in the base case
  - A value of  $\sigma = 2.0$  was used in a sensitivity test
- The sediment porosity was set at 0.4
- The wave theory used was Stoke's second-order
- Tidal elevations were extracted from the Nigg MIKE21 hydrodynamic model (see Figure A2 and Figure A3)
- Wave parameters were extracted from the Nigg MIKE21-SW wave transformation model

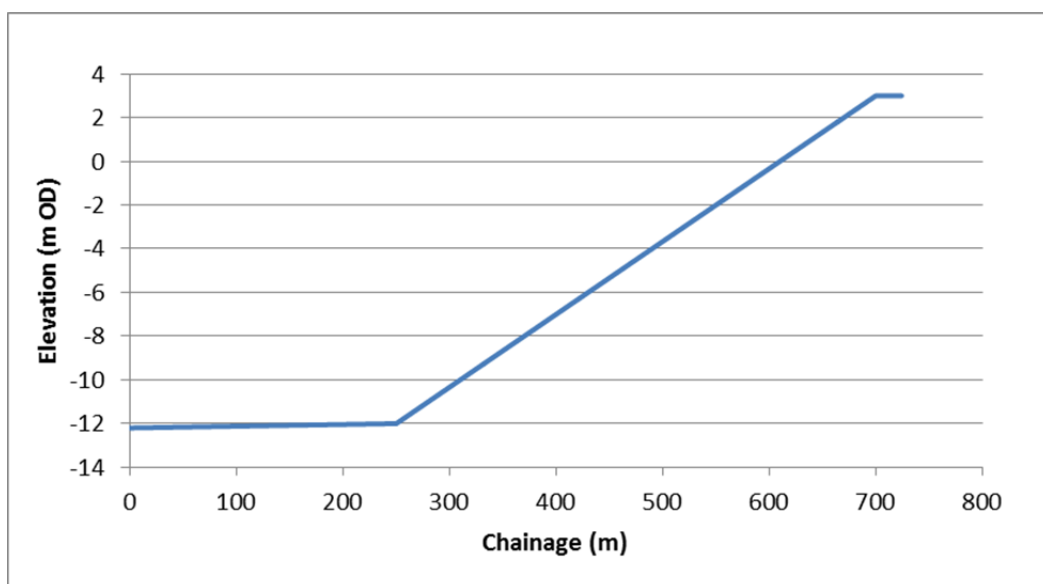
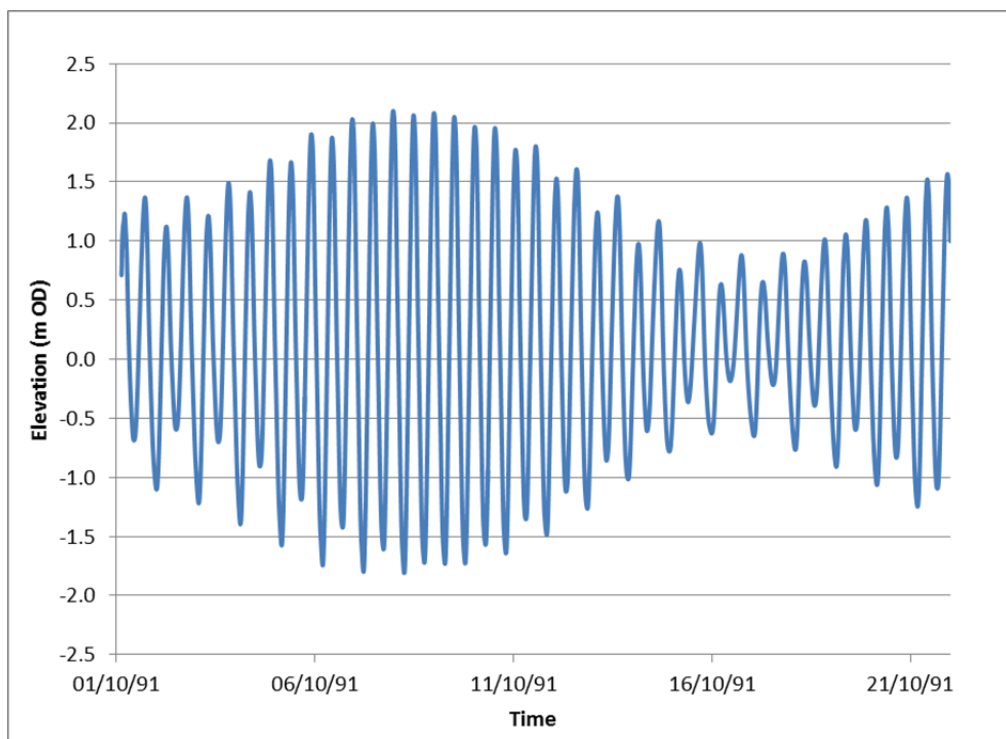
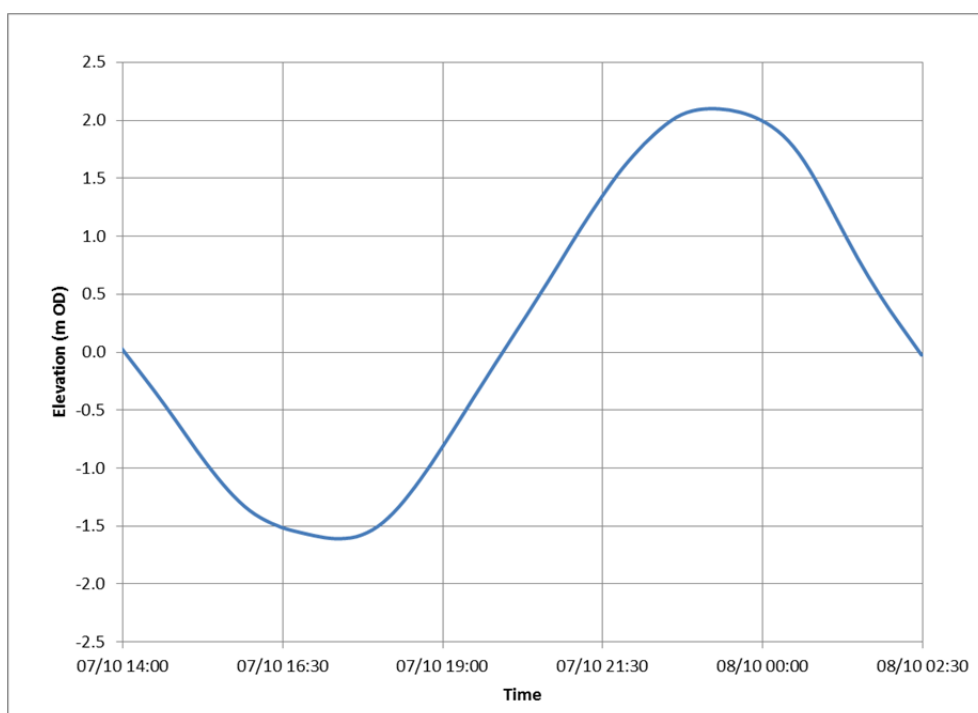


Figure A1: Berm profile





**Figure A2: Tidal elevations at Nigg Energy Park**



**Figure A3: Tidal elevation used for storm conditions (12.5 hours)**

### 3. Run scenarios

The following runs were undertaken using the LITPROF model:

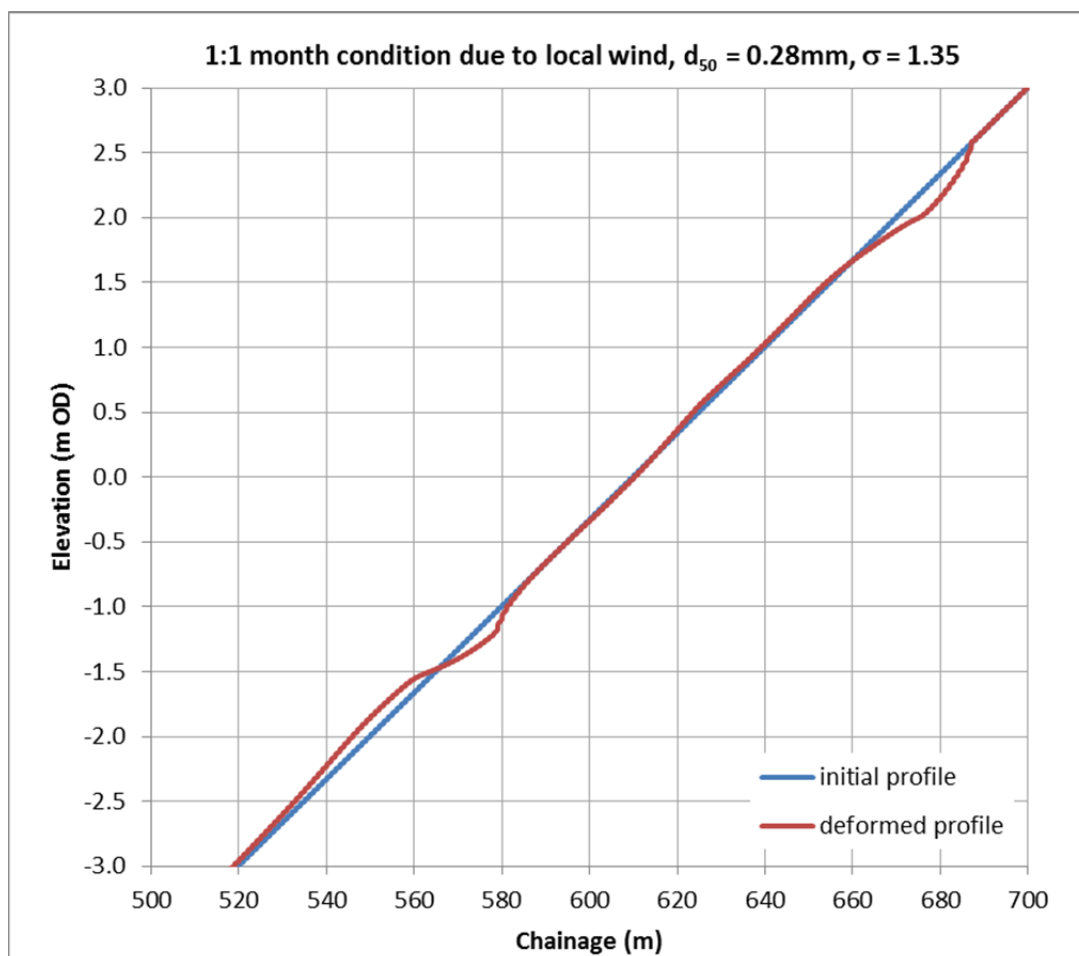
Run	Description	H <sub>s</sub> (m)	T <sub>m</sub> (s)	Mean Direction (°N)	Duration (hours)
1	1:1 month condition for waves by local SW wind	0.60	3.0	242	12.5
2	1:1 month condition for waves from North Sea	0.60	4.2	120	12.5
3	1:1 year condition for waves by local SW wind	0.92	3.0	245	12.5
4	1:1 year condition for waves from North Sea	0.92	6.4	120	12.5

The base case for each run used a grading coefficient  $\sigma = 1.35$

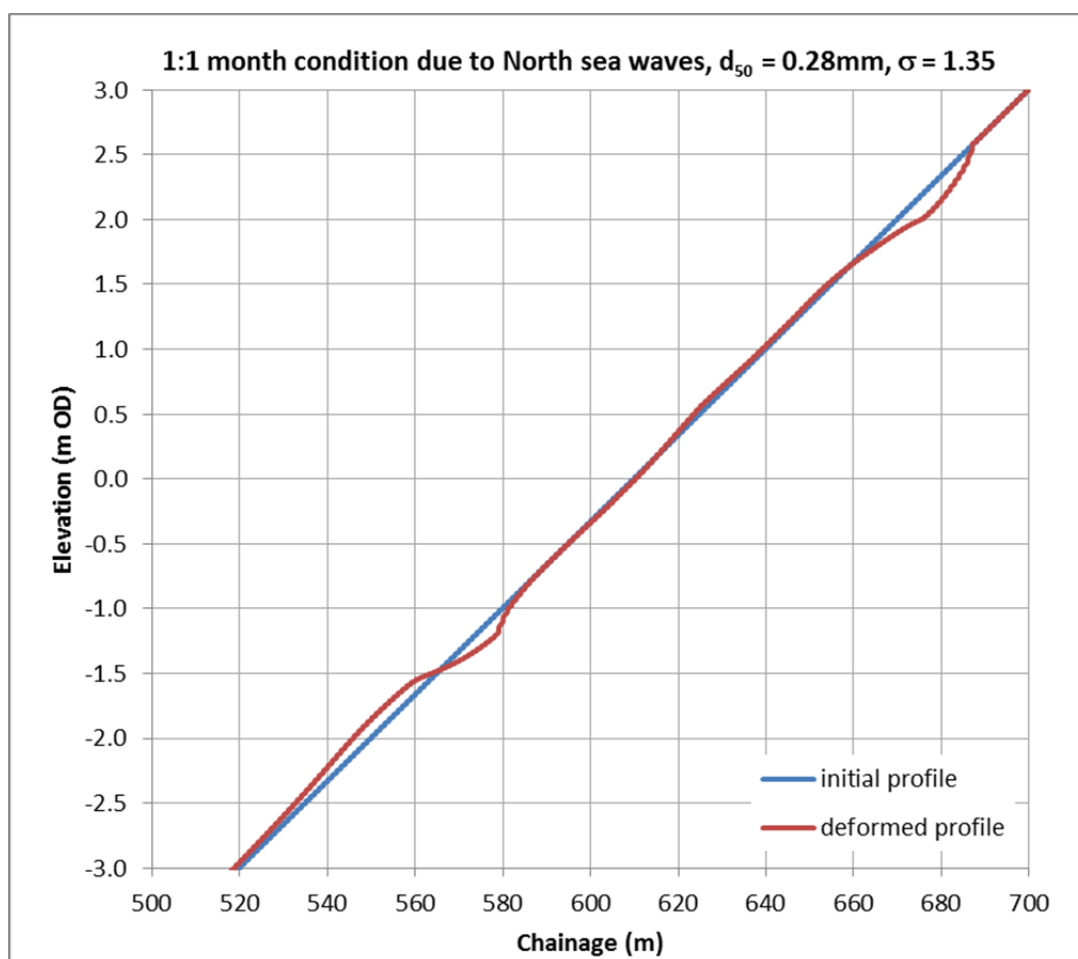
The sensitivity case for each run used a grading coefficient  $\sigma = 2.0$

### 4. Results

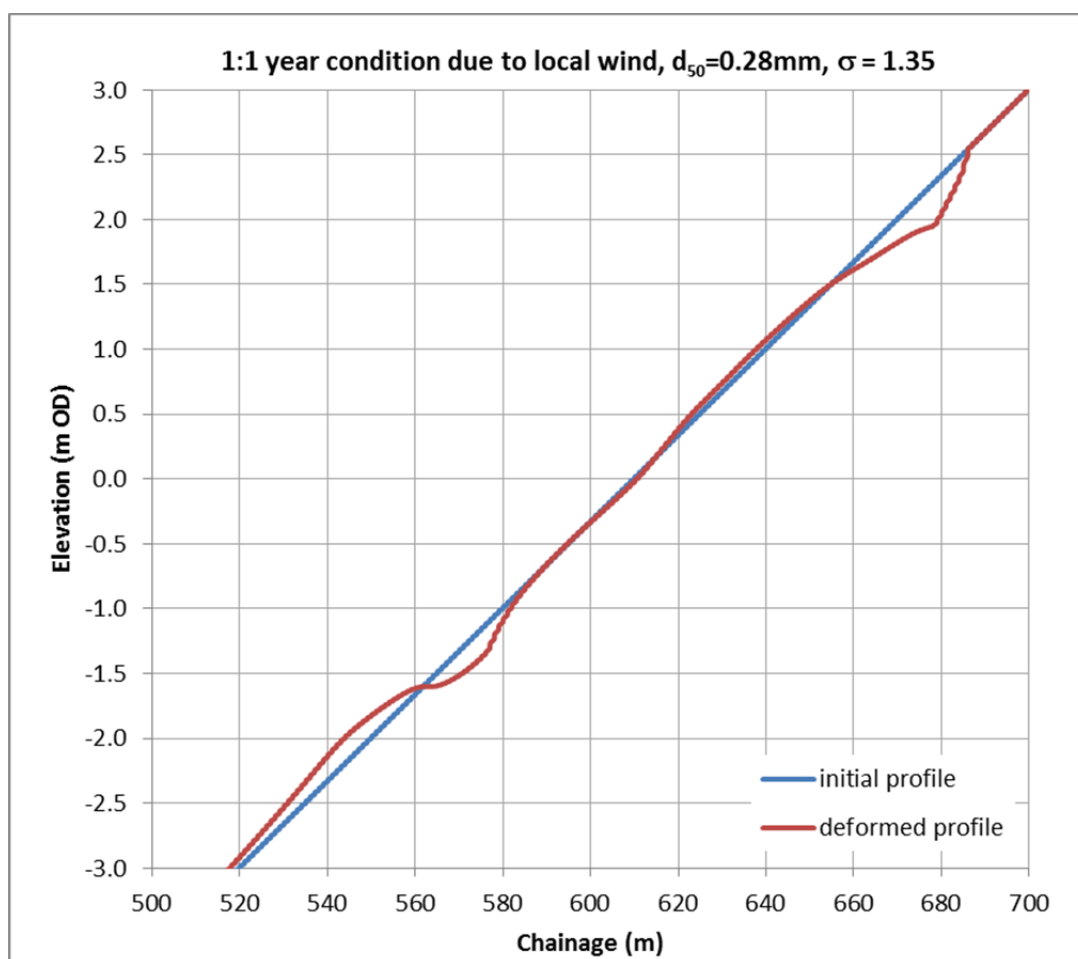
The model results are presented in the following plots. Deformations of the seaward slope of the berm concentrate at the low and high water marks, therefore for ease of observation the plots focus on this zone of the berm slope.



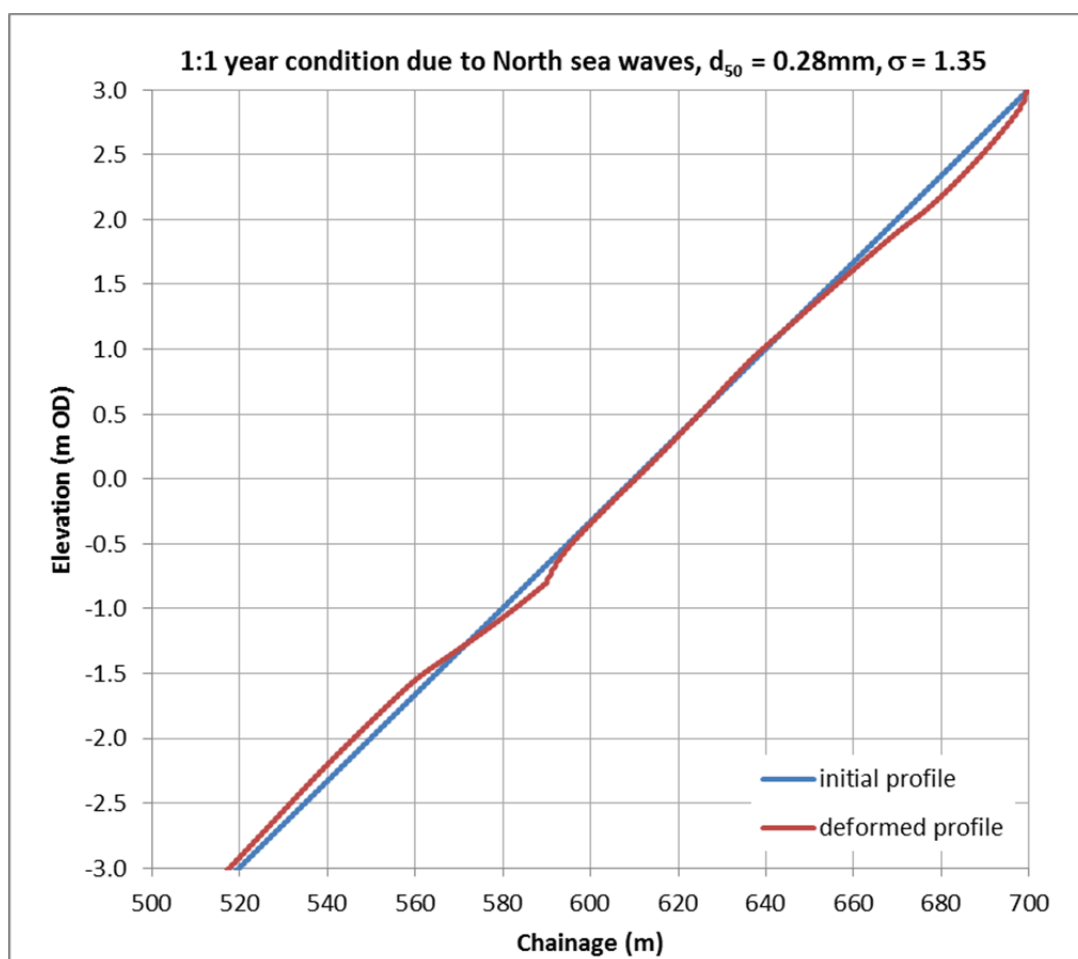
**Plot 1 – Run 1 ( $\sigma = 1.35$ )**



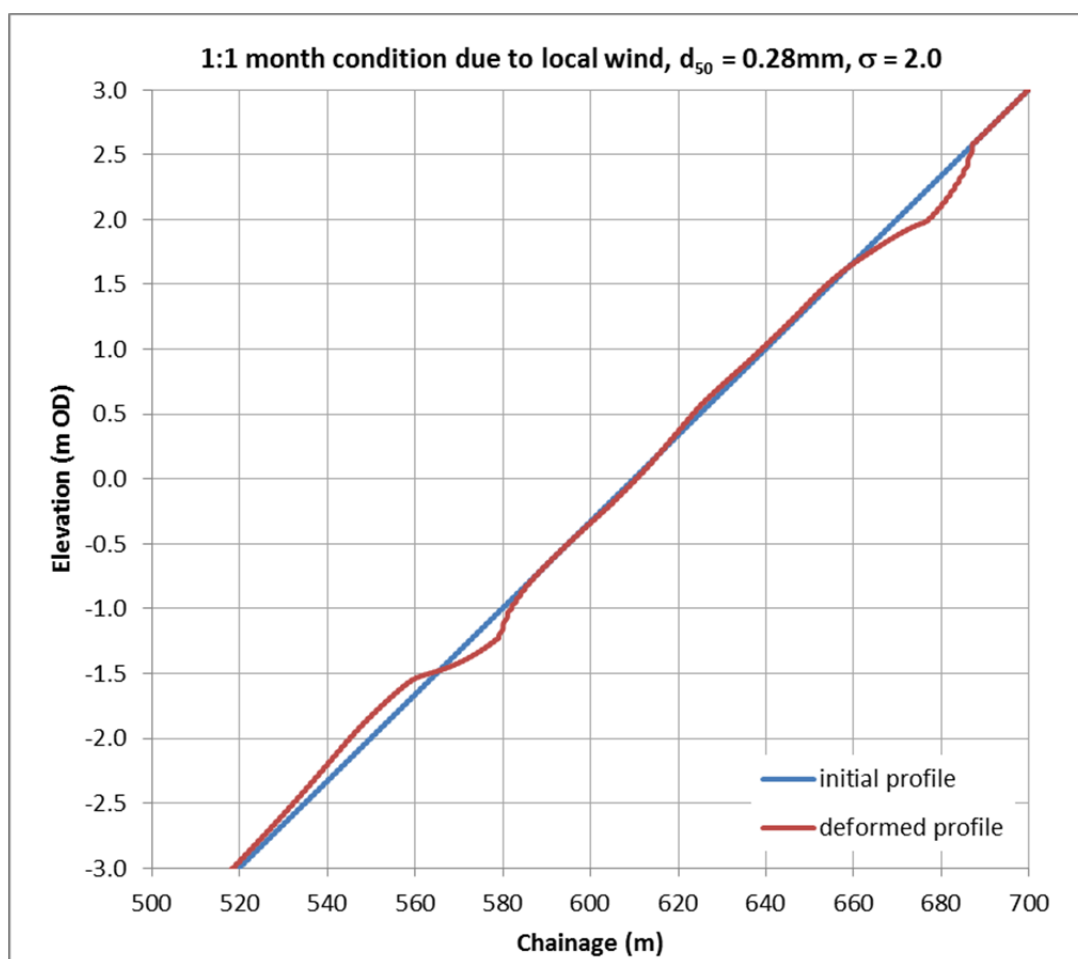
Plot 2 – Run 2 ( $\sigma = 1.35$ )



**Plot 3 – Run 3 ( $\sigma = 1.35$ )**

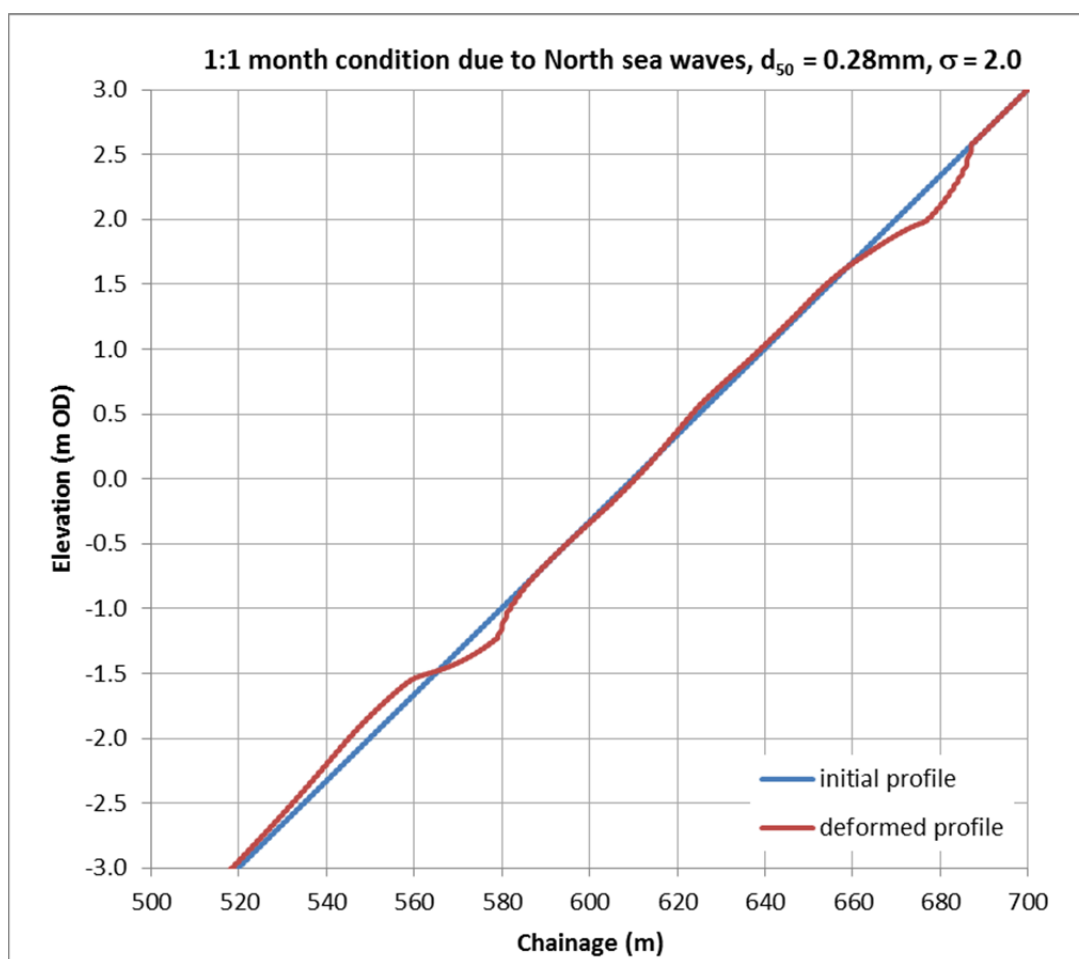


Plot 4 – Run 4 ( $\sigma = 1.35$ )

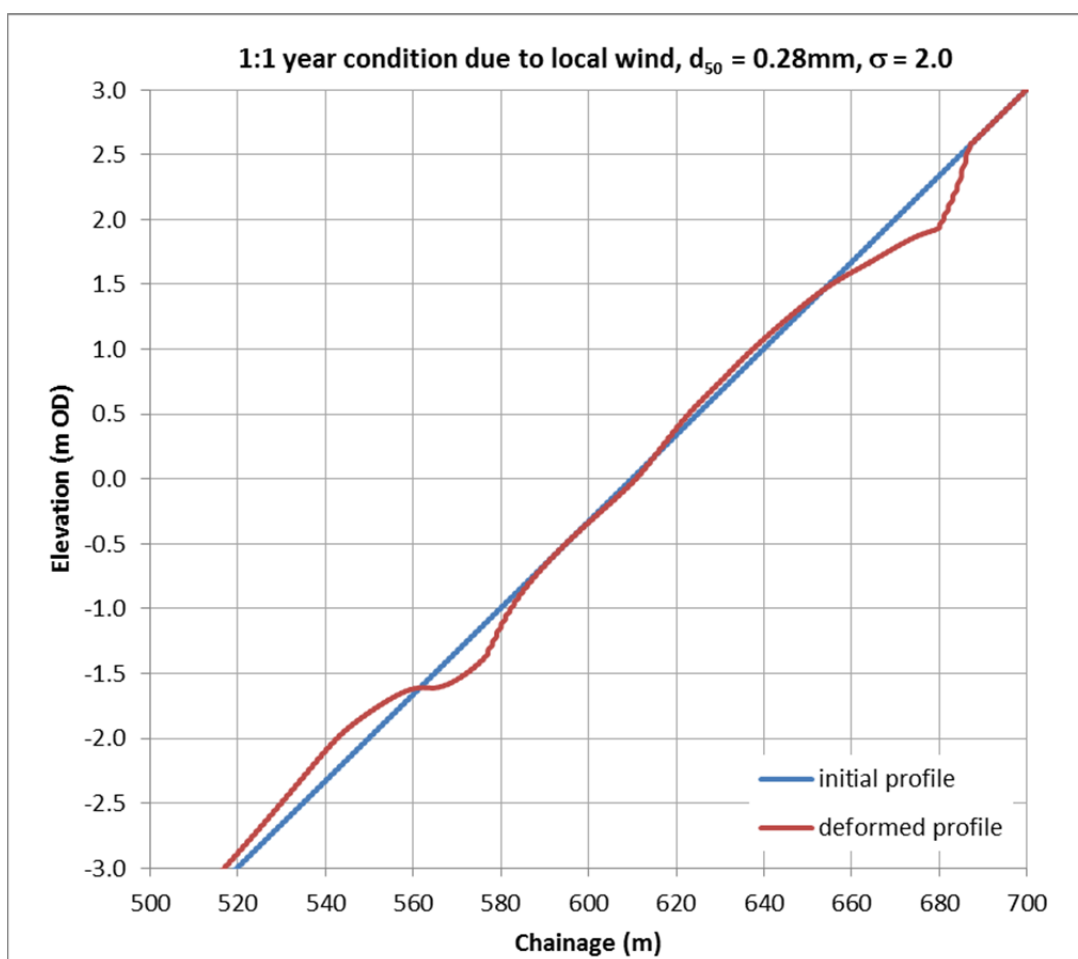


**Plot 5 – Run 1 ( $\sigma = 2.00$ )**

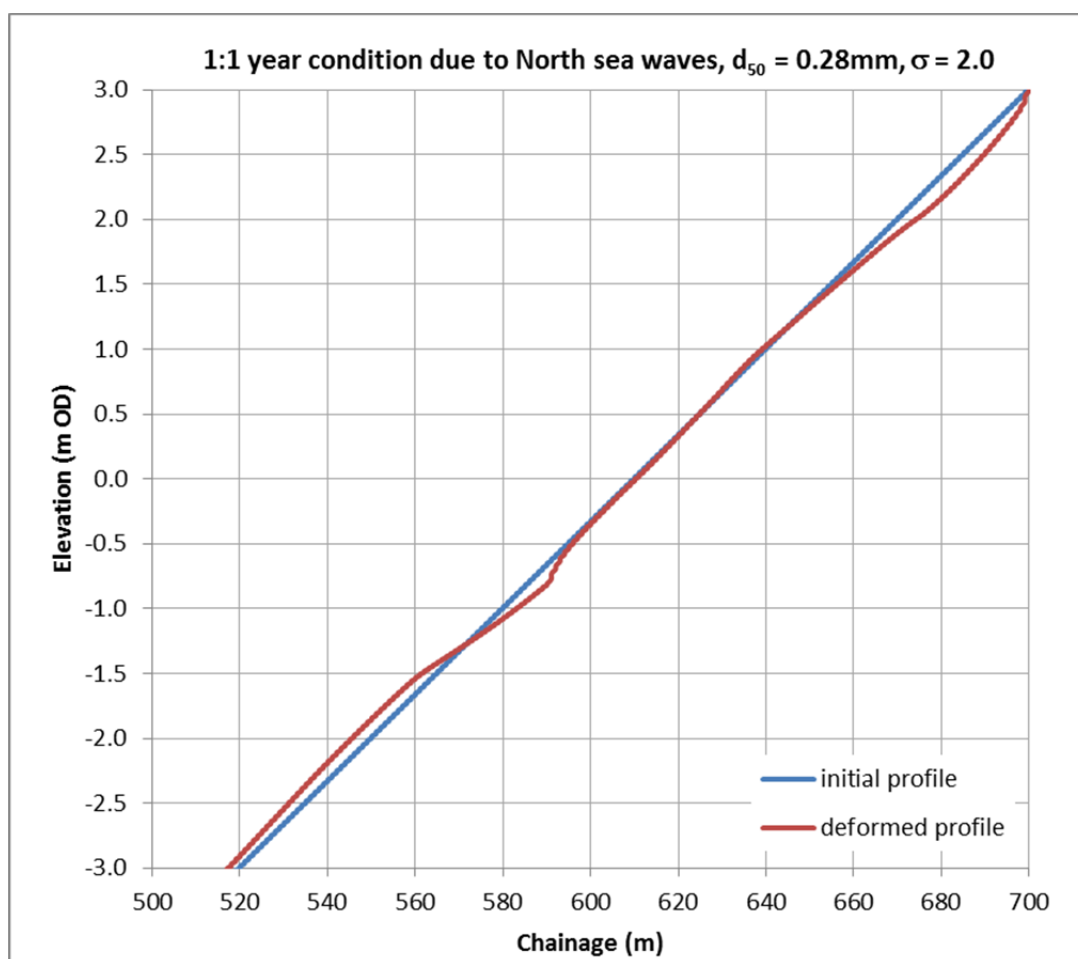




Plot 6 – Run 2 ( $\sigma = 2.00$ )



Plot 7 – Run 3 ( $\sigma = 2.00$ )



Plot 8 – Run 4 ( $\sigma = 2.00$ )

## 5. Conclusion

In each model run, there are some areas where sediment is eroded from the seaward face of the berm and deposited elsewhere on the seaward face of the berm. As a worst case assessment, it has been assumed that all sediment eroded from the berm has the potential to become entrained by the tidal currents (if they are sufficiently strong) and thus form a sediment plume. Therefore the total eroded area, per metre length of berm, is summarised in the table below

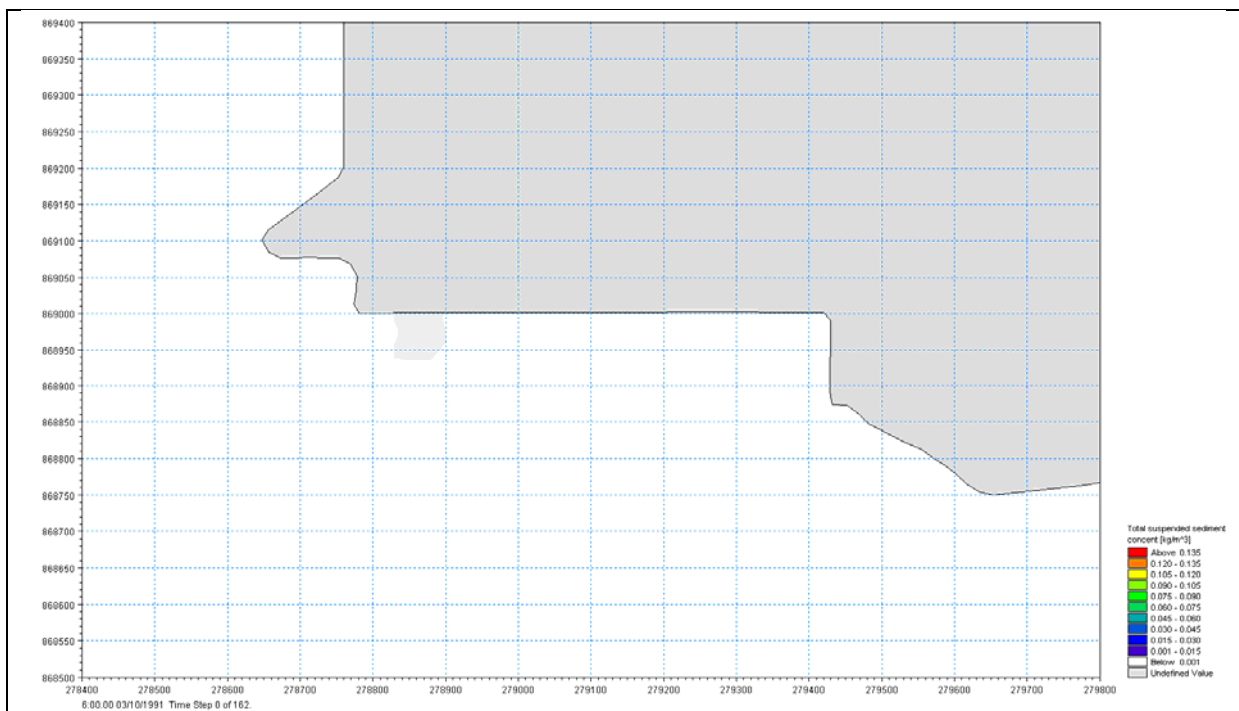
Run	Description	Eroded area (m <sup>2</sup> /m) Base Case $\sigma = 1.35$	Eroded area (m <sup>2</sup> /m) Sensitivity $\sigma = 2.0$
1	1:1 month condition for waves by local wind	4.8	6.1
2	1:1 month condition for waves from North Sea	4.8	6.1
3	1:1 year condition for waves by local wind	8.2	10.3
4	1:1 year condition for waves from North Sea	7.2	8.1

The model results suggest that the berm slope remains broadly stable under both the 'typical' and 'storm' wave conditions experienced. The most notable changes in the seaward face occur at around the high water and low water marks on the profile.

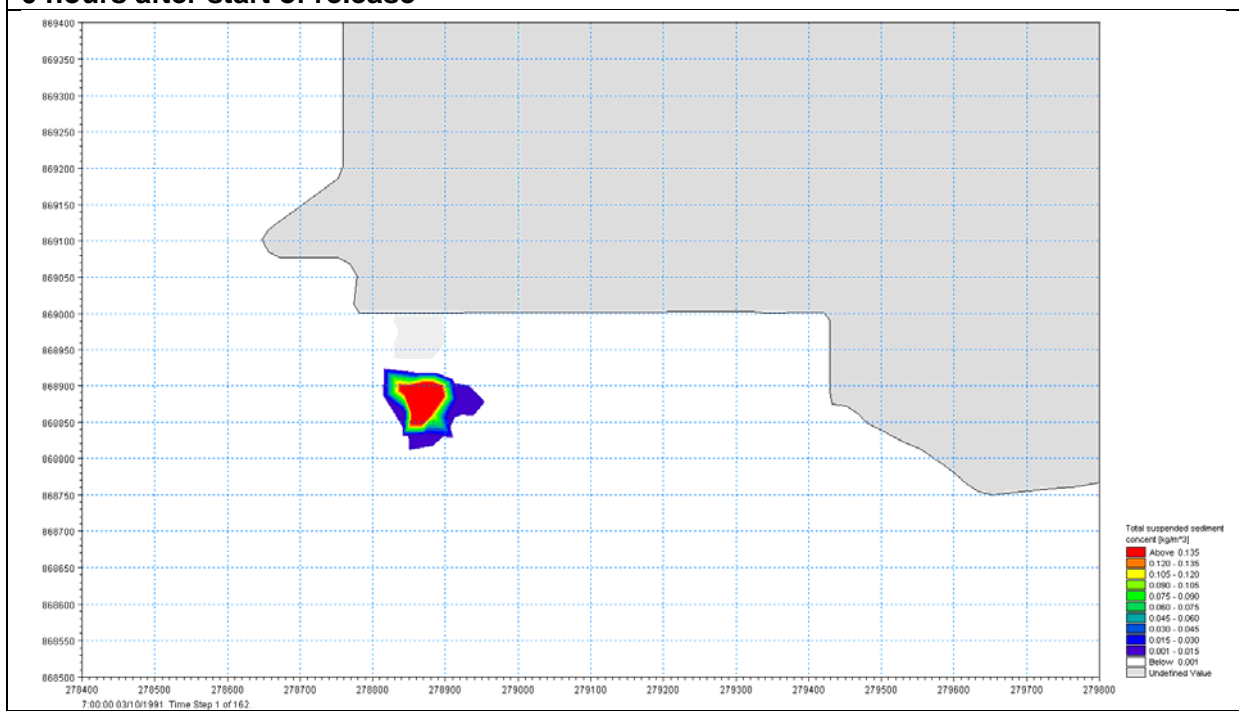
The sensitivity tests show that with a relatively small variation in the sediment gradation coefficient ( $\sigma$ ), there can be an increase in the extent of material released due to erosion.

## **APPENDIX B**

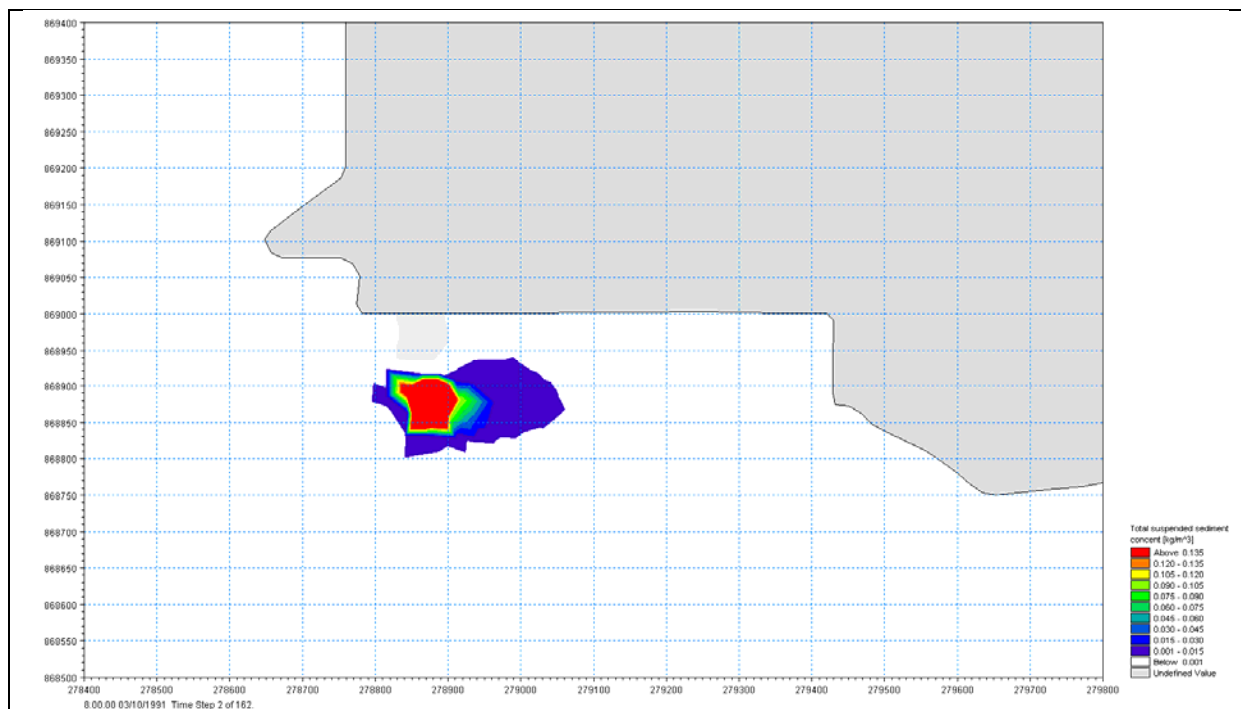
### **SCENARIO 2 MODELLING RESULTS**



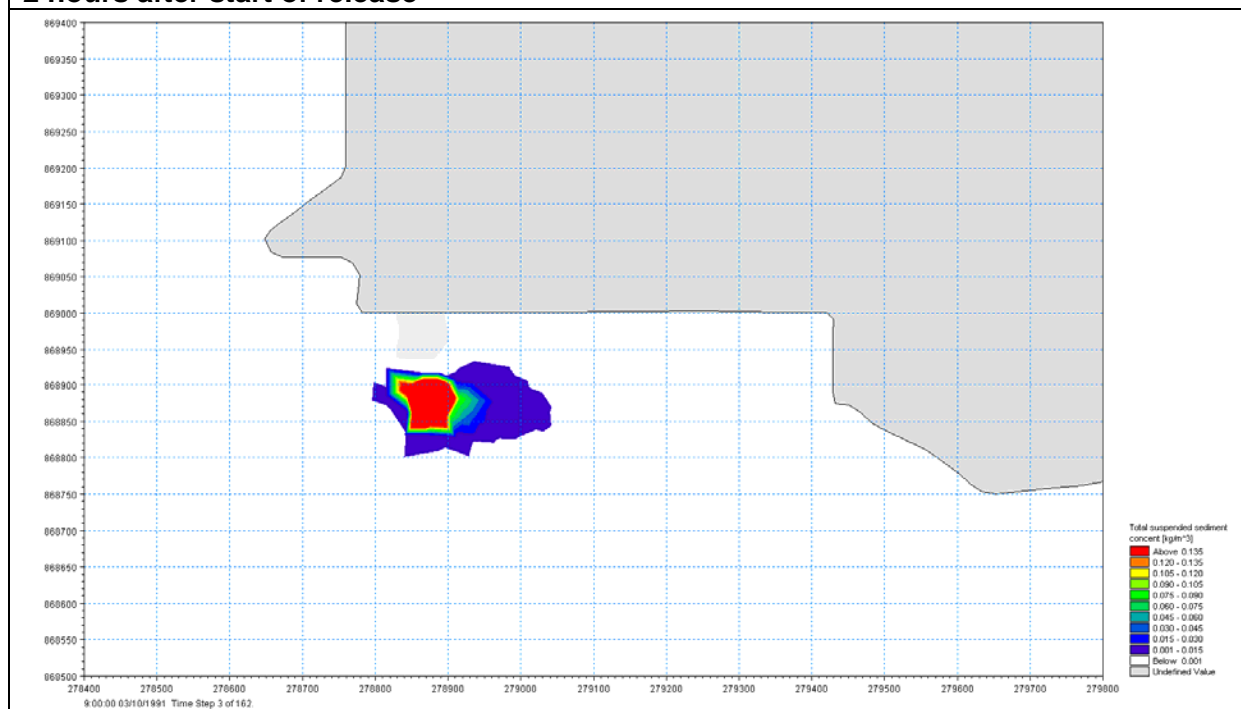
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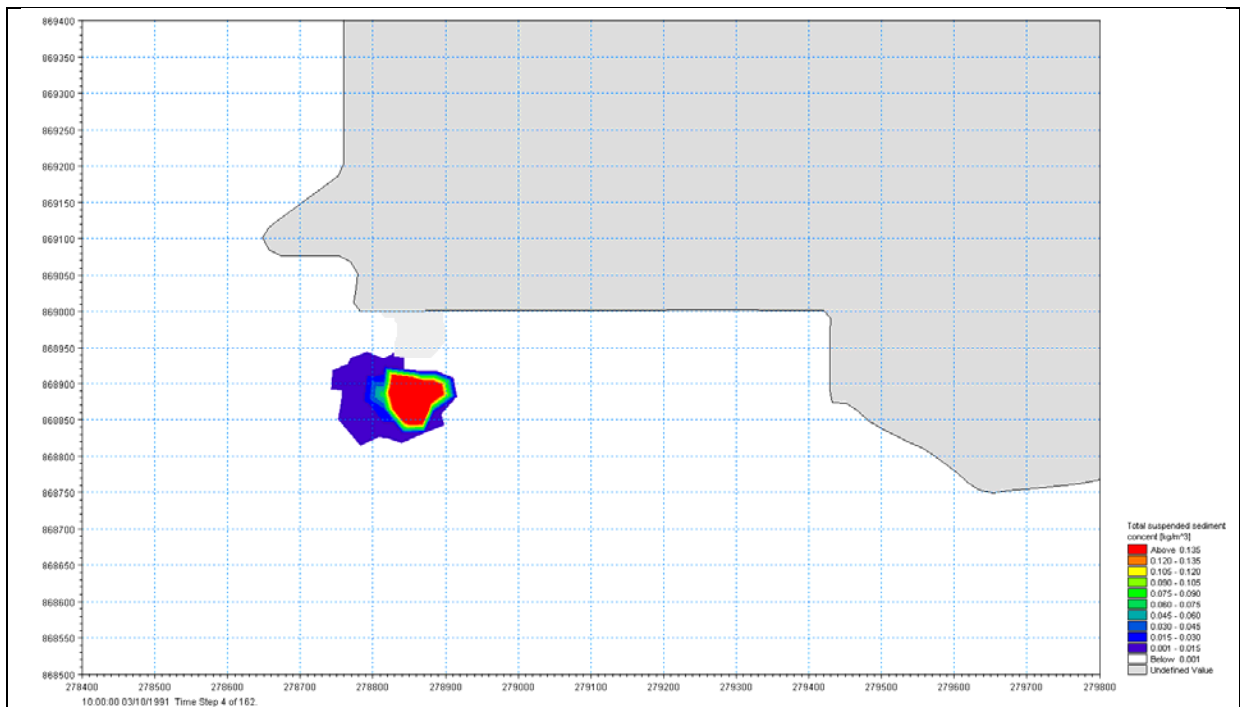


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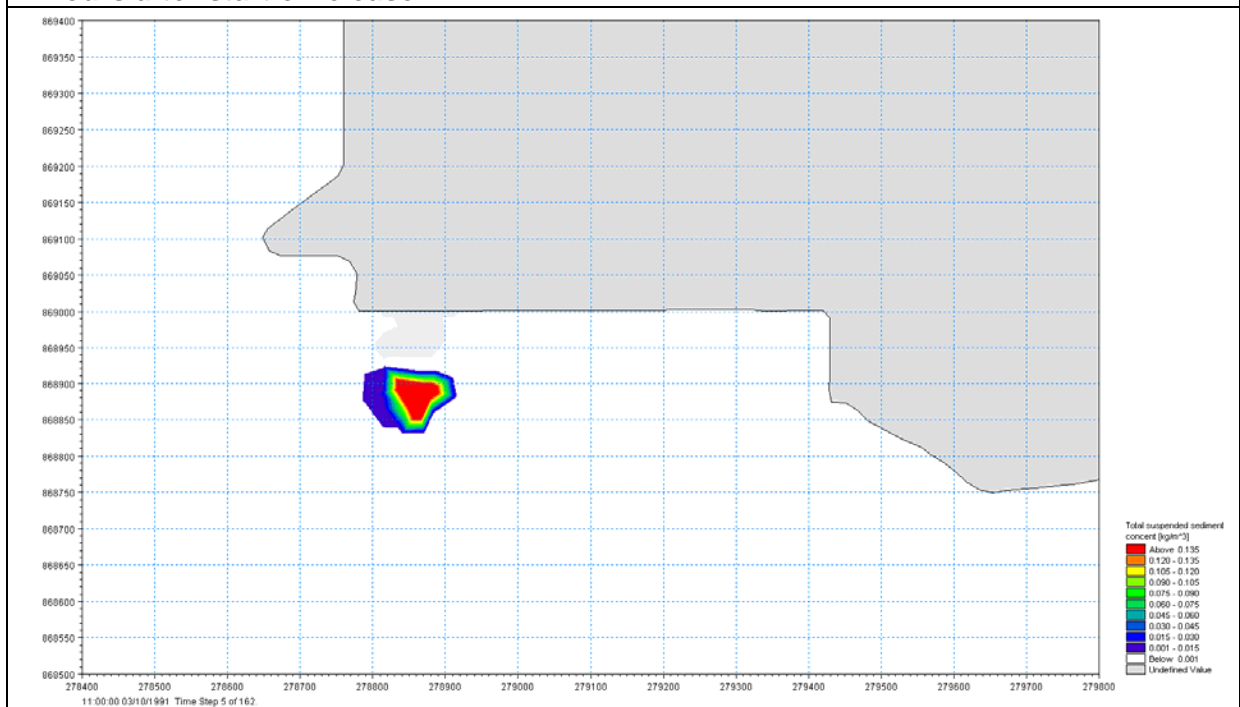


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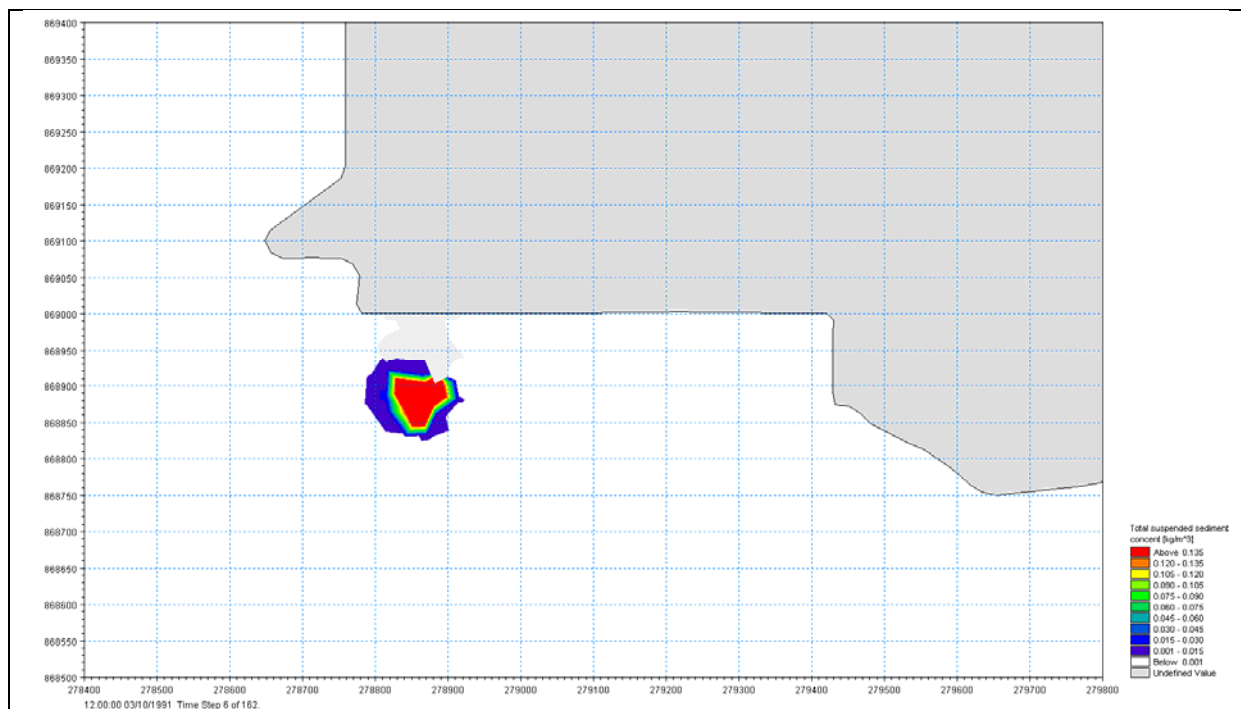




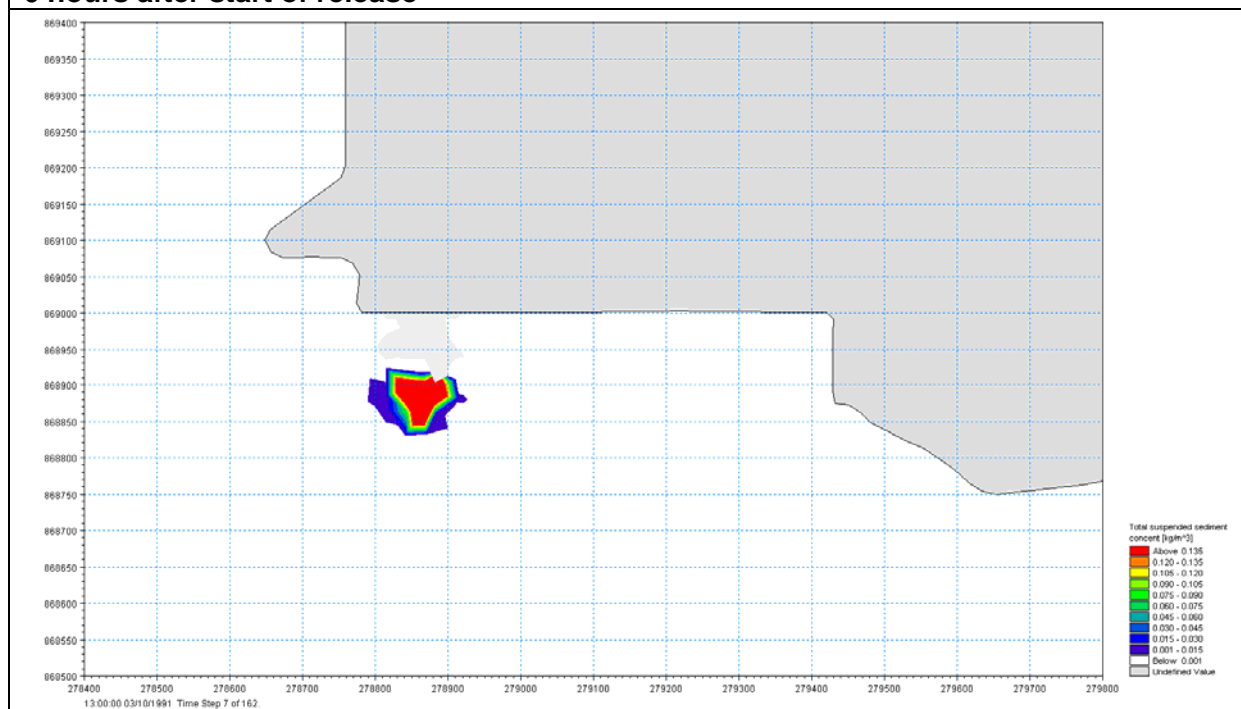
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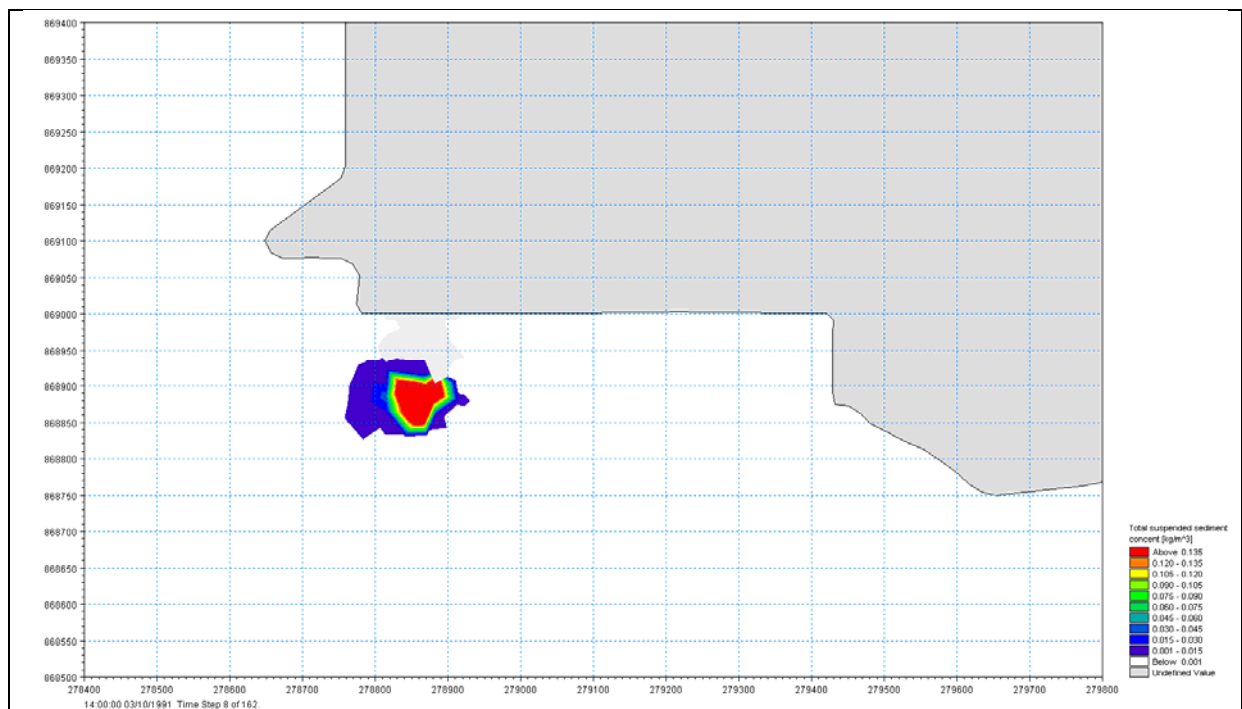
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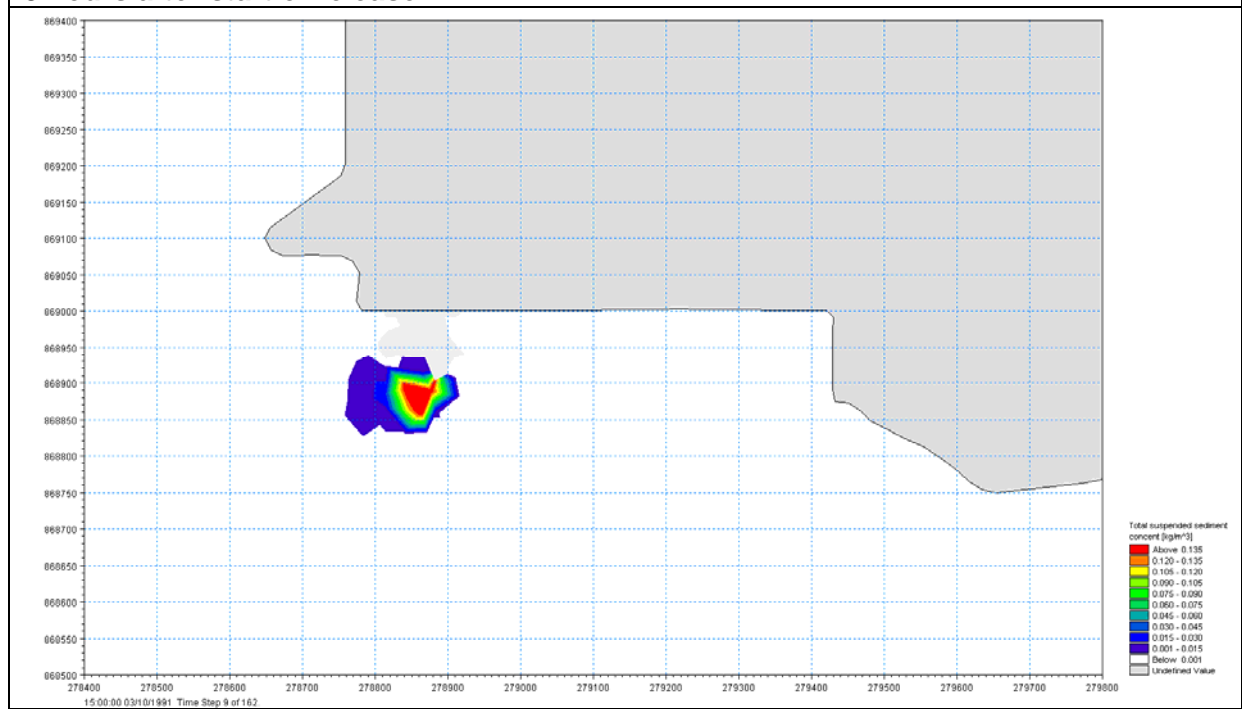
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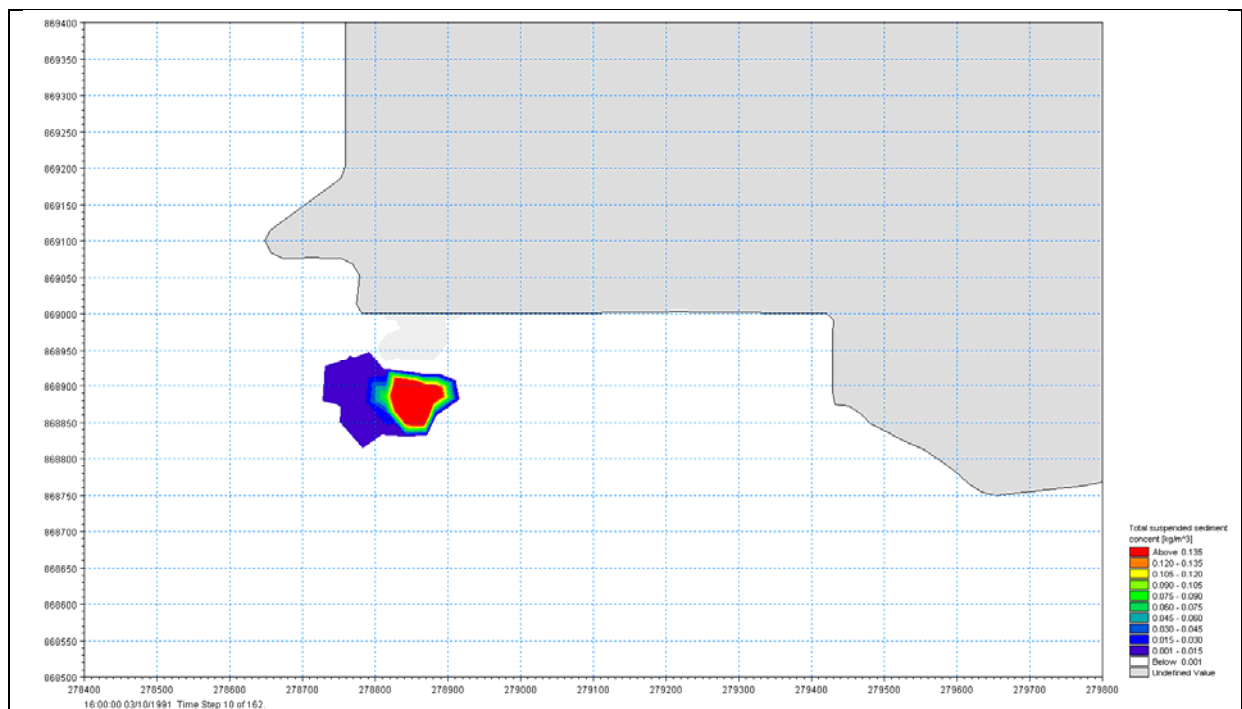
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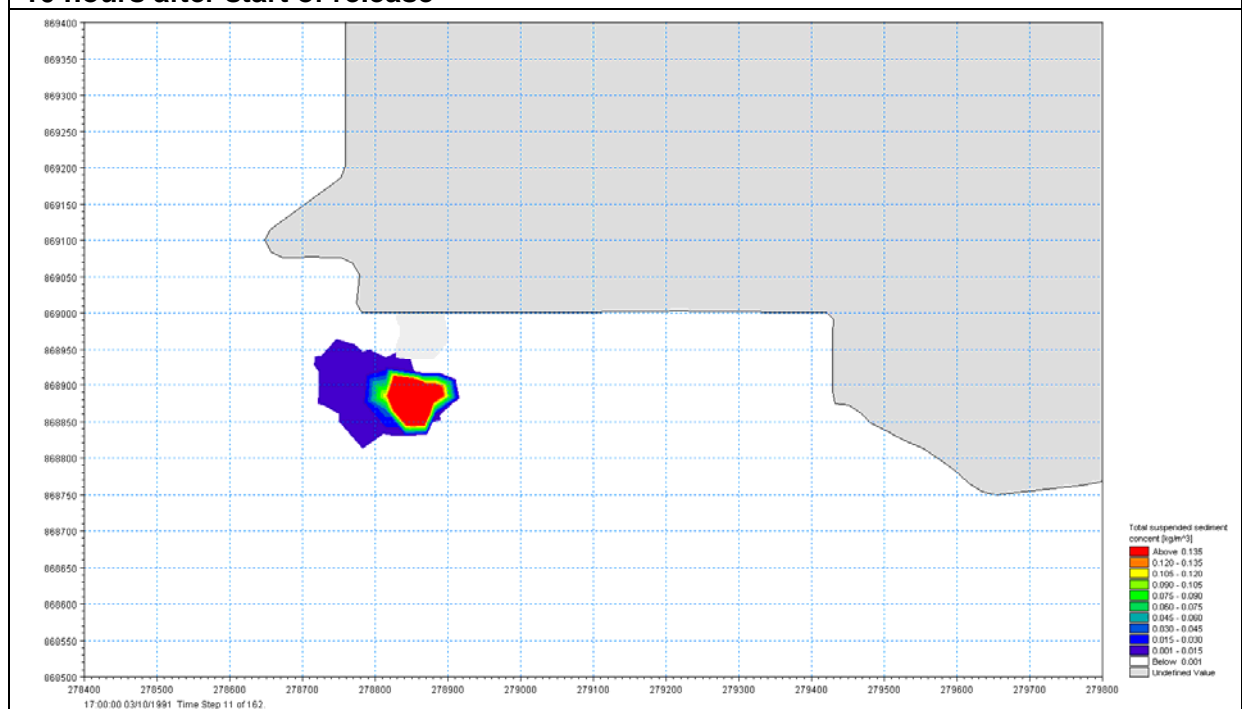
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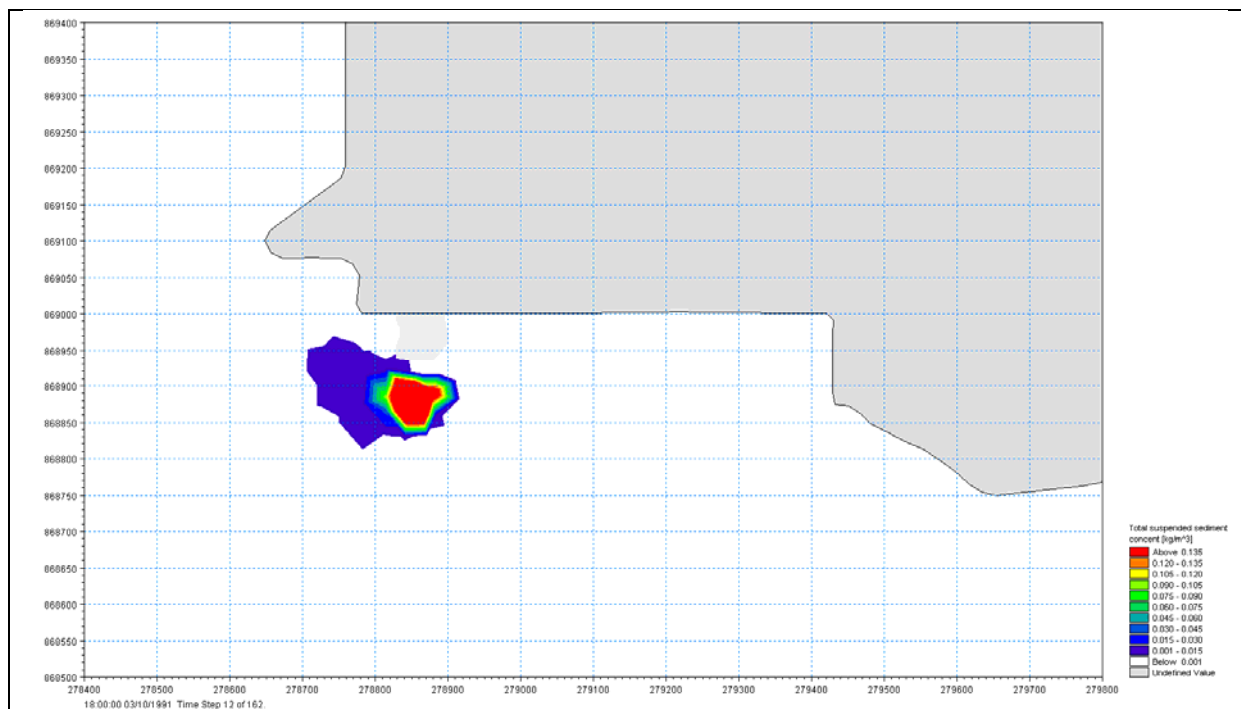
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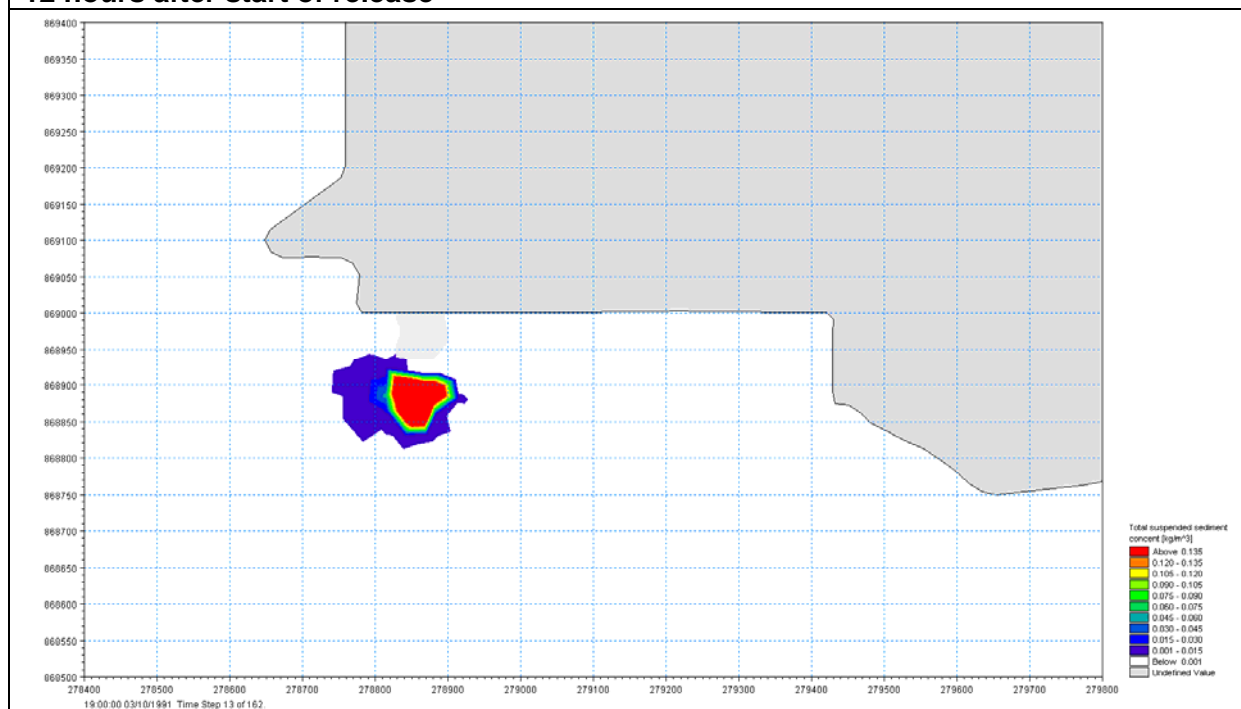
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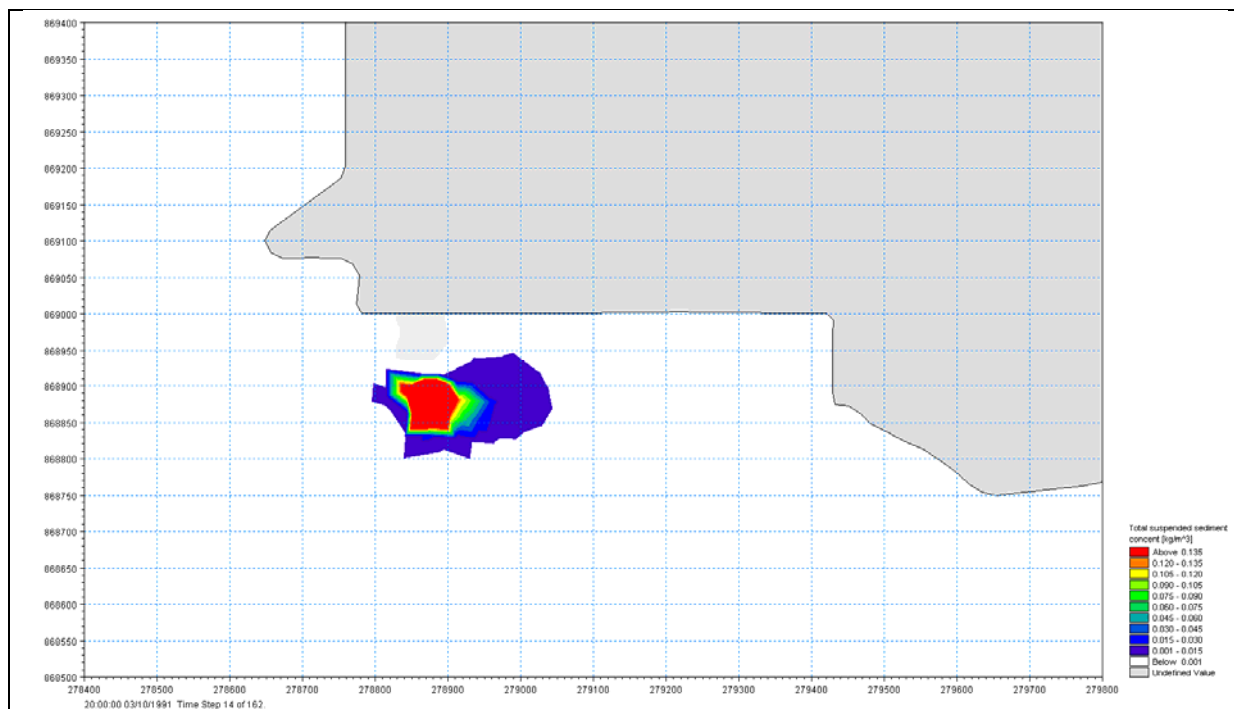
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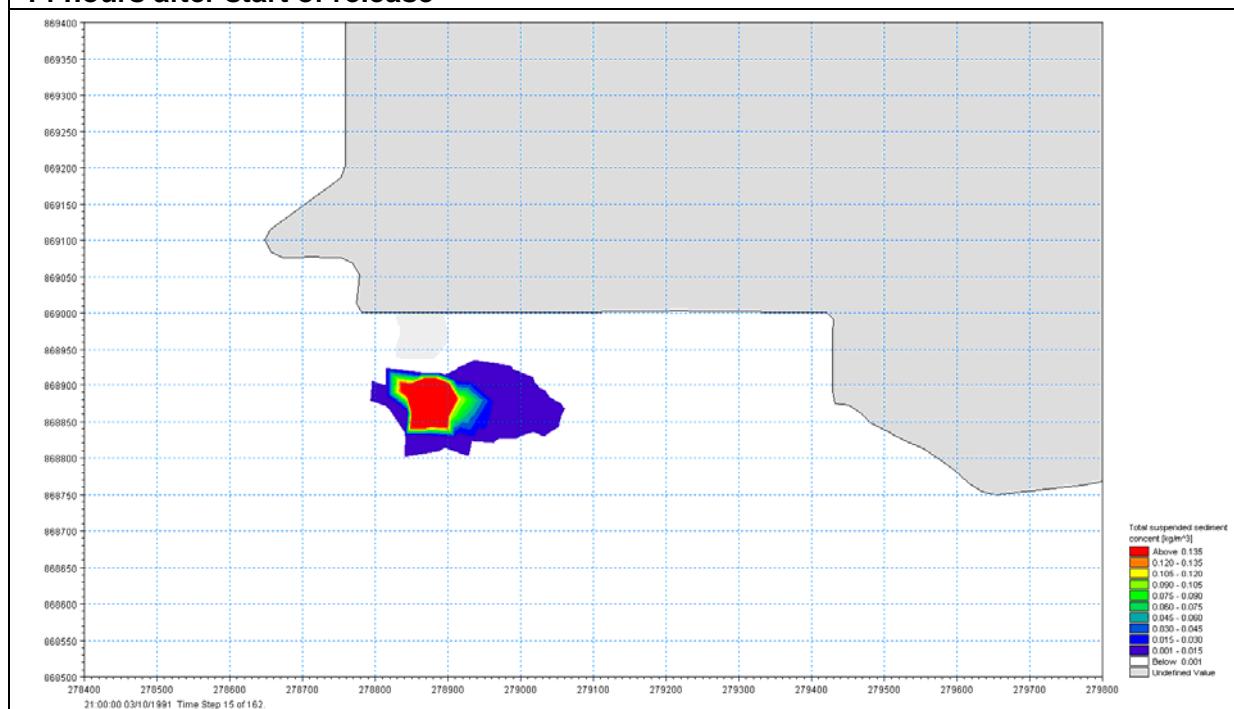
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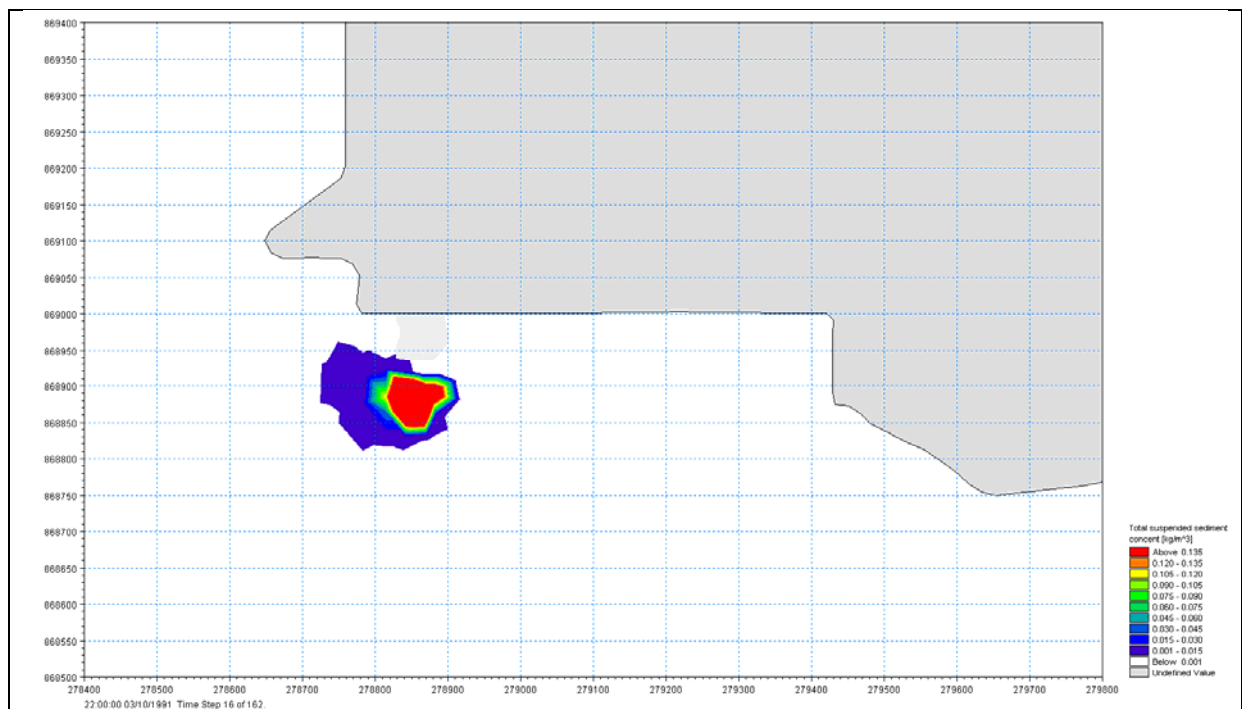
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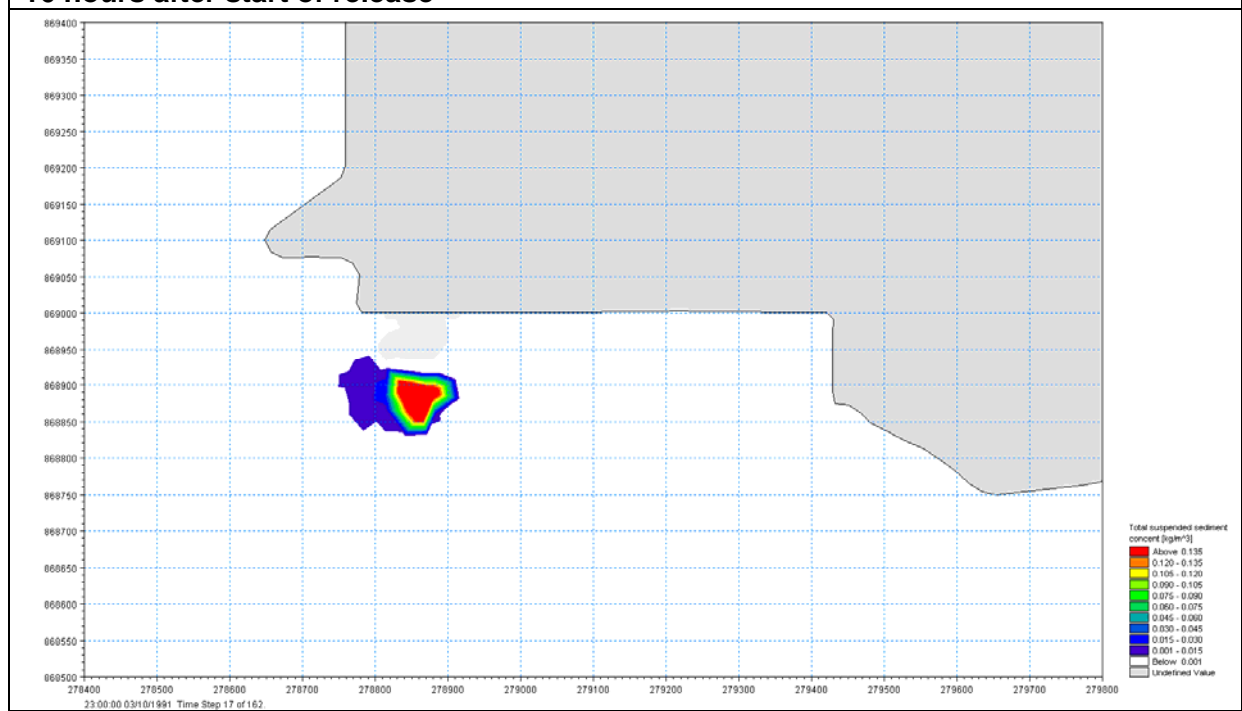
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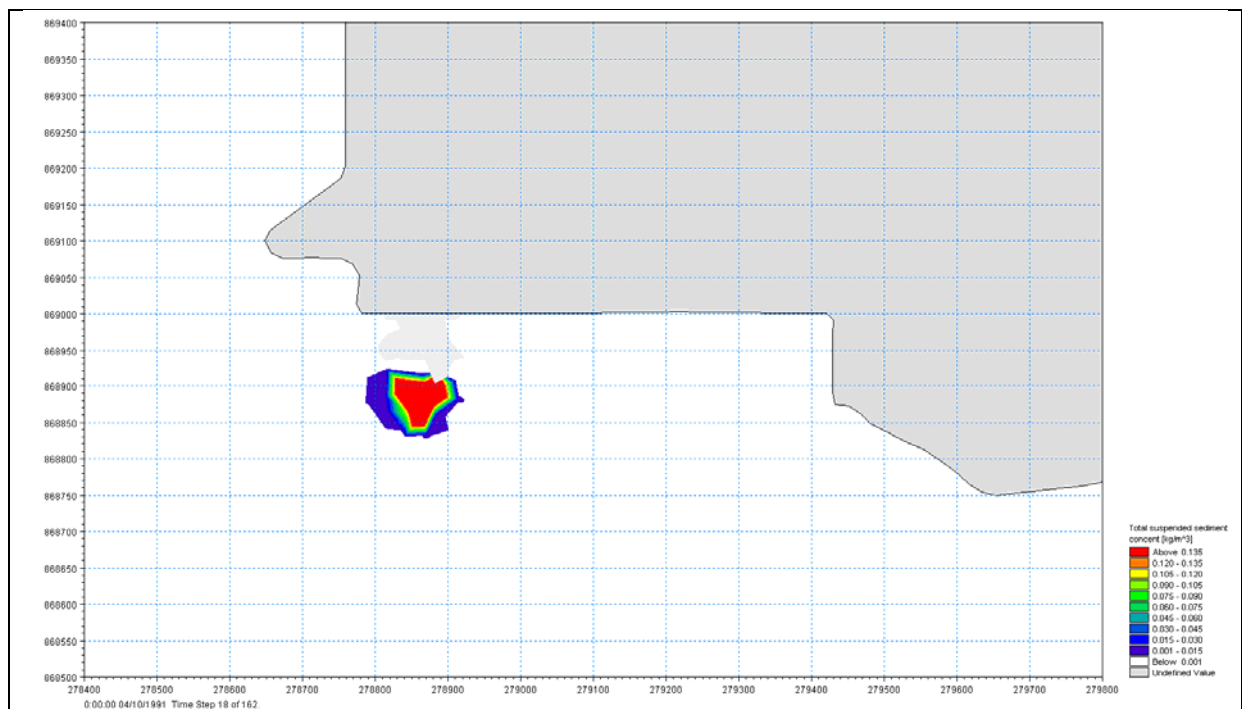


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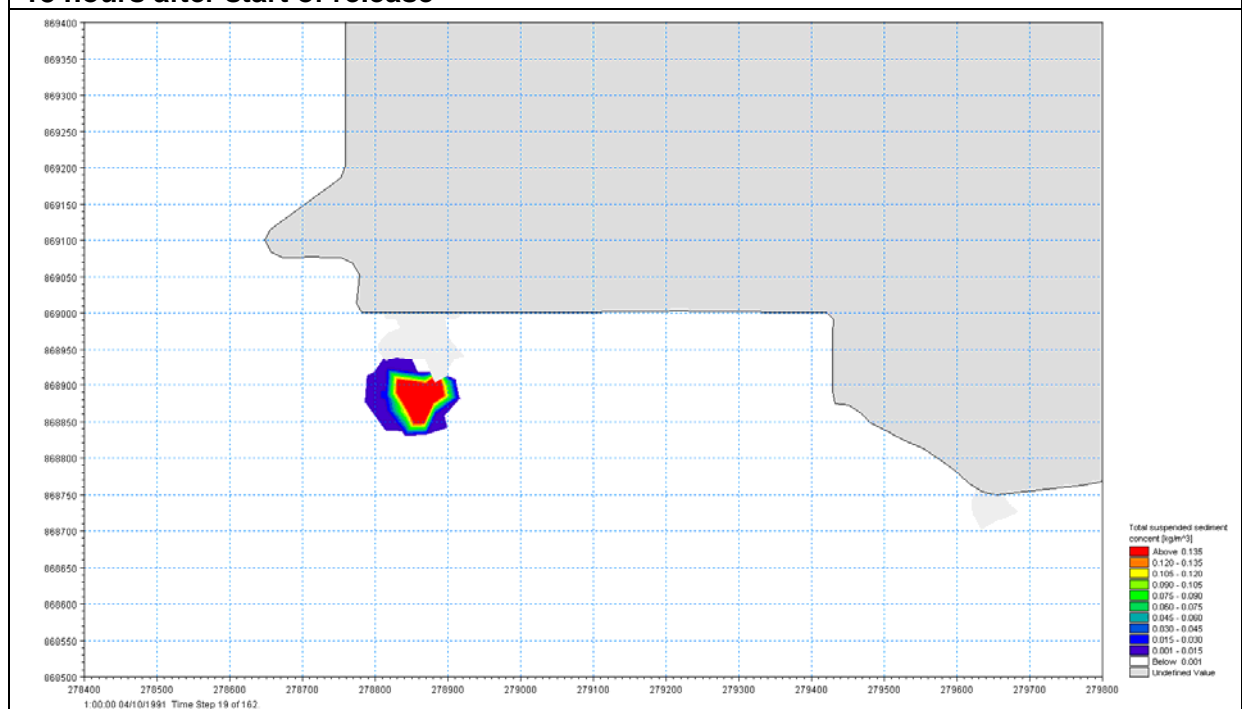


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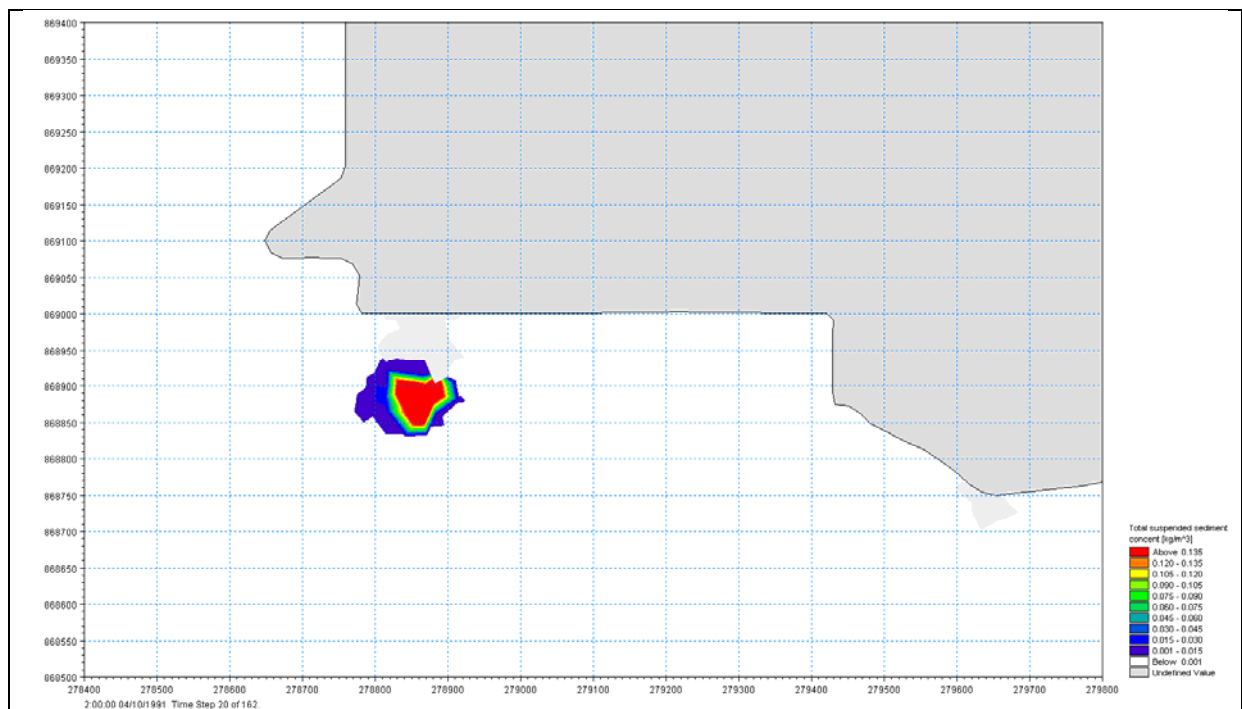




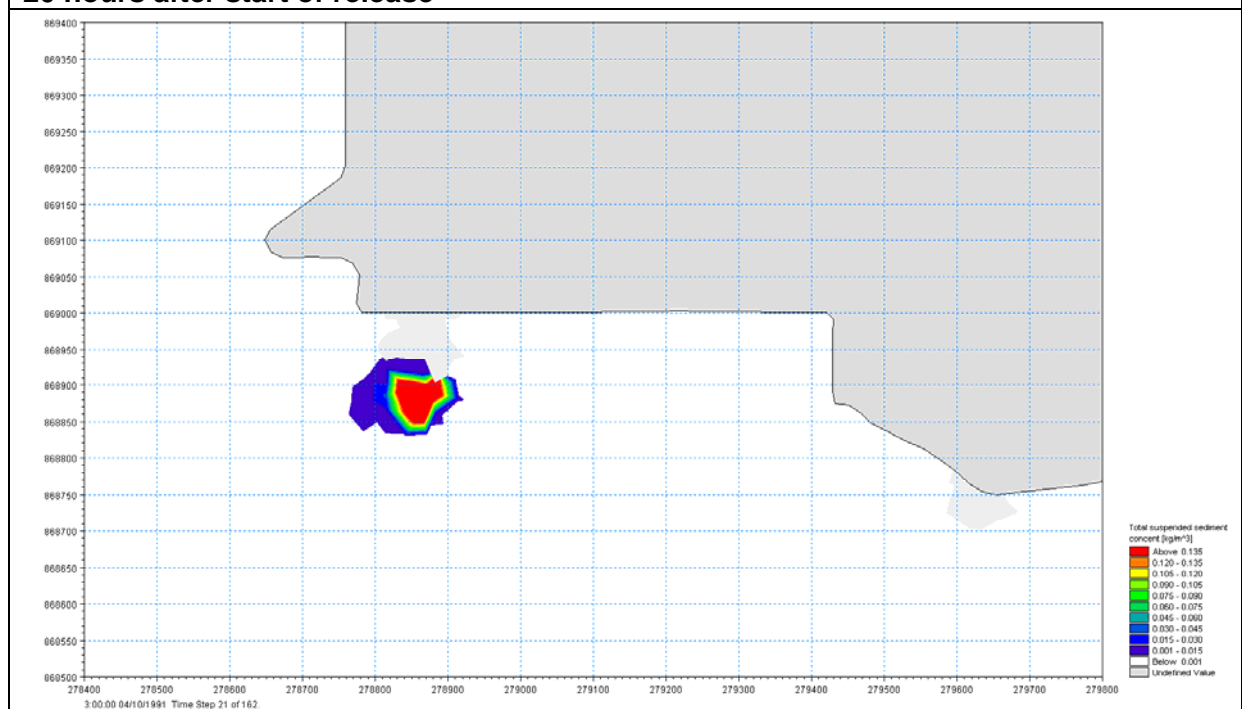
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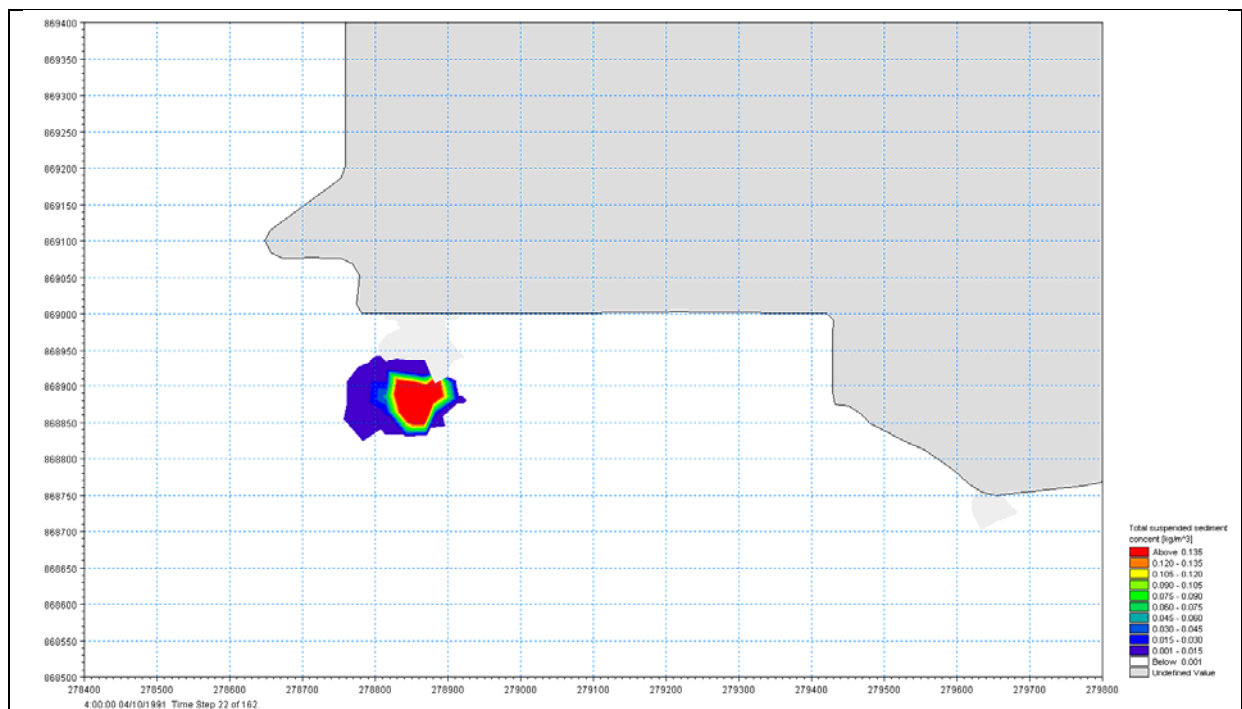
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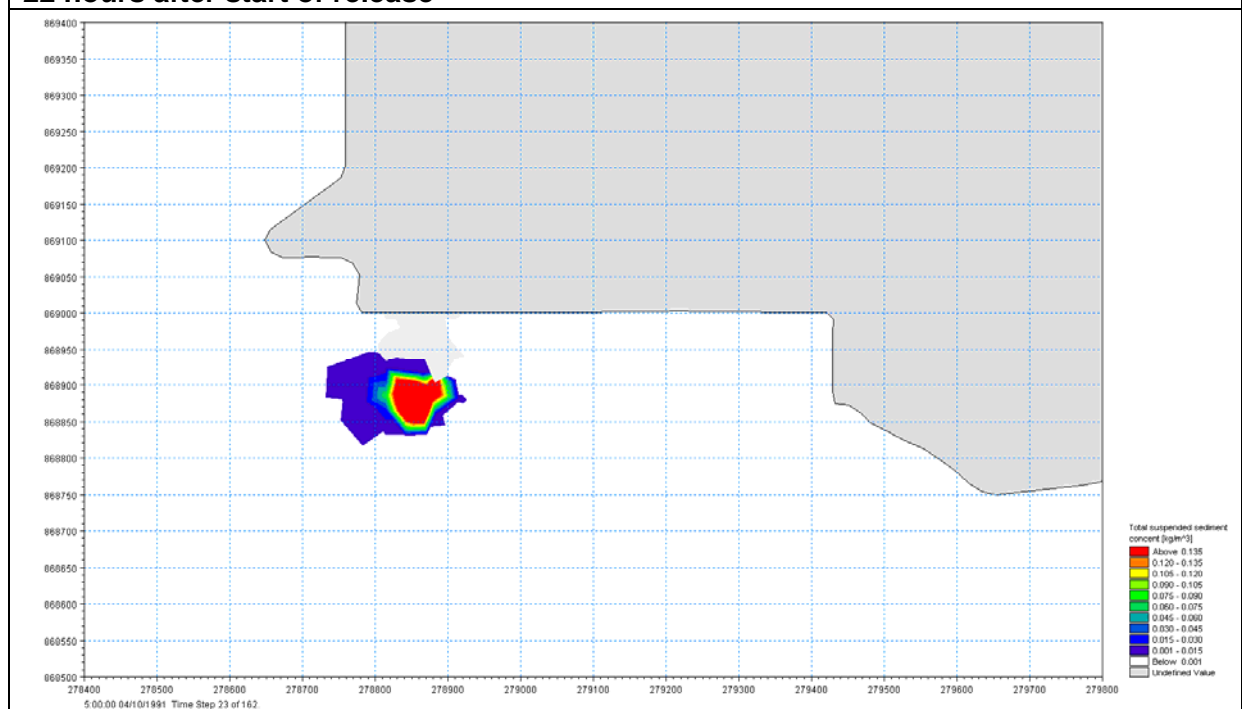
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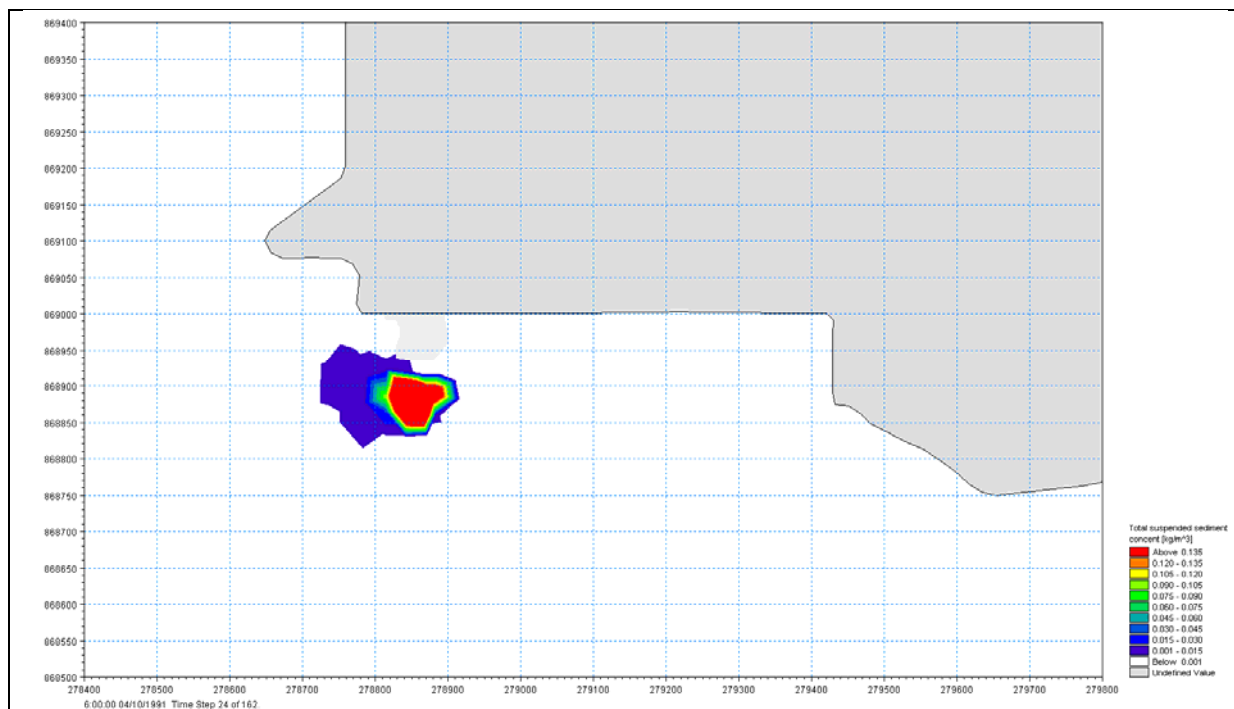
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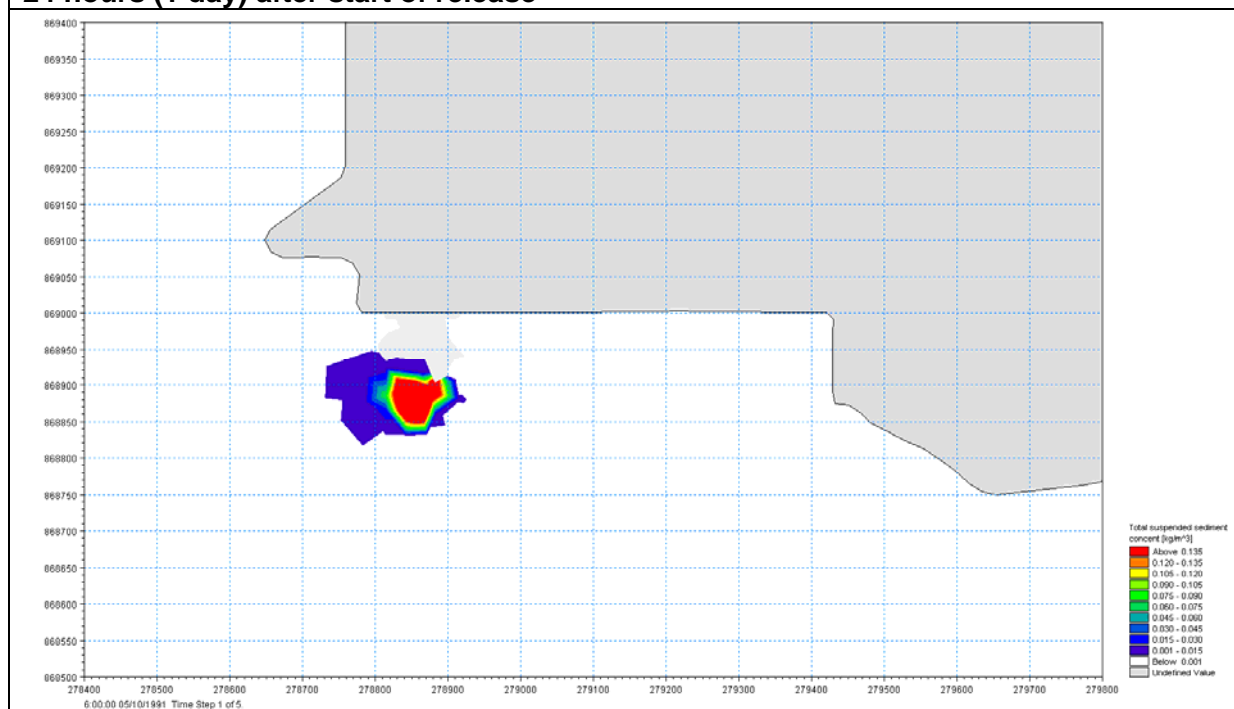
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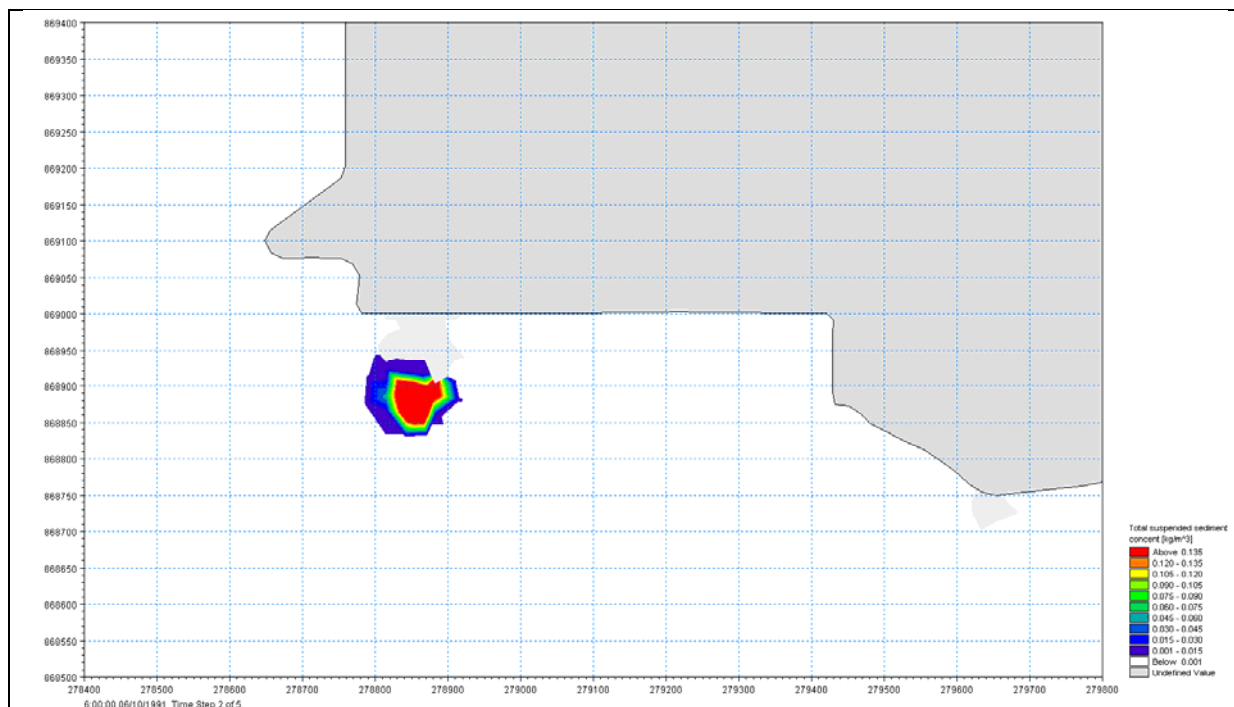
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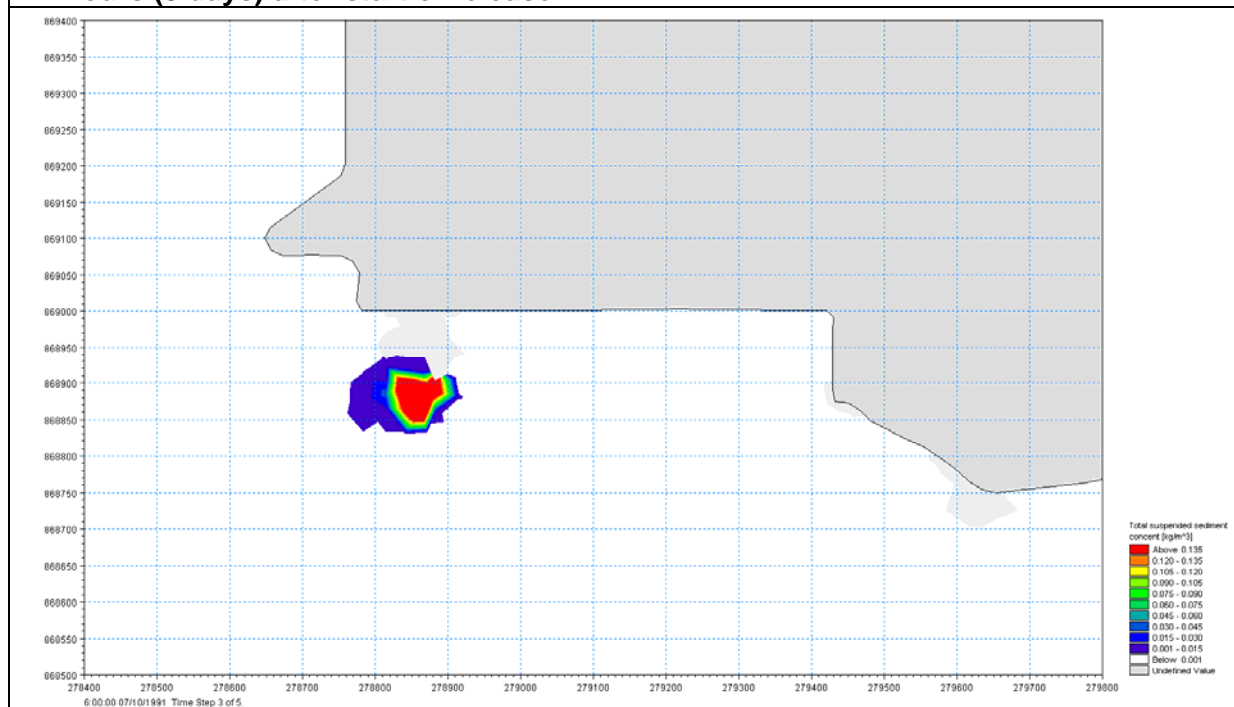
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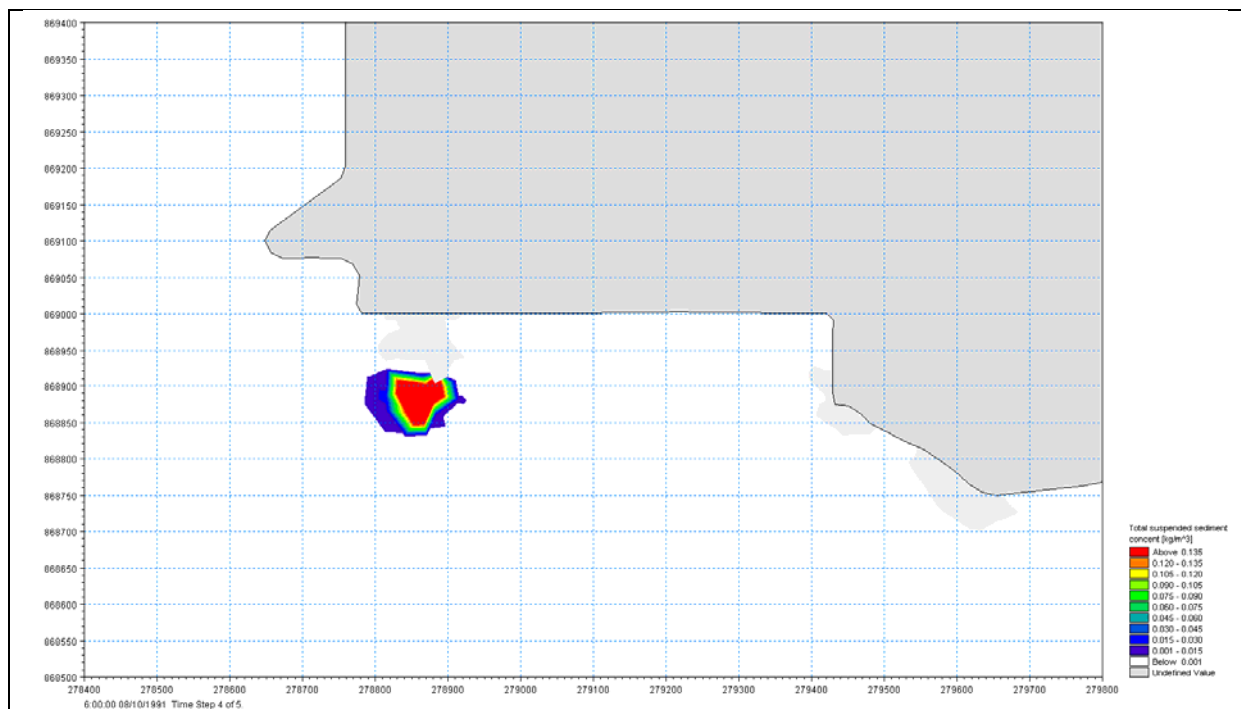
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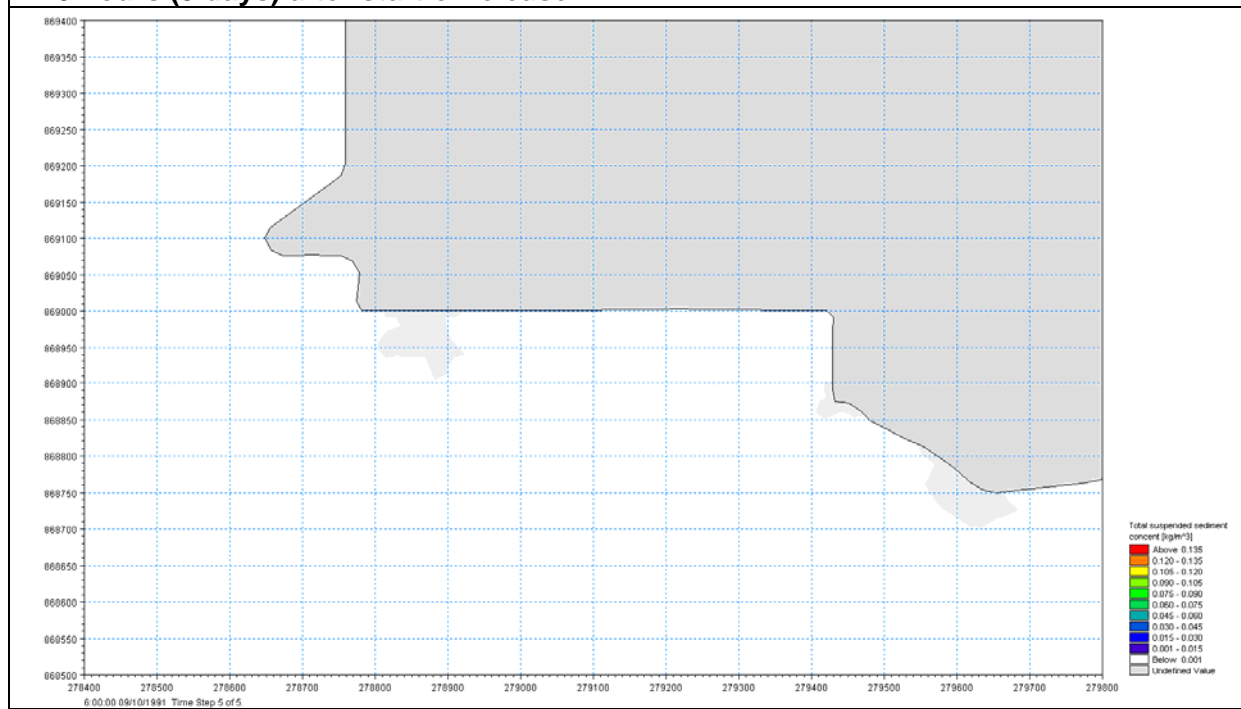
**72 hours (3 days) after start of release**



**96 hours (4 days) after start of release**



**120 hours (5 days) after start of release**

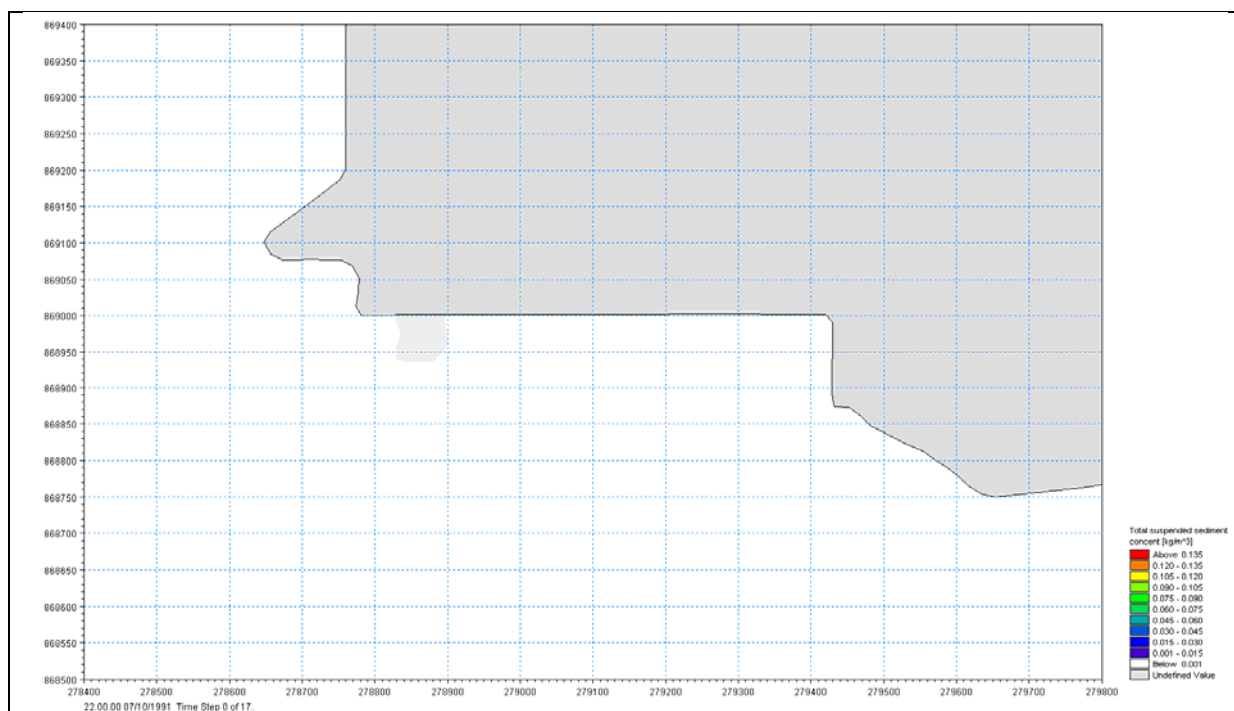


**144 hours (6 days) after start of release**

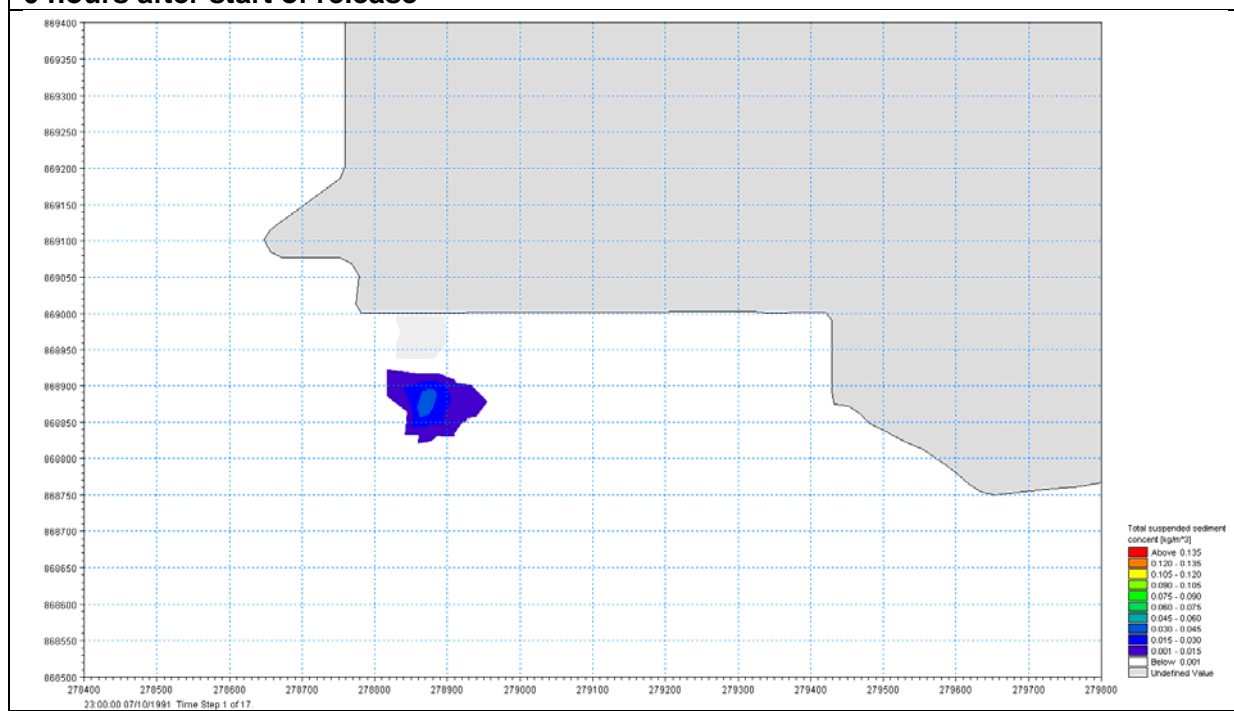
## **APPENDIX C**

### **SCENARIO 3 MODELLING RESULTS**

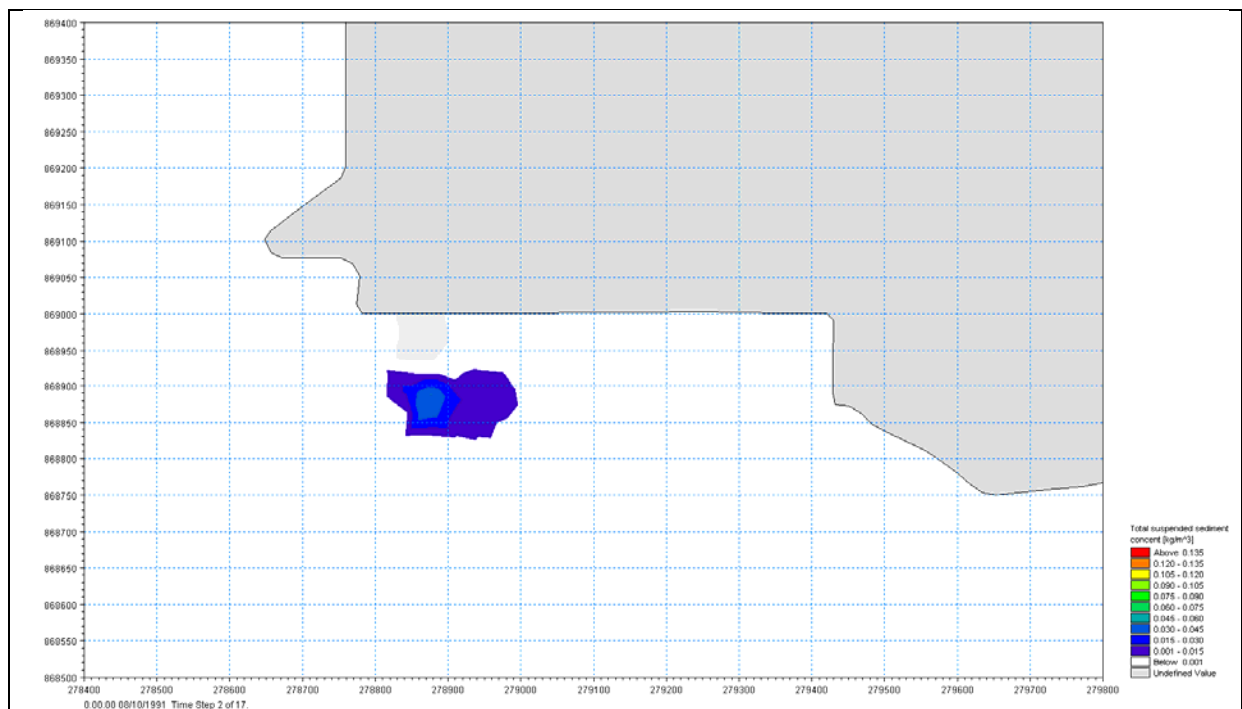




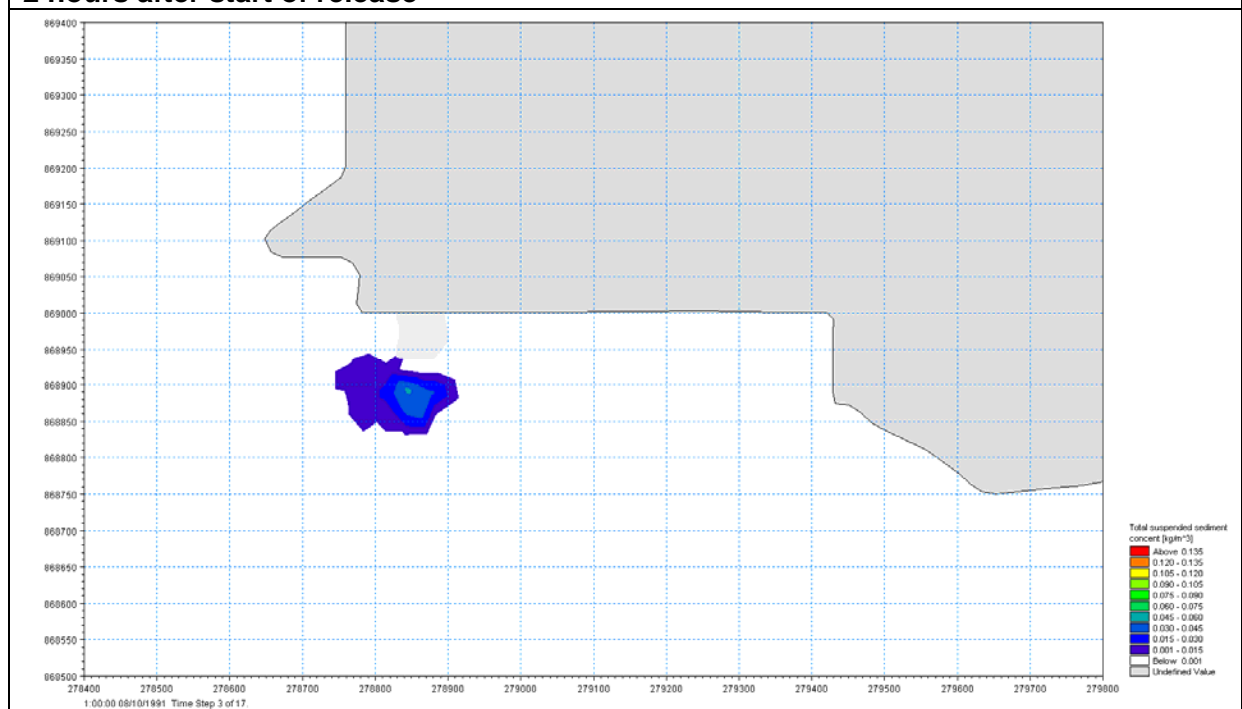
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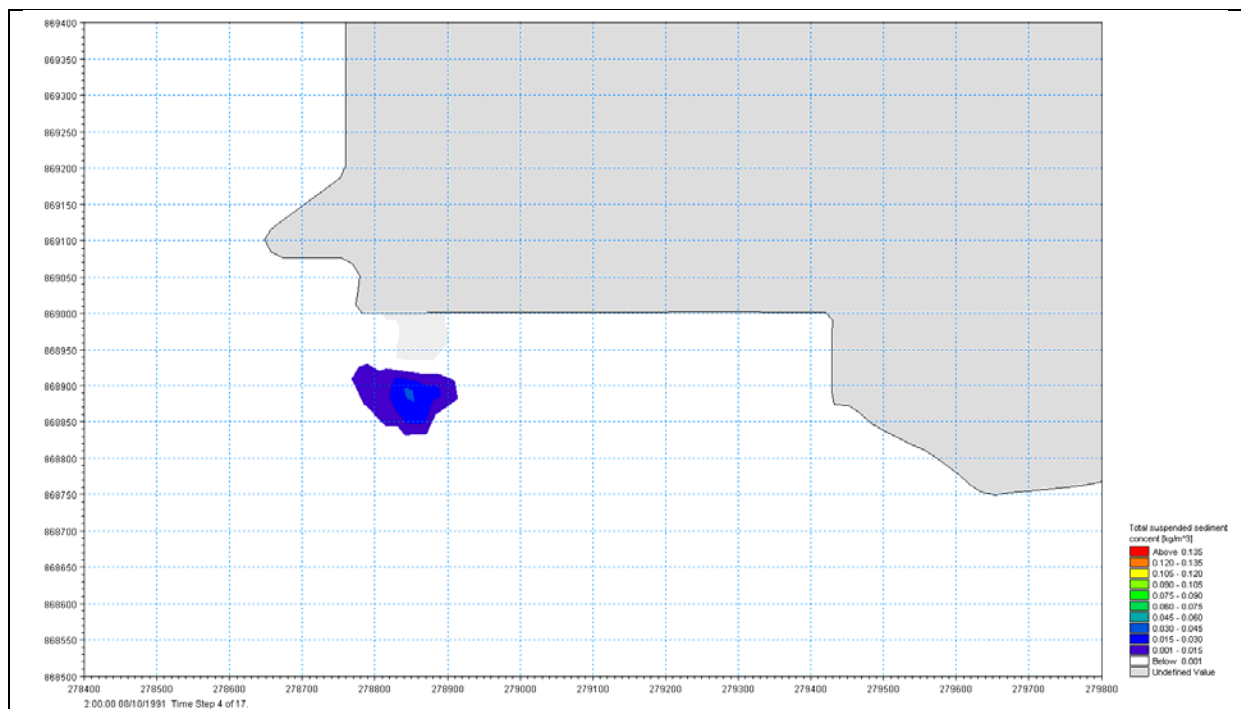
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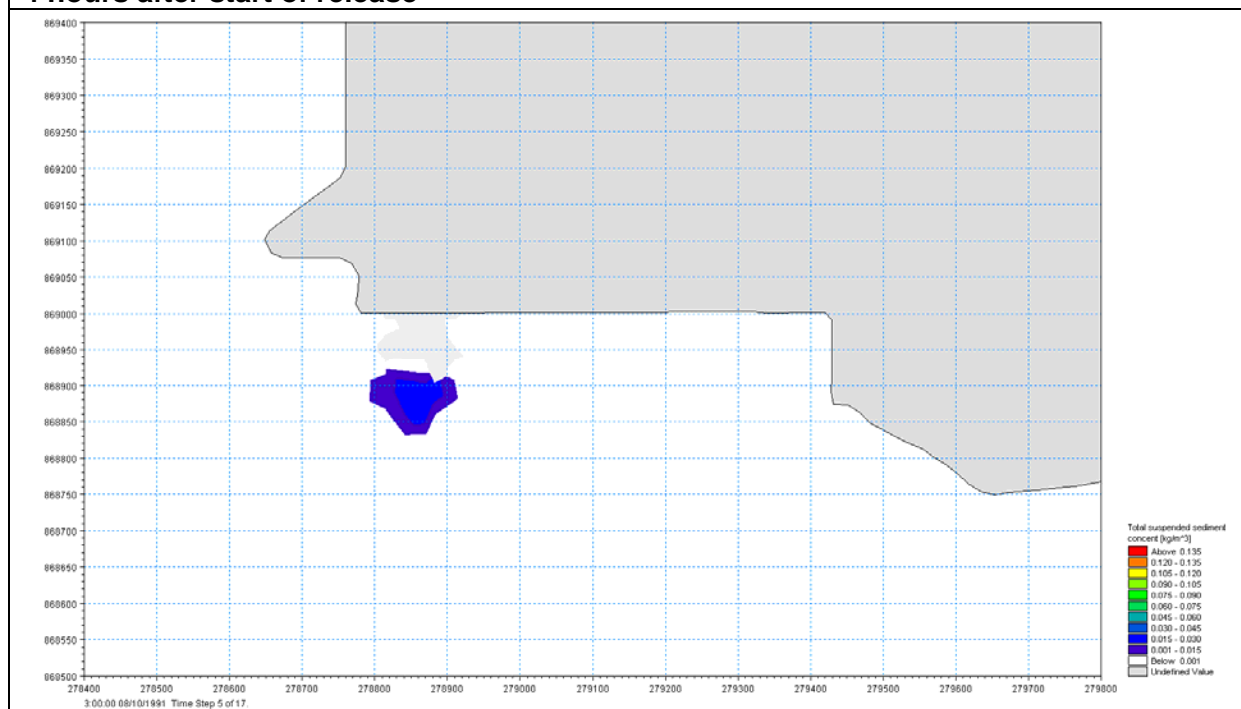
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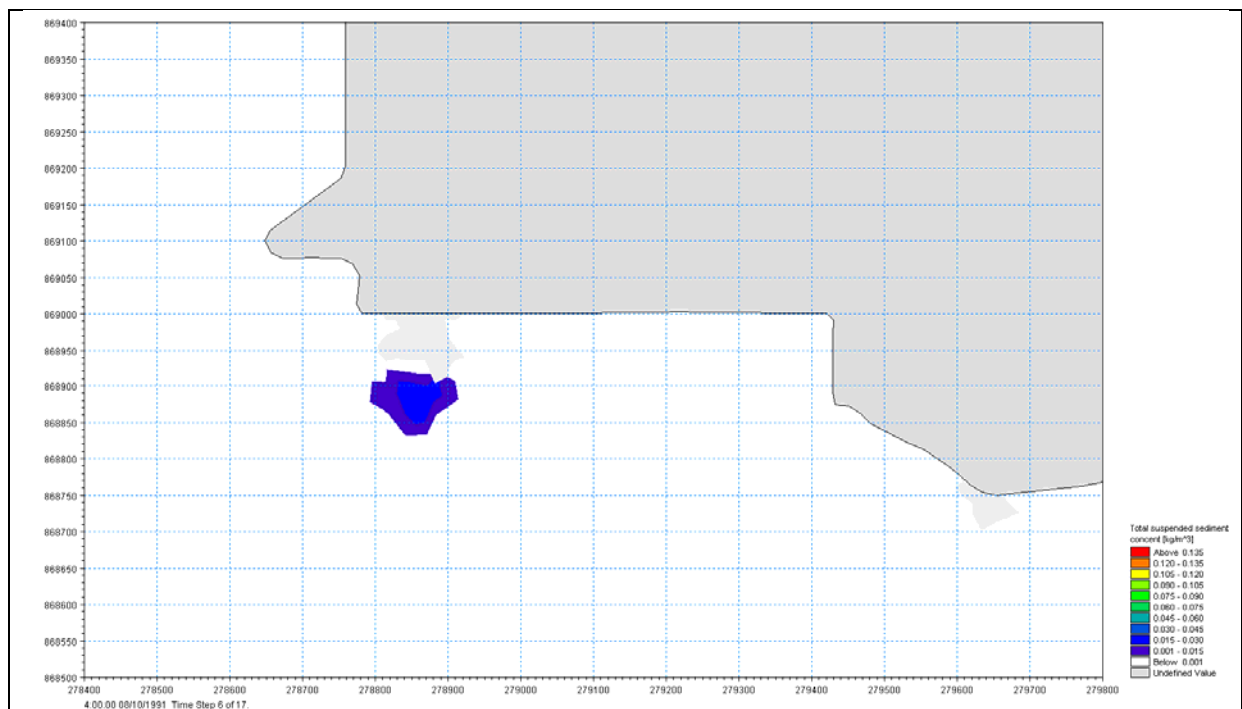
**3 hours after start of release**



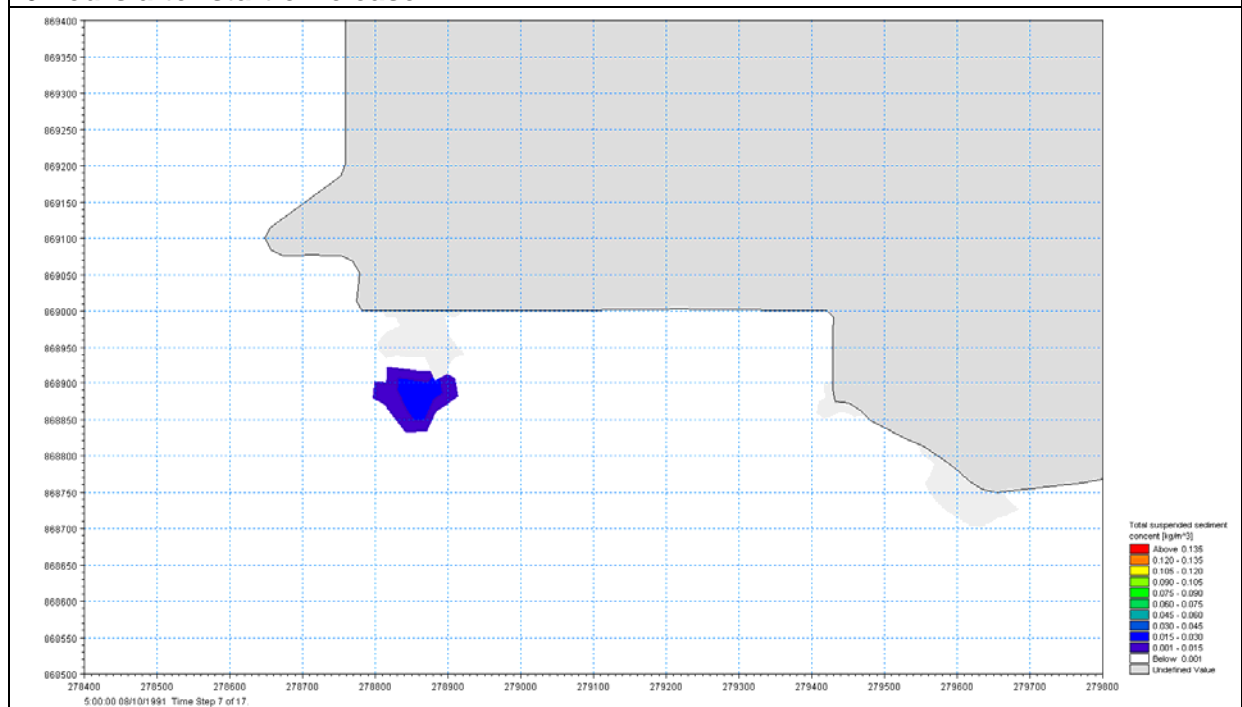
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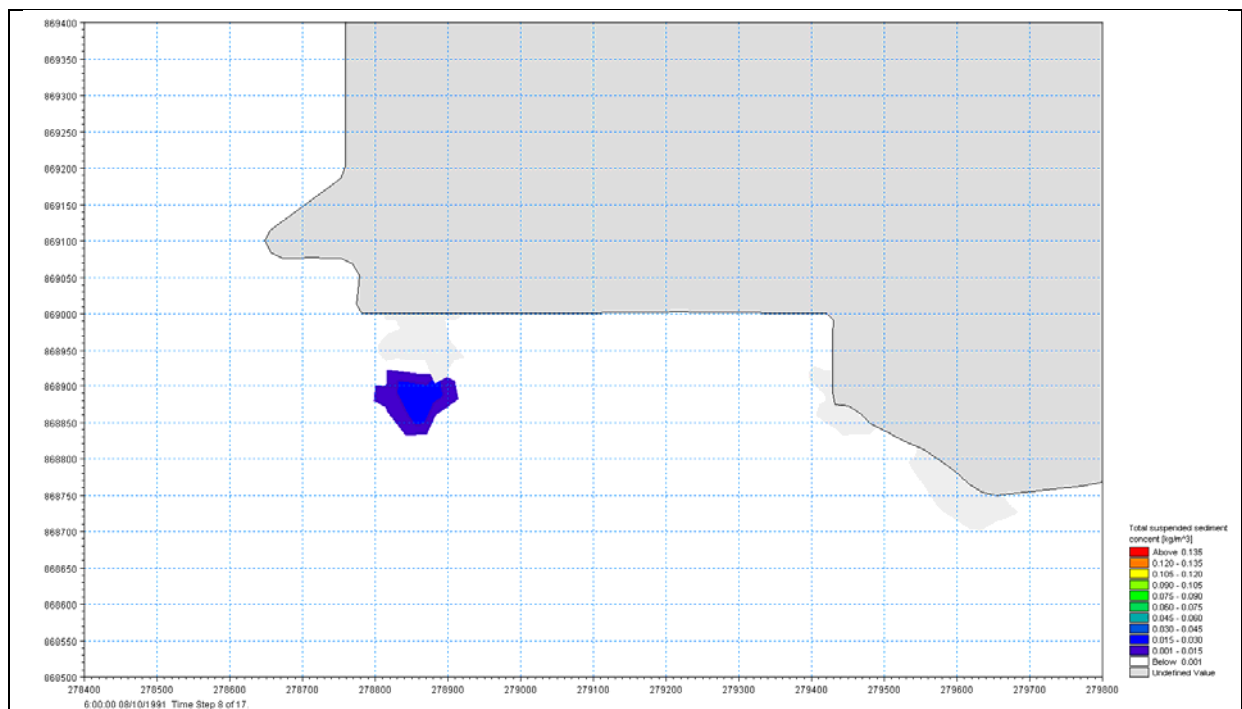
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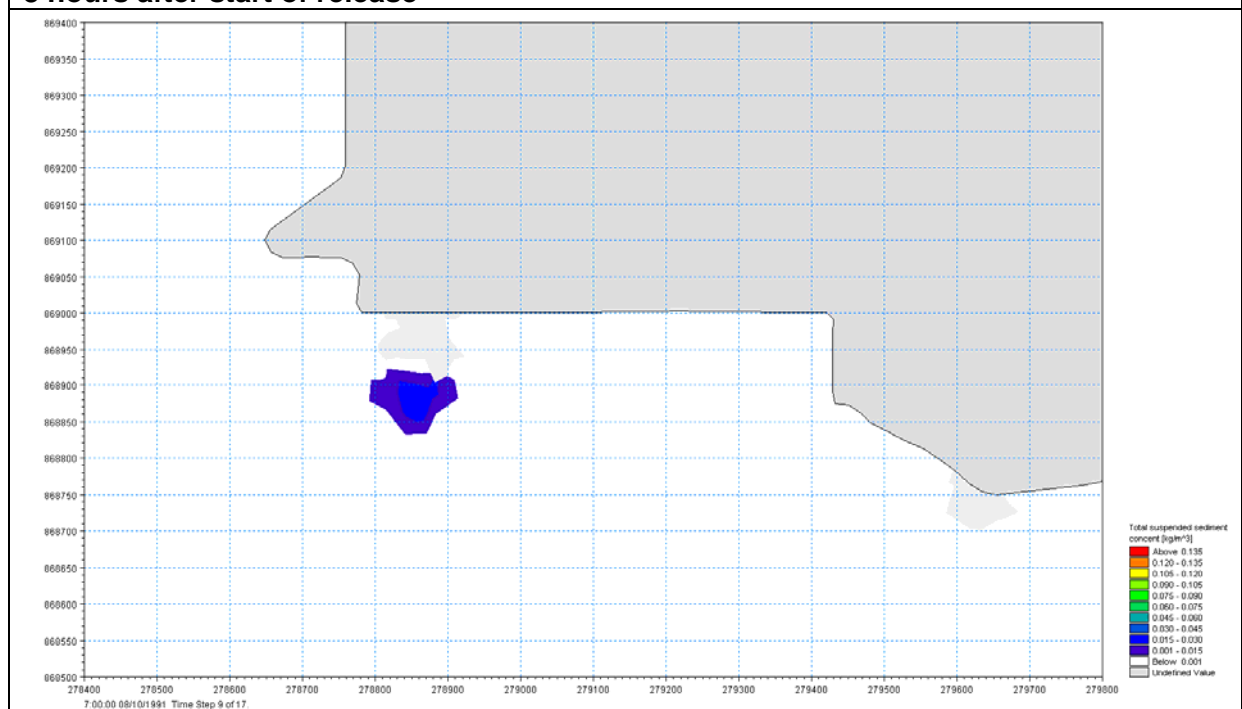
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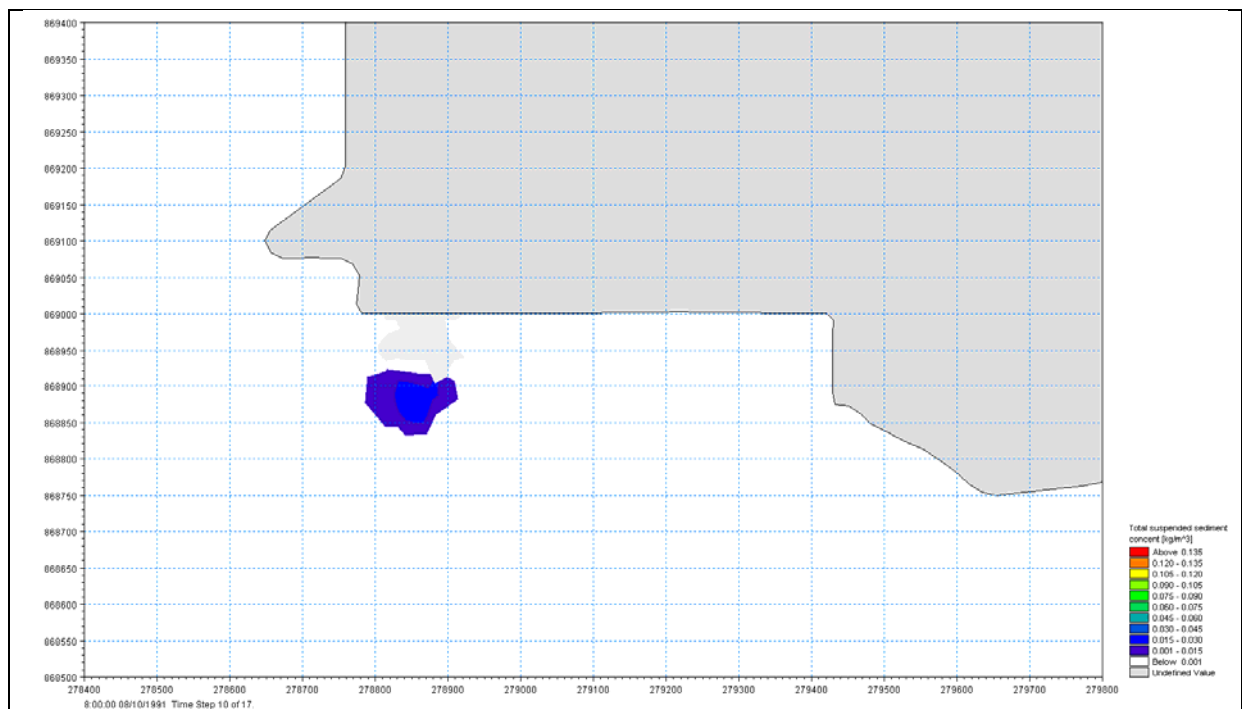
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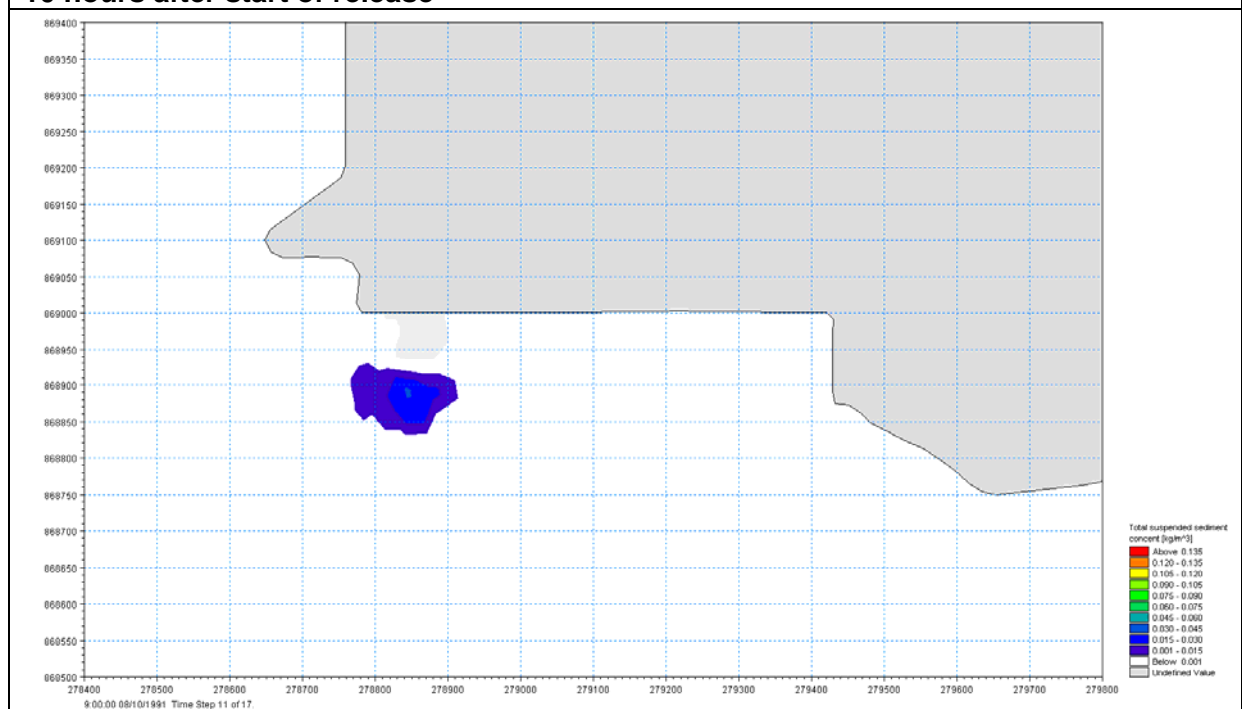
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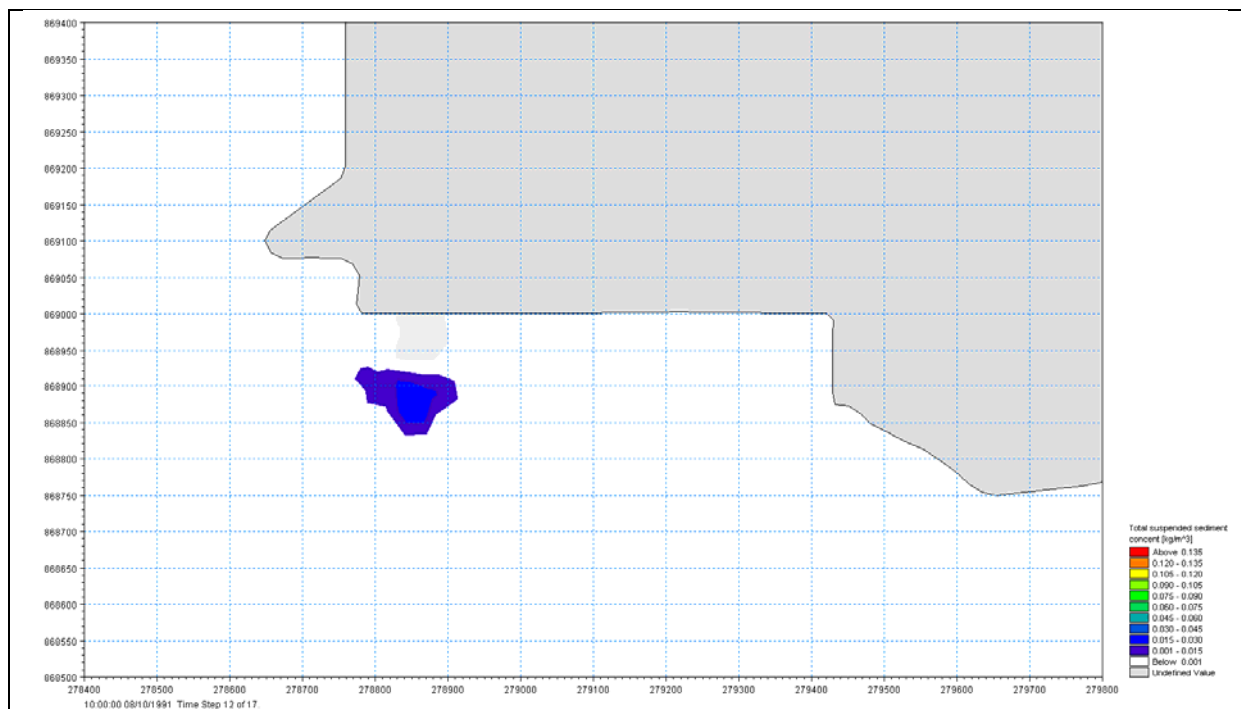
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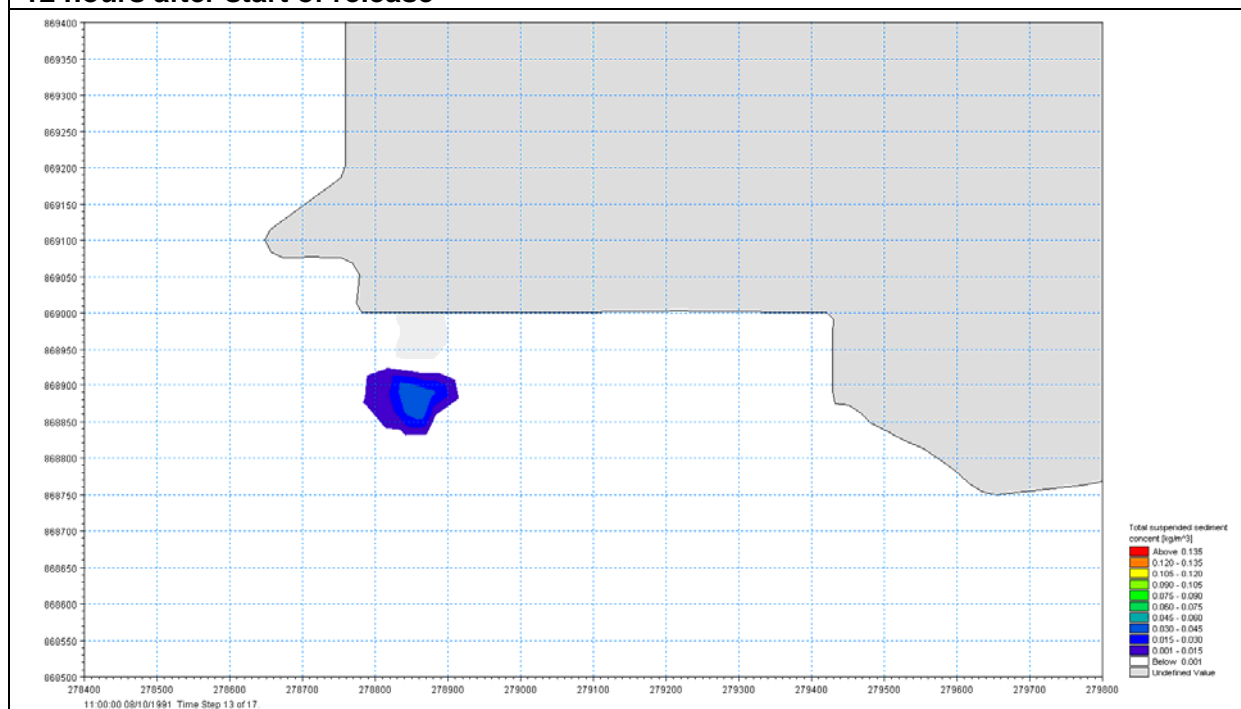
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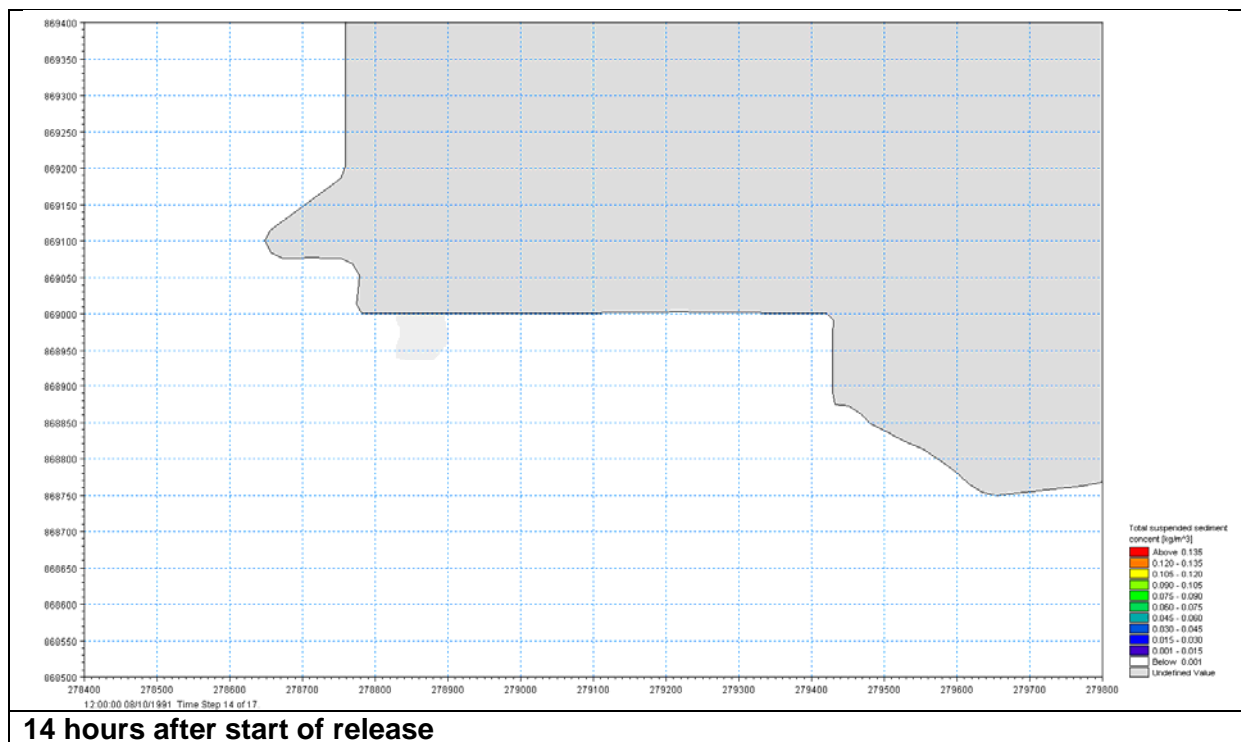


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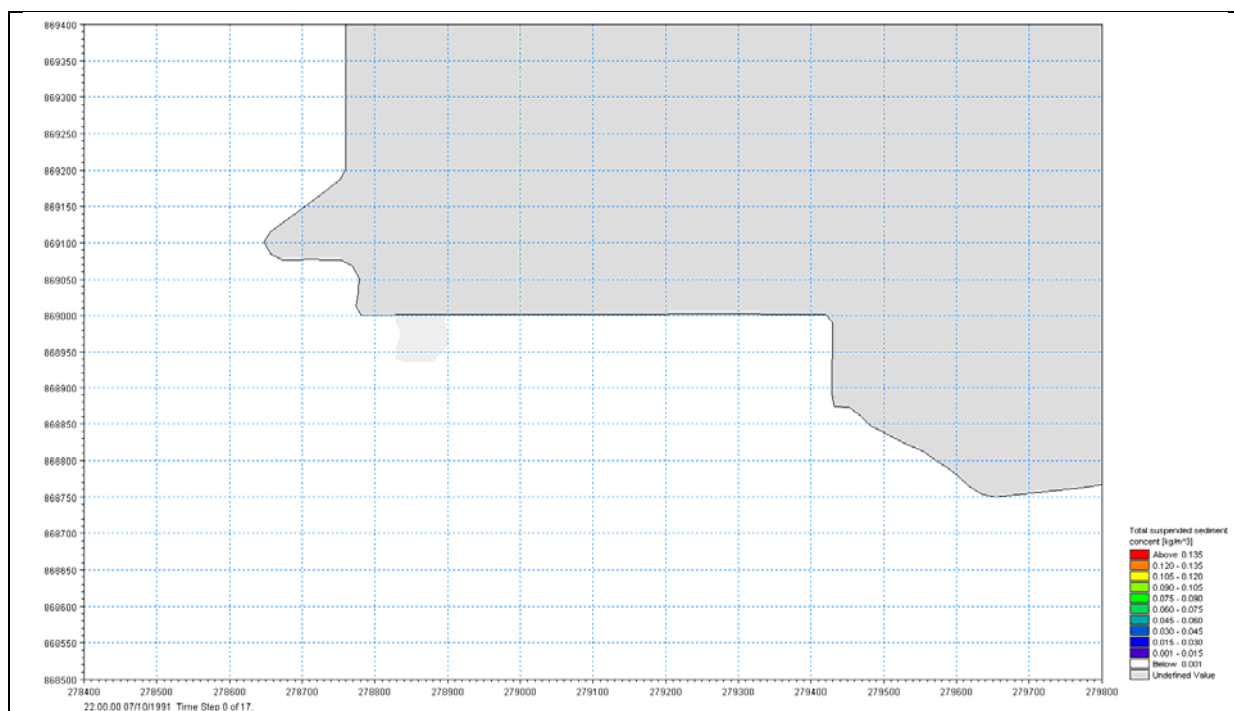
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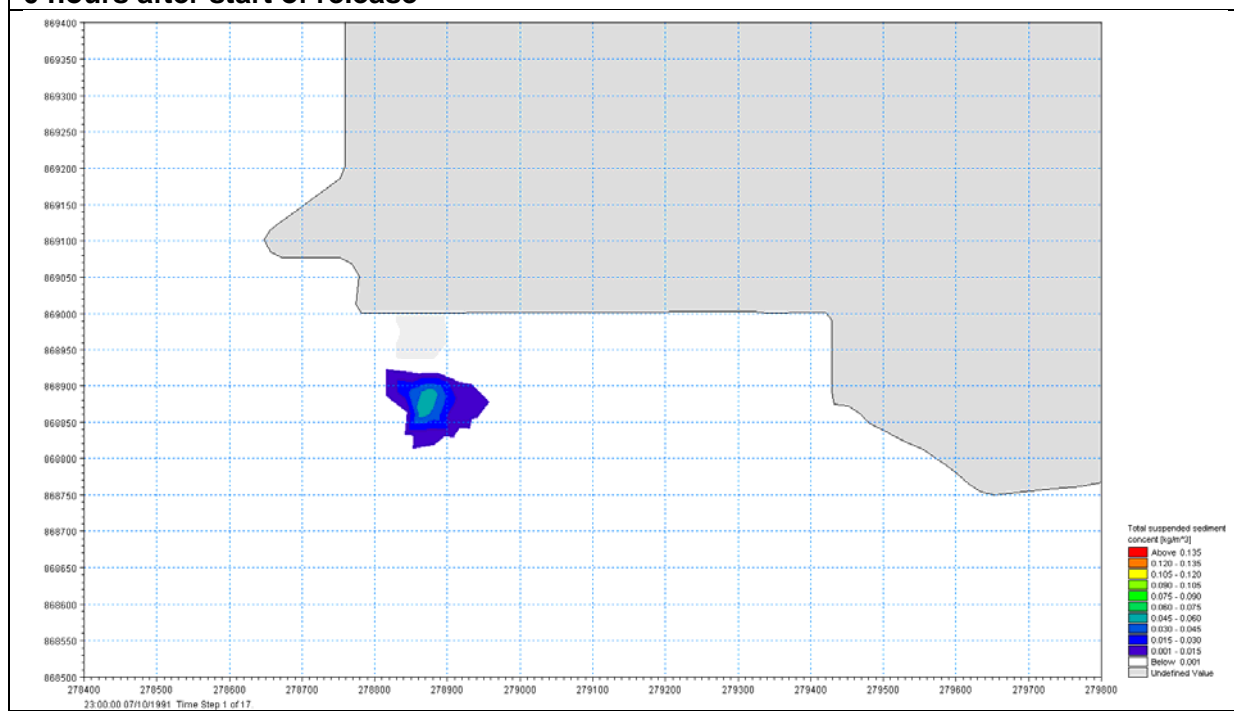


## **APPENDIX D**

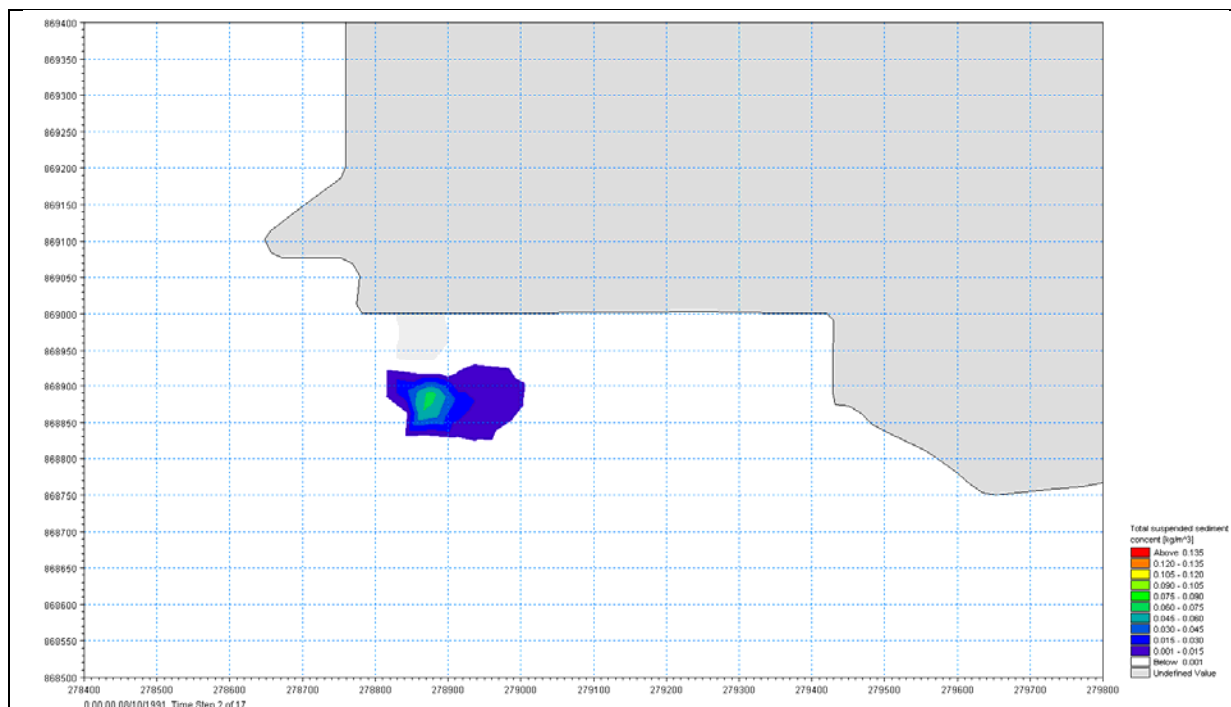
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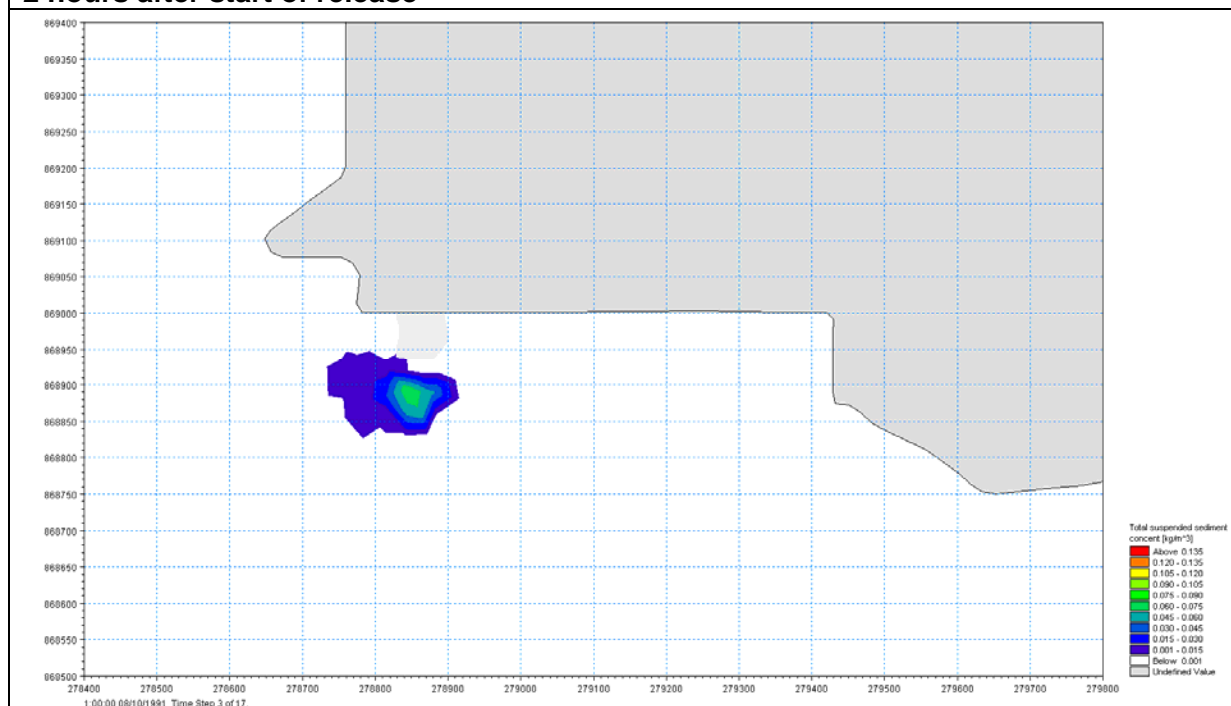
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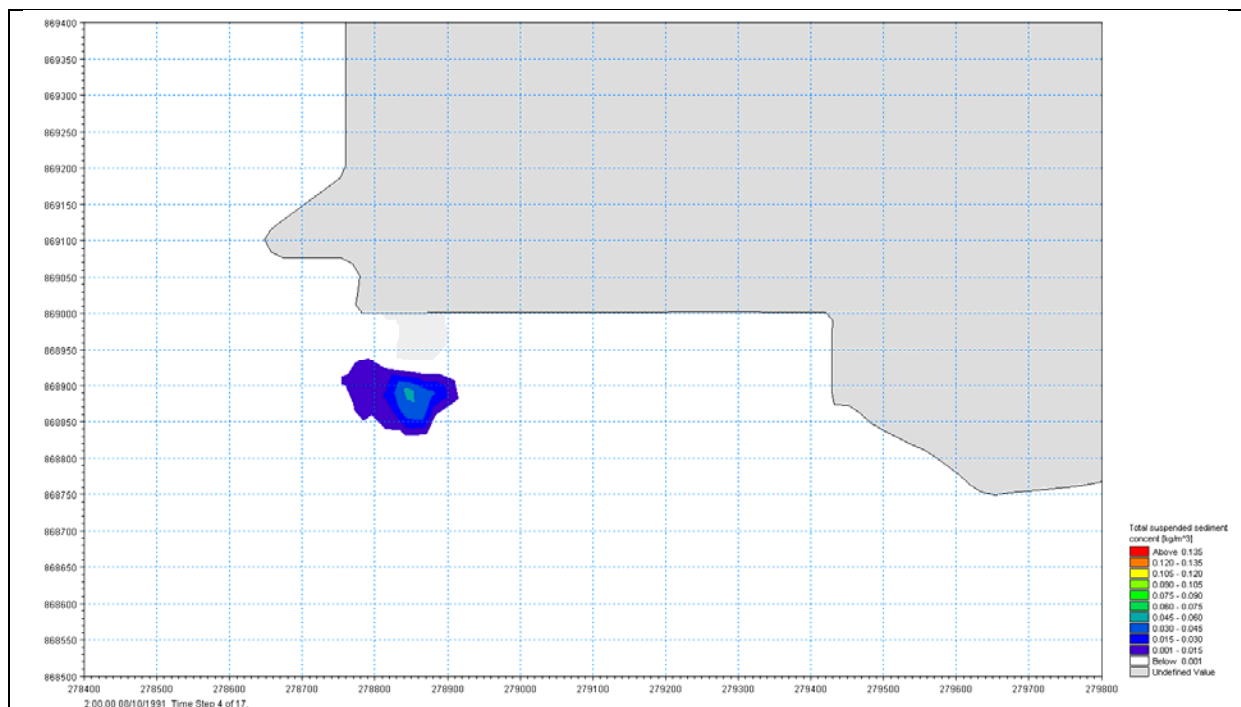
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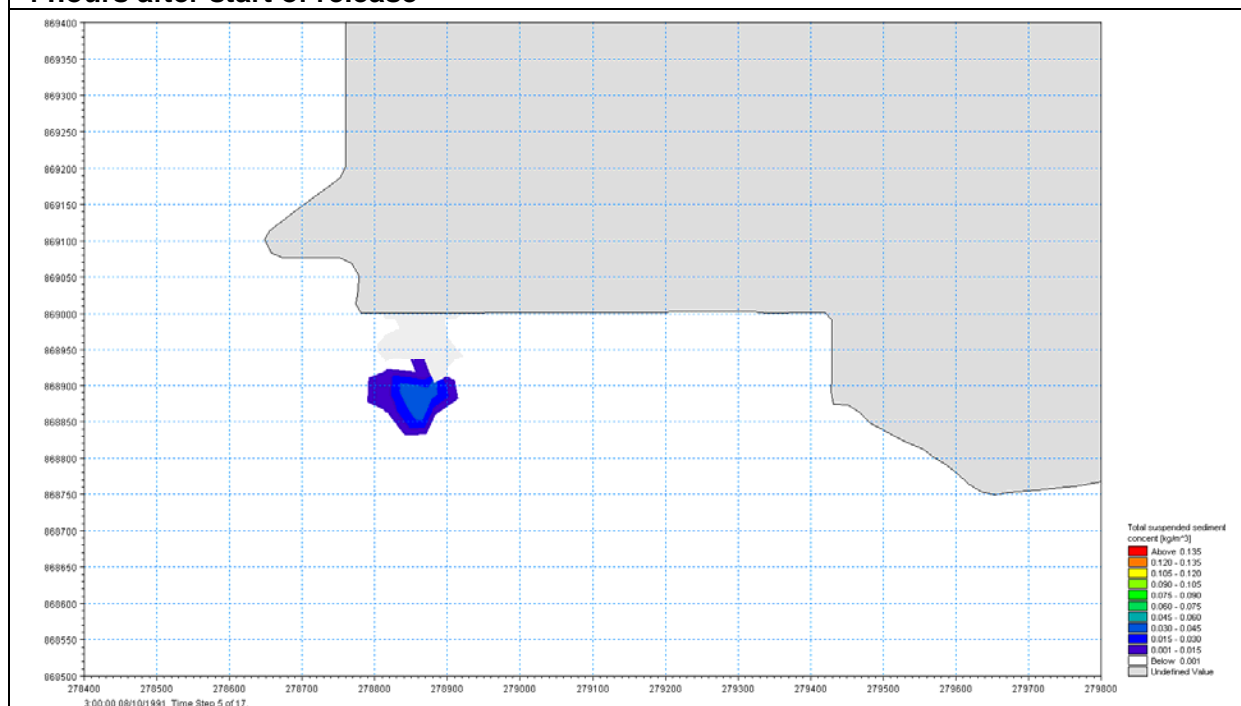
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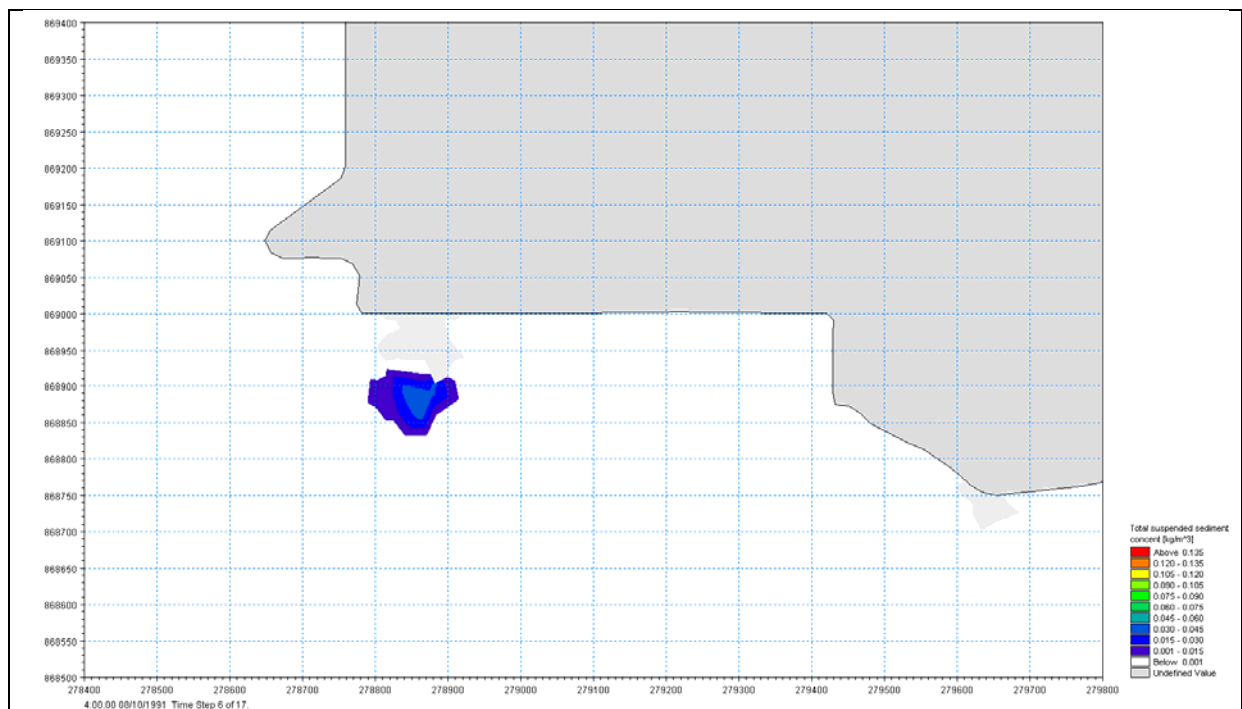
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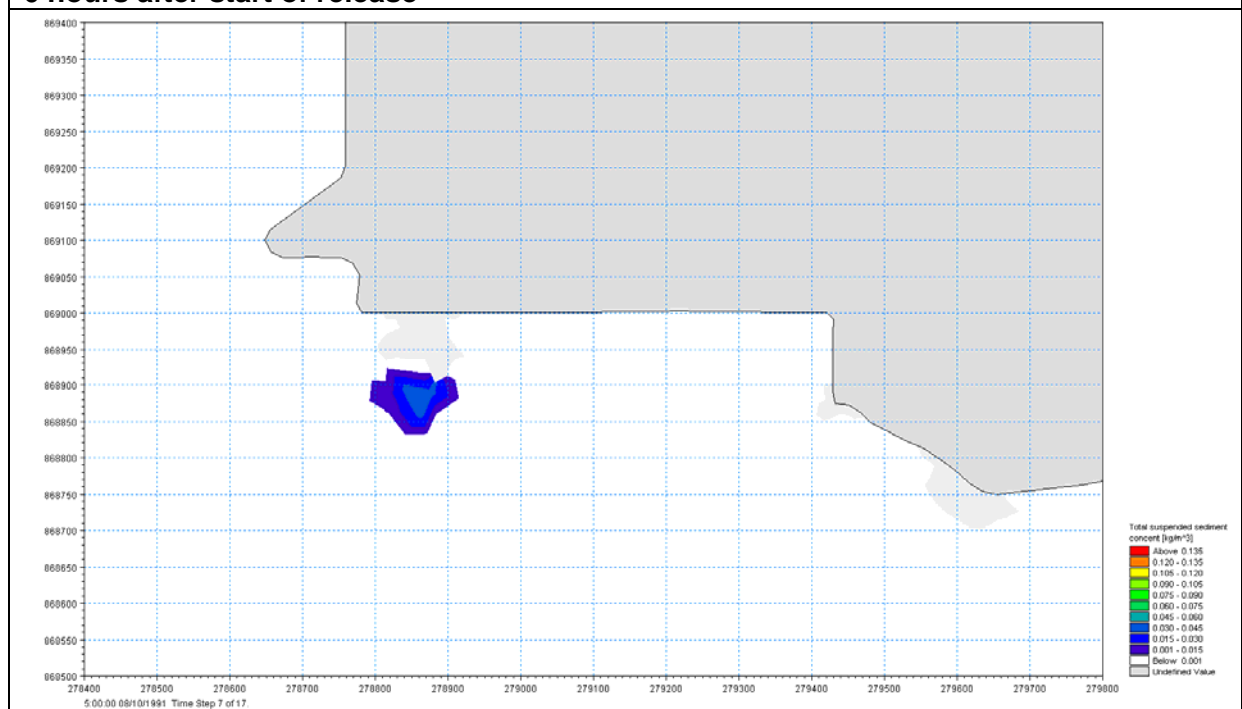
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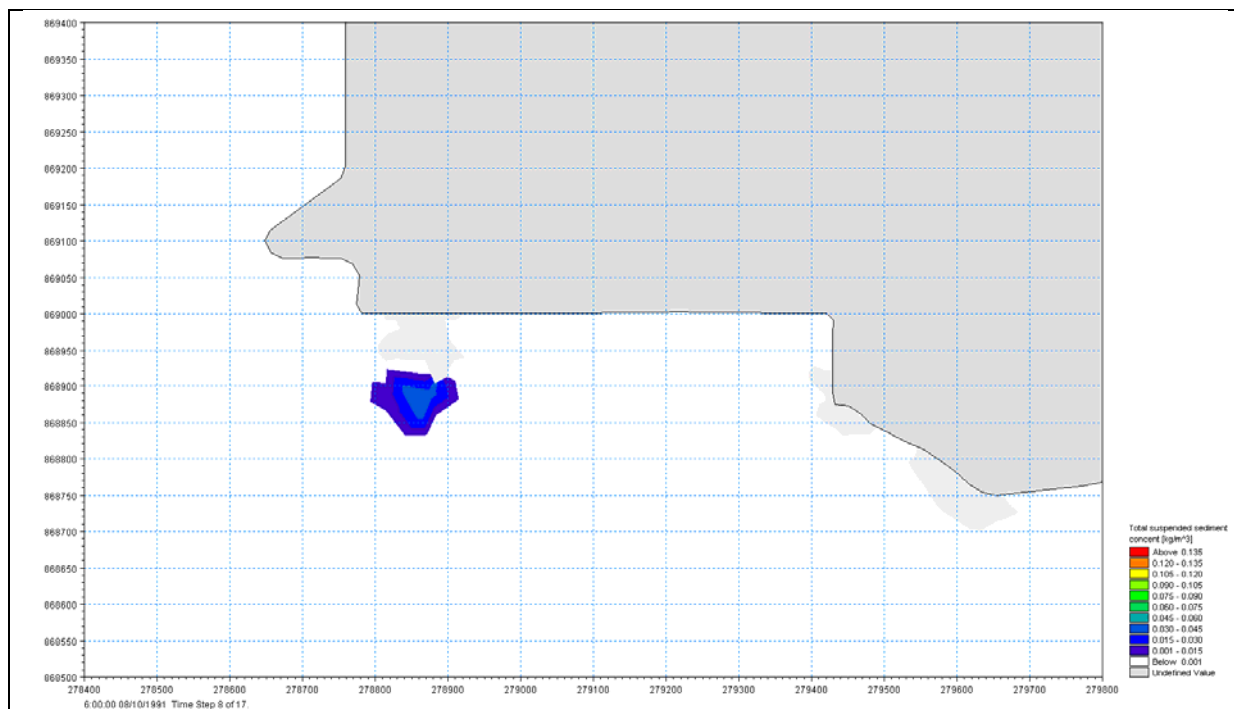
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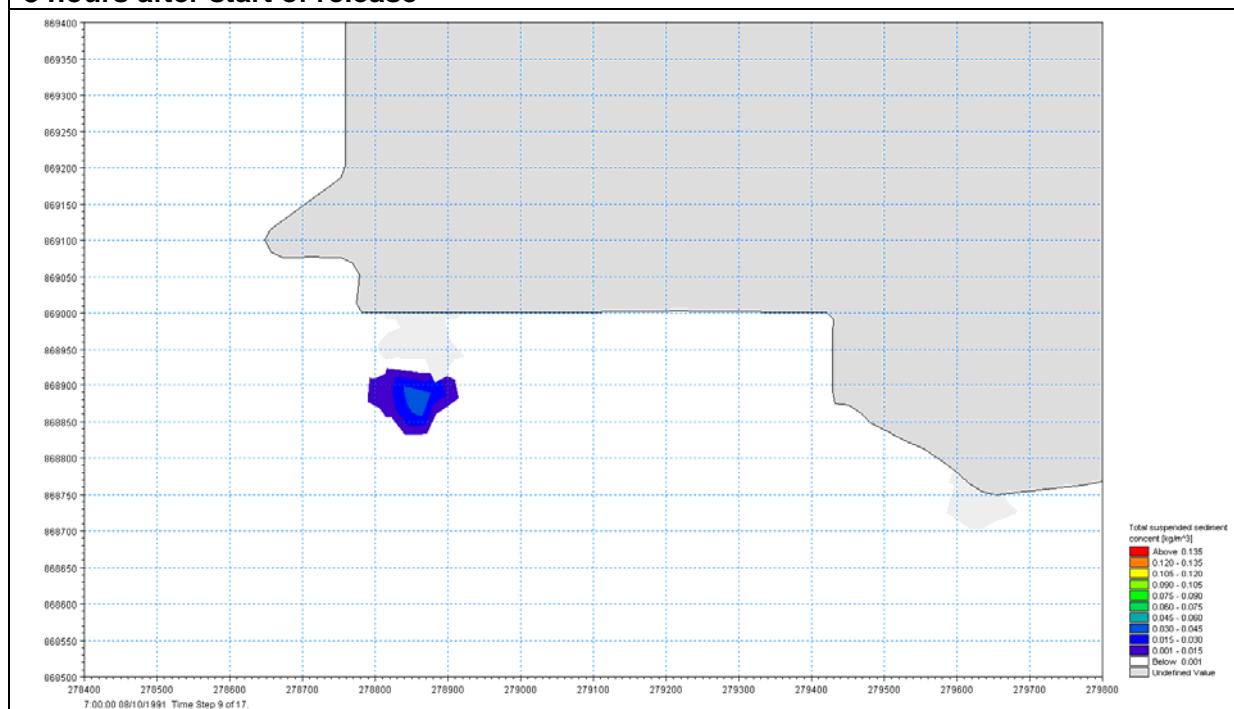
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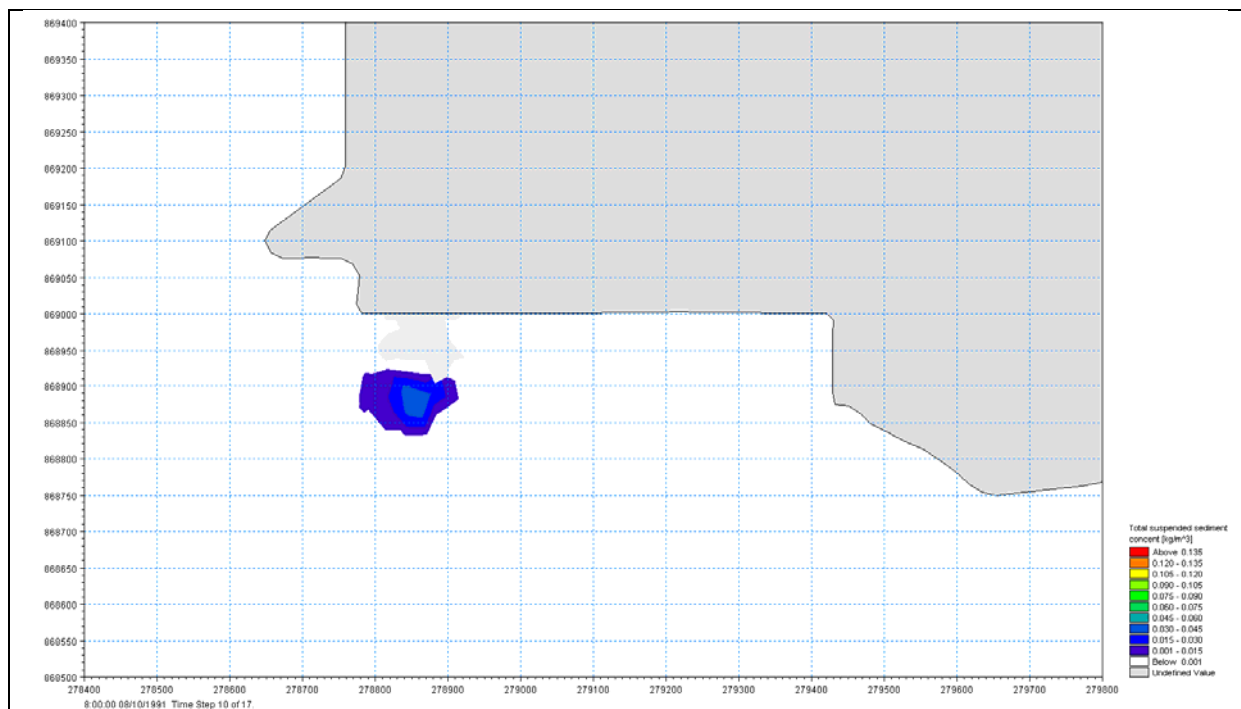


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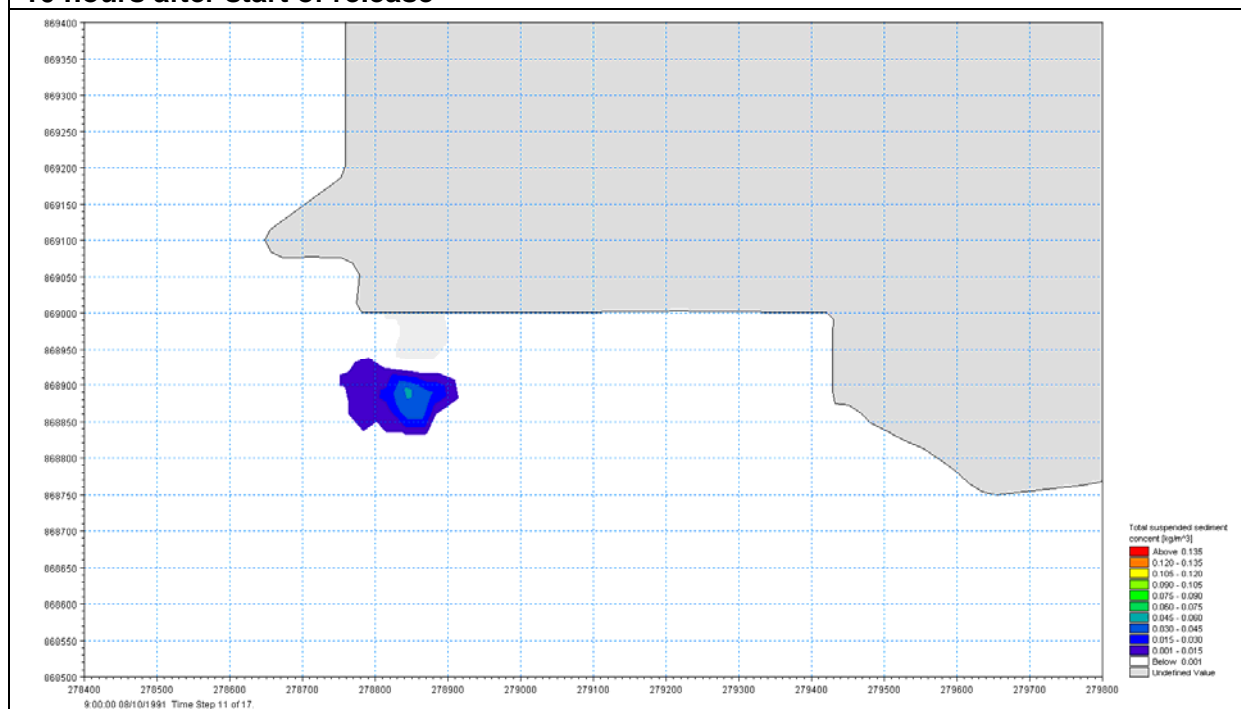


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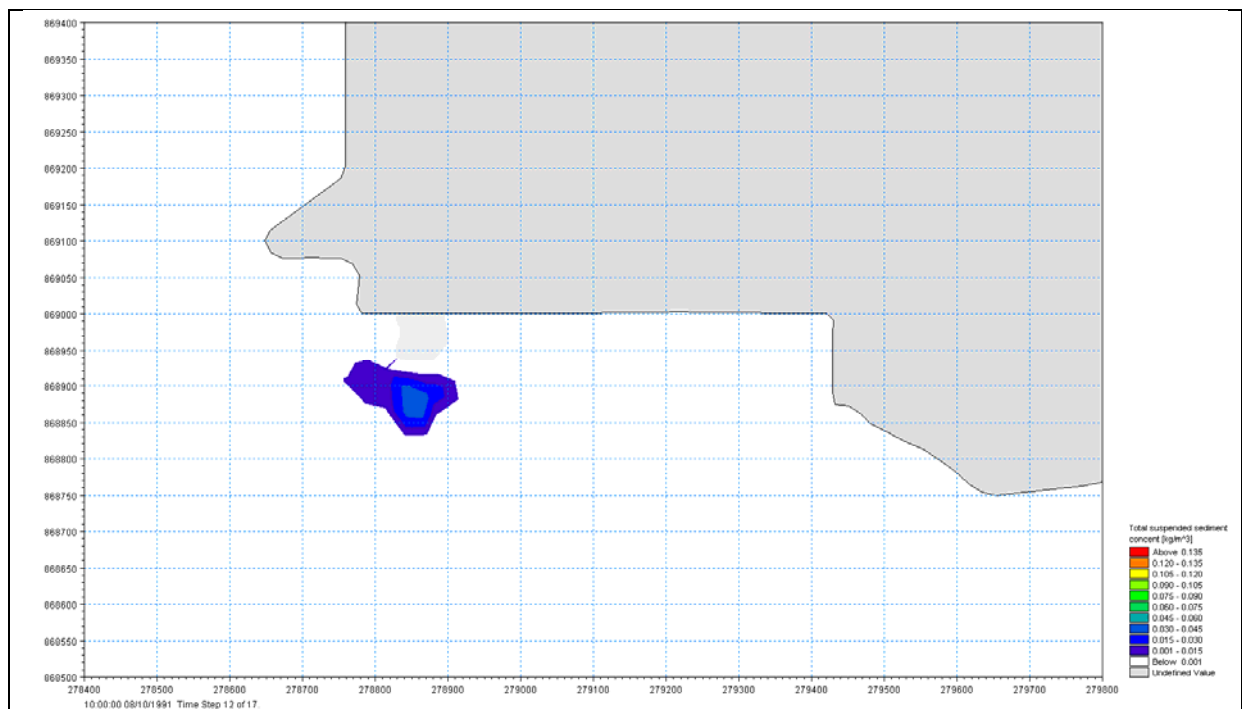




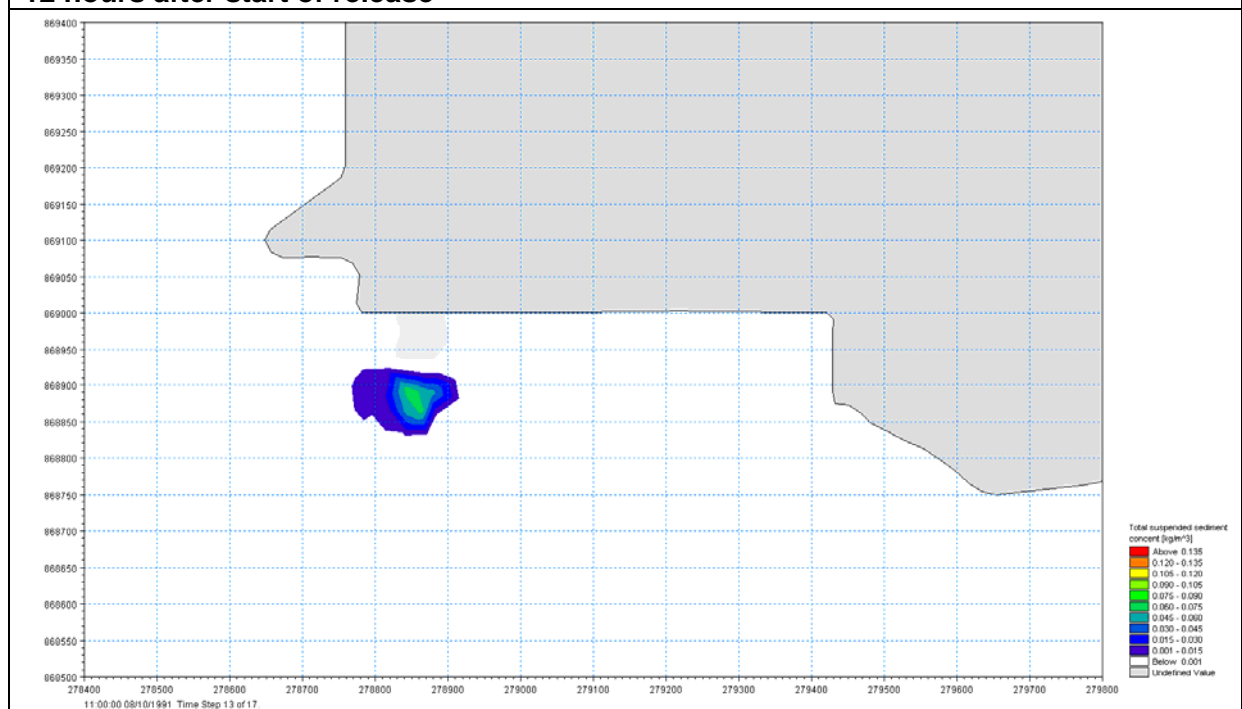
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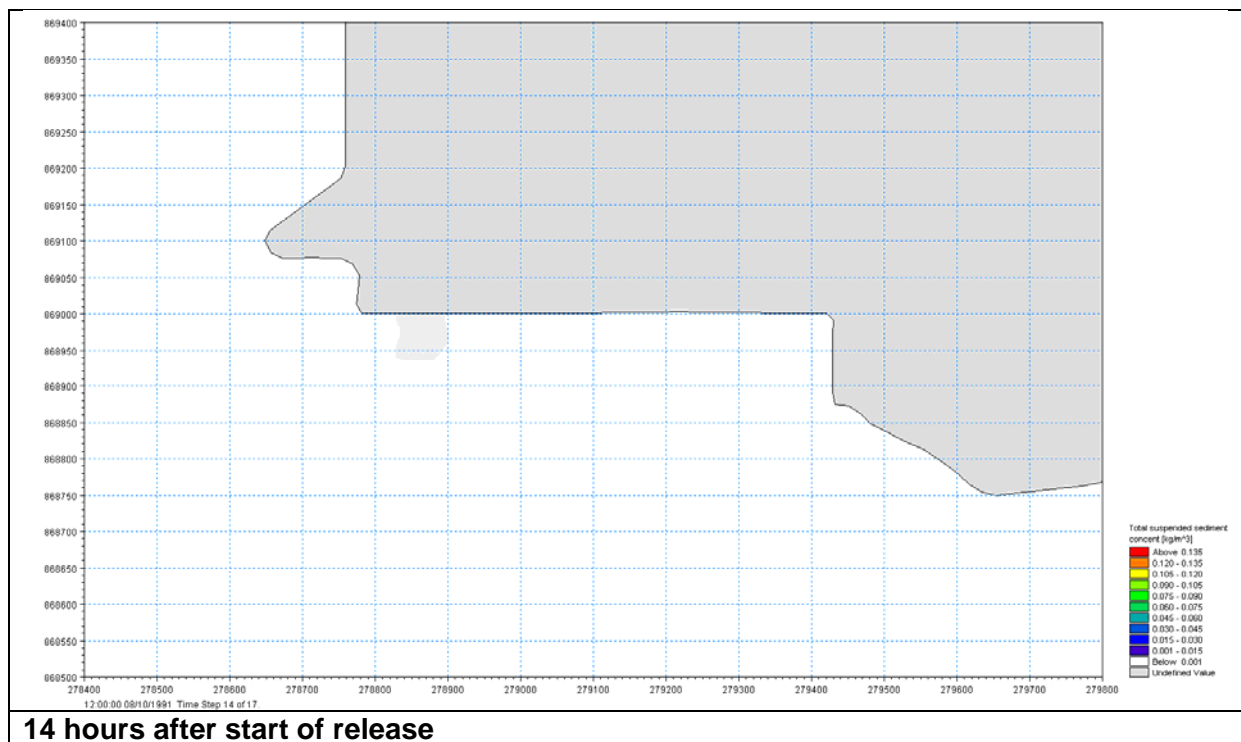
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## **Technical Appendix 6.1**



## **Nigg East Quay**

### **Technical Appendix 6.1, Noise Assessment**



**June 2019**

# Nigg East Quay

## Technical Appendix 6.1, Noise Assessment

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# 1 INTRODUCTION

## 1.1 Terms of Reference

EnviroCentre Ltd have been appointed by Global Energy Group to undertake a noise assessment for the proposed East Quay Development at Nigg Energy Park (see Drawing No. 671906-001, Appendix A for site location).

This report presents the results of the noise assessment for the proposed development. The noise assessment considers the airborne construction and operational noise impacts at existing sensitive receptors surrounding the site. The effects of construction noise on marine life is considered as part of the Underwater Noise Assessment presented in Technical Appendix 4.2, and Chapter 4, Marine Ecology of the EIAR.

## 1.2 Site Description

The site is situated south east of the Nigg Energy Park at an elevation of 5m above sea level and is centred at Ordnance Survey Grid Reference (OSGR) NH 79527 69016. The proposed entirety of the site boundary is approximately 11.27ha and is comprised of coastal waters and land of the former Dunskeath House, with derelict buildings associated with the former Dunskeath House situated within the site. The area above Mean Low Water Springs within the site boundary comprises approximately 4.78ha.

The Nigg Oil Terminal is located to the immediate north of Nigg Energy Park, with the B9175 and Fearn Peninsula to the east, the area where the Cromarty Firth meets the Moray Firth to the south (known as 'The Sutors') to the south, and Nigg Bay to the west (also part of the Cromarty Firth). Adjacent to the south-east of the site, the Cromarty Ferry crosses the entrance to the firth to the west of The Sutors in the summer season from May to September. Access to the facility can be gained from via the B9715.

A number of existing residential properties are located in the surrounding areas, within the hamlets of Balnabruaich and Balnapaling to the East, and the town of Cromarty situated approximately 1.5km to the south. The closest existing residential properties within Balnabruaich are located circa 25m to the west of the site boundary. The hamlet of Balnapaling is located to the east of the proposed laydown area, in which the Nigg Ferry Hotel is the closest property, approximately 100m from the site boundary.

## 1.3 Existing Use

Nigg Energy Park is situated to the immediate north of the proposed development. Facilities include a dry dock, extensive laydown and some 900m of heavy load bearing quayside (with depths of up to 12m). Technical services currently provided by Nigg Energy Park include;

- Large scale and complex fabrication projects for subsea and offshore equipment;
- Shot blasting and painting of infrastructure;
- Specialist diving (i.e. anode replacement, subsea solutions);
- Survey and engineering;
- Architectural repair and refurbishment of offshore rigs;
- Specialist rig access and inspection; in addition to
- Construction and decommission of offshore and subsea infrastructure.

The South Quay development is approximately 30m west of the proposed development. In May 2013, an application to MSLOT and THC (reference 13/01825/FUL and amended by 13/04695/FUL) was submitted

regarding an extension to the south quay harbour and berthing facilities at Nigg Energy Park, to accommodate large rig structures and floating production, storage and offloading vessels (FPSOs). The South Quay development was subject to a full EIA and was duly approved. Construction was completed in 2015 and the facility is now fully constructed and fully utilised, and in great demand with the Applicant's North Sea oil and energy sector clients.

## **1.4 Proposed Development**

At an outline level, the proposed development comprises the following features:

- A proposed east quay of plan area 250m by 50m (0.88ha) constructed using perimeter piling to retain locally dredged material as infill, with concrete cope;
- Associated fendering and rock armouring;
- Dredging (via suction dredging, with barge mounted excavator used if needed) of approximately 190,000m<sup>3</sup> to achieve a minimum sea bed level at the main west facing berth of 12m below chart datum to facilitate the proposed development;
- High level lighting to quayside in accordance with Port Regulations
- Sea water extraction for fire-fighting capability
- Re-use of approximately 30,000m<sup>3</sup> of dredged materials within the quay structure;
- Disposal of excess suitable dredged material (approximately 160,000m<sup>3</sup>) within The Sutors licenced disposal site at the mouth of the Cromarty Firth;
- Demolition and removal of buildings on site associated with the former Dunskeath House;
- Preparatory groundwork and associated landscaping for provision of a concrete laydown area for handling and temporary storage of plant and renewable energy components;
- A landscaped bund of 2m height formed from reclaimed material on the eastern and northern extents of the laydown area
- Access provision from the B1975; and
- Security lighting and fencing associated with the laydown area.

## **1.5 Report Usage**

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre.

If this report is to be submitted for regulatory approval more than 12 months following the report date, it is recommended that it is referred to EnviroCentre for review to ensure that any relevant changes in data, best practice, guidance or legislation in the intervening period are integrated into an updated version of the report.

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## 1.6 Potential Impacts

Due to the proximity of the site to existing residential properties in Balnabruaich to the north, Balnapaling to the east, and Cromarty to the south, there is the potential for noise from activities during both the construction and operational phases of the East Quay Development to impact on existing sensitive receptors.

Significant noise generating construction activities include piling, dredging, operation of heavy mobile plant and HGV movements / deliveries.

During the operational phase, new proposed noise generating activities have the potential to increase the day and night-time existing baseline (including current operational activities) noise levels at surrounding noise sensitive receptors. The proposed East Quay development will bring noise generating sources into closer proximity to residential receptors in Balnapaling than current operations, therefore there is the potential for an adverse effect at this location. A potential increase in noise levels at receptors in Balnabruaich and Cromarty is also possible.

## 1.7 Consultation

A summary of the relevant information contained within the Pre-Application Advice Pack for the Site, responses to the Scoping Report submitted by EnviroCentre, and further email consultation with The Highland Council's (THC) Environmental Health Department, is shown below and overleaf in Table 1-1.

**Table 1-1: Summary of Consultation Responses**

Organisation	Consultation Response	How and where addressed
Highland Council (THC) EHO	Within the Pre-Application Advice Pack dated 30/04/2018 and the Scoping Opinion dated 25/03/2019, Environmental Health Department has confirmed there are nearby receptors which have the potential to be affected during operational phase. It is agreed that operational noise impacts should be addressed within the EIA.	Operational noise is scoped into the EIA.

Organisation	Consultation Response	How and where addressed
	<p>Within the Pre-Application Advice Pack dated 30/04/2018 and the Scoping Opinion dated 25/03/2019, THC Environmental Health Department has confirmed that a construction noise assessment will be required in the following circumstances:-</p> <ul style="list-style-type: none"> <li>Where it is proposed to undertake work, which is audible at the site boundary, out with the hours Mon-Fri 8am to 7pm; Sat 8am to 1pm.</li> <li>Or</li> <li>Where noise levels during the above periods are likely to exceed 75dB(A) for short term works or 55dB(A) for long term works. Both measurements to be taken as a 1hr <math>L_{Aeq}</math> at the curtilage of any noise sensitive receptor. (Generally, long term works is taken to be more than 6 months.</li> </ul> <p>If an assessment is submitted, it should be carried out in accordance with BS 5228-1:2009, Part 1.</p>	<p>Proposed construction activities are proposed to occur out with the specified hours therefore a construction noise assessment in accordance with BS5228-1:2009 has been carried out, the results of which are presented in Section 6 of this noise assessment.</p>
	<p>Within the Scoping Opinion dated 25/03/2019, THC Environmental Health Department has confirmed that regardless of whether a construction noise assessment is required, it is expected that the developer / contractor will employ the best practicable means to reduce the impact of noise from construction activities. Attention should be given to construction traffic and the use of tonal reversing alarms.</p>	<p>Construction noise mitigation is discussed in Section 6.2 of this report.</p>
	<p>THC Environmental Health Department issued a consultation responses on 07<sup>th</sup>, 12<sup>th</sup> &amp; 18<sup>th</sup> February 2019 based on initial requests by EnviroCentre on 11<sup>th</sup> January and 6<sup>th</sup> February 2019 to establish the methodology for noise assessment. This included baseline monitoring, operational and construction noise assessment methodology / noise criteria. HC Environmental Health Department confirmed within their emails of 07<sup>th</sup>, 12<sup>th</sup> &amp; 18<sup>th</sup> February 2019 that this approach was acceptable.</p>	<p>The methodology and noise criteria proposed by EnviroCentre was accepted by Environmental Health Department and is fully explained within Section 2 of this noise assessment.</p>

Organisation	Consultation Response	How and where addressed
	<p>Within the Scoping Opinion dated 25/03/2019, Environmental Health Department has confirmed that to reduce the likelihood of future complaints, the target should be to prevent any increase over existing operational noise levels;</p> <p><i>It should be noted that the main source of ambient noise is from this site already so I would be very wary of accepting a noise level based on any exceedance above the existing background level. It is noted that previous monitoring for another similar development at this location indicated that noise levels from the site were already quite high, and the recommendation at the time was that the applicant should look at reducing noise levels from the site in general to reduce the likelihood of a Statutory Nuisance as described by the Environmental Protection Act 1990. Depending on the outcome of the round of monitoring for this application the advice is likely to be the same.</i></p>	<p>An assessment of the change noise levels with vs without the proposed development has been carried out as presented in Section 7 of this noise assessment.</p> <p>Site-wide noise management / mitigation recommendations for existing and proposed operations at Nigg Energy Park are presented in Section 7.3 of this noise assessment.</p>

## 2 NOISE ASSESSMENT METHODOLOGY

The noise assessment was undertaken to establish the impact of construction and operational activities on noise sensitive receptors surrounding the Site. The assessment involved the following stages;

- Consultation with THC Environmental Health Department to agree assessment methodology and noise criteria (refer to Section 1.7);
- Measurement of existing baseline noise environment at a sample of 5 areas representative of the most exposed noise sensitive receptors surrounding the proposed East Quay; the location of the monitoring locations are shown in Drawing Nos. 671906-007A & B, Appendix A.
- Review of construction activities, locations and noise data;
- Calculation and assessment of construction noise at the most exposed sensitive receptors, following guidance provided in BS5228-1:2009+A1:2-014; Code of Practice for Noise and Vibration on Construction and Open Sites. 3D computer noise modelling using CadnaA software has been used in the calculation of construction noise at sensitive receptors.
- Measurement of existing operational noise generating activities within Nigg Energy Park.
- Review of existing and proposed operational activities, locations and noise data;
- Prediction of operational noise using CadnaA software at location of most exposed sensitive receptors;
- PAN 1/2011 assessment of operational noise, using principles defined in BS4142:2014;
- Provision of operational noise mitigation advice to East Quay design team to inform proposed site design; and
- Provision of recommended noise mitigation and management measures for site-wide existing and proposed East Quay operations at Nigg Energy Park.

### 2.1 Noise Guidance

#### 2.1.1 BS5228-1:2009+A1:2014; Code of Practice for Noise and Vibration Control on Construction and Open Sites.

Methods for calculating noise and vibration produced by construction and open sites are provided in BS5228-1:2009+A1:2014. Annexes C and D of Part 1 provide generic source data for different types of noise source, as well as methods for calculating noise from stationary and mobile plant. Specific advice on noise from sources such as piling is provided.

#### 2.1.2 PAN 1/2011 Planning and Noise

Advice on the role of the planning system in helping to prevent and limit the adverse effects of noise is provided in *Planning Advice Note (PAN) 1/2011 'Planning and Noise'* (The Scottish Government, 2011a). The associated *Technical Advice Note (TAN) 1/2011 'Assessment of Noise'* (The Scottish Government, 2011b) provides guidance on noise impact assessment methods.

The methodology provided in Technical Advice Note (TAN) 1/2011 '*Assessment of Noise*' (The Scottish Government, 2011b) is used to assess the impact of noise on residential properties.



### **2.1.3 BS4142:2014, Methods for rating and assessing industrial and commercial sound**

BS4142:2014 provides methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

- a) Sound from industrial and manufacturing processes;
- b) Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- c) Sound from loading and unloading of goods and materials at industrial and/or commercial premises; and
- d) Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements in or around an industrial and/or commercial site.

The methods described use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

The standard is applicable to the determination of the following levels at outdoor locations:

- a) Rating levels for sources of sound of an industrial and/or commercial nature;
- b) Ambient, background and residual sound levels;
- c) Investigating complaints;
- d) Assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
- e) Assessing sound at proposed new dwellings or premises used for residential purposes.

## **2.2 Noise Assessment Criteria**

### **2.2.1 BS5228-1:2009+A1: 2014 – Methodology (ABC Method)**

Consultation, as described in Section 1.6, stated that where work is proposed out with the hours of Monday to Friday 8am – 7pm or Saturday 8am – 1pm, a full construction noise impact assessment is required. As work is proposed for a seven day working week, a full assessment is presented.

The assessment of construction noise is carried out in accordance with guidance provided in BS 5228-1:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1 Noise'. The standard describes methods for evaluating the potential significant effects of construction noise, one of which is the 'ABC' method which is based on exceedance of fixed noise limits. The ABC method, as detailed within Annex E.3.2 has been used within this noise assessment, as it considers the pre-existing industrial noise climate at the receptors.

The ABC method considers that a potential significant effect occurs when the total noise level at a dwelling, including construction activity, exceeds the appropriate category values shown in Table 2-1. The table is used as follows;

- The ambient noise is determined and rounded to the nearest 5dB;
- The rounded ambient noise level is then compared with the total noise level, including construction. A significant effect at a noise sensitive receptor is considered to occur when the total noise, including construction activity exceeds the appropriate category values, shown in Table 2-1.
- The ABC method of BS5228-1:2009+A1:2014 does not provide specific guidance on determining the magnitude and significance of noise impacts above the threshold values shown in Table 2-1. In order

to determine the level of significance, guidance provided in the Technical Advice Note (TAN) 1/2011 has been used. The significance criteria adopted within this noise assessment are shown in Table 2-2.

**Table 2-1: Threshold of Significant Effect at Dwellings**

Period	Threshold Value, in decibels (dB)		
	Category A	Category B	Category C
Night-time (23:00 to 07:00)	45	50	55
Evenings weekday (19:00-23:00), Saturdays (13:00-23:00) and Sundays (07:00-23:00)	55	60	65
Daytime weekday (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75
<p>Note 1: A significant effect has been deemed to occur if the total <math>L_{Aeq}</math> noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.</p> <p>Note 2: If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total <math>L_{Aeq}</math>, T noise level for the period increases by more than 3 dB due to site noise.</p> <p>Note 3: Applied to residential receptors only.</p>			
<p>Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.</p> <p>Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.</p> <p>Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.</p>			

**Table 2-2: Significance Criteria for the Assessment of Construction Noise**

Significance	Level Above Threshold Value dB(A)	Definition
Neutral	< 0	No effect, not significant, noise need not be considered as a determining factor in the decision making process.
Slight adverse	≤ 0 to < 3	These effects may be raised but are unlikely to be of importance in the decision making process.
Moderate adverse	≤ 3 to < 5	These effects, if adverse, while important, are not likely to be key decision making issues.
Large adverse	≤ 5.0 to < 10	The effects are likely to be important considerations but where mitigation may be effectively employed such that resultant adverse effects are likely to have a moderate or slight significance.
Very large adverse	≥ 10	These effects represent key factors in the decision making process. They are generally, but not exclusively, associated with impacts where mitigation is not practical or would be ineffective.

## 2.2.2 PAN 1/2011 Assessment Methodology

Proposed activities from the operations within the East Quay are assessed following guidance provided in PAN 1/2011 (as the associated document TAN 1/2011 'Technical Assessment of Noise'), using principles defined in BS4142:2014.

The noise criteria to be applied to operational industrial noise is summarised in Table 2-3. The table is used as follows;

- Calculate the difference between the rated operational noise level ( $L_{A,r,T}$ ) and the background noise ( $L_{A90,T}$ ) at each noise sensitive receptor, following principles defined in BS4142:2014. This difference in levels is used to define the Sensitivity of Receptor, as shown in Table 2-3.
- Calculate the total noise at each noise sensitive receptor, including operational activity ( $L_{Aeq,T}$ ). The difference between the total noise including operational activity, and that before development at each sensitive receptor is used to define the Magnitude of Impact, as shown in Table 2-3.
- The Significance of Impact is then defined, as shown in Table 2-3.

**Table 2-3: Significance of Effects; Operational Industrial Noise**

Magnitude of Impact (After – Before) $L_{Aeq,T}$ dB	Sensitivity of Receptor based on likelihood of complaint $X = (\text{Rating } (L_{A,r,T}) - \text{Background } (L_{A90,T})) \text{ dB}$		
	Low ( $x < 5$ )	Medium ( $5 \leq x < 10$ )	High ( $x \geq 10$ )
<b>Major</b> ( $\geq 5$ )	Slight / Moderate	Moderate / Large	Large / Very Large
<b>Moderate</b> (3 to 4.9)	Slight	Moderate	Moderate / Large
<b>Minor</b> (1 to 2.9)	Neutral	Slight	Slight / Moderate
<b>Negligible</b> (0.1 to 0.9)	Neutral / Slight	Neutral / Slight	Slight
<b>No Change</b> (0)	Neutral	Neutral	Neutral

## 2.3 Noise Definitions

The following definitions relating to noise are used in this report:-

**$L_{Aeq,T}$ :** Equivalent continuous A-weighted sound pressure level. This is the single number that represents the average sound energy over that time period. It is the sound level of a notionally steady sound that has the same energy as a sound that fluctuates over a specified measurement period.

**$L_{A90,T}$ :** The noise level exceeded for 90% of the measurement period.

**$L_{A10,T}$ :** The noise level exceeded for 10% of the measurement period.

**$L_{AF, \max}$ :** The A-weighted maximum sound pressure level over the measurement period. The measurement is taken using the fast time weighting of the sound level meter.

**Free-field:** As sound propagates from the source it may do so freely, or it may be obstructed in some way by a wall, a fence, building, earth bund, etc. The former is known as free-field propagation.

**Ambient Sound Level,  $L_a$ :** As defined in BS4142:2014; equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.

**Façade Effect:** When sound is reflected back towards its source, off a surface, such a wall, the reflected and incident sound waves interfere constructively, causing what is known as façade effect, or pressure doubling. This increases the noise, compared to that which exists in free-field, by approximately 2.5 dB(A).

**Octave:** A range of frequencies whose upper frequency limit is twice that of its lower frequency limit.

**Octave Band:** Sound pressure level is often measured in octave bands, the centre frequencies of the bands are defined by ISO – 31.5Hz, 63Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz, 16kHz to divide the audio spectrum into 10 equal parts. The sound pressure level of sound that has been passed through an octave band pass filter is termed the octave band sound pressure level.

### 3 BASELINE NOISE MONITORING

Noise surveys were carried out in the area surrounding Nigg Energy Park, comprising of the adjacent hamlets of Balnabruaich & Balnapaling, and in the town of Cromarty to the south. The surveys were completed during the day and night-time periods on Tuesday 26<sup>th</sup> and Wednesday 27<sup>th</sup> February 2019. The purpose of the surveys was to establish day and night-time background noise levels at areas representative of the most exposed properties in Balnabruaich, Balnapaling and Cromarty. The noise monitoring locations and methodology were agreed with Highland Council Environmental Health department through consultation.

#### 3.1 Noise Monitoring Locations

The noise monitoring locations are described in Table 3-1, and shown in Drawing Nos. 671906-007A & B, Appendix A.

**Table 3-1: Noise Monitoring Locations**

No.	Grid Reference	Location
01A	279451 869831	Balnabruaich; on verge next to B9175, roughly 70 metres north of entrance to Nigg Energy Park. Position used on first round of day and night-time monitoring (26/02/19). Road traffic noise on B9157 dominant, due to close proximity of position to the road.
01B	279410 869877	Balnabruaich; roughly 50 metres north of position 01A, 12.5 metres west of B9175 to reduce influence of traffic noise to/from Nigg Energy Park. Position used on second round of day and night-time monitoring (27/02/19). Chosen at similar distance back from road as noise sensitive receptors, therefore considered to be more representative of baseline noise at houses than Position 1A.
02	279645 868817	Balnapaling; at southern extent of B9175, roughly 1.5 metres from east boundary fence.
03	278710 867724	Cromarty; on grass next to George Street.
04A	278942 867572	Cromarty; between two properties on corner of Forsyth Place and Shore Street. Position used on first round of daytime monitoring on 26/02/19.
04B	278918 867603	Cromarty; roughly 35 metres north west of position 04A. Selected on west side of properties to give better line of site to Nigg Energy Park and reduce influence of traffic noise from Shore Street and bus stop on Forsyth Place.
05	279169 867340	Cromarty; on grass at south eastern corner of Shore Street.

#### 3.2 Noise Monitoring Details

Fully calibrated Type 1 sound levels meters were used to undertake all the noise monitoring events as detailed in Table 3-2. The sound level meters were calibrated both before and after measurements were taken and no significant drift was noted.

**Table 3-2: Investigative Equipment Utilised and Technical Details**

<b>Time Intervals:</b>	Daytime = 1 x 1hr intervals at each of the five noise monitoring locations, repeated over two separate days. Night time = 1 x 30 minute intervals at each of the five noise monitoring locations, repeated over two separate days.
<b>Monitoring Periods:</b>	14:20hrs – 17:45hrs on 26/02/2019; 23:01hrs – 03:06hrs on 26/02/2019 to 27/02/2019; 14:02hrs – 17:27hrs on 27/02/2019; and 23:41hrs – 01:58hrs on 27/02/2019 to 28/02/2019.
<b>Instrument:</b>	Norsonic 118 and 140 sound analysers
<b>Calibration:</b>	At the start and finish of each monitoring event calibration was completed using a Norsonic NOR-1251 Sound Calibrator
<b>Measurement Settings:</b>	Environmental logging mode: A-weighted sound pressure level with time weighting F
<b>Measurement Positions:</b>	Measurements were taken between 1.2m and 1.5m above the ground.

The weather conditions during the monitoring events were recorded and are summarised in Table 3-3.

**Table 3-3: Monitoring Periods and Weather Conditions**

Monitoring period/ event	Date	Weather Conditions
Weekday Day	26/02/ 2019	Very mild, 11 - 12°C, dry, clear skies, wind speeds < 2 m/s.
Weekday Night	26/02/2019 & 27/02/2019	Between 3 and 4°C, dry, light airs
Weekday Day	27/02/ 2019	Staying mild, 10 - 11°C, dry, clear skies, wind speeds < 2 m/s.
Weekday Night	27/02/2019 & 28/02/2019	Between 3 and 4°C, dry, light airs

### 3.1 Nigg Energy Park Operational Activities

During the day and night-time noise monitoring events, operational activities within Nigg Energy Park were confirmed by site management to be representative of a typical busy period. Operational activities at the time of visiting included;

- Ships berthed at Berth 4 (South) & 5 (South Quay), including operational on-board generators. Associated 24 hour loading / unloading of wind turbine components and cargo to / from and laydown / storage areas using cranes and various items of mobile plant;
- 24 hour repair / refurbishment works on Ocean Endeavour drilling rig within Graving Dock (Berth 1). On-board generators and cranes were operational during the day and night-time;
- 24 hour assembly, fabrication and repair works of large marine structures and offshore assets within workshop buildings;
- 24 hour movement of cargo / offshore assets within yard using various items of mobile plant;
- HGV and LGV delivery / pick-ups and associated loading/unloading activities.

### 3.2 Observations

Notes of noise sources characterising the background noise environment at each of the monitoring locations for the monitoring periods were recorded and are summarised below in order of dominance (greatest first).

#### Position No. 1

Daytime noise sources for each of the monitoring periods included;

##### 26/02/2019, Position 01A;

- Road traffic noise on B9175, majority of which traveling to/from Nigg Energy Park (NEP) gate;
- Distant noise from cranes, generators and tannoy inside NEP; and
- Gulls cawing.

##### 27/02/2019, Position 01B;

- Road traffic noise on B9175; majority of which traveling to/from NEP gate;
- Distant mixed industrial and generator noise from NEP ; and
- Gulls cawing.

Night-time noise sources included;

##### 26/02/2019, Position 01A;

- Road traffic noise on B9175. (2 car movements from NEP gate).
- Distant industrial noise from NEP: cranes, generators, tannoy and reverse alarms; and

##### 27/02/2019, Position 01B

- Distant industrial noise from NEP: cranes, generators, tannoy and reverse alarms; and
- Road traffic noise on B9175 (1 car movement from NEP gate).

#### Position No. 2

Daytime noise sources included;

##### 26/02/2019;

- Industrial noise from NEP: cranes, generators and tannoy; and
- Road traffic noise (3 car movements in/out of car park at Nigg Ferry terminal).

##### 27/02/2019;

- Cranes and refurbishment works on rig in graving dock of NEP;
- Other indistinct industrial sources from NEP, generators and tannoy; and
- Road traffic noise (4 car movements in/out of car park at Nigg Ferry terminal).

Night-time noise sources included;

##### 26/02/2019;

- Industrial noise from NEP, cranes, generators and tannoy; and
- Gulls cawing.

##### 27/02/2019

- Indistinct industrial noise from NEP, works on rig in graving dock;
- Road traffic noise (2 car movements to/from Nigg Ferry terminal car park); and
- Gulls cawing.

### **Position No. 3**

Daytime noise sources included;

#### **26/02/2019;**

- Mix of industrial noise from Nigg Energy Park and on rig directly to west of Cromarty in Firth. Rig noise dominant when present, sources from both intermittent;
- Traffic on George Street (3 car movements, low speed);
- Local voices from park/open land next to water, dog walkers and families; and
- Birdsong from nearby rooftops.

#### **27/02/2019;**

- Industrial noise from NEP: cranes, generators and tannoy. Less noise from rig to west in Firth than previous daytime measurement;
- Traffic on George Street (2 car movements, low speed);
- Local voices from park/open land next to water, dog walkers and families; and
- Birdsong from nearby rooftops.

Night-time noise sources included;

#### **26/02/2019;**

- Mixed industrial noise from NEP and rig directly to west of Cromarty in Firth. Noise character variable from both depending on operations: cranes, generators, tannoy and reverse alarms heard.

#### **27/02/2019**

- Mixed industrial noise from NEP and rig directly to west of Cromarty in Firth. Noise character variable from both depending on operations: cranes, generators, tannoy and reverse alarms heard. Less noise from rig in Firth than previous night-time measurement.

### **Position No. 4**

Daytime noise sources included;

#### **26/02/2019, Position 04A;**

- Road traffic noise from Shore Street and Forsyth Place: 1 bus and 1 coach, each reversing and idling close to meter;
- Intermittent works nearby on Rose Lane: cutting and hammering;
- Mixed indistinct industrial noise from NEP;
- Some indistinct industrial noise from rig to west of Cromarty in Firth; and
- Birdsong from nearby rooftops.

#### **27/02/2019, Position 04B;**

- Mixed industrial noise from NEP;
- Road traffic noise from Shore Street and Forsyth Place. Influence of road traffic greatly reduced by moving monitoring position.
- Works on Rose Lane;
- Birdsong from nearby rooftops.

Night-time noise sources included;

#### **26/02/2019, Position 04B;**

- Mixed industrial noise from NEP: cranes, generators and tannoy (rig to west of Cromarty in Firth not heard); and
- Gently breaking waves on shore.



**27/02/2019, Position 04B**

- Mixed industrial noise from NEP: cranes, generators and tannoy (rig to west of Cromarty in Firth not heard); and
- Gently breaking waves on shore.

**Position No. 5**

Daytime noise sources included;

**26/02/2019;**

- Mixed industrial noise from NEP, rig to west of Cromarty in Firth not heard;
- Road traffic noise on Shore Street; and
- Some occasional bangs from work in nearby garden to north of measurement position.

**27/02/2019;**

- Mixed industrial noise from NEP, rig to west of Cromarty in Firth not heard;
- Road traffic noise on Shore Street;
- Trailer being loaded and driven away next to Old Brewery, roughly 50 metres away; and
- Some occasional bangs from work in nearby garden to north of measurement position.

Night-time noise sources included;

**26/02/2019;**

- Mixed industrial noise from NEP, rig to west of Cromarty in Firth not heard; and
- Background noise levels low enough to hear burn in nearby cutting leading out to Cromarty Firth.

**27/02/2019**

- Mixed industrial noise from NEP, rig to west of Cromarty in Firth not heard; and
- Background noise levels low enough to hear burn in nearby cutting leading out to Cromarty Firth.

### 3.3 Baseline Noise Data

A summary of the baseline noise monitoring data can be found in Table 3-4 and Table 3-5.

**Table 3-4: Baseline Noise Monitoring Data**

Date	Period	Noise Monitoring Location	Start time/ Duration (hrs:mins)	L <sub>Aeq</sub> (dB <sub>A</sub> )	L <sub>AFmax</sub> (dB <sub>A</sub> )	L <sub>A90</sub> (dB <sub>A</sub> )
26/02/2019	Daytime	01A	16:44 / 01:00	63.9	86.4	41.0
		02	15:27 / 01:00	49.1	66.9	46.3
		03	14:20 / 01:00	47.7	75.2	40.6
		04A	15:32 / 01:00	52.1	78.6	41.2
		05	16:42 / 01:00	51.3	73.1	42.8
26/02/2019 – 27/02/2019	Night-time	01A	23:41 / 00:30	52.6	82.4	35.4
		02	23:01 / 00:30	46.7	55.9	45.4
		03	01:16 / 00:30	42.3	48.7	41.2
		04A	01:56 / 00:30	47.7	60.6	45.5
		05	02:36 / 00:30	39.6	51.5	37.7
27/02/2019	Daytime	01B	14:50 / 01:00	54.5	76.4	34.1
		02	15:59 / 01:00	46.1	63.7	42.7
		03	14:02 / 01:00	45.4	66.6	41.2
		04B	15:14 / 01:00	46.7	64.3	42.3
		05	16:27 / 01:00	51.0	72.3	42.2
27/02/2019 – 28/02/2019	Night-time	01B	00:20 / 00:30	47.6	76.4	31.1
		02	23:41 / 00:30	45.0	57.1	42.3
		03	23:50 / 00:30	41.8	63.8	40.2
		04B	00:52 / 00:30	44.8	56.2	40.3
		05	01:28 / 00:30	40.1	62.6	37.8

**Table 3-5: Octave Band Baseline Noise Monitoring Data**

Period	Start Time (hrs:mins)	Noise Monitoring Location	Octave Band Centre Frequency (Hz)									A
			31.5	63	125	250	500	1000	2000	4000	8000	
Daytime 26/02/2019	16:44	01A	60.8	64.9	58.0	58.3	58.5	61.9	54.3	47.4	41.7	63.9
	15:27	02	69.4	67.2	55.1	43.7	46.4	44.9	38.1	30.5	19.9	49.1
	14:20	03	69.6	61.8	55.2	47.7	43.2	42.2	37.4	35.1	30.1	47.7
	15:32	04A	67.3	62.7	54.1	48.7	47.2	47.7	44.6	41.0	34.8	52.1
	16:42	05	58.7	62.7	55.8	48.1	46.7	47.5	42.9	39.1	29.8	51.3
Night-time 27/02/2019 – 28/02/2019	23:41	01A	54.4	55.0	48.6	49.9	48.1	50.6	41.4	31.8	24.8	52.6
	23:01	02	65.8	69.7	54.3	43.1	44.5	40.3	33.3	28.6	17.1	46.7
	01:16	03	72.4	64.2	52.4	37.3	37.0	35.4	24.8	15.0	13.5	42.3
	01:56	04A	72.6	69.1	57.8	43.5	42.9	41.6	36.0	31.0	23.6	47.7
	02:36	05	58.0	59.0	53.8	37.4	34.5	31.0	24.2	21.7	19.1	39.6
Daytime 27/02/2019	14:50	01B	55.5	55.2	52.3	50.6	50.0	52.1	44.9	40.4	31.3	54.5
	15:59	02	62.0	66.2	53.9	40.2	42.8	41.3	35.5	26.9	17.4	46.1
	14:02	03	66.0	64.1	52.8	45.9	40.7	40.2	34.9	31.2	25.5	45.4
	15:14	04B	64.2	61.1	53.9	43.0	40.4	41.1	38.5	38.1	28.5	46.7
	16:27	05	59.2	64.4	52.5	46.4	45.3	47.3	43.4	39.4	30.1	51.0
Night-time 27/02/2019 – 28/02/2019	00:20	01B	50.1	49.6	42.4	41.1	40.4	45.5	40.1	29.9	18.5	47.6
	23:41	02	67.6	60.4	50.1	39.7	44.1	39.6	33.3	27.7	16.8	45.0
	23:50	03	69.5	58.5	49.0	40.1	38.5	36.7	28.0	20.0	14.8	41.8
	00:52	04B	65.3	58.8	52.4	43.4	40.9	39.5	36.1	30.2	20.4	44.8
	01:28	05	53.8	54.8	49.8	38.9	37.0	34.7	27.3	22.8	17.7	40.1

## 4 EXISTING OPERATIONAL NOISE MONITORING

Noise monitoring was carried out inside Nigg Energy Park on the 27/02/2019 to capture levels from existing operational plant and activities within the site.

### 4.1 Noise Monitoring Details

A fully calibrated Type 1 sound level meter was used to undertake all the noise monitoring events as detailed in table 4-1. The sound level meter was calibrated both before and after measurements were taken and no significant drift was noted.

**Table 4-1: Investigative Equipment Utilised and Technical Details**

<b>Time Intervals:</b>	The durations of the measurements were determined on site, and were dependent on the length of time that activities / items of plant were operational. Measurement durations varied between thirty seconds and three and a half minutes.
<b>Monitoring Period:</b>	All levels captured between 10:20hrs – 14:41hrs on 27/02/2019;
<b>Instrument:</b>	Norsonic 140 sound analyser
<b>Calibration:</b>	At the start and finish of the operational monitoring, calibration was completed using a Norsonic NOR-1251 Sound Calibrator
<b>Measurement Settings:</b>	Environmental logging mode: A-weighted sound pressure level with time weighting F
<b>Measurement Positions:</b>	Measurements were taken at various positions around the yard and recorded on a Trimble GPS logger. Measurements were taken between 1.2m and 1.5m above the ground.

The weather conditions during the monitoring events were recorded and are summarised in Table 4-2.

**Table 4-2: Monitoring Periods and Weather Conditions**

Monitoring period/ event	Date	Weather Conditions
Weekday	27/02/2019	Very mild, 11 - 12°C, dry, clear skies, wind speeds < 2 m/s.

### 4.2 Existing Operational Noise Data

A summary of the operational noise monitoring results can be found in Table 4-3.

**Table 4-3: Operational Noise Data**

Start Time (hrs:mins)	Duration (min:secs)	Grid Reference	Notes	L <sub>Aeq</sub> (dB <sub>A</sub> )	L <sub>AFmax</sub> (dB <sub>A</sub> )
10:20	01:04	278921 869073	Yard at Berth 4; Pacific Orca large crane loading wind turbine towers onto boat. Ship engine & generator noise. Hammering in yard.	60.7	67.1

Start Time (hrs:mins)	Duration (min:secs)	Grid Reference	Notes	L <sub>Aeq</sub> (dB <sub>A</sub> )	L <sub>AFmax</sub> (dB <sub>A</sub> )
10:22	03:22	278921 869073	Yard at Berth 4; Pacific Orca large crane loading wind turbine towers onto boat. Ship engine & generator noise.	59.9	64.1
10:30	02:29	278812 869000	Berth 5; Rotra Mare ship berthing. Ship generator noise.	63.8	66.3
10:41	01:51	279057 869004	Yard at Berth 4; Pacific Orca small rear crane moving life raft from boat to yard.	67.1	74.5
10:46	03:30	279057 869004	Yard at Berth 4; Pacific Orca small rear crane loading contaminated waste skip from yard to boat.	66.5	75.5
11:20	01:10	278937 869409	2m from Fabrication Shop 6 open doors; Fork lift truck movements and fabrication works inside unit.	65.8	79.7
11:31	02:00	279082 869474	2m from Fabrication Shop 4 open east doors; fork lift truck movements and fabrication works inside unit	71.7	77.6
11:42	02:00	279200 869570	North of graving dock, looking towards Ocean Endeavour; works on rig, yard noise, noise from paint and blast unit	52.2	58.6
11:47	01:32	279307 869582	2m from paint and blast open side doors; compressor hiss.	77.2	92.7
11:58	01:00	279312 869681	2m from fabrication shop 1 open doors; Manual palate truck movements, birds cawing within unit.	60.9	66.2
12:03	01:02	279353 869549	1m from generator by paint and blast unit; generator noise.	71.1	73.4
12:07	01:19	279347 869514	2m from paint and blast unit extract; extract noise, approx 0.5m high.	78.3	79.3
12:12	00:30	279397 869445	Climavent outside unit 12 (rig fabrication); extract noise	78.2	79.5
12:21	02:02	279386 869449	2m from unit 12 (rig fabrication) open doors; fabrication works inside unit	80.6	93.5
12:27	01:16	279397 869331	East of graving dock N; generator noise on rig. no fabrication works (workers on lunch break)	54	61.1
12:45	02:00	279400 869191	East of graving dock S; generator noise on rig. No fabrication works (workers on lunch break)	56.6	58.6
12:52	00:30	279389 869029	2m from pipe extract on ground at end of graving dock; extract noise	86.9	88.2
14:22	03:17	279189 869213	West of graving dock S; 2 x cranes on rig, 1 x FLT in yard, generator noise on rig, clattering	67.6	74
14:27	02:29	279183 869296	West of graving dock N; 2 x cranes on rig, generator noise on rig	66.7	73.7
14:38	02:17	279401 869273	East of graving dock; 2 x cranes on rig, generator noise on rig	58.1	64.6

## 5 NOISE MODEL INPUT PARAMETERS

### 5.1 Noise Sensitive Receptors

A sample of five noise sensitive receptors have been chosen as being representative of those most exposed to noise from construction and operational activities at the proposed East Quay. These are described in Table 5-1, and shown in Drawing No. 671926-023A & B, Appendix A.

**Table 5-1: Noise Sensitive Receptor Locations; Construction and Industrial Noise**

NSR ID	Location	Grid Reference
NSR 1	Balnabruich, north-east of NEP entrance	279468 / 869831
NSR 2	Balnabaling, east of proposed East Quay	279676 / 868834
NSR 3	Cromarty; George Street	278687 / 867725
NSR 4	Cromarty; Forsyth Place	278927 / 867598
NSR 5	Cromarty; Shore Street	279190 / 867333

### 5.2 Construction Noise Model Input Parameters

#### 5.2.1 Construction Schedule and Modelled Scenarios

Details of the proposed construction schedule at the Site have been supplied by Arch Henderson. A summary of the proposed construction schedule is shown in Table 5-2.

**Table 5-2: East Quay, Proposed Construction Schedule**

Ref	Construction Stage	Start Month	Finish Month
1	Temporary bund / working platform	1	2
2	Piling	2	7
3	Rock armour revetment	6	7
4	Dredging	6	10
5	Infill within quay structure to tie rod level	5	6
6	Tie rod / anchor walls	4	7
7	Infill within quay structure above tie rod level	7	8
8	Services installation	7	9
9	Placing final structure	9	9
10	Concrete copes	7	10
11	Deck furniture installation	9	10
12	Cathodic protection	9	10
13	General activities	1	12
14	Deliveries to site	1	12

As can be seen in Table 5-2, in many cases more than one stage of construction will to occur during the same months. Noise modelling scenarios have been set up to account for the cumulative impact of the concurrent stages. The scenarios have been set up to model the worst-case potential combination of construction activities for each set of months considered, periods where fewer noisy activities are expected, or general site levels are expected to be lower have not been modelled. A summary of the months, associated combined construction stages and relevant assessment periods for each of the modelled scenarios is shown in Table 5-3.

It should be noted that while the modelling has predicted all operations within a month-long period to be concurrent, this is a conservative assumption and some activities will in fact be contiguous.

**Table 5-3: Modelled Scenarios; Construction Noise**

Modelled Scenario	Months	Modelled Combination of Construction Stages (Worst Case)	Relevant Assessment Periods
1A	6	Piling (king piles only)	Day, Evening, Night, Weekend
		Rock armour revetment	
		Dredging	
		Infill within quay structure to tie rod level	
		Tie rod / anchor walls	
		General activities	
		Deliveries to site	
1B	6	Piling (king piles and sheet piles)	Day, Evening, Night, Weekend
		Rock armour revetment	
		Dredging	
		Infill within quay structure to tie rod level	
		Tie rod / anchor walls	
		General activities	
		Deliveries to site	
2A	7	Piling (king piles only)	Day, Evening, Night, Weekend
		Rock armour revetment	
		Dredging	
		Tie rod / anchor walls	
		Infill within quay structure above tie rod level	
		Services installation	
		Concrete copes	
		General activities	
		Deliveries to site	
2B	7	Piling (king piles and sheet piles)	Day, Evening, Night, Weekend
		Rock armour revetment	
		Dredging	
		Tie rod / anchor walls	
		Infill within quay structure above tie rod level	
		Services installation	
		Concrete copes	
		General activities	
		Deliveries to site	
3	9	Dredging	Day, Evening, Night, Weekend
		Services installation	
		Placing final structure	
		Concrete copes	
		Deck furniture installation	
		Cathodic protection	
		General activities	
		Deliveries to site	

### **5.2.2 Evening and Night-time Construction Noise**

With reference to the assessment periods included in Table 5-3, only in the case of dredging are works scheduled to be carried out over a 24-hour period. However, it is expected that onsite generators and temporary lighting could be operational throughout the evening and night, and therefore these assessment periods have been considered for all scenarios. All other activities are expected to have finished by 7 pm on a daily basis, and therefore evening and night time levels are expected to be the same.

### **5.2.3 Weekend Construction Noise**

The proposed construction schedule includes working during daytime hours during the week days and the weekends. The implication of this is that works associated with higher noise levels are likely to be carried out during weekend hours (Saturday 13:00 – 19:00 and Sunday 08:00 – 19:00), which are subject to more stringent noise limits than during the weekdays (refer to Table 2-1).

### **5.2.4 Piling**

Piling will be carried out between the hours of 08:00 and 19:00.

Tubular steel king piles with profiled steel sheets will be installed at specified locations. To reduce the overall duration of the works, it is proposed that two separate piling rigs may be operational simultaneously. One rig will operate from a floating barge, while the other may operate from a temporary bund constructed at the shore end of the new quay.

The installation of piles will comprise “HZM” type steel king piles at specified centres, with profiled sheet piles spanning between to form a high modulus retaining wall. The HZM piles will be primarily driven using a vibrating pile hammer to the required depth. Where bedrock is encountered and hard driving is required, an impact hammer will be used to drive the pile into its final position. Impact piling typically generates higher noise levels than vibratory piling, the maximum period that impact piling is predicted to be used in any one daytime period is 15% of the construction site operating hours, with vibratory methods being used for the remaining 85%. The noise modelling of piling carried out at the proposed development contains this assumption.

The noise associated with the installation of sheet piles is greater than that associated with king piles. Variants on the construction scenarios (refer to Table 5-3) have been produced to predict levels during periods of only installing king piles (A) and periods where sheet piles are also being installed (B).

### **5.2.5 Dredging**

Dredging is anticipated to include the use of both a suction dredger and a barge-mounted excavator. The operation of the suction dredger would be continuous over a 24 hour period, while operation of the barge-mounted long-reach excavator would be daytime only.

The suction dredging would be used for loose materials and involves a specialised vessel which lowers dredge pumps and hoses to the seabed to remove material. The material will then either be deposited on shore, within any required fill area or to a hopper barge for disposal at a licensed sea disposal site. Ground investigation works indicated that the bed material is mostly granular, and so will be dredged with the suction dredger.

Where more cohesive materials, such as sandy clay, are encountered, the contractor may dredge using a barge-mounted long-reach excavator. The dredged material will be disposed of in the same manner as that extracted with the suction dredger.



### 5.2.6 Construction Noise Model Data

3D computer noise modelling of the various stages of construction activity at the site has been carried out using CadnaA software. Details on worst case construction activities, durations, operating times, and associated items of noise generating plant for each stage of construction used within the noise models have been supplied by Arch Henderson.

Calculations were carried out using noise data and guidance provided in BS5228-1:2009+A1:2014, to derive predicted noise levels at noise sensitive receptors. Where data was not available within BS5228 it has been sourced from the Environmental Protection Department of Hong Kong's Technical Memorandum on Noise from Construction Work. Noise data for suction dredging was taken from Royal Haskoning DHV, Memo on Swansea Channel Noise Impact Assessment, dated 25<sup>th</sup> June 2014. Impact wrench noise data was taken from a study of impact wrench noise, Markesino et al.

In summary, noise data has been sourced from the following publications;

- BS5228-1-2009+A1:2014, *Code of Practice for Noise on Construction and Open Sites*;
- Environmental Protection Department of Hong Kong; *Technical Memorandum on Noise from Construction Work other than Percussive Piling*, 1989.
- Royal Haskoning DHV, *Swansea Channel Noise Impact Assessment, Memo*, 25<sup>th</sup> June 2014.
- Markesino et al, *Study of noise transmission from an electric impact wrench*, Noise-Con 2004, Baltimore

Full details of the items of modelled construction plant, noise data (including data source), operating times, durations and source heights for each of the considered scenarios is shown in Appendix C.

### 5.2.7 Construction Noise Model Assumptions

A number of assumptions have been established during the CadnaA modelling exercise, as detailed below:

- The ground model uses Lidar 1m resolution terrain height data for Nigg Energy Park and the surrounding area.
- The heights of buildings have been estimated from photographs;
- Predicted levels are calculated in the free-field environment;
- Ground absorption has been set to 0.5 for mixed soft/hard ground, areas of water have been set to 1 for reflective surface;
- Weekend daytime noise levels generated by construction activities have been assumed to be the same as those generated during weekday hours representing a worst case scenario;
- The noise model assumes locations of plant based on descriptions of construction activities provided by Arch Henderson;
- Worst case scenario combinations of construction activities likely to occur in any one day during the considered assessment periods have been assumed;
- Articulated dump truck and HGV deliveries have been assumed to take 12.5 mins to arrive within the site, and 12.5 mins to depart;
- Articulated dump truck deliveries have been assumed to take 1 minute to tip;
- Spud-leg barges on which piling equipment is intended to be located have been assumed to have a height of 1m above sea level. The height of equipment located on the barges (eg piling excavators) has been assumed as relative to the height of the barge (eg a 1m high noise source height located on the 1m high barge, has a total height of 2m);
- The following sources have been modelled as line sources within CadnaA;
  - Heavy goods vehicles (HGVs) and dump trucks;
  - Concrete trucks;

- Moving construction plant;
  - Tugs / work boats.
- Barges have been modelled within CadnaA as area sources;
- All remaining sources (not outlined above) have been modelled within CadnaA as point sources.
- A number of the phases include the use of excavators. With the exception of dredging activities, all excavator use has been collated and included in the general onsite activities, with the number and type of excavators supplied by Arch Henderson.

### 5.2.8 ABC Category Thresholds

The appropriate ABC category thresholds above which there is considered to be a noise impact from construction noise have been calculated following guidance provided in BS5228-1:2009+A1:2014 (refer to Section 2.2.1). Details of the calculations are shown in Appendix B.

## 5.3 Operational Noise Model Input Parameters

### 5.3.1 Proposed East Quay / Laydown Area Operational Activities

During the operational stage, there is the potential for noise from ships berthing, loading / unloading activities, and transfer to / from materials to the laydown area to impact upon existing residents. In summary, the noise generating operational activities as a result of the proposed East Quay / Laydown Area will comprise of;

- Ship berthing (including on-board generators) and cargo loading / unloading activities;
- Laydown and storage of cargo and offshore structures such as wind farm components using a combination of Self Propelled Modular Transporters SMPTs and 16ton Fork Lift Trucks;
- HGV movements of materials to/from quay and laydown area.

It is understood that it is proposed to use the laydown area predominantly for the storage of wind turbine jacket (foundation) structures. These structures shall be loaded / unloaded directly from the ship using pairs of SPMTs. Three pairs of SPMTs shall be driven onto the ship to load / unload each jacket, with approximately one movement within a 10 hour shift. The noise model has assumed a worst case one movement per hour during the day and night-time period.

An additional circa 300t mobile crane, and two 16 ton Fork Lift Trucks are likely to be present on the quay to service the vessels and move materials. Circa two HGV movements in and out of the East Quay or Laydown Area are likely to occur per 24 hour period. The noise model has assumed a worst case two movements per hour during the day and night-time period.

### 5.3.2 Operational Noise Data

3D computer noise modelling of operational activity at the proposed development has been carried out using CadnaA software.

Calculations were carried out using plant manufacturer's noise data provided by the Applicant, and published data in BS5228:2009+A1:2014, to derive predicted noise levels at noise sensitive receptors. Full details of the items of modelled operational plant, noise data (including data source), operating times, durations and source heights for the modelled East Quay operations are shown in Appendix D.

### 5.3.3 Operational Noise Model Assumptions

A number of assumptions have been established during the CadnaA modelling exercise, as detailed below:

- The noise model assumes locations of plant based on descriptions of construction activities provided by the Applicant;
- Worst case scenario combinations of operational activities likely to occur in any one day during the considered assessment periods have been assumed;
- The ground model uses Lidar 1m resolution terrain height data for existing parts of Nigg Energy Park and the surrounding area. Topographic levels for the proposed development have been provided by Arch Henderson. This includes the 2m high acoustic bund along the north and eastern boundaries of the Laydown Area;
- The heights of buildings have been estimated from site visits and photographs;
- Ground absorption has been set to 0.5 for mixed soft / hard ground, areas of hard standing or water have been set to 1 for reflective surface;
- Receptors at ground floor level have been taken to be at 1.5m height. Those at second floor level have been assumed to be at 4m height (i.e. 1<sup>st</sup> floor bedrooms);
- At one storey noise sensitive receptors, day and night-time noise levels have been calculated at 1.5m height. At two storey or above, day and night-time noise levels have been calculated at 4m height.
- Items of moving plant have been modelled as line sources within CadnaA. All remaining operational plant has been modelled as point sources.

### 5.3.4 Site Design Mitigation

As part of the site design process for the proposed development, EnviroCentre modelled scenarios of operational activities provided by the Applicant in order to inform noise mitigation measures. As part of this process, and in order to reduce noise from the operational activities described in Section 5.3.1, an acoustic bund of up to 2m height is proposed, located between the Laydown Area and noise sensitive receptors to the north (Balnabruaich) and east (Balnapaling). The extent and height of the acoustic bund is shown in Drawing No. 671906-024, Appendix A.

The most exposed properties to noise are identified as being those located to the east of the proposed development in Balnapaling. The topographic level of the ground on which the acoustic bund is proposed is between 1.2m and 1.8m higher than that of the East Quay itself, therefore the proposed bund effectively reduces noise from both the Laydown Area and operational activities on the southern half of the quay, on which the majority of loading / unloading activities are likely to take place. It also provides a reduction in noise levels from existing operations in Nigg Energy Park, including parts of the Graving Dock, southern sections of the main yard / berths and South Quay activities, at receptors in Balnapaling.

## 5.4 Construction and Operational Assessment Baseline Noise Assumptions

In order to assume a worst-case scenario, the lowest measured background ( $L_{A90}$ ) noise levels have been assumed within the operational noise assessment.

Existing ambient ( $L_{Aeq}$ ) noise measurements taken at Noise Monitoring Locations (NML) 1A have been discounted from use in the construction and operational noise assessments due to the close proximity of the monitoring location to the B9175, which was noted to be the dominant source of noise at this location. NML 1B was chosen on the second round of monitoring to be at similar distance back from the B9175 to houses in Balnabruaich, and therefore is considered to be more representative of industrial noise levels at sensitive receptors in this location.

Existing ambient noise measurements taken at NML 4A have been discounted from use in the operational and construction noise assessments due to the increased influence of road traffic noise on Shore Street and Forsyth Place, and the line of sight to Nigg Energy Park. NML 4B was chosen on the second round of monitoring to reduce the influence of existing road traffic noise, and increase the line of sight to Nigg Energy Park, and is therefore considered to be more representative of industrial noise levels at sensitive receptors in this location.

In summary the existing ambient noise levels used in the operational noise assessment at each noise sensitive receptor location are as follows;

- NSR 1; That of Noise Monitoring Location (NML) 1B on 27th Feb 2019;
- NSR 2; The average of noise monitoring levels measured on 26th & 27th Feb 2019 at NML 2;
- NSR 3; The average of noise monitoring levels measured on 26th, 27th & 28th Feb 2019 at NML 3;
- NSR 4; That of NML 4B on 27th & 28th Feb 2019; and
- NSR 5; The average of noise monitoring levels measured on 26th, 27th & 28th Feb 2019 at NML 5.

## 6 CONSTRUCTION NOISE MODEL RESULTS AND ASSESSMENT

The noise model results for each modelled scenario of construction activity, along with the BS5228 assessment at each of the considered noise sensitive receptors are summarised in Table 6-1 to Table 6-5.

**Table 6-1: Noise Model Results and BS5228 Assessment; Noise Sensitive Receptor No. 1**

NSR 01	Weekday Daytime			Weekend Daytime			Evening			Night-time		
Scenario	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance
1A	65	48	Neutral	55	48	Neutral	55	36	Neutral	55	36	Neutral
1B	65	49	Neutral	55	49	Neutral	55	36	Neutral	55	36	Neutral
2A	65	49	Neutral	55	49	Neutral	55	36	Neutral	55	36	Neutral
2B	65	49	Neutral	55	49	Neutral	55	36	Neutral	55	36	Neutral
3	65	44	Neutral	55	44	Neutral	55	35	Neutral	55	35	Neutral

**Table 6-2: Noise Model Results and BS5228 Assessment; Noise Sensitive Receptor No. 2**

NSR 02	Weekday Daytime			Weekend Daytime			Evening			Night-time		
Scenario	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance
1A	65	58	Neutral	55	58	Moderate adverse	55	50	Neutral	50	50	Slight adverse
1B	65	60	Neutral	55	60	Large adverse	55	50	Neutral	50	50	Slight adverse
2A	65	59	Neutral	55	59	Moderate adverse	55	50	Neutral	50	50	Slight adverse
2B	65	60	Neutral	55	60	Large adverse	55	50	Neutral	50	50	Slight adverse
3	65	56	Neutral	55	56	Slight adverse	55	50	Neutral	50	50	Slight adverse

**Table 6-3: Noise Model Results and BS5228 Assessment; Noise Sensitive Receptor No. 3**

NSR 03	Weekday Daytime			Weekend Daytime			Evening			Night-time		
Scenario	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance
1A	65	45	Neutral	55	45	Neutral	55	36	Neutral	45	36	Neutral
1B	65	48	Neutral	55	48	Neutral	55	36	Neutral	45	36	Neutral
2A	65	46	Neutral	55	46	Neutral	55	36	Neutral	45	36	Neutral
2B	65	48	Neutral	55	48	Neutral	55	36	Neutral	45	36	Neutral
3	65	44	Neutral	55	44	Neutral	55	35	Neutral	45	35	Neutral

**Table 6-4: Noise Model Results and BS5228 Assessment; Noise Sensitive Receptor No. 4**

NSR 04	Weekday Daytime			Weekend Daytime			Evening			Night-time		
Scenario	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance
1A	65	45	Neutral	55	45	Neutral	55	35	Neutral	50	35	Neutral
1B	65	47	Neutral	55	47	Neutral	55	35	Neutral	50	35	Neutral
2A	65	45	Neutral	55	45	Neutral	55	35	Neutral	50	35	Neutral
2B	65	47	Neutral	55	47	Neutral	55	35	Neutral	50	35	Neutral
3	65	45	Neutral	55	45	Neutral	55	35	Neutral	50	35	Neutral

**Table 6-5: Noise Model Results and BS5228 Assessment; Noise Sensitive Receptor No. 5**

NSR 05	Weekday Daytime			Weekend Daytime			Evening			Night-time		
Scenario	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance	Threshold Level dB(A)	Predicted Level dB(A)	Significance
1A	65	43	Neutral	55	43	Neutral	55	34	Neutral	45	34	Neutral
1B	65	44	Neutral	55	44	Neutral	55	34	Neutral	45	34	Neutral
2A	65	44	Neutral	55	44	Neutral	55	34	Neutral	45	34	Neutral
2B	65	45	Neutral	55	45	Neutral	55	34	Neutral	45	34	Neutral
3	65	42	Neutral	55	42	Neutral	55	33	Neutral	45	33	Neutral

## 6.1 Discussion of Results

The worst case noise impacts for each of the modelled scenarios on concurrent construction stages and relevant assessment periods are summarised below (refer to Table 5-3).

**Scenario 1 (Month 6):** The combined construction stages of the piling, the rock armour revetment, dredging, infill within quay structure to tie rod level and the tie rod / anchor walls are predicted to result in noise impacts of Neutral significance at all noise sensitive receptors during weekday daytime and evening hours.

At NSR 2 (Balnapaling), work during the weekend daytime hours is expected to result in a Moderate Adverse impact during king pile installation and a Large Adverse impact during sheet pile installation. For all other receptors weekend daytime works are predicted to result in a Neutral impact.

This phase of work is expected to meet the night time threshold levels as defined using the ABC method of BS 5228 at all noise sensitive receptors. At NSR 2 (Balnapaling) the expected noise levels are equal to the threshold indicating a Slight Adverse impact. The impact is predicted to be Neutral at all other receptors.

**Scenario 2 (Month 7):** The combined construction stages of the piling, rock armour revetment, dredging, tie rod / anchor walls, the infill within quay structure above tie rod level, services installation and concrete copes are expected to result in noise impacts of Neutral significance for all receptors during the weekday daytime and evening hours.

At NSR 2 (Balnapaling), work during the weekend daytime hours is expected to result in a Moderate Adverse impact during king pile installation and a Large Adverse impact during sheet pile installation. For all other receptors it is predicted that weekend daytime works will result in a Neutral impact.

This phase of work is expected to meet the night time threshold levels as defined using the ABC method of BS 5228 at all noise sensitive receptors. At NSR 2 (Balnapaling) the expected noise levels are equal to the threshold indicating a Slight Adverse impact. The impact is predicted to be Neutral at all other receptors.

**Scenario 3 (Month 9):** The combined construction stages of the dredging, services installation, placing the final structure, concrete copes, deck furniture installation and cathodic protection are expected to result in noise impacts of Neutral significance for all receptors during the weekday daytime and evening hours.

Weekend daytime works are expected to result in a Slight Adverse impact at NSR 2 (Balnapaling). Neutral significance is predicted at all other receptors.

This phase of work is expected to meet the night time threshold levels as defined using the ABC method of BS 5228 at all noise sensitive receptors. At NSR 2 (Balnapaling) the expected noise levels are equal to the threshold indicating a Slight Adverse impact. The impact is predicted to be Neutral at all other receptors.

### 6.1.1 Greatest Weekday Daytime Noise Impacts

The greatest noise generating activities for weekday daytime works are expected to be during a crossover of piling and dredging works. This crossover is expected to last approximately two weeks. Piling works largely dominate levels when taking place, with the greatest impact predicted during the installation of sheet piles. However, the impact from construction works during the weekday daytime hours is predicted to be Neutral at all receptors.



### **6.1.2 Greatest Weekend Daytime Noise Impacts**

The greatest noise generating activities for weekend daytime works are expected to be during a crossover of piling and dredging works. This crossover is expected to last approximately two weeks. Piling works largely dominate levels when taking place, with the greatest impact predicted during the installation of sheet piles, where Large Adverse impacts are predicted at NSR 2 (Balnapaling). Moderate Adverse impacts are also predicted during the weekend daytime hours at NSR 2 during the installation of king piles. Impacts at all other receptors during the weekend daytime are predicted to be Neutral. The majority of piling will be carried out over a two month period during the Piling and Rock Armour Revetment construction stages.

### **6.1.3 Greatest Evening Noise Impacts**

Evening noise throughout the project will largely be due to the operation of onsite generators associated with works or lighting. However, during the course of dredging it is expected that the suction dredger would operate for 24 hours per day. The dredger has been modelled in its position closest to NSR 2 (Balnapaling) to ensure worst case modelling, which has shown that levels are predicted to be within the thresholds defined in the ABC method of BS 5228 by at least 5dB. A Neutral impact is therefore predicted at all receptors during the evening.

### **6.1.4 Greatest Night-time Noise Impacts**

Night time noise throughout the project will largely be due to the operation of onsite generators associated with works or lighting. However, during the course of dredging it is expected that the suction dredger would operate for 24 hours per day. The dredger has been modelled in its position closest to NSR 2 (Balnapaling) to ensure worst case modelling, which has shown that levels are predicted to meet the thresholds defined in the ABC method of BS 5228. This indicates a Slight Adverse impact at NSR 2 in accordance with TAN 1/2011, with Neutral impacts predicted at all other receptors. The maximum duration that suction dredging would be carried out at night is 5 months, however, in reality the dredger will only be this close to the NSR 2 for a small portion of the dredging works.

## **6.2 Construction Noise Mitigation**

Construction activities during weekday daytime and evening hours are predicted to have a Neutral level of significance at all noise sensitive receptors surrounding the site. At the weekend, the worst case daytime significance of effect from construction activities are predicted to be of Large Adverse significance when carrying out sheet piling, and Moderate adverse significance when carrying out king piling (NSR 2, Balnapaling). Neutral weekend impacts are predicted at the remaining noise sensitive receptors.

Impacts of Large adverse significance are likely to be important considerations, however, mitigation may be effectively employed such that resultant adverse effects may have a Moderate or Slight significance (refer to Table 2-2). Impacts of Moderate Adverse significance are defined in Tan 2011 as undesirable, but not likely to be key decision making issues. If piling were to be carried out at the weekend, the maximum duration would be two months. To reduce the level of impact from Large Adverse significance during the weekend daytime, noise mitigation measures relating to piling are recommended in Section 6.2.1.

At night, the worst case impacts are predicted to be of Slight significance (NSR 2, Balnapaling). Neutral night-time impacts are predicted at the remaining noise sensitive receptors. The maximum duration that suction dredging would be carried out at night is five months, however, as mentioned previously the dredger will only be this close to the NSR 2 for a small portion of the dredging works. Impacts of Slight significance may be raised but are unlikely to be of importance in the decision making process (refer to Table 2-2).

### **6.2.1 Piling**

As discussed previously, the majority of piling will be carried out using a vibratory hammer with the impact hammer being used to drive the sheet and king piles into their final position. The use of the impact hammer, particularly when driving the sheet piles generates the greatest level of noise during this process (Large Adverse significance). In order to reduce the level of impact during the most sensitive weekend daytime period at receptors in Balnapaling the following measures are recommended;

- The use of impact hammers on sheet piles should, where practicable, be scheduled for weekdays and avoided at weekends;
- The use of quiet hammer systems and acoustic shrouding techniques should be considered during impact piling.

### **6.2.2 Construction Noise Management**

It is recommended that best practice construction noise management techniques should be employed following guidance provided in BS5228-1:2009, and that the general principles of the Considerate Constructors Scheme be incorporated into the Construction Environmental Management Plan (CEMP).

## 7 OPERATIONAL NOISE MODEL RESULTS AND ASSESSMENT

### 7.1 BS4142:2014 Acoustic Feature Correction

CadnaA software has been used to model the specific sound level from operational activities at the location of the most exposed sensitive receptors. To calculate the rated sound level, the assessment considers the character of the sound being assessed at the receptor location. If present, corrections for impulsivity, intermittency and/or tonality are added to the specific sound level to calculate the rated sound level.

A sound source may exhibit acoustic characters at source, however, the prominence of these features may be masked at the location of the noise sensitive receptors by the residual (background) sound at these locations. The amount by which the residual sound masks these features varies as the residual sound changes in level and possible character. Similarly, the sources acoustic character may also vary with time.

In the case of ships loading/unloading, the movement of cargo and wind turbine components has the potential to create sound which is impulsive in nature. The modelled specific sound from these activities is predicted to be below, or close to the measured background noise at the most exposed sensitive receptors, which is an indication that the sound is predicted to be mostly inaudible. Despite this, due to the high transient peak levels that the movement of cargo and wind turbine components may create it is considered likely that some sound from these activities may be just perceptible at the most exposed sensitive receptors. For this reason, a correction of 3dB(A), for impulsivity that is just perceptible, has been applied to the specific noise levels all receptor locations.

#### 7.1.1 Assessment of Tonality

The proposed East Quay extension will employ the same, or similar noise generating plant to that currently being employed for existing operations at Nigg Energy Park. In order to determine if there is a tonal component to existing industrial / commercial noise emissions from the Site, analysis has been carried out of day and night-time measured levels, following guidance provided in BS4142:2014 (Annex C). The purpose of the analysis is to determine if any existing operations exhibit prominent tonality, which would in turn suggest that tonality may also be present for proposed East Quay operations.

Analysis has been carried out on noise measurements carried out on the operational ambient noise measurements carried out at noise sensitive receptor locations in Balnabruich, Balnapaling and Cromarty to account for propagation of any tonal components with distance, including low frequency noise. The tonal analysis has been carried out on all day and night-time ambient operational noise measurements described within Table 3-4.

The third octave band data along with the tonal analysis calculations are shown in Appendix E. The results show that there are no tonal components identifiable in the one-third octave band spectra that would indicate a 6 dB tonal penalty at noise sensitive receptors within Balnabruich, Balnapaling and Cromarty.

Despite the analysis that there are no prominent tones present, it was observed subjectively on site that noise from ship and oil rig generators created audible low frequency noise at surrounding noise sensitive receptors, which was most noticeable during the night-time. Although not considered prominently tonal when assessed with one-third octave bands, a slight degree of low frequency generator tonality is subjectively considered to be present at existing receptors surrounding NEP, suggesting a 2 dB tonal penalty could be applicable.

With regards to proposed East Quay operational activities (as described in Section 5.3.1), the sound generated is anticipated to be predominantly broadband in nature. Noise modelling has predicted that individual items of

noise generating plant will have lower modelled partial specific noise levels than the measured background sound at all receptor locations, therefore are predicted to be largely inaudible. Despite this, it is considered likely that a slight degree of subjective tonality from the vehicle reverse alarms and ship generators may be just audible at receptor locations during the day and night-time periods. For this reason a conservative +2dB(A) tonal penalty has been applied to the specific noise levels from the proposed East Quay at all receptor locations.

## 7.2 East Quay Operational Activities

The noise model results and TAN 2011 assessments for the day and night-time periods for operational activities are shown in Table 7-1 and Table 7-2. The results include the effects of the site design mitigation measures described in Section 5.3.4.

**Table 7-1: Noise Model Results and TAN 1/2011 Assessment; Daytime**

Noise Sensitive Receptor ID	1	2	3	4	5
<b>Modelled Specific Level</b> L <sub>S</sub> , (1 hour) dB	34.4	43.5	32.7	32.2	30.8
<b>Acoustic Feature Correction dB(A)</b>	5.0	5.0	5.0	5.0	5.0
<b>Rated Noise</b> L <sub>Ar</sub> , (1 hour) dB	39.4	48.5	37.7	37.2	35.8
<b>Background Noise</b> L <sub>A90</sub> , (1 hour) dB	34.1	42.7	40.6	41.2	42.2
<b>Rated - Background Noise</b> dB(A)	5.3	5.8	-2.9	-4.0	-6.4
<b>Sensitivity of Receptor</b>	Medium	Medium	Low	Low	Low
<b>Existing Level</b> L <sub>Aeq</sub> , (1 hour) dB	54.5	47.9	46.7	46.7	51.2
<b>Specific Level + Existing Level</b> L <sub>Aeq</sub> , (1 hour) dB	54.5	49.2	46.9	46.9	51.2
<b>Change in level</b>	0.0	1.3	0.2	0.2	0.0
<b>Magnitude of Impact (After – Before)</b>	No change	Minor	Negligible	Negligible	No change
<b>Significance of Effects</b>	Neutral	Slight	Neutral / Slight	Neutral / Slight	Neutral

**Table 7-2: Noise Model Results and TAN 1/2011 Assessment; Night-time**

Noise Sensitive Receptor ID	1	2	3	4	5
<b>Modelled Specific Level</b> L <sub>S</sub> , (1 hour) dB	32.6	41.8	31.6	31.4	30.2
<b>Acoustic Feature Correction dB(A)</b>	5.0	5.0	5.0	5.0	5.0
<b>Rated Noise</b> L <sub>Ar</sub> , (1 hour) dB	37.6	46.8	36.6	36.4	35.2
<b>Background Noise</b> L <sub>A90</sub> , (1 hour) dB	31.1	42.3	40.2	40.3	37.7
<b>Rated - Background Noise</b> dB(A)	6.5	4.5	-3.6	-3.9	-2.5
<b>Sensitivity of Receptor</b>	Medium	Low	Low	Low	Low
<b>Existing Level</b> L <sub>Aeq</sub> , (1 hour) dB	47.6	45.9	42.1	44.8	39.9
<b>Specific Level + Existing Level</b> L <sub>Aeq</sub> , (1 hour) dB	47.7	47.3	42.5	45.0	40.3
<b>Change in level</b>	0.1	1.4	0.4	0.2	0.4
<b>Magnitude of Impact (After – Before)</b>	Negligible	Minor	Negligible	Negligible	Negligible
<b>Significance of Effects</b>	Neutral / Slight	Neutral / Slight	Neutral / Slight	Neutral / Slight	Neutral / Slight

The results show that the daytime noise from proposed operations at the East Quay and Laydown Area is predicted to result in an increase in noise levels at sensitive receptors of between 0.2dB(A) at NSRs 3 & 4 (George Street & Forsyth Place, Cromarty) and 1.3dB(A) at NSR 2 (Balnapaling). The significance of the increases in noise level varies between Neutral/Slight at NSRs 3 & 4 (George Street & Forsyth Place, Cromarty) and Slight at NSR 2 (Balnapaling). The noise levels are predicted to be unchanged at NSRs 1 (Balnabruaich) and 05 (Shore Street, Cromarty).

At night the noise from proposed operations at the East Quay and Laydown Area is predicted to result in an increase in noise levels at sensitive receptors of between 0.1dB(A) at NSR1 (Balnabruaich) and 1.4dB(A) at NSR 2 (Balnapaling). The increase in noise levels in receptors in Cromarty varies between 0.2dB(A) at NSR 4 (Forsyth Place) and 0.4dB(A) at NSRs 3 & 5 (George Street and Shore Street). The significance of the increases in night-time noise levels are Neutral/Slight at all receptors.

### 7.2.1 Discussion of Results

The maximum increase in daytime noise levels is predicted to be 1.3dB(A) at NSR 02 (Balnapaling), the significance of which is Slight, at night the increase is predicted to be 1.4dB(A) at the same receptor, the significance of which is Neutral/Slight. In terms of human perception of sound, an increase of 3dB(A) is considered to be barely perceptible, therefore the predicted increase of 1.4dB(A) at receptors in Balnapaling is considered likely to be mostly imperceptible.

At receptors in Balnabruaich and Cromarty during the day and night-time there is predicted to be no change, or an increase of less than 0.4dB(A), the significance of any increases being Neutral / Slight. An increase in noise levels of this amount will not be perceptible.

Despite the prediction that the worst case increase in noise levels as a result of the East Quay is likely to be mostly imperceptible, any small numerical increase in noise levels will contribute to the cumulative industrial noise emissions from the site. It is therefore recommended that site-wide (i.e. existing and proposed East Quay operations) noise mitigation measures are implemented throughout Nigg Energy Park to offset this predicted increase in noise levels from the East Quay, as discussed in Section 7.3. These recommendations are in line with the Scoping Consultation Response received from THC, in which it was requested that site-wide mitigation measures be considered as part of this assessment.

## **7.3 Operational Noise Mitigation and Management**

The following noise mitigation measures have been discussed with the Applicant and are recommended to be incorporated into the site-wide noise management plan for both existing and proposed East Quay operations. These recommendations are in addition to the proposed site design mitigation measures described in Section 5.3.4.

### **7.3.1 General Noise Management**

- Minimise, and if feasible avoid plant movements or loading / unloading activities on the southern half of the East Quay (due to line of sight to receptors in Balnapaling) during the most sensitive night-time period;
- Use of centralised and temporary quiet generator systems positioned on or near to the South and East Quaysides;
- Where practicable, switch off vessel and rig generators when not required;
- Where practicable, select low noise plant / equipment for works on the South Quay and proposed East Quayside;
- Restrict the operation of loud speaker communication systems to daytime periods only;
- Schedule high noise generating activities to occur during daytime hours, with restrictions on high noise activities at night;
- Where maintenance activities are to be carried out at night, ensure maintenance areas are remote, or isolated from areas of noise sensitivity;
- Keep internal haul routes well maintained and avoid steep gradients;
- Keep doors to fabrication and workshop units closed when not in use;
- When plant/equipment is due for replacement/renewal, or when hiring, give preference to selection of low noise options;
- Carry out regular and effective maintenance on plant/equipment to reduce noise from wear and tear of components;
- Provide training to existing and new start employees (through incorporation into the site induction process) in best practice noise management techniques / make familiar with the operational noise management plan; and
- Carry out weekly scheduled monitoring of on-site noise levels. Log measured levels, along with description of activities occurring at time of monitoring. The log may be used to determine particularly high noise generating activities, or combinations of activities to inform further refinement of the operational noise management plan (if required), or provide information in the event of noise complaints in the surrounding community.

### **7.3.2 Mobile Plant**

- Design traffic routing and vehicle selection to avoid / minimise the requirement for vehicle reversing;

- Where vehicle reverse alarms are required, they should be designed to cause the lowest practical environmental impact; preferably they should be directional broadband noise emitters or automatically adjusted to ambient noise levels;
- Avoid unnecessary revving of engines and shut down idling plant and equipment when not in use;
- Start-up plant and vehicles sequentially rather than all together;
- Acoustic covers to engines should be kept closed; and
- Noise from plant which is known to be particularly directional, where practicable, should be orientated such that the noise is directed away from noise sensitive areas.

## **8 CONCLUSIONS**

A construction and operational noise assessment has been carried out for the proposed East Quay development at Nigg Energy Park.

### **8.1 Construction Noise**

Worst case combined construction stages based on the proposed construction schedule have been modelled using CadnaA software. Details of construction activities and associated plant on which assessment assumptions are based have been provided by Arch Henderson.

#### **8.1.1 Weekday Daytime Construction Noise**

The greatest noise generating activities for weekday daytime works are expected to be during a crossover of piling and dredging works. This crossover is expected to last approximately two weeks. Piling works largely dominate levels when taking place, with the greatest impact predicted during the installation of sheet piles. However, the impact from construction works during the weekday daytime hours is predicted to be Neutral at all receptors.

#### **8.1.2 Weekend Daytime Construction Noise**

The greatest noise generating activities for weekend daytime works are expected to be during a crossover of piling and dredging works. This crossover is expected to last approximately two weeks. Piling works largely dominate levels when taking place, with the greatest impact predicted during the installation of sheet piles, where Large Adverse impacts are predicted at NSR 2 (Balnapaling). Moderate adverse impacts are also predicted during the weekend daytime hours at NSR 2 during the installation of king piles. Impacts at all other receptors during the weekend daytime are predicted to be Neutral. Mitigation measures relating to weekend piling works are recommended in Section 6.2.1.

#### **8.1.3 Evening Construction Noise**

Evening noise throughout the project will largely be due to the operation of onsite generators associated with works or lighting. However, during the course of dredging it is expected that the suction dredger would operate for 24 hours per day. The dredger has been modelled in its position closest to NSR 2 (Balnapaling) to ensure worst case modelling, which has shown that levels are predicted to be within the thresholds defined in the ABC method of BS 5228 by at least 5 dB. A Neutral impact is therefore predicted at all receptors during the evening.

#### **8.1.4 Night-time Construction Noise**

Night time noise throughout the project will largely be due to the operation of onsite generators associated with works or lighting. However, during the course of dredging it is expected that the suction dredger would operate for 24 hours per day. The dredger has been modelled in its position closest to NSR 2 (Balnapaling) to ensure worst case modelling, which has shown that levels are predicted to meet the thresholds defined in the ABC method of BS 5228. This indicates a Slight Adverse impact at NSR 2 in accordance with TAN 1/2011, with Neutral impacts predicted at all other receptors. The maximum duration that suction dredging would be carried out at night is 5 months, however, in reality the dredger will only be this close to the NSR 2 for a small



portion of the dredging works. It is therefore recommended that night-time dredging is carried out away from the east of the proposed dredging area, as described in Section 6.2.2.

## **8.2 Operational Noise**

The operational noise assessment considers potentially significant noise generating activities within the proposed East Quay. The assessment includes the effect of the proposed site noise mitigation design, as described in Section 5.3.4.

### **8.2.1 Daytime Operational Noise**

Daytime noise from proposed operations at the East Quay and Laydown Area is predicted to result in an increase in noise levels at sensitive receptors of between 0.2dB(A) at NSRs 3 & 4 (George Street & Forsyth Place, Cromarty) and 1.3dB(A) at NSR 2 (Balnapaling). The significance of the increases in noise level varies between Neutral/Slight at NSRs 3 & 4 (George Street & Forsyth Place, Cromarty) and Slight at NSR 2 (Balnapaling). The noise levels are predicted to be unchanged at NSRs 1 (Balnabruaich) and 05 (Shore Street, Cromarty). An increase in noise levels of less than 1dB(A) at Receptors in Cromarty shall not be perceptible to the listener, and is therefore considered as insignificant. The predicted increase in noise levels of 1.3dB(A) at receptors in Balnapaling is considered likely to be mostly imperceptible, and therefore also insignificant.

### **8.2.2 Night-Time Operational Noise**

Night-time noise from proposed operations at the East Quay and Laydown Area is predicted to result in an increase in noise levels at sensitive receptors of between 0.1dB(A) at NSR1 (Balnabruaich) and 1.4dB(A) at NSR 2 (Balnapaling). The increase in noise levels in receptors in Cromarty varies between 0.2dB(A) at NSR 4 (Forsyth Place) and 0.4dB(A) at NSRs 3 & 5 (George Street and Shore Street). The significance of the increases in night-time noise level are Neutral/Slight at all receptors. An increase in noise levels of less than 1dB(A) at Receptors in Balnabruaich and Cromarty shall not be perceptible to the listener, and is therefore considered as insignificant. The predicted increase in noise levels of 1.4dB(A) at receptors in Balnapaling is considered likely to be mostly imperceptible, and therefore also insignificant.

### **8.2.3 Site-Wide Noise Mitigation and Management Measures**

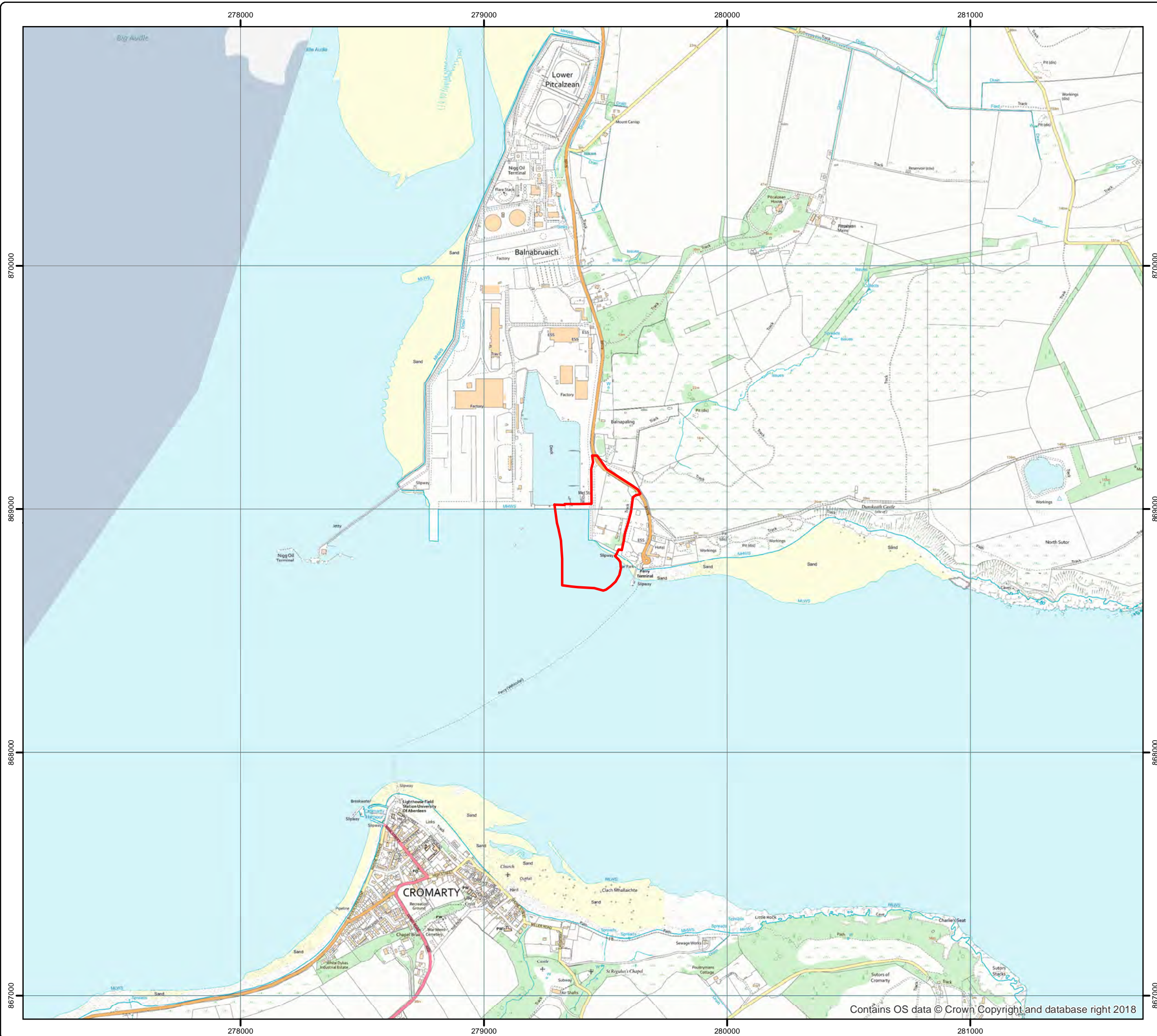
In order to reduce noise emissions from the proposed East Quay and Nigg Energy Park as a whole it is recommended that site-wide (i.e. existing and proposed East Quay operations) noise mitigation measures are implemented to offset the slight predicted increase in noise levels from the East Quay, as discussed in Section 7.3. These recommendations are in line with the Consultation Response received from THC, in which it was requested that site-wide mitigation measures be considered as part of this assessment.

## REFERENCES


- The Scottish Government (2011a). *PAN 1/2011 Planning and Noise*. The Scottish Government.
- The Scottish Government (2011b). *Technical Advice Note (TAN) 1/2011 - Assessment of Noise*. The Scottish Government.
- British Standards Institution, *Methods for Rating and Assessing Industrial and Commercial Sound*. Publ. No. BS4142:2014. BSI.
- BSI British Standards BS5228-1:2009+A1 – 2014; *Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1 Noise*.
- Environmental Protection Department of Hong Kong; *Technical Memorandum on Noise from Construction Work other than Percussive Piling*, 1989.
- Royal Haskoning DHV, *Swansea Channel Noise Impact Assessment, Memo*, 25<sup>th</sup> June 2014. The Scottish Government (2011b). *Technical Advice Note (TAN) 1/2011 - Assessment of Noise*. The Scottish Government.
- Markesino et al, *Study of noise transmission from an electric impact wrench*, Noise-Con 2004, Baltimore

## **APPENDICES**

## **A      DRAWINGS**



Legend

 Site Boundary

Do not scale this map

Client

Global Energy Nigg Limited

Project

Nigg East Quay

Title

Site Location Plan

Status

FINAL

Drawing No. 671906-001	Revision
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Scale 1:15,000	A3	Date 12 Feb 2019
Drawn AH	Checked CC	Approved CP



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Glasgow, G4 9XA  
Tel: 0141 341 5040  
Fax: 0141 341 5045





- Legend
- Site Boundary
  - Noise Monitoring Locations

Do not scale this map

Client  
Global Energy Nigg Limited

Project  
Nigg East Quay

Title  
Noise Monitoring Locations, Nigg

Status  
FINAL

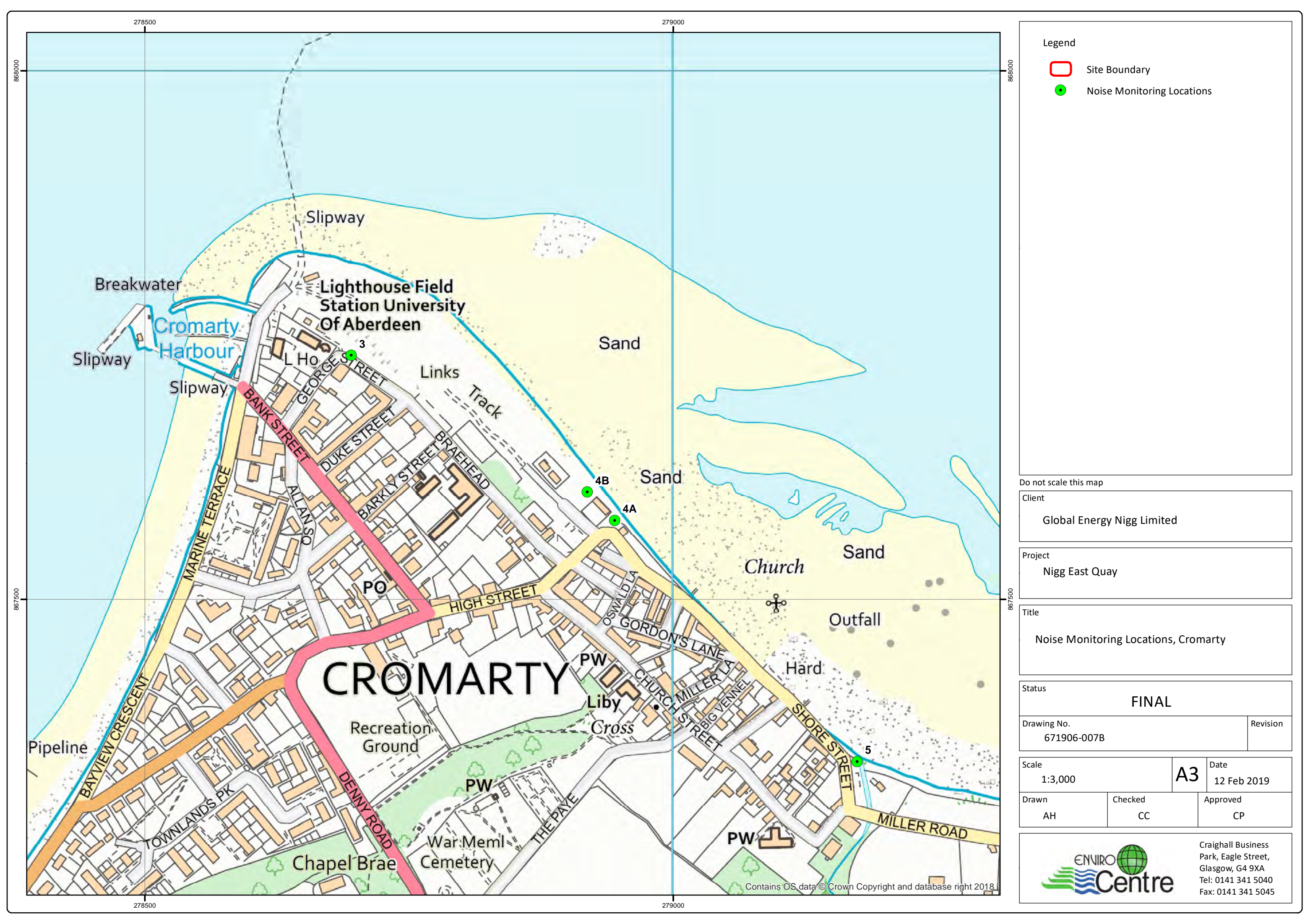
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Drawn AH	Checked CC	Approved CP




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Tel: 0141 341 5040  
Fax: 0141 341 5045

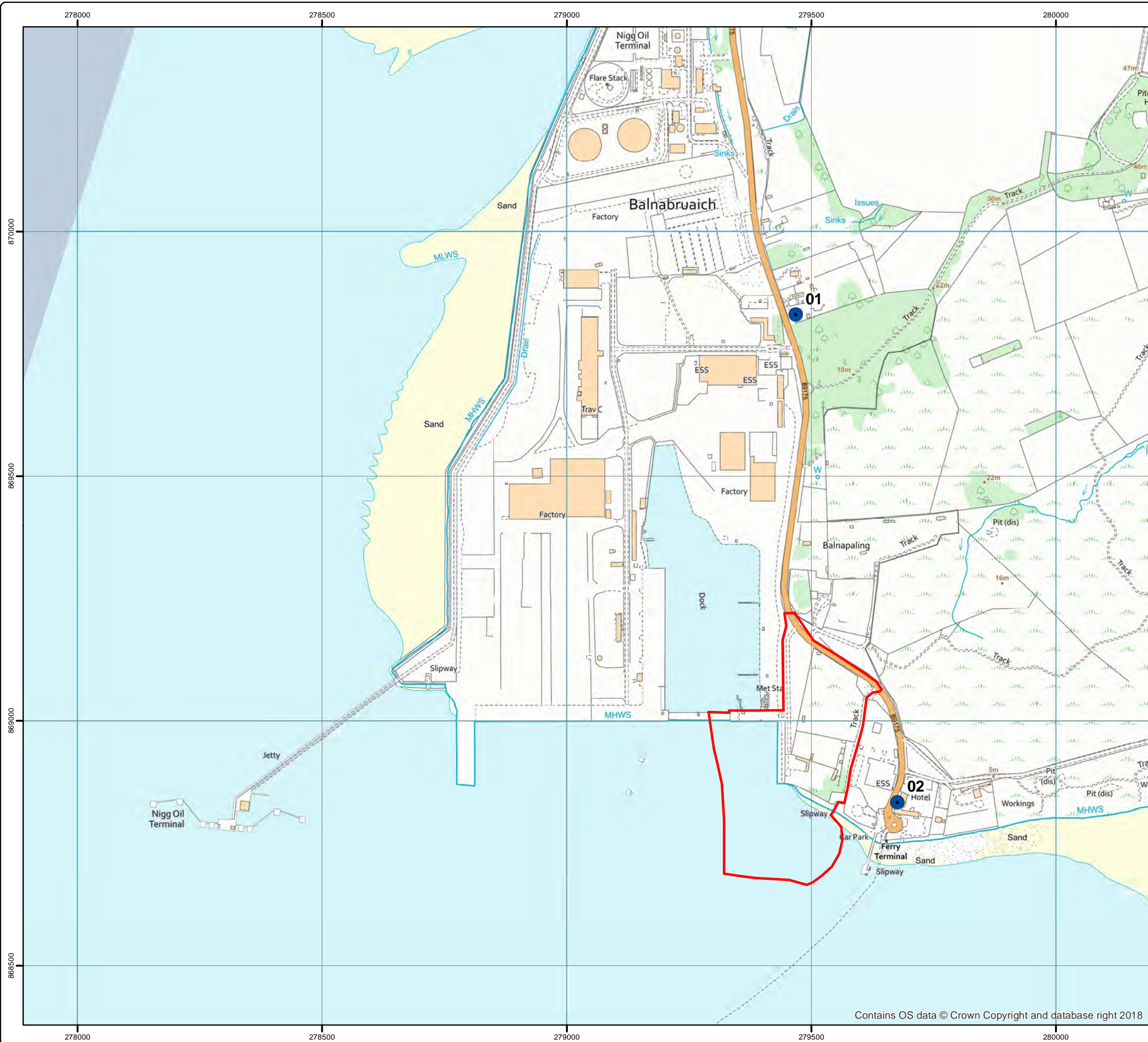




- Legend
- Site Boundary
  - Noise Monitoring Locations

Do not scale this map		
Client		
Global Energy Nigg Limited		
Project		
Nigg East Quay		
Title		
Noise Monitoring Locations, Cromarty		
Status		
FINAL		
Drawing No.		Revision
671906-007B		
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Drawn	Checked	Approved
AH	CC	CP
<div></div> <div>Craighall Business Park, Eagle Street, Glasgow, G4 9XA Tel: 0141 341 5040 Fax: 0141 341 5045</div>		





- Legend
- Site Boundary
  - Noise Sensitive Receptors

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Global Energy Nigg Limited

Project  
Nigg East Quay

Title  
Noise Sensitive Receptor Plan, Nigg

Status  
FINAL

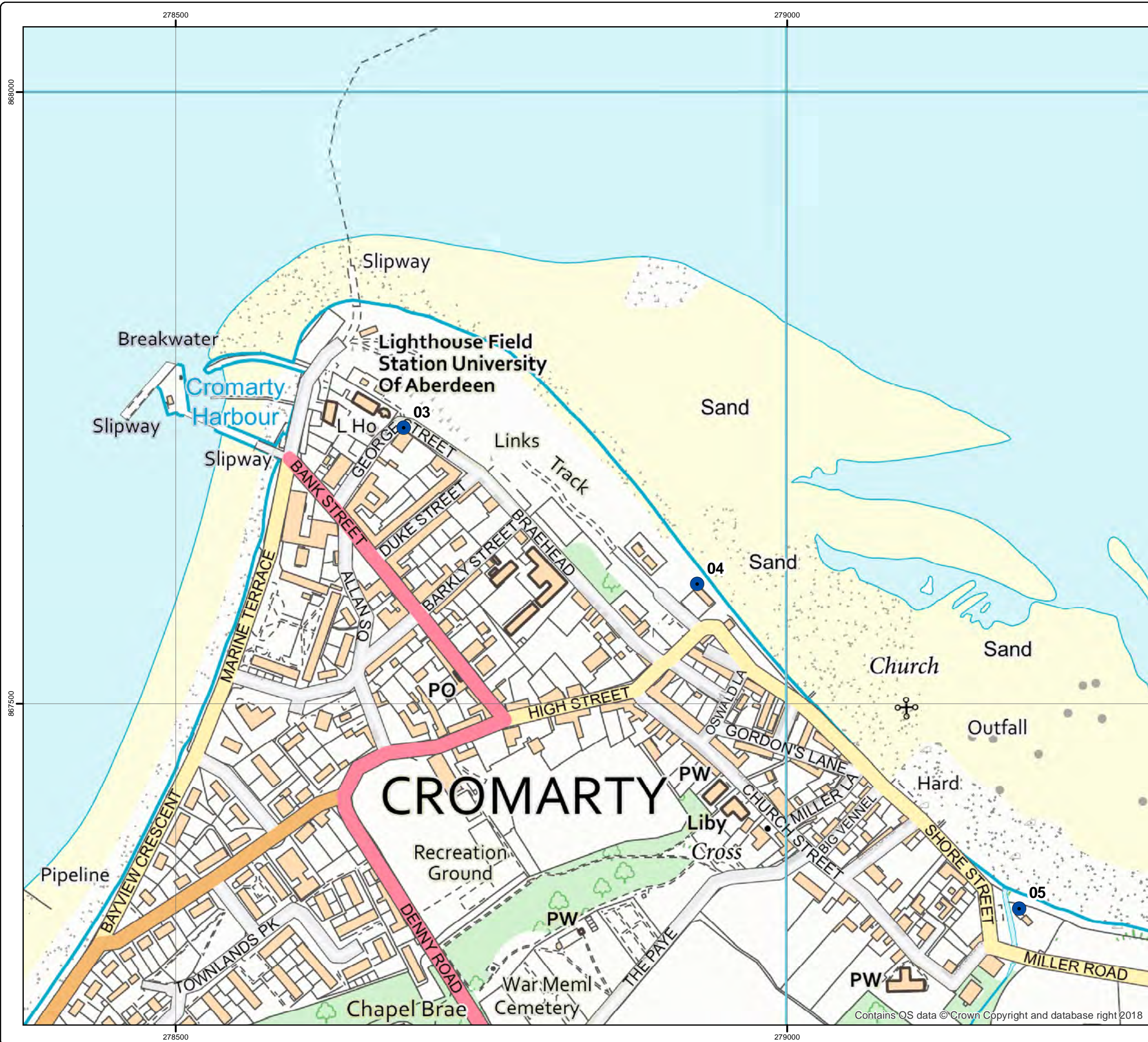
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- Legend
- Site Boundary
  - Noise Sensitive Receptors

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Project  
Nigg East Quay

Title  
Noise Sensitive Receptor Plan, Cromarty

Status  
FINAL

Drawing No. 671906-023B  
Revision

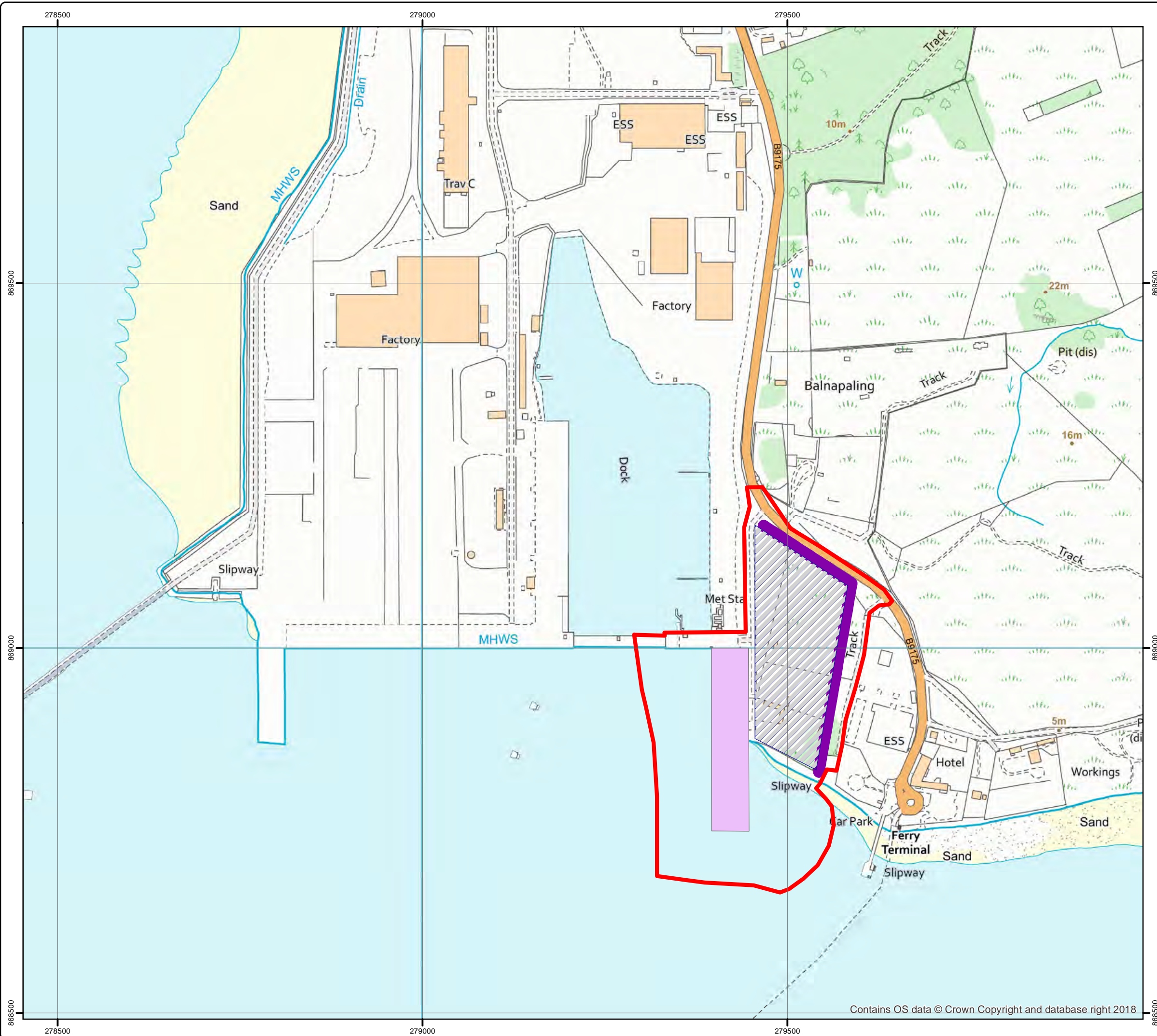
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Date 08 May 2019





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- Legend
-  Site Boundary
  -  Proposed East Quay
  -  Laydown / Storage Area
  -  2m High Acoustic Bund

Do not scale this map

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Project  
Nigg East Quay

Title  
Site Noise Mitigation Design

Status  
Final

Drawing No. 671906-024	Revision
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## B ABC CATEGORY THRESHOLDS

The appropriate ABC category thresholds for each of the noise sensitive receptors has been calculated following guidance provided in Annex E of the standard (refer to Section 2.2.1 for assessment criteria).

Calculations for each of the noise sensitive receptors, based on measured day and night-time ambient noise levels in the absence of construction noise is shown in Table 0-1 to Table 0-5. Evening and Weekend ambient noise levels have been assumed to be Category A to ensure a conservative assessment.

**Table 0-1: ABC Category Thresholds, NSR 01**

NSR 01	Measured Daytime dB(A)	Measured Night-time dB(A)	Weekend dB(A)	Evening dB(A)
Ambient Levels	54.5	47.6	N/A	N/A
Average Levels	54.5	47.6		
Average Levels Rounded	55	50		
BS5228 ABC Category	A	C	A	A
Threshold Value	65	55	55	55

**Table 0-2: ABC Category Thresholds, NSR 02**

NSR 02	Measured Daytime dB(A)	Measured Night-time dB(A)	Weekend dB(A)	Evening dB(A)
Ambient Levels	49.1	46.7	N/A	N/A
	46.1	45.0		
Average Levels	47.9	45.9		
Average Levels Rounded	50	45		
BS5228 ABC Category	A	B	A	A
Threshold Value	65	50	55	55

**Table 0-3: ABC Category Thresholds, NSR 03**

NSR 03	Measured Daytime dB(A)	Measured Night-time dB(A)	Weekend dB(A)	Evening dB(A)
Ambient Levels	47.7	42.3	N/A	N/A
	45.4	41.8		
Average Levels	46.7	42.1		
Average Levels Rounded	45	40		
BS5228 ABC Category	A	A	A	A
Threshold Value	65	45	55	55

**Table 0-4: ABC Category Thresholds, NSR 04**

<b>NSR 04</b>	<b>Measured Daytime dB(A)</b>	<b>Measured Night-time dB(A)</b>	<b>Weekend dB(A)</b>	<b>Evening dB(A)</b>
<b>Ambient Levels</b>	52.1	47.7	N/A	N/A
	46.7	44.8		
<b>Average Levels</b>	50.2	46.5		
<b>Average Levels Rounded</b>	50	45		
<b>BS5228 ABC Category</b>	<b>A</b>	<b>B</b>	<b>A</b>	<b>A</b>
<b>Threshold Value</b>	65	50	55	55

**Table 0-5: ABC Category Thresholds, NSR 05**

<b>NSR 05</b>	<b>Measured Daytime dB(A)</b>	<b>Measured Night-time dB(A)</b>	<b>Weekend dB(A)</b>	<b>Evening dB(A)</b>
<b>Ambient Levels</b>	51.3	39.6	N/A	N/A
	51.0	40.1		
<b>Average Levels</b>	51.2	39.9		
<b>Average Levels Rounded</b>	50	40		
<b>BS5228 ABC Category</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>
<b>Threshold Value</b>	65	45	55	55

## C CONSTRUCTION NOISE MODEL DATA

Ref	Start Month	Finish Month	Construction Stage	Individual Plant / Activities	No. of Units	Lp at 10m dB(A)	Data Source	Source Height (m)	Operating Times	% On-time of Operating Hours	Operating Periods			
											D	W	E	N
2	2	7	Piling	Drilling Rig	2	82	BS 5228 C.3 ref 15	0.5	08:00 – 19:00	30	x	x		
				Large crane	2	67	BS 5228 C.3 ref 28	1		50	x	x		
				Impact hammer driving sheet steel pile	1	100	BS5228 D4 Ref 4	1		15	x	x		
				Vessel to transport and position barge	1	82	CNP 221	1		75	x	x		
				Hopper barge	1	76	CNP 061	1		100	x	x	x	x
				Vibrating hammer	2	88	BS5228 D4 Ref43	1		40	x	x		
				Vibrating hammer generator	2	74	BS 5228 C.4 ref 84	1		100	x	x		
				Large capacity impact hammer	2	90	BS5228 D4 Ref 64b	1		15	x	x		
				Barge generator	1	74	BS 5228 C.4 ref 84	1		100	x	x	x	x
				Small boat to transfer personnel between the barge and shore	1	82	CNP 221	1		6	x	x		
3	6	7	Rock Armour Revetment	Compressor	1	78	BS 5228 D.3 ref 99	1	08:00 – 19:00	50	x	x		
				Generator	1	74	BS 5228 C.4 ref 84	1		100	x	x		
				Crawler Crane	1	67	BS 5228 C.3 ref 28	1		50	x	x		
				Vibrating Hammer	1	88	BS5228 D4 Ref43	1		40	x	x		
				Articulated dump truck (tipping)	60/day	80	BS5228 C1 Ref. 11	1			x	x		
				Articulated dump truck (delivery)	5/hour	85	BS5228 C6 Ref. 17	1		26	x	x		

Ref	Start Month	Finish Month	Construction Stage	Individual Plant / Activities	No. of Units	Lp at 10m dB(A)	Data Source	Source Height (m)	Operating Times	% On-time of Operating Hours	Operating Periods			
											D	W	E	N
4	6	10	Dredging	Suction dredger	1	82	Royal Haskoning DHV; Swansea Channel NIA, Memo, dated 25th June 2014.	1	Suction Dredger 24 hours / Backhoe Dredging 08:00 – 19:00	100	x	x	x	x
				Hopper barge	1	76	CNP 061	1		100	x	x	x	x
				Generator for pumps		88	BS 5228 C.4 ref 84	1		100	x	x	x	x
				Generator for barge facilities		88	BS 5228 C.4 ref 84	1		100	x	x	x	x
				Small boat to transfer personnel between the barge and shore	1	82	CNP 221	1		6	x	x		
				Long reach excavator	1	86	BS 5228 C6 Ref 5	1		80	x	x		
				Articulated dump truck (movement to move backhoe dredged material)	1/hour	85	BS5228 C6 Ref. 17	1		6	x	x		
				Articulated dump truck (tipping)	12/day	80	BS5228 C1 Ref. 11	1		1	x	x		
				Articulated dump truck (idling)	1	85	BS5228 C6 Ref. 17	1		93	x	x		
5	5	6	Infill within quay structure to tie rod level	Dumper trucks (30t)	5/hour	85	BS5228 C1 Ref. 11	0.5	08:00 – 19:00	31	x	x		
				Articulated dump truck (tipping)	20/day	80	BS5228 C6 Ref 17	0.5		2	x	x		
6	4	7	Tie rod / anchor walls	Large crane	1	67	BS 5228 C.3 ref 28	1	08:00 – 19:00	50	x	x		
				Vibrating Hammer	1	88	BS5228 D4 Ref43	1		40	x	x		
				Impact wrenches	4	70.4	Markesino et al, Study of noise transmission from an electric impact wrench	1		30	x	x		
				Hammer	4	79	BS 5228 D.7 ref 80	1		20	x	x		
7	7	8	Infill within quay structure	Vibrating plant (Roller)	2	74	BS5228 C.2 ref 39	1	08:00 – 19:00	30	x	x		
				Dumper trucks (30t)	5/hour	85	BS5228 C1 Ref. 11	0.5		26	x	x		

Ref	Start Month	Finish Month	Construction Stage	Individual Plant / Activities	No. of Units	Lp at 10m dB(A)	Data Source	Source Height (m)	Operating Times	% On-time of Operating Hours	Operating Periods			
											D	W	E	N
			above tie rod level	Articulated dump truck (tipping)	20/day	80	BS5228 C6 Ref 17	0.5		2	x	x		
				Vibrating plant (wacker plate)	2	78	BS 5228 F.1	1		30	x	x		
8	7	9	Services installation	Vibratory roller	1	74	BS5228 C.2 ref 39	1	08:00 – 19:00	50	x	x		
				Crane	1	67	BS 5228 C.3 ref 28	1		50	x	x		
				Mechanical Compaction	1	80	BS 5228 C.2 ref 42	1		75	x	x		
9	9	9	Placing final structure	Articulated dump truck (tipping)	12/day	80	BS5228 C1 Ref. 11	1	08:00 – 19:00	1	x	x		
				Articulated dump truck (delivery)	2/hour	85	BS5228 C6 Ref. 17	1		26	x	x		
				Vibratory roller	1	74	BS5228 C.2 ref 39	1		50	x	x		
				Crane	1	67	BS 5228 C.3 ref 28	1		50	x	x		
				Mechanical Compaction	1	80	BS 5228 C.2 ref 42	1		75	x	x		
10	7	10	Concrete copes	Vibrating Poker	1	78	BS 5228 C.4 Ref 33	1	08:00 – 19:00	50	x	x		
				Crane	1	67	BS 5228 C.3 ref 28	1		50	x	x		
				Cutting steel	1	91	BS 5228 C.4 ref 70	1		10	x	x		
				Hammer	4	79	BS 5228 D.7 ref 80	1		10	x	x		
				Concrete wagon - arriving to site	2/day	77	BS 5228 C.4 ref 21	2		3	x	x		
				Concrete wagon - Idling	2/day	75	BS 5228 Table C.4 ref 26	2		90	x	x		
				Concrete pump - discharging	2/day	75	BS 5228 Table C.4 ref 28	2		10	x	x		
11	9	10	Deck furniture installation	Core drill	1	85	BS5228 C.4 ref 69	1.5	08:00 – 19:00	5	x	x		
				Petrol hand-held circular saw	1	91	BS5228 C.4 Ref 70	1		5	x	x		
				Angle grinder	1	80	BS 5228 C.4 ref 93	1		5	x	x		
				Hammer	1	79	BS 5228 D.7 ref 80	1		10	x	x		
				Crane	1	67	BS 5228 C.3 ref 28	1		50	x	x		
12	9	10	Cathodic Protection	Crane	1	67	BS 5228 C.3 ref 28	1	08:00 – 19:00	50	x	x		
				Generator	1	74	BS 5228 C.4 ref 84	1		100	x	x		
				Compactor	1	80	BS 5228 C.2 ref 42	1		75	x	x		
13	1	12		Fork Lift Truck	3	88	BS 5228 D.7 ref 94	1		40	x	x		

Ref	Start Month	Finish Month	Construction Stage	Individual Plant / Activities	No. of Units	Lp at 10m dB(A)	Data Source	Source Height (m)	Operating Times	% On-time of Operating Hours	Operating Periods			
											D	W	E	N
			General activities	Core drill	2	85	BS5228 C.4 ref 69	1.5	08:00 – 19:00	5	x	x		
				Petrol hand-held circular saw	1	91	BS5228 C.4 Ref 70	1		5	x	x		
				Tractor (towing equipment)	1	80	BS 5228 C.4 ref 74	1		25	x	x		
				Site cabin Diesel gen	1	74	BS 5228 C.4 ref 84	1		100	x	x	x	x
				Power for lighting	10	65	BS 5228 C.5 ref 87	1		100	x	x	x	x
				Angle grinder	1	80	BS 5228 C.4 ref 93	1		5	x	x		
				Handheld cordless nail gun	1	73	BS 5228 C.4 Ref 85	1		5	x	x		
				Excavator (40t)	2	77	BS5228 C4 ref 63	1		80	x	x		
				Excavator - Long Reach	1	86	BS 5228 C6 Ref 5	1		30	x	x		
				Wheeled excavator	1	77	BS 5228 C4 ref 12	1		80	x	x		
				Directional drill	1	77	BS 5228 C.4 ref 96	1		5	x	x		
				Impact wrenches	4	70.4	Markesino et al, Study of noise transmission from an electric impact wrench	1		5	x	x		
14	1	12	Deliveries to site	Lorry	10/day	88	BS5228 C.11 ref 8	1	08:00 – 17:00	5	x	x		



## D OPERATIONAL NOISE MODEL DATA

### Proposed East Quay Operations

Description of Operations	Individual Plant / Activities	No. of Units	Lw	Data Source	Source Height (m)	Operating Periods	% On-time of Operating Hours	Mins per 16 Hour Daytime	Mins per 8 Hour Night-time	Assumptions
Proposed East Quay Operations	Liebher LR1280 Crawler Crane	1	106	BS5228 C4 Ref. 38	1.5	24 hours	70	672	0	This is for servicing activities during the daytime only
	SPMT	3 pairs	111 per pair	NGE; Manufacturer's data	0.5		70	672	336	6 x SPMTs per triangular jacket, will move to yard and then back once in a 10 hour shift, going at 2km/h. They go onto the ship to unload the jackets, then are jacked down in the yard. Assume 1 movement per hour max and 2km/h.
	16 ton Fork Lift Trucks	2	107	NGE; Manufacturer's data	0.5		70	672	336	Assume 10 movements per hour during the day and night-time. 15km/h
	HGV delivery or pick up	2 per 24 hours	108	BS5228, Table C6, Ref 21	0.5		2 per hour max	30	30	Assume 2 movements per hour during the day and night-time. 20km/h
	Ship generator noise	1	100.4	On-site measurements	1.5		100	960	480	Assumed to be that of Rotra Mare

## E TONAL ANALYSIS

In order to determine if there is a tonal component to existing industrial / commercial noise sources within and surrounding the Site, analysis has been carried out of day and night-time measured levels, following guidance provided in BS4142:2014 (Annex C).

The objective method compares the  $L_{eq,T}$  sound pressure level of adjacent linear one-third octave bands. A prominent discrete tone is identified as being present when the level differences between the one-third octave bands where the tone exists and both of the adjacent side bands are;

- 15dB in the low frequency one-third octave bands (25Hz to 125Hz);
- 8dB in the mid frequency one-third octave bands (160Hz to 400Hz); and
- 5dB in the high frequency one-third octave bands (500Hz to 10kHz).

The analysis below shows the minimum difference between each one-third octave band and its neighbouring one-third octave bands. If the minimum difference is above the threshold level differences indicated above, a 6 dB tonal penalty would be applicable.

The results of the analysis carried out at the measurement locations in the surrounding area, taken as representative of noise sensitive receptors in Balnabruach, Balnapaling and Cromarty are shown in the tables below.

### Noise Sensitive Receptors Ambient Noise; Daytime, Tonal Analysis

Start Time	Measurement Location	Low Frequency								Mid Frequency					High Frequency												
		25Hz	31. Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz
26/02/2019																											
14:20:30	3	-14.7	-3.8	3.8	-11.9	3.4	-6.5	-1.4	0.2	-5.9	-3.8	1.5	-1.5	-4.2	0.8	-1.4	0.7	-0.7	-1.7	-2.2	-1.4	-1.2	-1.1	0.7	-0.7	-2.8	-2.5
15:32:09	4A	2.5	-2.5	-0.8	-1.8	-0.5	-3.7	-3.8	-2.7	-0.8	-2.9	-0.2	-2.3	-1.8	-0.1	0.1	-1.2	0.6	-0.6	-2.2	-1.5	0.2	-2.6	0.1	-2.1	-3.1	-2.4
16:42:20	5	-6.3	-3.2	-3.6	3.6	-3.8	-1.1	-1.5	-5.1	-0.9	-3.8	-0.6	-1.4	-0.9	-0.2	-0.5	-0.3	0.3	-1.0	-2.1	-2.8	-0.9	0.1	-2.3	-3.2	-3.6	-2.7
15:27:07	2	-13.4	-3.9	3.3	-3.3	-1.6	-7.3	-2.3	-5.5	-1.8	-7.1	-1.3	-1.2	-2.3	2.2	-2.2	1.2	-2.7	-1.2	-3.5	-2.2	0.1	-3.4	-5.7	-4.5	-2.4	-1.8
16:44:39	1A	-2.2	-2.3	-4.1	2.6	-2.6	-1.3	-3.5	-2.3	-0.6	-1.5	1.5	-1.7	-2.0	-0.5	-2.4	-1.3	1.3	-2.6	-3.8	-3.2	-2.5	-1.9	-1.5	-3.1	-0.9	-2.5
27/02/2019																											
14:50:56	1B	-1.4	-1.7	-0.6	0.6	-0.6	-0.7	-1.9	0.0	-1.0	-0.1	-0.7	-1.5	-0.4	-1.2	-1.4	-0.8	0.8	-2.4	-3.4	-3.8	-1.4	1.3	-4.8	-2.5	-2.8	-1.9
15:59:43	2	-3.6	-3.3	-4.0	1.8	-1.8	-8.8	0.1	-10.2	-2.5	-5.2	-0.6	-1.4	-1.5	0.4	-0.4	-0.7	-0.6	-2.0	-2.4	-2.3	-1.6	-4.3	-2.6	-3.2	-4.0	-2.9
14:02:28	3	-8.8	-4.0	2.7	-2.7	-1.7	-11.2	1.8	-4.0	-1.7	-0.1	-7.8	-1.2	-0.4	-0.6	0.1	-0.1	-0.9	-0.9	-2.3	-3.0	-1.3	-0.6	-1.3	0.0	-3.9	-0.1
15:14:14	4B	-0.9	-2.9	2.0	-2.0	-4.8	-3.0	0.3	-4.4	-1.4	-6.2	-1.8	-1.5	-0.6	0.5	-0.5	-1.2	1.2	-3.0	-0.9	-1.5	1.5	-1.6	-3.2	-2.9	-6.2	
16:27:38	5	-1.0	-3.8	-6.6	6.6	-7.6	-2.5	-3.0	-4.7	-0.2	-3.7	0.8	-2.1	-2.2	1.2	-1.2	-1.0	-2.1	2.1	-4.0	-2.3	-0.4	-1.0	-1.8	-2.7	-4.1	-3.2

### Noise Sensitive Receptors Ambient Noise; Night-time, Tonal Analysis

Start Time	Measurement Location	Low Frequency Mid Frequency								Mid Frequency					High Frequency													
		25Hz	31. Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125H z	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	
26/02/2019 to 27/02/2019																												
23:01:01	2	-10.6	-4.3	-4.4	4.4	-6.5	-8.7	-0.6	-5.6	-4.7	-5.4	-3.1	-0.5	0.2	-0.2	-2.9	-0.4	-1.5	-2.7	-3.1	-2.5	0.1	-0.1	-11.1	-0.7	-1.9	-2.9	
23:41:02	1A	-3.5	-3	-1.5	1.5	-6.1	-2.1	0	-3.3	-1.5	-0.6	0.6	-1.6	-1.4	-1.9	-2.1	-0.3	0.3	-3.1	-4.2	-4.1	-3.8	-2.1	-3.4	-2.5	-1.2	-3.1	
01:16:31	3	-20.3	-3.9	3.9	-8.3	-4	-9.3	2.2	-7.5	-5	-6	-1.2	-0.1	0.1	-0.4	-0.9	0.9	-1.9	-3	-4.6	-4.3	-4.5	-3	-1.3	-0.6	-0.3	-0.2	
01:56:13	4B	-21.5	-3.9	3	-3	-7	-5.7	1.5	-8.3	-1.9	-6	-3.1	-0.8	-0.9	0.3	-0.3	-0.4	-0.8	-1.5	-2.5	-2.6	-0.7	-1.7	-2	-2.4	-2.7	-2.6	
02:36:08	5	-15.5	-4	-0.4	0.4	-5.4	-0.9	0.9	-10.2	-1	-6.4	-5.5	-0.5	-0.4	0.4	-1.1	-0.7	-2.7	-2.6	-2.6	-1.4	-0.7	-0.8	-1.2	0.2	-1.1	-1.2	
27/02/2019 to 28/02/2019																												
23:41:27	2	-9.4	-3.8	3.8	-7.2	-5.1	-2.2	-2.8	-5.1	-4.2	-5.7	-4	-2.2	-1.2	1.2	-2.3	-2.7	-0.7	-0.5	-4.2	-2.7	0.5	-0.7	-12.1	1.8	-3.2	-2.6	
00:20:29	1B	-2.4	-3.1	1.2	-1.2	-0.9	-4.6	-1.1	-4.2	0.1	-0.2	-0.2	0.2	-2.5	0.2	-3.6	-2.4	2.4	-2.6	-2.3	-2	-3.7	-3.6	-3.9	-4.3	-3.7	-3.2	
23:50:32	3	-16.4	-3.8	3.8	-12.1	-3.5	-0.9	-4.8	-3.3	-3.3	-3.4	-2.1	-0.4	0.1	-0.3	-1.3	0.3	-0.7	-2.6	-3.5	-4.3	-3.8	-0.9	-2.7	-1.4	-1.9	-1.5	
00:52:54	4B	-12.2	-4	4	-7	-5	-0.6	-1.8	-2.8	-0.4	-5.9	-2.2	-1.5	-0.6	0.2	-0.2	-0.4	-1.2	-0.8	-1.4	-1	-1.3	-2.3	-2.9	-3.1	-3.6	-3.2	
01:28:15	5	-2.6	-3.9	-1.6	1.6	-7.9	0.2	-0.2	-4.7	2.3	-8.4	-4.6	1.5	-1.5	0.9	-0.9	-1	-0.4	-3	-3.3	-2.1	-1.9	-1.8	0.3	-2.5	-2.2	-1.2	

The day and night-time results show no values above BS4142:2014 Annex C frequency thresholds, therefore no prominent tones at noise sensitive receptor locations have been identified.

## **Technical Appendix 7.1**

## APPENDIX 7.1 CONSTRUCTION TRAFFIC MANAGEMENT PLAN



# NIGG EAST QUAY EIA

## APPENDIX 7.1 CONSTRUCTION TRAFFIC MANAGEMENT PLAN

### IDENTIFICATION TABLE

<b>Client/Project owner</b>	Global Energy Nigg Limited
<b>Project</b>	Nigg East Quay EIA
<b>Study</b>	Appendix 7.1 Construction Traffic Management Plan
<b>Type of document</b>	Report
<b>Date</b>	18/06/2019
<b>Reference number</b>	108490
<b>Number of pages</b>	30

### APPROVAL

Version	Name		Position	Date	Modifications
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	Checked by	S Livingstone	Associate	31/05/2019	
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<b>3</b>	Author	B Fleming	Consultant	18/06/2019	Final Version following Client review
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## 1. INTRODUCTION

### 1.1 General

1.1.1 SYSTRA Ltd (SYSTRA) has been commissioned Global Energy Nigg Ltd (GEN) to prepare a framework Construction Traffic Management Plan (CTMP) for a proposed new quay to the south-east of the existing Nigg Energy Park in Ross-shire in the Highlands, hereafter referred to as the 'proposed development'.

1.1.2 The proposed development is situated to the south-east of the existing Nigg Energy Park on the Cromarty Firth. The proposed development site currently comprises brownfield land surrounding Dunskeath House, a disused residential property, and the remainder of the site is coastal waters. The location of the site is indicated by **Figure 1** below.



Source: OpenStreetMap & SYSTRA

**Figure 1. Site Location**

### 1.2 Purpose of the CTMP

1.2.1 The purpose of this CTMP is to develop a framework for minimising traffic impacts during the construction works associated with the proposed development and to minimise impacts on local residents and users of the area. In particular, the document will seek to clarify the traffic and associated impacts from the construction stage of the development. The CTMP brings forward management and mitigation measures that will address the potential impacts during the duration of the construction works.

1.2.2 This document seeks to define the mechanisms for managing the movement of construction related vehicular traffic associated with the development, the processes for monitoring of the CTMP and consultation with parties who may be affected by construction traffic and construction activities.

1.2.3 The CTMP only applies to the construction stage of the development and does not apply to the future ongoing operation of the development. It is the responsibility of the Applicant, GEN, and the main contractor for the construction of the proposed development to implement the CTMP as well as monitoring its application and making any modifications to the CTMP that may be required. Any sub-contractors employed on the site would fall under the umbrella of the CTMP.

1.2.4 This framework CTMP is informed by consultation discussions with The Highland Council (THC) Roads and Transport Scotland, a site visit undertaken by SYSTRA on 15/01/19, and information provided by Arch Henderson Marine Engineers.

### 1.3 Scope of CTMP

1.3.1 The document focuses on addressing the issues of safety and controlling the risks that may arise from the use of heavy goods vehicles (HGVs) for the delivery of plant and materials. The Health and Safety Executive (HSE) expect to see CTMPs that include the following elements:

- Planning and managing both vehicles and pedestrian routes;
- The elimination of reversing where possible;
- Safe driving and working practices;
- Protection of the public;
- Adequate vision and lines of sight;
- The provision of signs and barriers; and
- Adequate parking and off-loading/storage areas.

1.3.2 This framework CTMP has been prepared taking into account the above elements and also ensuring that other environmental impacts such as dust and dirt are also considered.

1.3.3 The CTMP is intended to be a working document that evolves during the detailed planning stage for project and during the construction period itself. Monitoring of the CTMP will be undertaken and any necessary modifications will be made in consultation with THC as the local roads authority and Transport Scotland in relation to the trunk road network.

### 1.4 Document Structure

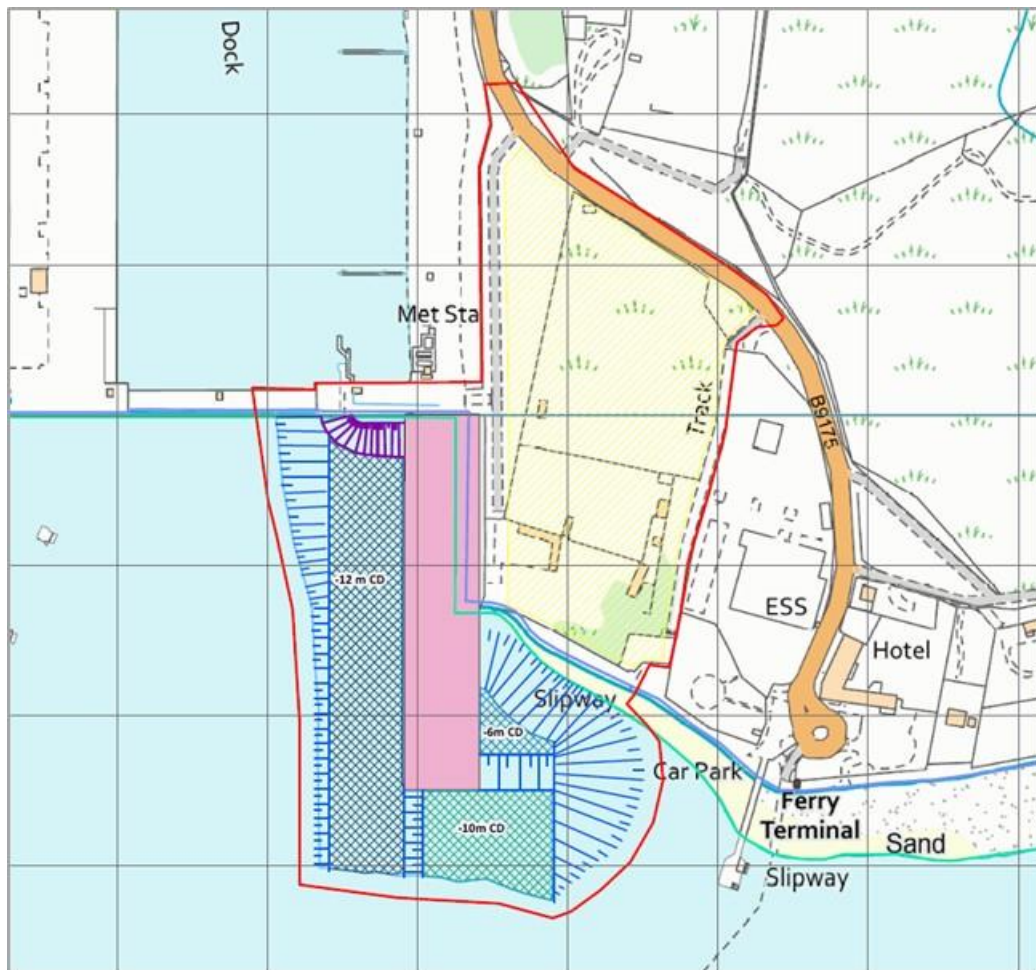
1.4.1 Following this introductory chapter, the report is structured as follows:

- Chapter 2 – Project Description & Existing Transport Network;
- Chapter 3 – Characteristics of Construction Works;
- Chapter 4 – Measures to Reduce and Mitigate Impacts;
- Chapter 5 – Implementation & Monitoring of the CTMP; and
- Chapter 6 – Summary & Conclusions

## 2. PROJECT DESCRIPTION & EXISTING TRANSPORT NETWORK

### 2.1 Project Overview

- 2.1.1 The proposed development will comprise the construction of a new quay situated to the east of the existing Nigg Energy Park facility. The proposed development will comprise a site area of approximately 2.86 hectares. The redline boundary of the site is indicated by **Figure 2** below.



Source: EnviroCentre

**Figure 2. Redline Boundary**

## 2.2 Baseline Conditions

- 2.2.1 The site is bound to the north and east by the B9175 and bound to the west by the existing Nigg Energy Park. A context plan of the local road network and surrounding land uses is indicated by Figure 3



Source: Google Maps & SYSTRA

Figure 3. Site Context Plan

## Walking & Cycling

2.2.2 The pedestrian network surrounding the site is highlighted in **Figure 4** below.



Source: Google Maps & SYSTRA

**Figure 4. Local Pedestrian Network**

2.2.3 There are intermittent sections of footway along the length of the B9175. The characteristics of the footways is variable in terms of standard and width with sections of uneven surfacing and overgrown verges. Generally, the footways are approximately 1.2m wide in the vicinity of Nigg Energy Park. Within Arabella, the footways are of a good standard and are approximately 1.5m wide, as indicated by Figure 5.

2.2.4 Under the Land Reform (Scotland) Act 2003, every local authority in Scotland is required to draw up a plan for a system of paths ('core paths') sufficient for the purpose of giving the public reasonable access throughout their area by non-motorised means. As demonstrated by the figure above, the proposed development is situated nearby Core Path 35.01 which routes between the B9175 and Castle Craig Quarry.





Source: SYSTRA

**Figure 5. General Characteristics of Footway within Arabella**

- 2.2.5 The National Cycle Network Route (NRC) 1 is a long distance cycle route connecting Dover and the Shetland Islands. NRC 1 connects over the Cromarty Firth via the seasonal Nigg – Cromarty Ferry, as shown by Figure 6 below. The route comprises a small on-road section along B9175 passing the proposed development and the Nigg Energy Park to the east.



Source: Google Maps

**Figure 6. NCR 1**

## Bus

- 2.2.6 The nearest bus stop to the site is located at the Nigg Ferry pier, approximately 1km south-east of the developments access. The bus stop comprises a shelter and seating, as indicated by Figure 7 below. Service 29 operates from this stop and is a circular route between Tain and the Nigg Ferry slipway, stopping in Nigg village and Arabella. There are 3 services operating per day Monday – Friday and no services on Saturdays and Sundays.



Source: SYSTRA

**Figure 7. Ferry Terminal Bus Stop**

## Site Access

- 2.2.7 The main entrance and vehicular access point to the current Nigg Energy Park facility is gained from the B9175 approximately 1km north from the Nigg to Cromarty Ferry pier (hereafter referred to as the “Nigg Ferry” pier). Once operational, access to the proposed development will be from the same main entrance (indicated by 0) and vehicles will route through the existing Nigg Energy Park facility to reach the proposed development.
- 2.2.8 There is an existing junction further south of Nigg Energy Park’s main entrance, approximately 500m to the north of the Nigg Ferry pier, which currently provides direct access into the proposed development site (indicated by Figure 9). This access will be used by general construction traffic to gain access to the site during the construction stage. This access would then operate as an emergency access only once the proposed development is operational.



Source: SYSTRA

**Figure 8. Nigg Energy Park Main Entrance**



Source: SYSTRA

**Figure 9. Site Existing Access Point**

## Local Road Network

### A9 Trunk Road

- 2.2.9 The A9 connects to the B9175 via a four-arm roundabout. The A9 in the vicinity of the B9175 is a good standard derestricted single carriageway (speed limit 60mph). The A9 provides a link south to Inverness, the nearest city to the proposed development, and continues north from the roundabout with the B9175 to Thurso and Scrabster. The general characteristics of the road are depicted by Figure 10.





Source: Google Maps

**Figure 10. General Characteristics of the A9 Trunk Road**

- 2.2.10 It is anticipated that staff vehicle trips and a small number of construction HGV traffic will utilise the A9 to reach the B9175 to route towards the proposed development. There is a ready-mix plant in the town of Alness, approximately 16km south-west along the A9 from the roundabout with the B9175, and it is proposed that concrete for the proposed development is sourced from this plant.

#### *B9175*

- 2.2.11 The B9175 is a single carriageway road which is rural in nature and generally of a good standard throughout. The B9175 is derestricted (with a speed limit of 60mph) except for a small section of the road through the villages of Nigg Station and Arabella, whereby the speed limit is reduced to 40mph. There is street lighting within the villages and there are intermittent sections of footway along the length of the B9175. The general characteristics of the road are indicated by Figure 11.



Source: SYSTRA

**Figure 11. General Characteristics of the B9175**

- 2.2.12 Given that the proposed development will take access from the B9175, all staff vehicle trips and construction HGV traffic will route along the B9175 at some point, albeit, the length of the route will vary depending on the origin of staff / source of the materials.

*CastleCraig Quarry Road (Unclassified)*

- 2.2.13 CastleCraig Quarry is accessible from the B9175 via a junction immediately to the east of the proposed development. The length of road between the B9175 and the quarry entrance is approximately 1.6km in length, however, only approximately 250m of this route is within the public road network and the remainder is a private access road. The road is single track with passing places, lined by grass verges on either side.
- 2.2.14 It is noted that the route between the B9175 and CastleCraig Quarry forms part of THC's core path<sup>1</sup> network and is identified as core path RC35.02. The general characteristics of the road are indicated by Figure 12.

<sup>1</sup> Under the Land Reform (Scotland) Act 2003, every local authority in Scotland is required to have a system of paths that is sufficient for the purpose of giving the public reasonable access throughout their area by all non-motorised means.



Source: SYSTRA

**Figure 12. General Characteristics of Castlecraig Quarry Road**

- 2.2.15 Given that this road is largely a private access road to Castlecraig Quarry and Castlecraig Farm only, it is predicted that the AAWT flow is very low.

*Nigg – Cromarty Ferry Pier*

- 2.2.16 The Nigg Ferry operates between May / June and September from the pier which is located immediately to the east of the proposed development site to Cromarty on the southern side of the Cromarty Firth, as shown in Figure 13. The pier is accessed via the B9175, approximately 1km along the road from the site access. Ferry services run every 30 minutes between 08:00 until 18:15.



Source: Google Maps

**Figure 13. Nigg Pier**



### 3. CHARACTERISTICS OF CONSTRUCTION WORKS

#### 3.1 Construction Programme

- 3.1.1 It is anticipated that construction of the proposed development would begin in late 2019 and would take approximately 10 months (approximately 253 working days, covering the period from initial contractor mobilisation to the date of handover).
- 3.1.2 In general, working hours on-site are expected to be between 07:00 and 19:00 on weekdays and 07:00 to 13:00 on Saturdays during the construction stage. Deliveries during the working day are likely to be staggered across the day. Staff are likely to arrive and depart before the network peak AM and PM periods (which are generally 08:00 – 09:00 and 17:00 – 18:00 respectively).

#### 3.2 Potential Construction Impacts

- 3.2.1 Marine Engineers, Arch Henderson, have provided information in relation to the construction activities, number of associated HGV loads, and number of staff required during the construction stage from a first principles approach. The following construction activities are expected:

- Site establishment: establish site office and welfare, install temporary service connections, plant arrival on site and prep;
- Piling supply and installation / construction;
  - Phase 1: piles and structure
  - Phase 2: dredging
  - Phase 3: concrete works, install services
  - Phase 4: surface layer, deck furniture
- Testing and Commissioning.

- 3.2.2 It is understood that a significant proportion of the construction materials will arrive to the site by sea and, therefore, will not result in any HGV movements.

- 3.2.3 It is not possible to provide a wholly accurate estimate of traffic movements for the construction stage until the contractor team is appointed and they have the opportunity to fully plan the construction works. Notwithstanding this, robust assumptions have been made at this stage to identify the likely worst case and average traffic movements to and from the construction site.

- 3.2.4 Considering the materials that require to be imported to the site via the public road network, the following number of HGV loads and vehicle trips are estimated:

- Imported crushed rock from Castlecraig Quarry – 912 loads (1,824 two-way vehicle movements);
- Imported concrete from ready-mix plant in Alness – 155 loads (310 two-way vehicle movements); and
- Construction staff – 20 at most, likely to arrive in two works mini-buses.

- 3.2.5 In relation to staff, it is expected that a works minibus is put in place. The construction materials transported to the site via the public road network (as opposed to by sea) will originate from either Castlecraig Quarry or the ready-mix plant in Alness. Materials from Castlecraig Quarry will only be required to travel along a short section of the public road network between the quarry and the Nigg Energy Park access point (approximately 2.5km).
- 3.2.6 Therefore, only staff vehicle trips and HGVs importing concrete from Alness (310 two-way HGV movements throughout the construction stage) will travel through the largest part of the study area along the A9 and B9715.
- 3.2.7 It is likely that the concrete importation to the proposed development from the plant in Alness will be concentrated over one month of the construction stage as it is typical for construction contracts to supply products on a campaign basis.

## 4. MEASURES TO REDUCE & MITIGATE IMPACTS

4.1.1 There are a number of traffic management measures proposed to help reduce the impact of general construction traffic during the construction works. These measures are described in turn below.

### 4.2 Design Principles

4.2.1 The development has been designed in such a way as to minimise the amount of earthworks required, minimise the amount of material that requires to be taken off and on-site and maximise the amount of materials sourced and recycled on-site.

### 4.3 Vehicular Access to Site

4.3.1 As discussed in Chapter 2, access to the proposed development will be gained from the existing junction approximately 500 north-west of the Nigg Ferry pier. A temporary security facility will be set-up during the construction stage to control access to the site and prevent non-authorised personnel from accessing the site.

4.3.2 Once the development is operational, this access will be closed securely and all general traffic accessing the development will do so via the current main entrance to the Nigg Energy Park which operated a controlled, barrier-entry system.

### 4.4 Sustainability

4.4.1 The main contractor will plan and execute the construction of the development with a high regard to sustainability. In particular, the following objectives will be put in place:

- Minimisation of vehicle movements to/from the site;
- Promotion of shared transport arrangements for site operatives;
- Thorough pre-planning of operations on site to optimise the redistribution of earthworks materials together with minimisation of haul distances; and
- Apply a reduce-reuse-recycle philosophy to all waste processing activities.

### 4.5 Delivery Control

4.5.1 The main contractor will require to plan and manage deliveries and collections from the site to minimise the impact on the surrounding road network. In order to manage the delivery of materials and plant, the main contractor will implement the following measures where possible during the construction period:

- Peak hours for a construction site are generally outside regular office / employment hours and where possible deliveries shall not occur within the AM and PM road network peaks;
- The number of delivery trips shall be minimised through a combination of consolidated ordering, rationalising suppliers and consolidated deliveries.
- On-site waste shall be minimised through recycling and re-use to minimise the number of collections from site; and
- Under no circumstance shall lorries be allowed to lay-up in surrounding roads.

- 4.5.2 The main contractor will be responsible in planning and managing deliveries and collections from the site to minimise the impact on the surrounding road network. Deliveries will be planned well in advance and on-site activities will be co-ordinated so that concentrated peaks in traffic movements on and off the site are avoided.

## 4.6 Driver Management & Code of Conduct

- 4.6.1 Transportation of materials to and from the site should be conducted by HGV vehicles operated by drivers with an in date Driver Certificate of Professional Competence (CPC) qualification.
- 4.6.2 In addition to the Driver CPC qualification, regular 'in-house' coaching should be provided to ensure drivers maintain best practice when operating HGVs.
- 4.6.3 Drivers should be fully inducted and enrolled into a code of conduct which outlines how driving duties should be undertaken. The driver's code of conduct should include guidance on the following:
- Required license categories;
  - General vehicle operation and highway code;
  - Drivers working hours / fatigue management;
  - Breakdowns / RTC / Emergencies;
  - Use of electronic devices;
  - Drug and Alcohol policy; and
  - Behavioural expectations.
- 4.6.4 The items listed above are not exhaustive and are only indicative of the elements that should be included in the driver's code of conduct document.

## 4.7 Banksman

- 4.7.1 Where appropriate, banksman will be deployed to assist in the management of HGV construction traffic. These banksman would likely be deployed during peak construction periods.
- 4.7.2 A banksman will be deployed at the site access point during the brief periods of higher construction traffic (during stone and concrete importation) only to control access and egress to the site in line with required security procedures for the proposed development and Nigg Energy Park.

## 4.8 Contractor Speed Limit

- 4.8.1 The speed limit currently in operation along the B9175 is the national speed limit, however it is proposed to impose a reduced speed limit of 40mph for all construction HGVs along the route. Within Nigg Station and Arabella where the current speed limit is 40mph, a reduced speed limit of 30mph will be enforced for construction HGVs.
- 4.8.2 This speed limit will be reinforced by construction traffic speed limit signs along the length of the route. Local residents will be able to report any instances of speeding to an

appointed site representative who would take necessary action to prevent a repeated incident.

- 4.8.3 The contractors will be briefed on the speed limits through induction sessions and through regular staff briefings, including the existing 20mph speed limit along the Castlecraig Quarry route. Any other parties responsible for site deliveries will also be instructed on the restrictions and made aware of the requirements relating to existing road users.

## 4.9 Designated Construction Routes

- 4.9.1 Subject to where materials are sourced, construction vehicles will route to the site via the most direct route possible whilst keeping to roads which are most suitable to HGV movements and avoiding residential routes as much as possible, i.e. utilise the strategic road network where applicable. In the vicinity of the site, construction vehicles will be instructed to utilise the A9 trunk road and the B9175 only and not route via any of the single-track roads through Ankerville and Nigg village.
- 4.9.2 It is noted that HGVs transporting stone between Castlecraig Quarry and the proposed development will be required to utilise a small section of single-track road, albeit, this route is generally used for quarry purposes only.
- 4.9.3 The main contractor shall ensure that the existing visibility splays at the access point is kept clear in order to maintain road safety at these locations.

## 4.10 Measures to Reduce Dust and Debris

- 4.10.1 Unless unavoidable, no vehicles used for travel on public roads will be permitted to drive over broken or unsealed ground in order to minimise the potential for tracking mud, dust and stones outside of the site. Notwithstanding this, the following measures will be implemented at the site to manage dust and dirt effects:
- Mechanical Road Sweeping
    - A road brush will be used as required to maintain clean routes within the site and along the public road network;
  - Covering of Loads
    - Where possible, HGVs carrying material to and from the site will be covered during transportation to minimise wind-blowing materials from being deposited onto the public road network; and
  - Dust Suppression
    - During periods of particularly dry weather, dust suppression measures such as water spraying will be used on the internal and external access roads where necessary.

## 4.11 Signage

4.11.1 Temporary construction site signage will be erected on the local road network in the vicinity of the development site to warn people of construction activities and associated construction vehicles. Additional signage along the Castlecraig Quarry route will also be erected during the month(s) of stone importation.

4.11.2 The purpose of such signage is to provide driver and pedestrian information and to maintain road safety along the designated construction vehicle routes. The exact nature and location of the signage will be agreed with THC prior to construction activity on site. Indicative signage for use on these routes is indicated by Figure 14.



Figure 14. Indicative Warning Signs

## 4.12 Construction Site Operating Hours

4.12.1 Construction activities will be undertaken during the following hours as stipulated in the previous planning conditions:

- 07:00 – 19:00 Monday to Friday; and
- 07:00 – 13:00 Saturday.

4.12.2 There will be no external construction activities or scheduled deliveries on a Sunday or on bank holidays. The purpose of the above working hours is to find a balance between progressing the development at an acceptable speed and minimising the impact upon local residents and roads.

## 4.13 Workforce Travel and Parking Arrangements

4.13.1 It is highly unlikely that the on-site workforce will walk to the site even though some of the workforce may be drawn from the local area. It is more likely that the majority of the workforce will travel to the site either via two contractor's works mini-buses.

4.13.2 Given that the workforce is expected to comprise a maximum 20 staff during the peak periods, the traffic impacts associated with commuting to and from the site are not expected to be significant, and indeed, have been assessed within Chapter 7 Traffic and Transport of the EIA Report. Notwithstanding this, construction staff will be encouraged to either car share or travel by works bus to minimise traffic movements and minimise on-site parking requirements.

- 4.13.3 Car parking for the workforce will be provided entirely within the confines of the site boundary and no overspill will be permitted onto the public road network within the area.
- 4.13.4 All plant, machinery and vehicles when parked will be with the hand brakes applied and ignition keys removed. Where immobilisers are fitted, these will be fully activated. This applies mostly to plant and machinery left on site overnight, weekends and during holiday periods.
- 4.13.5 Full consideration must always be given to unauthorised persons gaining access to plant and machinery when the site is closed. All plant and machinery shall be kept within the contractor compound area when not in use.

#### **4.14 Measures to Maintain Pedestrian Safety**

- 4.14.1 It is acknowledged that there will be an increase in construction vehicle movements on the local road network adjacent to the site. There is not expected to be any pedestrian activity at the access point. However, the hamlet of Balnapaling is situated adjacent to the Nigg Ferry pier, both of which could be affected by the HGV movements between the development and Castlecraig Quarry.
- 4.14.2 The residents of Balnapaling will be informed in advance of the dates in which increased HGV movements will occur. The main contractor will aim to schedule these movements to occur between 10:00 and 16:00 when the majority of residents are likely to be away from the home to minimise disruption to their day.
- 4.14.3 From May / June – September when the Nigg Ferry is operational there could be additional pedestrians in this general vicinity due to the operation of the ferry. In order to minimise the impact of construction traffic on the ferry passengers, the main contractor will arrange that HGVs transporting stone from the quarry are to hold station when ferry passengers are disembarking and until they have vacated the immediate area.
- 4.14.4 The single-track road which links the B9175 and Castlecraig Quarry is part of THC's core paths plan and it will be important that access to this core path by pedestrians is maintained during the period of stone importation to the proposed development. To manage the interaction between vehicles and pedestrians, additional warning signs for the duration of the stone importation will be implemented as well as ensuring enforcement of the 20mph speed limit already in place.
- 4.14.5 It is anticipated that stone importation will be concentrated over a short period during construction stage (that could possibly not coincide with the ferry's operating months), therefore reducing the number of members of public experiencing the effect.
- 4.14.6 It is noted that the route to and from Castlecraig Quarry will already be well-used by HGVs when the quarry is fulfilling contracts, therefore, construction of the proposed development will not create more disruption than is typical for this route.



#### 4.15 Travel Notice Board

- 4.15.1 In addition to the staff induction process (detailed below), regular driver briefings and implementation of a driver code of conduct, travel notice boards should be erected at various locations and maintained up to date with relevant travel information.

#### 4.16 Staff Induction Process

- 4.16.1 Immediately on commencement of construction, all deliveries, operatives and visitors will report for induction at the main compound. The induction will be communicated to all sub-contractors also at their inception meeting.
- 4.16.2 The induction will be undertaken by the Site Liaison Officer and other parties as required. All operatives will be advised on emergency procedures, assembly points, first aid, site rules and location of welfare facilities, policies and contacts at this time. All operatives will be instructed to sign in and out at the site access points each day.
- 4.16.3 All site staff will be informed about traffic management arrangements and procedures via site induction literature. All contractor induction literature will contain information on CTMP arrangements such as car parking provision.

#### 4.17 Road Condition Survey

- 4.17.1 It is recognised the potential increase in HGV movements on the local road network may result in accelerated wear and tear to the carriageway. In order to address this situation, a full dilapidation survey will be undertaken of the existing road conditions and surrounding structures by appointed structural engineers. A copy of the results of this survey will be provided to THC. This will ensure that any damage is recorded and measures taken to repair such damage.
- 4.17.2 This process will run separately to this CTMP but the steps associated with the CTMP can be summarised as follows;
- A full structural and condition survey will be undertaken on the route falling within an agreed area of influence to establish the existing condition before construction commences;
  - During the construction period, the main contractor (in consultation with THC) would monitor the condition of the road and would repair damage and wear as necessary to ensure that an acceptable running surface is maintained for all road users;
  - On completion of the overall works, a further survey would be undertaken to establish the condition of the route on completion of the works; and
  - A scheme of remedial works would be agreed with THC to repair any structural defects with the road and to repair the road surface where necessary.

## 4.18 Vehicle Movement Monitoring

- 4.18.1 The number of vehicles travelling on and off the site will be monitored during the construction works. This will be achieved through the control point at the secure access point. The access point will be staffed and all vehicle movements will be recorded in and out so that there is a daily record of movements on and off the site. This information can be made available to THC on request to monitor site traffic levels against the estimated numbers set out in the CTMP.

## 5. IMPLEMENTATION & MONITORING OF THE CTMP

### 5.1 General

- 5.1.1 The implementation and monitoring of the CTMP will be the responsibility of the main contractor. Further evolution of the CTMP will be required during the detailed project planning stages and during the construction period itself.
- 5.1.2 The main contractor may employ a number of sub-contractors on the site who will fall under the auspices of the CTMP and will have an obligation to adhere to the plan written in to their contracts.

### 5.2 Responsibilities of the Main Contractor

#### Primary Point of Contact

- 5.2.1 The main contractor will nominate a person to be responsible for the co-ordination of all elements of traffic and transport during the construction of the development. This person will also act as a Liaison Officer with THC so that they have a direct point of contact with the main contractor who they may contact for information purposes or to discuss matters pertaining to traffic management or site operation.
- 5.2.2 The main contractor will review and update the number of site personnel, traffic numbers and the construction programme as the project progresses. Regular updates will be provided to THC with regard to traffic management and any significant changes will be discussed and agreed with THC before implementation. Regular meetings, where required, will be organised for monitoring purposes.

#### Transport Co-ordination

- 5.2.3 The main contractor will be responsible for the co-ordination of all elements of HGV transport to and from the construction site. The company will be responsible for coordination and liaison with THC, Transport Scotland and the local community, as necessary.
- 5.2.4 The person nominated by the main contractor (Liaison Officer) will inform THC of any significant matters that may affect traffic movement by means or reports issued at regular intervals or by day to day reports of any significant essential changes to transport plans necessitated by circumstances. Contact details for Liaison Officer will be made available to all relevant parties prior to commencement of works on site.

#### Monitoring of the CTMP

- 5.2.5 The CTMP will be monitored by the main contractor who in turn would report to THC. A report will be prepared by the main contractor at regular intervals during the construction stage (e.g. every 3 months) and issued to THC. This report will include comparisons with this document and will identify any breaches with regard to projected traffic flows associated with construction vehicles and traffic associated with the employed workforce.

- 5.2.6 As necessary, meetings will be held with THC to discuss the CTMP and to discuss any issues raised by the local community.
- 5.2.7 Use of the agreed routes by hauliers will be monitored by undertaking spot checks by the main contractor and / or THC. These spot checks would take the form of observations or surveys at key locations. It is also noted that traffic levels will constantly be monitored at the access point to the site. The information collected from the spot checks will be held by the main contractor and will be made available to THC and others on request.

#### **Liaison with Local Community**

- 5.2.8 The key to the success of the CTMP will be how it is communicated to the local community and how it is adapted to take on board feedback received.
- 5.2.9 As indicated above, the main contractor will provide a Liaison officer to act as a point of contact with THC and the local community. The liaison officer will be responsible for keeping the local community informed of progress on the site and warning them of upcoming activities which may give rise to increased construction vehicle movements.
- 5.2.10 The liaison officer would be able to attend Community Council meetings to provide a report and to be on hand to answer any questions that the local community may have. Contact details will be provided for the liaison officer (telephone number and email address) so that members of the public have an opportunity to ask questions and provide feedback. The main contractor will also make use of the local press in order to disseminate information regarding traffic management and other activities.

#### **Letters / Telephone Calls / Meetings Etc.**

- 5.2.11 It would be the responsibility of the main contractor to respond to enquiries from members of the public regarding the operation of the facility and update residents/interested parties through traditional methods.
- 5.2.12 It may be necessary to visit homes of interested parties if they are unable attend consultation events through disability or otherwise.

## 6. SUMMARY & CONCLUSIONS

6.1.1 SYSTRA Ltd has been commissioned Global Energy Nigg Ltd to prepare a framework Construction Traffic Management Plan for a proposed new quay to the south-east of the existing Nigg Energy Park in Ross-shire in the Highlands.

6.1.2 The purpose of the CTMP is to provide details on the proposed traffic management measures and procedures that will be put in place to support the proposed development during the construction phase, and to minimise disruption to local residents while maintaining road safety on the surrounding road network.

### 6.2 Summary

6.2.1 Management measures have been identified for both the movement of general construction traffic and also for the movement HGVs. It is considered that when these measures are implemented, a safe environment will be created for local residents affected by the development, other road users and also personnel at the construction site.

6.2.2 It is acknowledged that the construction of the development would impact upon the local residents most, so a number of specific measures have been proposed to mitigate impacts in these areas. The measures include a contractors speed limit, signage and delivery control measures.

6.2.3 The main contractor will be responsible for all elements of transport during the construction process. The coordinator will review and update the number of site personnel, traffic numbers, and the construction programme as the project progresses. Any significant changes will be discussed and agreed with THC. The coordinator will also act as the liaison officer responsible for communication with external parties.

6.2.4 Discussions with sub-contractors at the tender stages will allow for traffic management policies to be written into the contractual agreements by the main contractor. It is anticipated that through the introduction of the CTMP and the promotion of car share and works transport, a reduction in the number of car trips to the site can also be achieved.

### 6.3 Conclusions

6.3.1 It is considered that the impact of construction traffic associated with the construction of the proposed development can be appropriately mitigated with measures put in place to minimise the impact on local residents and maintain the safe environment currently enjoyed by users of the area surrounding the development.

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## **Technical Appendix 8.1**





## **Nigg East Quay**

### **Appendix B: Phase 1 Habitat & Protected Species Survey**



**February 2019**

# Nigg East Quay

## Appendix B: Phase 1 Habitat & Protected Species Survey

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## EXECUTIVE SUMMARY

EnviroCentre Limited was commissioned by Global Energy Nigg Limited to undertake a Phase 1 Habitat and Protected Species Surveys of Nigg East Quay located approximately 1.5km north of Cromarty in the town of Nigg, Cromarty Firth.

The key aim of this survey is to establish an ecological baseline for the site and to allow further ecological surveys required to be identified and appropriately designed.

No statutory designated site, non-statutory designated site or ancient woodland are present within the site.

A total of 17 Phase 1 Habitat types, including boundary features, were identified on the site and consist of habitats such as scrub, improved grassland, semi-improved grassland, dune grassland, open dune, ephemeral/short perennial, tall ruderal vegetation, intertidal sand, shingle, sea wall, bare ground, scattered trees, buildings and fencing. Commuting and foraging habitat was assessed as low due to isolated features which bats may utilise, that lack good connection to suitable habitat in the wider environment.

Two trees with Potential Roost Features (PRFs) were identified within the site and assessed as negligible and low for roosting bats. Six buildings exist within the site, however one is not involved in any works. The five buildings were assessed as low potential for hibernating and roosting bats due to PRFs and features.

No evidence of otter was identified during the survey, however suitable habitat exists within the site for otter and the desk study results highlight that they have been noted in the wider area.

No evidence of badger was identified and a lack of suitable habitat for foraging, commuting and sett creation is available.

Ecological data is considered valid for a period of 12 months. Providing that ground works commence before December 2019 then no further update to the baseline data in relation to these species is considered necessary other than pre-works checks. If the site boundary was to change, further survey work for these protected and notable species may be required.

Further surveys which are ongoing as part of the baseline ecological assessment include:

- Hibernation surveys of the five buildings within the site completed over two visits, one in mid-January and one in mid- February, which will also include a detailed internal inspection of PRFs.
- One bat activity survey carried out on each building, in the bat activity season (May-August) to determine the presence/absence of summer roosting bats.
- Elevated inspection of ivy covered tree if it is to be felled or subjected to arboricultural operations to facilitate development, prior to works commencing.

**The requirement for a licence from Scottish Natural Heritage to disturb or destroy a bat roost will need to be re-assessed following the above surveys.**

No building demolition or vegetation removal should be scheduled to occur during the bird breeding season (March-August), otherwise a nesting bird survey may need to be undertaken as suitable habitat exists for nesting birds.

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# **1 INTRODUCTION**

## **1.1 Terms of Reference**

EnviroCentre Limited was commissioned by Global Energy Nigg Limited to undertake Phase 1 Habitat and Protected Species Surveys of Nigg East Quay located approximately 1.5km north of Cromarty in the town of Nigg, Cromarty Firth. The proposal comprises the construction of a new quay and associated dredging in addition to the creation of an extensive laydown area from adjacent countryside at Dunskeath House.

The 'site' is defined as the area demarcated by the red line boundary as shown in Appendix A. The 'survey area' constitutes the area of the 'site' plus appropriate buffers.

The results and recommendations in this document relate to the site boundary as provided by the client in December 2018.

## **1.2 Scope of Report**

The key aim of these surveys is to establish an ecological baseline for the site to inform further assessment and surveys for the development proposals.

The main objectives are as follows:

- Identify and map the broad habitats present on the site;
- Search for field evidence of a range of protected or notable faunal species which may frequent the survey area;
- Identify suitable habitat for protected or notable faunal species in the survey area; and
- Make recommendations for any further survey and/or species licensing requirements.

## **1.3 Site Description**

The site is situated south east of the Nigg Energy Park at an elevation of 5m above sea level and is centred at Ordnance Survey Grid Reference (OSGR) NH 79527 69016. The site is dominated by bare ground with areas of dense and scattered scrub, grassland, tall ruderal vegetation and broadleaved trees. Sand and shingle above the high tide mark are also present in the south of the site and a sea wall exists in the west. The site extends into the Moray Firth which meets the Cromarty Firth south west of the site. The village of Nigg is located north of the site beyond arable and grassland fields, and the B9175 forms the northern site boundary. In the wider area woodland, grassland and scrub are located to the north and east, whilst the Moray Firth and Cromarty Firth are present to the south and west respectively.

On arrival at the site, it was noted that works had previously been undertaken within the site boundary, as a large proportion of the site was disturbed and covered in rubble and gravel.

## **1.4 Legislation, Policy and Guidance**

European and national legislation and national and local policy relevant to this report includes:

- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- The Wildlife and Countryside Act 1981 (as amended) (WCA);

- The Nature Conservation (Scotland) Act 2004;
- The Wildlife and Natural Environment (Scotland) Act 2011 (WANE);
- Water Framework Directive (WFD) 2000/60/EC;
- The Protection of Badgers Act 1992 (as amended by the WANE Act 2011);
- British Standard BS 42020:2013 Biodiversity – Code of practice for planning and development;
- The Scottish Biodiversity Strategy;
- Scottish Planning Policy (2014);
- Highland Biodiversity Action Plan (HBAP) (2015);
- Highland-Wide Local Development Plan (HWLDP) (2012); and
- The Ross and Cromarty (East) Biodiversity Action Plan (RCBAP) (2004).

A summary of protected species legislation is provided in Appendix B.

## **1.5 Report Usage**

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre.

If this report is to be submitted for regulatory approval more than 12 months following the report date, it is recommended that it is referred to EnviroCentre for review to ensure that any relevant changes in data, best practice, guidance or legislation in the intervening period are integrated into an updated version of the report.

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## 2 METHODS

### 2.1 Desk Study

In order to anticipate the potential ecological sensitivities at the site, a desk study was conducted in advance of the field studies in December 2018. The following sources were checked:

- Scotland's Environment Web (SEW) (The Scottish Government, n.d.) and Scottish Natural Heritage (SNH) Sitelink website (SNH, n.d.) for statutory designated sites up to 5km from the site;
- The HWLDP (THC, 2012) (up to 2km from the site) for non-statutory designated sites up to 2km from the site;
- Ancient woodland and Scottish native woodland locations available through SEW (up to 2km from the site);
- The Highland Biological Recording Group (HBRG) (up to 2km from the site) for species records;
- The UK Biodiversity Action Plan (UKBAP) (JNCC, n.d.) for National (UK) Priority Habitats and Species;
- The Scottish Biodiversity List (SBL) (Scottish Government, 2013) for National (Scotland) Priority Habitats and Species;
- The HBAP (Highland Environmental Forum, 2015) and RCBAP (Ross & Cromarty (East) Biodiversity Group, 2004) for Local Priority Habitats and Species;
- National Biodiversity Network (NBN) Atlas (NBN Atlas Scotland Partnership, 2017) for records of species (up to 2km from the site); and
- Aerial imagery from Google Earth (Google, 2015).

### 2.2 Field Survey

Guided by the results from data searches, the following relevant species groups were focussed upon:

- Plants;
- Bats;
- Otter;
- Badger;
- West European hedgehog;
- Brown hare; and
- Birds.

All field survey work was undertaken by experienced and competent ecologists, who are members of the Chartered Institute of Ecology and Environmental Management (CIEEM). The surveys were designed using the guidelines endorsed by SNH and CIEEM (CIEEM, 2013a, 2013b, n.d.). The surveys focussed on plants and habitats on the site and those faunal species that are most likely to be found in the habitats which make up the landscape in and around the site. The survey was undertaken on the 18<sup>th</sup> and 19<sup>th</sup> December 2018. For the duration of the survey the weather conditions were dry with a light easterly breeze. The Phase 1 Habitat and Bat Potential Roosting Feature (PRF) surveys were undertaken on 18<sup>th</sup> December 2018 when conditions were cloudy and overcast. The otter survey was undertaken on 19<sup>th</sup> December 2018 when conditions were dry and sunny. Visibility was good throughout all surveys and the air temperature was measured at 9°C.

This section provides details of the methods adopted in the survey areas described in Table 2-1.



**Table 2-1: Survey Areas**

Habitat/Species/Species Group	Survey Area
Phase 1 Habitat	Within site boundary
Bats	Site plus 50m survey buffer
Otter	Site plus 250m survey buffer upstream and downstream
Badger	Site plus 100m survey buffer
West European hedgehog	Site plus 50m survey buffer
Brown hare	Site plus 50m survey buffer
Birds	Within site boundary

### 2.2.1 Phase 1 Habitat Survey

A Phase 1 Habitat Survey is a method that rapidly records vegetation and wildlife habitat over large areas. The information is used to identify ecologically sensitive features, inform additional species surveys and, ultimately, recommend mitigation and enhancement measures in connection with a proposed development.

The Phase 1 Habitat Survey was undertaken according to the standard Joint Nature Conservation Committee method (JNCC, 2010) and was used to determine the presence of any Annex I habitat types included in the appropriate UK Biodiversity Action Plan (BAP) priority habitats.

### 2.2.2 Groundwater Dependent Terrestrial Ecosystems

The Functional Wetland Typology (SNIFFER, 2009) was used to aid identification of wetland habitats that derive their water from groundwater and surface water. This information is useful in identifying if and where further surveys are required to identify the presence and potential sensitivity of Groundwater Dependent Terrestrial Ecosystems (GWDTEs). To help assess ground water dependency, observations of local topography, underlying geology, and features such as springs, diffuse ground water emergence and floristic indicators of base enrichment were made.

## 2.3 Invasive Non-Native Species

The survey included a check for the presence of any invasive non-native species (INNS) including but not limited to the following:

- Japanese knotweed (*Fallopia japonica*);
- Giant hogweed (*Heracleum mantegazzianum*); and
- Himalayan balsam (*Impatiens glandulifera*).

### 2.3.1 Bats

A survey was undertaken in accordance with the criteria set out by the Bat Conservation Trust (BCT) (The Bat Conservation Trust, 2016). The suitability of roosting, commuting and foraging habitats was classified according to the criteria in Table 2-2.

Six buildings are present on the site. One of the buildings is being retained and will not undergo any renovation works, therefore no assessment has been undertaken of that building (see building 6 detailed in Appendix D).

Internal inspections were not completed on the buildings for health and safety reasons, due to uncertainties regarding their structural integrity and the presence of asbestos.

**Table 2-2: Suitability Classification of Roosting, Commuting and Foraging Habitats for Bats**

Suitability	Roosting Features	Foraging and Commuting Habitats
<b>High</b>	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	<p>Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edges.</p> <p>High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>The site is close to and connected to known roosts.</p>
<b>Moderate</b>	A structure or tree with one or more potential roost sites that could be used by bats due their size, shelter, protection, conditions and/or surrounding habitat but unlikely to support a roost of high conservation status.	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
<b>Low</b>	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis; or A tree of sufficient size and age to contain potential roost features but with none seen from the ground; or features seen with only very limited roosting potential.	<p>Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated.</p> <p>Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree or a patch of scrub.</p>
<b>Negligible</b>	A structure or a tree with negligible features likely to be used by roosting bats.	Negligible habitat features likely to be used by foraging or commuting bats.

Potential Roosting Features (PRFs) in trees and structures commonly utilised by roosting bats are listed in 2-3 below.

**Table 2-3: PRFs in Trees and Structures Frequently Used by Bats for Roosting**

PRFs in trees frequently used as bat roosts	Access points in structures frequently used as bat roosts	Frequently used roosting locations in structures
Hollows and cavities from woodpecker, rot and knot holes Hazard beams and other vertical or horizontal cracks and splits in stems or branches	Gaps in windowsills and window panes Underneath peeling paintwork or lifted rendering	Top of chimney breasts, gable ends and dividing walls All beams and roof beams (ridge, hip etc.)
Partially detached plated bark	Behind hanging tiles, weatherboarding, eaves, soffit boxes, fascias and lead flashing	Junction of timber joints, mortise and tenon joints
Cankers, included bark and compression forks with potential cavities	Under tiles and slates	Behind purlins
Partially detached ivy with stem diameters in excess of 50mm	Gaps in brickwork and stonework	Between tiles/slates and the roof lining
Bat or bird boxes	Gaps in rendering behind gutters	Under flat roof materials

### 2.3.2 Otter

The otter survey was undertaken along the Cromarty Firth, situated within the south of the site, plus a 250m buffer upstream and downstream, following best practice guidelines (Chanin, 2003), and aimed to identify suitable otter habitat and field signs, including:

- Spraints (otter faeces/droppings used as territorial signposts. Often located in prominent positions and can be placed on deliberate piles of soil or sand). Three categories are used for describing otter spraint: Dried fragmented (Df); Dried intact (Di); and Not fully dry (Nd);
- Footprints;
- Feeding remains (can often be a useful indication of otter presence);
- Paths/slides (otter can often leave a distinctive path from and into the watercourse);
- Holts (underground shelter) are generally found:
  - Within trees roots at the edge of the bank of a river;
  - Within hollowed out trees;
  - In naturally formed holes in the river banks that can be easily extended;
  - Or preferably in ready-made holes created by other large mammals such as badger setts, rabbit burrows or outlet pipes; and
- Couches/lay-ups (couches or lay-ups are places for lying up above ground are usually located near a watercourse, between rocks or boulders, under dense vegetation).

In order to assess their importance, the status of otter resting sites was assigned from Low to High according to Table 2-4 below (Bassett & Wynn, 2010).

**Table 2-4: Status of Otter Resting Sites**

Resting Site Status	Definition
Low	Feature with limited evidence of otter activity – low number of spraints, not all age classes present. Insufficient seclusion to be a breeding site or key resting site, unlikely to have links to the key otter requirements. Most likely to provide a temporary ‘stop off’ for otters when moving through their territory. Loss/disturbance of such a feature is unlikely to be significant in terms of the individual or population.

Resting Site Status	Definition
Moderate	Feature containing sprainting with a range of age classes, but not in significant quantities. Availability may be limited by season, tides or flow. Unlikely to be suitable as a breeding/natal site but will be a key resting site and may be linked to other important features within the territory. The impact arising from a loss or disturbance of such a feature will be determined by the availability of more suitable or well used sites within the otter's territory.
High	Feature has a high level of otter activity, including an abundance of sprainting of all age classes, large spraint mounds, well used grooming hollows, paths and slides. Affords a high degree of cover and is linked to key features such as fresh water and abundance of prey. May be suitable as a breeding area (spraints may be absent from natal holts). The site is usually available at all times of year and at high and low tide/flow. The loss/ disturbance of such a feature will often be considered significant in terms of the individual or population.

### 2.3.3 Badger

A badger survey was undertaken in suitable and accessible habitat within the site and a survey buffer of 100m, with reference to the methodology described by (Scottish Badgers, 2018). The Quay, west of the site and Cromarty/Moray Firth south of the site boundary are deemed unsuitable for badger and were therefore not surveyed for badger. The survey aimed to identify the following field evidence:

- Setts (any structure or place, which displays signs indicating current use by badger/located within an active badger territory as defined by the standard guidance);
- Day beds (above ground areas where badgers sleep, characterised by flattened vegetation or bundles of grass);
- Badger paths (network of paths generally linking setts to foraging habitat);
- Footprints;
- Guard hair;
- Foraging signs such as diggings or snuffle holes (badgers use their snout to turn over vegetation or soft soil to forage for bulbs and invertebrates);
- Scratching posts (marks on tree trunks/ fallen trees where badgers have left claw marks);
- Breach points (gaps in fences or crossing points over roads);
- Dung pit (single faeces deposit placed in a small excavation); and
- Latrines (collection of faecal deposits often used by badger clans to mark home range boundaries).

Setts were categorised as follows (Scottish Badgers, 2018):

- Main sett: Numerous entrances, large spoil heaps, active and with well-used paths. One per social group.
- Annex setts: Numerous entrances and well used paths leading to the main sett nearby. Not always in use.
- Subsidiary setts: Variable number of entrances not connected to other setts by obvious path. Not always used.
- Outlier setts: one or two entrances, no defined paths. Used sporadically.

Suitable foraging habitat was categorised with reference to SNH approved guidance (Scottish Badgers, 2018):

- Primary foraging habitat (short grazed or mown grassland and broadleaved woodlands); and
- Secondary foraging habitat (arable land, rough grassland, scrub and mixed woodland).

### 2.3.4 West European Hedgehog

The suitability of the habitats for hedgehog was assessed according to guidance (The Mammal Society, 2012) Suitable habitats include:

- Grazed pastureland separated into small fields by hedgerows;
- Deciduous woodland copses (oak, beech);
- Overgrown verges or margins; and
- Suburban gardens, woodpiles or parklands.

### 2.3.5 Brown Hare

Guidance (The Mammal Society, 2012) was used to identify direct evidence of brown hare and to assess the suitability of the habitat for brown hare as follows:

- Direct sightings;
- Suitable habitat: lowland, mixed arable, hayfields and pasture land with hedgerows and field margins;
- Forms (resting places): typically beside a tuft of grass or rushes or a shallow scrape in soil, on a gentle slope with a good view ahead; and
- Droppings: hard round or slightly flattened pellets, about 1cm across, usually straw to mid brown coloured, scattered in small quantities or singular.

### 2.3.6 Birds

Habitats within the survey area were assessed for their suitability to support breeding and over wintering birds. Observations of birds were noted during the survey.

## 2.4 Constraints

### 2.4.1 Desk Study

It should be noted that the desk study is limited by the reliability of third party information and the geographical availability of biological and/or ecological records and data. This emphasises the need to collate up-to-date, site-specific data based on field surveys by experienced surveyors. The absence of species from biological records cannot be taken to represent actual absence. Species distribution patterns should be interpreted with caution as they may reflect survey/reporting effort rather than actual distribution.

### 2.4.2 Field Study

The Phase 1 Habitat Survey was undertaken outside the main flowering plant season (May-September). This is unlikely to change the habitat assessment on site, however, some flowering species within these areas would not have been visible due to these constraints.

Sections of the 100m survey buffer, west of the site, could not be accessed due to security fencing around the quay making it inaccessible (see Appendix D). Sections of the 100m survey buffer north and east of the site could not be accessed due to the presence of livestock in fields and private residential buildings with associated gardens. Binoculars were used to survey inaccessible areas where possible, however, some field signs would not have been visible due to these constraints.

A section of the upstream 250m survey buffer for the otter survey could not be directly accessed due to the quay being inaccessible. Binoculars were utilised to search for any signs of otter, however, field signs would not have been visible due to these constraints

### 3 BASELINE ECOLOGICAL CONDITIONS

#### 3.1 Statutory Designated Sites

No statutory designated sites are present within the site boundary. However, three designated sites are present within a 5km radius of the site as detailed in Table 3-1.

**Table 3-1: Statutory Designated Sites**

Site Name	Designation <sup>1</sup>	Distance and Orientation	Features	Ecologically Connected to the Site
Moray Firth	SAC	Adjacent to site	Subtidal sandbanks, bottlenose dolphin ( <i>Tursiops truncatus</i> ) and aggregations of non-breeding birds, including Common Scoter ( <i>Melanitta nigra</i> ), Eider ( <i>Somateria mollissima</i> ), Goldeneye ( <i>Bucephala clangula</i> ), Great Northern Diver ( <i>Gavia immer</i> ).	Via the marine environment
Cromarty Firth	RAMSAR/SSSI /SPA	Approx. 0.59km west	Intertidal mudflats and sandflats, non-breeding birds, including Bar-Tailed Godwit ( <i>Limosa lapponica</i> ), Greylag Goose ( <i>Anser anser</i> ), Red-Breasted Merganser ( <i>Mergus serrator</i> ), Redshank ( <i>Tringa totanus</i> ), Curlew ( <i>Numenius arquata</i> ), Dunlin ( <i>Caladris alpina</i> ) and other waterfowl assemblage and breeding birds including Common Tern ( <i>Sterna hirundo</i> ).	Via the marine environment
Rosemarkie to Shandwick Coast	SSSI	Approx. 0.76km east	Maritime cliffs, geological features and breeding birds, including Cormorant ( <i>Phalacrocorax carbo</i> ).	Via the marine environment

##### 3.1.1 Non-Statutory Designated Sites

No non-statutory designated sites exist within the site boundary, or within a 5km radius of the site.

#### 3.2 Habitats

##### 3.2.1 Ancient Woodland Inventory Sites

No areas of ancient woodland are present within the site. However, three areas are present within a 2km radius of the site boundary as detailed in Table 3-2:

**Table 3-2: Ancient Woodland Inventory Sites**

Site name	Distance and Orientation	Designation <sup>2</sup> (Ancient Woodland Categories)
Unnamed Woodland	Approx. 0.74km north	Long-Established (of Plantation Origin) (LEPO)

<sup>1</sup> SAC (Special Area of Conservation), SPA (Special Protection Area), RAMSAR (Wetland of International Importance), SSSI (Site of Special Scientific Interest), NNR (National Nature Reserve)

<sup>2</sup> Definition of antiquity categories, available from: <http://www.snh.org.uk/publications/on-line/advisorynotes/95/95.html>. ASNO: Sites shown as woodland on all available map sources from 1750 onwards and as semi-natural woodland on the 1750 'Roy' maps. LEPO: Sites shown as plantation woodland in c.1860 but not shown as woodland at all in 1750 or shown as plantation on these maps. These are woods that were apparently planted before 1860

Site name	Distance and Orientation	Designation <sup>2</sup> (Ancient Woodland Categories)
Unnamed Woodland	Approx. 1.5km south	Ancient (of Semi-Natural Origin) (ASNO)
Unnamed Woodland	Approx. 1.5km south	LEPO

The Phase 1 Habitat Map can be found in Appendix C and Photographs in Appendix E.

The habitat types and boundary features within the site are:

### 3.2.2 Phase 1 Habitats

A total of 17 Phase 1 Habitat types, including boundary features, were identified on the site and are listed below.

- A2.1 Dense Scrub;
- A2.2 Scattered Scrub;
- A3.1 Broadleaved Parkland/Scattered Trees;
- B2.2 Semi-Improved Neutral Grassland;
- B4 Improved Grassland;
- C3.1 Tall Ruderal Vegetation;
- H1.1 Intertidal Mud/Sand;
- H3 Shingle/Gravel Above High-Tide Mark;
- H6.5 Dune Grassland;
- H6.8 Open Dune;
- J1.3 Ephemeral/Short Perennial;
- J2.4 Fence;
- J2.5 Wall;
- J3.5 Sea Wall;
- J3.6 Buildings;
- J4 Bare Ground; and
- J5 Other Habitat.

### 3.2.3 Dense Scrub

Scrub is seral or climax vegetation that is dominated by locally native shrubs, usually less than 5m tall and occasionally with a few scattered trees. Dense scrub is located in the south east of the site and consists of sea buckthorn (*Hippophae rhamnoides*), with marram grass (*Ammophila arenaria*) scattered along the southern aspect of the stand (Photograph 1).

### 3.2.4 Scattered Scrub

Scattered scrub is present along the northern and eastern boundaries of the site as well as within the east of the site. Species include dog rose (*Rosa canina*), broom (*Cytisus scoparius*), gorse (*Ulex europaeus*), sea buckthorn, elder (*Sambucus nigra*) and sycamore (*Acer pseudoplatanus*) saplings (Photograph 2).



### 3.2.5 Broadleaved Parkland/Scattered Trees

Broadleaved scattered trees comprise areas of trees where 10% or less of the canopy is coniferous and tree cover is less than 30% of the area. Several sycamore trees are present in the south east of the site and the specimens range from mature to semi-mature (Photograph 3).

### 3.2.6 Semi-Improved Neutral Grassland

Semi-improved grasslands are transition categories made up of grasslands which have been modified by artificial fertilisers, slurry, intensive grazing, herbicides or drainage, and consequently have a range of species which is less diverse and natural than unimproved grasslands. Neutral grasslands are those which are typically enclosed and usually more intensively managed. This habitat is present in the north and west of the site. Previous management, through commercial land use and grazing from browsing species, including rabbits and deer, is likely to have contributed to these areas being low in species diversity. The dominant grass species are cock'sfoot (*Dactylis glomerata*), false oat grass (*Arrhenatherum elatius*) and tufted hair grass (*Deschampsia cespitosa*), with common knapweed (*Centaurea nigra*), common ragwort (*Jacobaea vulgaris*) and creeping thistle frequently dispersed throughout the sward. Common nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), creeping buttercup (*Ranunculus repens*) and spear thistle (*Cirsium vulgare*) are occasionally present. (Photograph 4).

### 3.2.7 Improved Grassland

Improved grasslands are those meadows and pastures which have been so affected by heavy grazing, drainage, or the application of herbicides, inorganic fertilisers, slurry or high doses of manure that they have lost many of the species expected in an unimproved sward. They have a limited range of grasses and a few common forbs. This habitat is present in the south east and west of the site, where it appears to have undergone regular disturbance via grazing animals. The dominant grass species are cock'sfoot, false oat grass and Yorkshire fog (*Holcus lanatus*). Common dandelion (*Taraxacum officinale*), creeping buttercup and common chickweed (*Stellaria media*) are occasional and common mouse-ear (*Cerastium fontanum*) and common field speedwell (*Veronica persica*) are rare (Photograph 1).

### 3.2.8 Tall Ruderal Vegetation

This category comprises stands of tall perennial or biennial dicotyledons, usually more than 25cm high. Tall ruderal vegetation is present in multiple areas within the site and species include common nettle, creeping thistle and umbellifer species (Photograph 5).

### 3.2.9 Intertidal Mud/Sand

There are small areas of sand within the east and west of the site and a band of sand along the southern boundary of the terrestrial habitat within the site where it meets the Cromarty Firth (Photograph 6).

Intertidal sand is classified as an Annex 1 type 1140 mudflats and sandflats not covered by seawater at low tide.

### 3.2.10 Shingle/Gravel Above High-Tide Mark

A band of shingle/gravel habitat is present within the south of the site (Photograph 7).

Shingle/gravel above the high-tide mark is classified as an Annex 1 type 1220 perennial vegetation of stony banks.

### 3.2.11 Dune Grassland

All grasslands occurring on consolidated and flattened dunes are classified under dune grassland habitat. This habitat is present in a small, isolated areas in the east of the site and is classified as an Annex 1 type 2130 fixed dunes with herbaceous vegetation ('grey dunes'). The dominant grass species are cock'sfoot (*Dactylis glomerata*), false oat grass (*Arrhenatherum elatius*) and tufted hair grass (*Deschampsia cespitosa*), with common knapweed (*Centaurea nigra*), common ragwort (*Jacobaea vulgaris*) and creeping thistle frequently dispersed throughout the sward. Common nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), creeping buttercup (*Ranunculus repens*) and spear thistle (*Cirsium vulgare*) are occasionally present. Marram grass is scattered throughout the sward (Photograph 8).

### 3.2.12 Open Dune

This category comprises the three early successional phases of dune formation.

Fore dune: unstable, usually low ridges of sand on the foreshore, often with a very open plant cover. Marram grass may be present in small quantities but is not dominant.

Yellow dune: partially stabilised ridges of sand lying between fore and grey dunes, with a marked but incomplete plant cover, nearly always dominated by marram grass, although lyme grass (*Leymus arenarius*) may be common.

Grey dune: stable ridges of sand, almost completely vegetated. The vegetation is very variable in species composition; marram grass is usually present but not dominant, and mosses and lichens may be frequent. Grey dune is distinguished from fixed dune by being markedly hilly or undulating, and by the sand not being fully consolidated.

A small isolated section of open dune is present in the north east of the site and is classified as an Annex 1 type 2130 fixed dunes with herbaceous vegetation ('grey dunes'). It is predominantly grey dune, due to the high cover of vegetation and variation in cover of marram grass. The sand was not fully consolidated and was also hilly in nature. The dominant grass species was false oat grass, with glittering wood-moss (*Hylocomium splendens*) being abundant and sand sedge (*Carex arenaria*), red fescue (*Festuca rubra*), Yorkshire fog and neat feather moss (*Pseudoscleropodium purum*) being frequent. Cock'sfoot, yarrow, heath bedstraw (*Galium saxatile*), harebell (*Campanula rotundifolia*), mouse-ear hawkweed (*Hieracium pilosella*) and big shaggy moss (*Rhytidiadelphus triquetrus*) are occasional and thyme-leaved speedwell (*Veronica serpyllifolia*) is rare. Marram grass was also present, being more frequent in the southern section of this habitat (Photograph 9).

### 3.2.13 Ephemeral/Short Perennial

This habitat consists of short, patchy associations typical of derelict urban sites, quarries and railway ballast. Land is free draining and usually shallow stony soils are present. Vegetation lacks clear dominant species but consists of a mixture of low-growing plants often less than 25cm high. This habitat is present in multiple areas within the site and consists of species including springy turf moss (*Rhytidiadelphus squarrosus*), hairy bittercress (*Cardamine hirsuta*) and shining cranesbill (*Geranium lucidum*), which are dominant in places, with white clover (*Trifolium repens*), young common dandelion, young yarrow (*Achillea millefolium*) and spear thistle being abundant. Broadleaved dock (*Rumex obtusifolius*), glittering wood-moss and ribwort plantain (*Plantago lanceolata*) are frequent (Photograph 1).

#### **3.2.14 Fence**

A combination of fences are located within the site and along sections of the east and west boundaries, comprising of wooden post and wire, security fencing and chain-link and cement post fencing (Photograph 1).

#### **3.2.15 Wall**

A stone wall is present within the west of the site (Photograph 10) and along the coast where it connects with the sea wall (Photograph 11).

#### **3.2.16 Sea Wall**

A sea wall constructed from artificial materials, rocks, wood and corrugated metal is present in the west of the site and extends eastward where artificial materials have been enclosed in gabion baskets (Photograph 10).

#### **3.2.17 Buildings**

Six buildings are present within the site boundary. There is a two storey, tiled pitched roof sandstone building with an associated outbuilding (also comprising of sandstone and a pitched tiled roof) and a modern roughcast extension on the south east aspect. A one storey, roughcast and metal corrugated roofed building and two one storey sandstone buildings are also present, as well as a tiled pitched roof building and a one storey stone and metal corrugated pitched roof building. Detailed descriptions and photographs are provided in Appendix F.

#### **3.2.18 Bare Ground**

Bare ground dominates the site, consisting of tarmac, gravel and rubble. A large proportion of the site has been modified and previously existing walls demolished, resulting in a large volume of compacted rubble being left behind (Photographs 10 and 12).

#### **3.2.19 Other Habitat**

A pile of rubble and stones is present in the north of the site, where the remnants of a stone built structure are also present (Target Note 1) (Photograph 13).

### **3.3 Groundwater Dependent Terrestrial Ecosystems**

No potential GWDTEs were recorded within the site boundary during the survey.

### **3.4 Invasive Non-Native Species**

No invasive non-native species were identified during the survey.

### **3.5 Faunal Species and Species Groups**

The Faunal Survey Results Map can be found in Appendix D and Photographs in Appendix E.

### 3.5.1 Disclaimer

Faunal species are transient and can move between favoured habitats regularly throughout and between years. This survey provides a snapshot of field signs present in the survey area in December 2018.

### 3.5.2 Local Records

The following is a summary of the notable local records returned from HBRG:

**Table 3-3: Local Biodiversity Records**

Species	Latin Name	Number of Records	Location (Approx.)	Date
<b>Mammals</b>				
West European hedgehog	<i>Erinaceus europaeus</i>	One	Approx. 1.7km north	2001
Brown hare	<i>Lepus europaeus</i>	One	Approx. 1.4km north	2002
Otter	<i>Lutra lutra</i>	Two – observation and evidence (spraint)	Approx. 1.3km and 1.4km east	2001 and 2014
<b>Herpetofauna</b>				
Common lizard	<i>Zootoca vivipara</i>	Three	Approx. 0.5km, 0.8km and 0.9km east	2015 and 2016

### 3.5.3 Biodiversity Action Plan and SBL Species and Habitats

The site is within the Highland Council area, which considers wider ecosystems within the HBAP and therefore does not highlight specific species and habitats of importance. The RCBAP covers the area the site is situated in and targets specific species and priority habitats. **Error! Reference source not found.** below presents the species and habitats listed on the RCBAP, UKBAP and SBL that are potentially relevant to the site:

**Table 3-4: Biodiversity Action Plan and SBL Species and Habitats**

Species	RCBAP	UKBAP	SBL
<b>Mammals*</b>			
Badger	✓		
Brown long-eared bat ( <i>Plecotus auritus</i> )	✓		
Common pipistrelle ( <i>Pipistrellus pipistrellus</i> )	✓	✓	✓
Soprano pipistrelle ( <i>Pipistrellus pygmaeus</i> )	✓	✓	✓
Daubenton's bat ( <i>Myotis daubentonii</i> )	✓	✓	✓
Natterer's bat ( <i>Myotis nattereri</i> )	✓	✓	✓
Brown hare ( <i>Lepus europaeus</i> )	✓		✓
West European hedgehog ( <i>Erinaceus europaeus</i> )	✓	✓	✓
Otter	✓	✓	✓
Minke whale ( <i>Balaenoptera acutorostrata</i> )	✓	✓	✓
Harbour porpoise ( <i>Phocoena phocoena</i> )	✓	✓	✓
Bottlenose dolphin	✓	✓	✓
Grey seal ( <i>Halichoerus grypus</i> )	✓		
Common (harbour) seal	✓		
<b>Birds*</b>			
Skylark ( <i>Alauda arvensis</i> )	✓	✓	✓
Wigeon ( <i>Anas penelope</i> )	✓		
Twite ( <i>Acanthis clavirostris</i> )	✓		
House Sparrow ( <i>Passer domesticus</i> )	✓		
Swallow ( <i>Hirundo rustica</i> )	✓	✓	✓

Species	RCBAP	UKBAP	SBL
Tree Sparrow ( <i>Passer montanus</i> )	✓	✓	✓
Fish*	RCBAP	UKBAP	SBL
Atlantic salmon ( <i>Salmo salar</i> )	✓	✓	✓
Brown trout ( <i>Salmo trutta</i> )	✓	✓	✓
Cod ( <i>Gadus morhua</i> )	✓		
Herring ( <i>Clupea harengus</i> )	✓		
Mackerel ( <i>Scomber scombus</i> )	✓		
Habitats	RCBAP	UKBAP	SBL
Sea and Coast	✓	✓	✓

\*Marine mammals, fish and birds are covered in further detail in the scoping report.

### 3.5.4 NBN Atlas

A summary of reported sightings of species potentially relevant to the site within a 2km radius is provided in Table 3-5 below:

**Table 3-5: Species Records from NBN Atlas**

Species*	Orientation	Date	Comments
Brown hare	One sighting (north of site)	08/07/2002	No information
West European hedgehog	One sighting (north of site)	23/09/2001	No information
Otter	One sightings (east and south)	05/2014	Field evidence (spraint) and actual sighting

## 3.6 Protected Species

### 3.6.1 Bats

No records of bats within a 2km radius of the site were returned from the desk study.

Two sycamore trees with PRFs are present within the site and located at NH79528 68907 (tree 1; Photograph 14) and NH 79561 68905 (tree 2; Photograph 15). Tree 1 was classified as negligible in accordance with Table 2-2; storm damage has created PRFs, however, all of them are upward facing making them prone to filling with water and as such unsuitable for roosting bats. This tree is also isolated from other vegetation leaving it exposed and lacking connectivity. Tree 2 is an ivy (*Hedera helix*) covered sycamore which may provide some opportunities for individual roosting bats. As such tree 2 was assessed as having low potential for roosting bats in accordance with Table 2-2.

Six buildings are present within the site boundary. The roughcast building with the red corrugated metal roof is to be retained and will not to be included in any works, therefore only the remaining five buildings have been assessed.

The buildings within the site are considered to offer potential for summer roosting bats, as per Table 2-2, due to the presence of PRFs, via cracks in mortar between brickwork, gaps in lintels above doorframes, broken tiles, gaps under lead flashings, gaps behind boards covering windows, gaps being fascia boards, missing harling and rough cast above windows, cracks in chimney stacks, and ivy covered aspects. Despite the presence of PRFs, the buildings have been classified as offering low suitability for summer roosting bats due to their isolated

coastal location and limited connecting terrestrial habitat (see Table 2-1). The buildings do not offer habitat for maternity roosting bats, only opportunistic individuals, due to the size of the cavities present.

All five buildings are considered to offer low potential for hibernating bats as per Table 2-1, as they have features suitable for roosting, are derelict in nature and as such could provide constant cool temperatures during the hibernation season. A detailed description of each building with photographs is provided in Appendix F.

The site offers limited terrestrial habitat which connects to adjacent features out with the site, therefore the site is assessed as offering low potential for commuting and foraging bats. The dense scrub and scattered trees would provide limited foraging habitat which does not connect to the wider area.

### 3.6.2 Otter

Two records of otter were returned from the desk study, east and south east of the site boundary. Spraint was identified along the Cromarty Firth coast and an observational sighting was reported in grassland adjacent to a quarry. No evidence of otter was identified during the survey.

The marine environment of the Moray Firth and Cromarty Firth provide suitable commuting and foraging habitat for otter, where they could obtain varied foraging resources such as Atlantic salmon (*Salmon salar*), brown trout (*Salmo trutta*), flatfish and eels, crustaceans and occasionally wading birds. Otters that inhabit coastal habitats utilise inshore areas which are shallow, for foraging and commuting.

In general, coastal otter habitats range from open, low-lying coastal habitat to sheltered wooded inlets. The dense scrub, within the site, adjacent to the shore, provides opportunities for rest sites and sheltered commuting. Otters will also utilise terrestrial habitats, including rough grassland, for resting and breeding holts. Otters may also utilise other mammal species' burrows for resting sites. Multiple burrows were present within the dense scrub, likely attributed to rabbit (*Oryctolagus cuniculus*), due to their small size, lack of spoil heaps and circular shapes, which otter could utilise for resting.

Overall the site has some suitable habitat for commuting, foraging and resting otter, however, the site is highly frequented by members of the public and dog walkers, which reduces its suitability.

### 3.6.3 Badger

No records of badger were returned from the desk study and no evidence of badger was found during the survey.

Suitable habitat for sett creation is lacking due to the site predominantly consisting of bare ground. Gorse and sea buckthorn are known to provide opportunities for sett creation, however, due to the isolated nature of this vegetation it is not considered likely.

The semi-improved grassland and berry producing scrub habitats within the site offer secondary foraging resources and the small area of improved grassland offers a limited primary foraging habitat as a source of earthworms, which comprise the majority of badgers' diet. Broadleaved woodland, arable fields and short mown grassland are present in the wider area which provide a primary foraging resource for badger.

Fragmented habitat is present within the site in the form of dense scrub and scattered scrub which provide some connecting habitat to the wider landscape.

### 3.6.4 Birds

No birds' nests were identified during the survey.

Multiple bird species were observed while undertaking the survey, which included: Wren (*Troglodytes troglodytes*), Great Tit (*Parus major*), Robin (*Erithacus rubecula*), Jackdaw (*Corvus monedula*), Herring Gull (*Larus argentatus*) and Black-headed Gull (*Chroicocephalus ridibundus*).

The Birds of Conservation Concern (BOCC) is a list of species which have been assessed against a set of criteria to place each on one of three lists (green, amber and red) to indicate an increasing level of conservation concern.

Wren, Great Tit, Robin and Jackdaw are listed on the BOCC Green List.

Black-headed Gull feature on the BOCC Amber List and Herring Gull on the BOCC Red List.



## **4 FURTHER SURVEY AND LICENSING**

### **4.1 Further Survey and Licensing**

#### **4.1.1 Habitats**

Although the Phase 1 Habitat Survey was completed outside of the optimal survey period for vegetation, it is deemed unnecessary to undertake further surveys of Annex 1 habitats within the site. This is due to the Annex 1 habitats (intertidal sand/mud, shingle/gravel above high –tide mark, dune grassland and open dune habitat) identified on site not being classified as viable due to the very small areas which they extend and the fragmented/isolated nature of each. As such, no further habitat surveys are required.

#### **4.1.2 Bats**

The five buildings assessed within the site boundary are classified as providing low potential for summer roosting bats and low potential for hibernating bats.

Winter hibernation surveys of the buildings should be completed, consisting of two visits, one in mid-January and one in mid- February, including a detailed internal inspection up to ladder height of any PRFs which may provide hibernating opportunities for bats.

One bat activity survey is also required on each building, between May and August, to determine the presence/absence of summer roosting bats.

If during the hibernation surveys and/or bat activity survey a roost/evidence of bats is identified or bat activity suggests that a roost may be present, further surveys would be required.

If the ivy covered tree is to be felled or subjected to arboricultural operations to facilitate development, an elevated inspection to search for roosting bats will be required prior to works commencing.

The requirement for a licence from SNH to disturb or destroy a bat roost will need to be re- assessed following the above surveys.

#### **4.1.3 Otter and Badger**

No evidence of otter or badger was found during the survey. Limited suitable habitat is present for badger within the site, however suitable habitat exists within and adjacent to the site for otter.

Ecological data is considered valid for a period of 12 months. Providing that ground works commence before December 2019 then no further update to the baseline data in relation to these species is considered necessary other than pre-works checks for otter, to locate any resting sites that may require a licence to disturb. If the site boundary was to change, further survey work for these protected and notable species may be required.

#### **4.1.4 Nesting Birds**

As suitable habitat for nesting birds is present within the site, no building demolition or vegetation removal should be undertaken during the bird breeding season (March-August), otherwise a nesting bird survey will need to be undertaken immediately prior to the works.

If an active nest is discovered the building cannot be demolished or the vegetation removed until the young have fledged and the nest is no longer active.

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## **APPENDICES**

## **A SITE LOCATION PLAN**



Legend

 Site Boundary

Do not scale this map

Client  
**Global Energy Nigg Limited**

Project  
**Nigg East Quay**

Title  
**Figure 1 - Site Location Plan**

Status  
**FINAL**

Drawing No. <b>671906-001</b>	Revision
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Scale <b>1:15,000</b>	<b>A3</b>	Date <b>12 Feb 2019</b>
Drawn <b>SMC</b>	Checked <b>JEP</b>	Approved <b>MH</b>



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## **B PROTECTED SPECIES LEGISLATION SUMMARY**

### **Bats and Otter**

A European Protected Species (EPS) is a species listed in the EC Directive (92/43) The Conservation of Natural Habitats and of Wild Flora and Fauna (the “Habitats Directive”), which is transposed into UK law through the Conservation (Natural Habitats &c.) Regulations 1994 (the “Habitat Regulations”) as amended by The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007. Under this legislation an EPS (*e.g.* all bat species) are protected from:

- (a) Deliberate or reckless capture, injuring or killing;
- (b) deliberate or reckless
  - (i) harassment of an animal or group of animals;
  - (ii) disturbance of such an animal while it is occupying a structure or place which it uses for shelter or protection;
  - (iii) disturbance of such an animal while it is rearing or otherwise caring for its young;
  - (iv) obstructing access to a breeding site or resting place of such an animal, or otherwise denying the animal use of the breeding site or resting place;
  - (v) disturbance of such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs; or
  - (vi) disturbing such an animal 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;
- (c) deliberate or reckless taking or destroying the eggs of such an animal; or,
- (d) damaging or destroying a breeding site or resting place of such an animal.
- (e) any person:
  - (i) possessing or controlling;
  - (ii) transporting;
  - (iii) selling or exchanging; or
  - (iv) offering for sale or exchange,

any live or dead animal or part of an animal or anything derived from such an animal which has been taken from the wild and which is of a species or subspecies listed in Annex IV(a) to the Habitats Directive – unless the animal from which the part or the thing in question is derived, was lawfully taken from the wild (*i.e.* taken from the wild in the European Union without contravention of appropriate domestic legislation and before the implementation date of the Habitats Directive (in that Country *e.g.* 1994 in UK) or if it was taken from elsewhere).

### **European Protected Species Licensing**

For a licence to be issued these three tests must be satisfied:

- That the development is 'in the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment';
- That there is 'no satisfactory alternative'; and
- That the derogation (*i.e.* any permission/licence granted) is 'not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range'.

To obtain a licence a Method Statement is required that identifies the activities to be undertaken, the location of all resting sites (*e.g.* bat roosts), the potential effects and details of the proposed mitigation.



## **Badger**

Under the Protection of Badgers Act (1992), as amended by the Nature Conservation (Scotland) Act 2004, it is an offence to:

- Kill, injure or take a badger;
- Have in possession a dead badger or any part of a badger;
- Cruelly ill-treat a badger; and
- Damage, destroy, interfere or obstruct a badger sett or disturb a badger whilst it is occupying a sett.
- 

Where an offence is committed the individual (as well as the body corporate, Scottish partnership or, as the case may be, unincorporated association) is guilty of the offence and is liable to be proceeded against and punished accordingly.

In some cases licenses may be issued by SNH to enable certain otherwise illegal activities to take place. With respect to development-related activities, licenses can be issued where there is likely to be damage or disturbance to a badger sett, for social, economic or environmental reasons. Licenses may only be issued for this purpose provided that:

- The activity authorised by the licence will contribute to significant social, economic or environmental benefit; and
- There is no other satisfactory solution.

## **General Breeding Birds**

All wild bird species in the UK are protected from killing, injury and taking under the Wildlife and Countryside Act 1981, as amended. It is an offence to take, damage or destroy a nest while in use or being built, and to take or destroy the eggs of any nesting bird.

Birds listed on Schedule 1 of the Act are provided additional protection. It is an offence, with certain exceptions, to:

- Intentionally kill, injure, or take (handle) any wild Schedule 1 bird;
- Intentionally take, damage or destroy any nest whilst in use or being “built” by a Schedule 1 bird;
- Intentionally take or destroy a wild Schedule 1 bird egg;
- Have in one’s possession or control a wild Schedule 1 bird (dead or alive), or egg, (unless one can show that it was obtained legally);
- Intentionally or recklessly disturb any wild Schedule 1 bird whilst “building” a nest or whilst in, on, or near a nest containing eggs or young; and
- Intentionally or recklessly disturb any dependent young of a Schedule 1 bird.

Licences can be granted by SNH to permit otherwise illegal acts; however licences cannot be issued for the removal of Schedule 1 birds to facilitate development.

*Note: The above information constitutes a summary only. Please refer to original legislation for full information*

## **C      PHASE 1 HABITAT SURVEY MAP**



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Legend

- Site Boundary
- TargetNote

JNCC Phase 1 Habitat Code

- A2.1 Dense/Continuous Scrub
- A2.2 Scattered Scrub
- A3.1 Parkland/Scattered Broad-leaved Trees
- B2.2 Neutral Semi-Improved Grassland
- B4 Improved Grassland
- C3.1 Tall Ruderal Vegetation
- H1.1 Intertidal Mud/Sand
- H3 Shingle above High Tide Mark
- H6.5 Dune Grassland
- H6.8 Open Dune - Grey Dune
- J1.3 Ephemeral/Short Perennial
- J2.4 Fence
- J2.5 Wall
- J3.5 Sea Wall
- J3.6 Building
- J4 Bare Ground
- J5 Other Habitat

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Project

Nigg East Quay

Title

Figure 4 - Phase 1 Habitat Survey Map

Status

FINAL

Drawing No.

671906-004

Revision

Scale

1:2,200

A3

Date

12 Feb 2019

Drawn

ED

Checked

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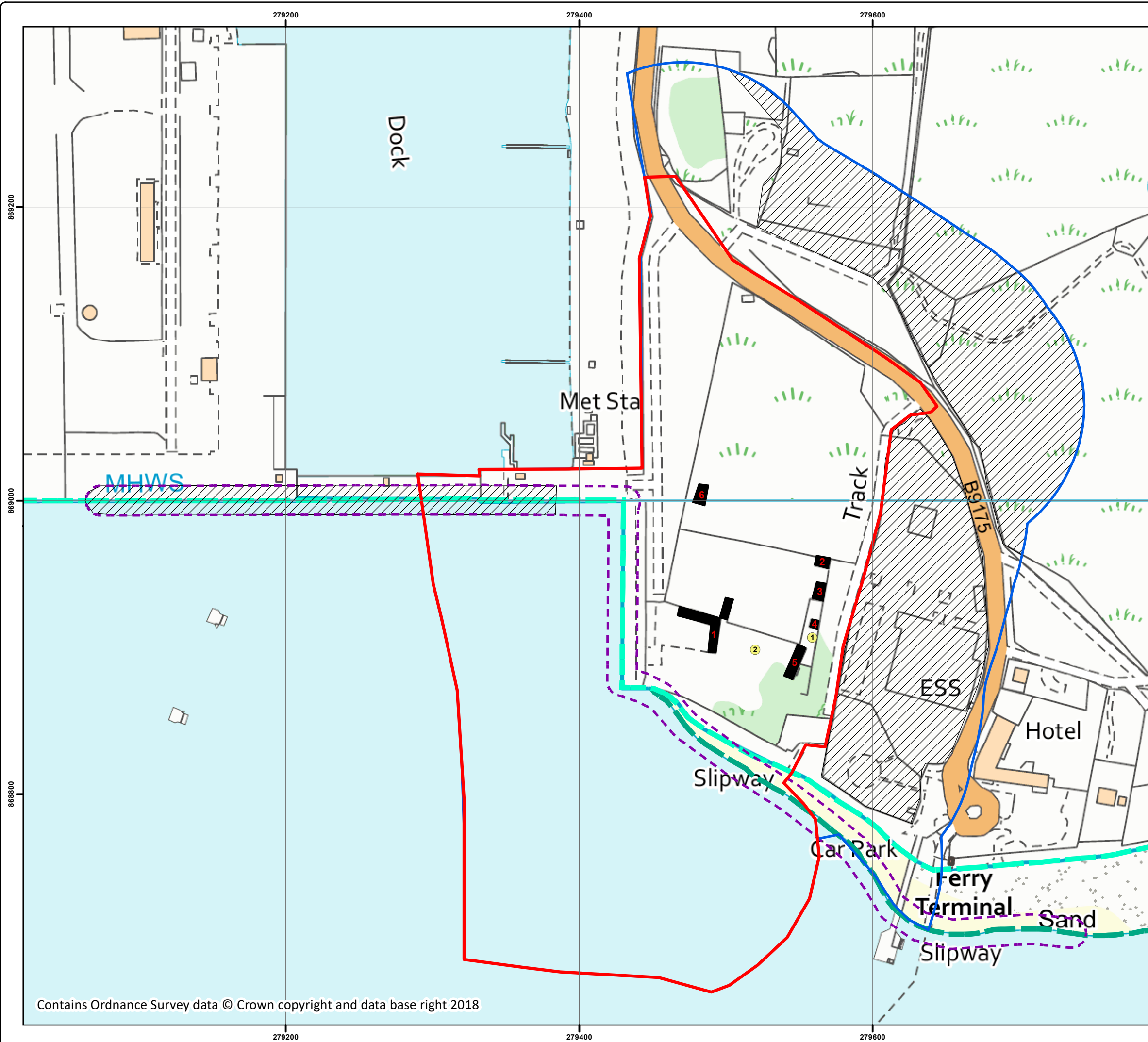
Approved

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## **D      PROTECTED SPECIES SURVEY RESULTS**



Legend

- Site Boundary
- 100m Survey Buffer
- 250m Survey Buffer
- Inaccessible Areas
- Buildings
- Trees With Potential Roost Features
- MHWS
- MLWS

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Client

Global Energy Nigg Limited

Project

Nigg East Quay

Title

Figure 5 - Protected Species Survey Area

Status

FINAL

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671906-005	

Scale	A3	Date
1:2,500		12 Feb 2019

Drawn	Checked	Approved
JEP	JEM	CP

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## E PHOTOGRAPHS



Photograph 1: Scattered scrub, ephemeral/short perennial habitat, improved grassland and fencing



Photograph 2: Dense scrub



Photograph 3: Scattered broadleaved trees



Photograph 4: Semi-improved neutral grassland



Photograph 5: Tall ruderal vegetation



Photograph 6: Intertidal sand



Photograph 7: Shingle above high tide mark



Photograph 8: Dune grassland



Photograph 9: Open dune (grey dune)



Photograph 10: Wall, sea wall, semi-improved grassland and bare ground



Photograph 11: Wall and intertidal sand



Photograph 12: Bare ground



Photograph 13: Stone pile





Photograph 14: Tree 1 – Sycamore with storm damage



Photograph 15: Tree 2 – Sycamore covered in ivy



## F DETAILED BUILDING DESCRIPTIONS

Building No.	Description and PRFs	Roosting Bat Potential	Hibernation Potential
1	 <p>Two storey sandstone and mortar building, with a pitched tiled roof. A small flat roofed, roughcast extension is present on the south east aspect of the building. A one storey sandstone and pitched roofed outbuilding is attached to the north east of the building. A section of the roof in the outbuilding has collapsed. The roof of the west aspect is missing as are several of the window panes and doors leaving sections exposed. Some of the windows have been boarded up.</p> <p>PRFs include: missing tiles on roof, loose mortar between sandstone blocks, gaps behind boarded up windows, gaps under flashings, gaps behind fascia boards, missing harling/roughcast above windows, missing glass in windows.</p>	Low	Low
2	 <p>Stone built structure with missing roof, windows and doors. The four walls of the structure are still in place, however are very exposed.</p> <p>PRFs include: gaps in mortar, gaps above wooden lintels above windows.</p>	Low	Low



3		<p>One storey sandstone and tiled pitched roof building. Glass is missing from windows and doors are missing. The compacted rubble present within the site reaches up to the top of the windows of the building.</p> <p>PRFs include: loose and missing tiles, gaps under tops of windows, cracks in chimney stack and under tiles and loose mortar between sandstone blocks.</p>	Low	Low
4		<p>One storey metal corrugated roofed stone building. A large hole is present in the roof and the doors are open on both the north and south aspects.</p> <p>PRFs include: gaps in lintel in doorframe and gaps in loose mortar.</p>	Low	Low
5		<p>One storey, sandstone building with a tiled pitched roof and harled north and south aspects. Three chimney stacks are present and glass in windows is missing as are the doors. The rubble adjacent reaches up to the roof of the building. Ivy covers the south aspect. Multiple areas of the roof have collapsed.</p> <p>PRFs include: missing harling, gaps in corner of roof where tiles missing and flashings broken, lifted and missing tiles, gaps in cracks in chimney stacks and within ivy growing on south aspect.</p>	Low	Low

## **Technical Appendix 8.2**



## **Nigg East Quay**

### **Technical Appendix 8.2: Bats**



**May 2019**

# Nigg East Quay

## Technical Appendix 8.2: Bats

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Filename: K:\671906 - Nigg East Quay EIA\300 - Ecology and Ornithology\340 - Ecology Reporting\Bats

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## EXECUTIVE SUMMARY

EnviroCentre Limited was commissioned by Global Energy Nigg Limited to conduct bat surveys of buildings present within lands of the former Dunskeath House, adjacent to Nigg Energy Park. Five buildings are proposed for demolition to enable development of a new laydown area which is being developed in conjunction with the construction of a new East Quay. The buildings were initially highlighted as having potential to host roosting bats during the baseline Protected Species Survey, conducted in December 2018 (and available within Technical Appendix 8.1 of this EIA Report (EIAR)).

A Preliminary Roost Assessment (PRA) conducted in January 2019 assessed the buildings as having low suitability for hibernating bats due to there being a small number of features which could provide appropriate conditions for hibernating bats, such as gaps in door lintels. Building 1 was assessed as having moderate suitability for summer bat roosts (see Appendix B of this report). Buildings 2 – 5 were assessed as having low suitability for summer bat roosts due to reduced number of potential features available for use. A small number of bat droppings were found within Building 1. DNA analysis revealed these as originating from a common pipistrelle bat. The location and spread of the droppings suggest these were from sheltered foraging rather than roosting bats. The site contains a patch of scrub and mature trees in the east with limited connections to suitable foraging habitat in the wider area and there is considerable artificial light spill from Nigg Energy Park. The habitat on site was, therefore, assessed as being of low suitability for commuting and foraging bats.

Winter hibernation surveys were conducted for the five buildings in January and February 2019. No evidence of hibernating bats was identified. Activity surveys of Buildings 1, 3, 4 and 5 were conducted in May 2019. One common pipistrelle roost was identified in Building 5. Activity on site was concentrated around mature trees and scrub in the east of the site.

A derogation licence from Scottish Natural Heritage (SNH) will be required prior to the demolition of Building 5. No replacement buildings are included within the proposed development design. It is recommended that three woodcrete crevice style bat boxes are erected on a mature tree(s) or structure within 50m of the site to compensate.

The following mitigation is recommended to reduce potential negative impacts to bats as a result of the proposed development:

- To reduce risk of accidental injury or death to opportunistically roosting bats it is recommended that demolition occurs in the months of October, November or March to avoid the bat summer activity season and the sensitive hibernation period.
- All site personnel should be made aware of the presence of bats on site via a toolbox talk.
- If bats are discovered on site or seen flying during daylight hours, demolition works should be halted and the project ecologist contacted for advice.
- The trees and scrub in the east of the site is a key commuting and foraging habitat for bats in the locale. It is understood that this will be removed as part of the proposed development. A landscape bund with associated planting has been proposed to screen the development. The landscape design should incorporate a similar species mix to that present within the existing scrub habitat.
- Artificial lighting, and security lighting in particular, should be designed to reduce impacts to nocturnal animals such as bats. Measures could include the use of shades to prevent light spill outside of the site, use of vegetation to act as a screen for artificial lighting and the use of soft white light. The Lighting Institute guidance on appropriate lighting can be found here:

<https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>

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# 1 INTRODUCTION

## 1.1 Terms of Reference

EnviroCentre Limited was commissioned by Global Energy Nigg Limited to conduct winter hibernation and summer activity surveys of the buildings present within the lands of the former Dunskeath House, adjacent to Nigg Energy Park. The buildings are proposed for demolition to enable development of a new laydown area which is being developed in conjunction with the construction of a new East Quay. The buildings were initially highlighted as having potential to host roosting bats during a baseline Protected Species Survey conducted in December 2018<sup>1</sup> (and available within Technical Appendix 8.1 of this EIA Report (EIAR)).

## 1.2 Scope of Report

The aim of the surveys was to obtain data on how bats utilise the site to inform an Environmental Impact Assessment (EIA) for the proposed development, as requested within The Highland Council (THC) Scoping Opinion<sup>2</sup>. The main objectives were to:

- Conduct a detailed internal and external search of the buildings to identify Potential Roost Features (PRFs) which could be used by bats and evidence of bat activity;
- Determine the presence or absence of summer and winter bat roosts within buildings due to be demolished;
- Identify any key foraging habitat and/or commuting routes within the site;
- Identify potential impacts to bats as a result of the proposed development; and
- Make recommendations on requirements for protected species licensing, mitigation and enhancement.

## 1.3 Site Description

The site is located to the east of Nigg Bay, on the Cromarty Firth. Nigg Energy Park is located immediately to the north-west of the site. The surrounding landscape to the north and east consists of pasture fields, gorse scrub and the hamlets of Balnapaling and Balnabraich. To the south of the site is a rocky foreshore and the Cromarty Firth. The site itself contains an area of scrub in the south-east, scattered trees, dune grassland and six largely disused buildings in various states of repair. Buildings 1-5 are to be demolished. Building 6 is being retained as it has occasional use as a holiday home. There are small woodland patches c. 500m to the north and c. 1.75km to the east of the site. Bayfield Loch is situated c. 3.5km to the north and there is a water body within an abandoned quarry c. 1.5km to the east. There are various small unnamed watercourses and drainage ditches on the peninsula.

A Site Location Plan is presented in Appendix A and plan of existing buildings in Appendix B.

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<sup>1</sup> EnviroCentre report 8527: *Appendix B: Phase 1 Habitat and Protected Species Survey* (Feb 2019).

<sup>2</sup> *The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. Scoping Opinion.* Paragraph 3.7. The Highland Council. 25<sup>th</sup> March 2019.

## **1.4 Legislation**

All bat species within Scotland are protected under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). This makes it an offence to deliberately or recklessly:

- (a) Capture, injure or kill a bat;
- (b) Harass a bat or group of bats;
- (c) Disturb a bat in its roost (any structure or place it uses for shelter or protection);
- (d) Disturb a bat whilst it is rearing or otherwise caring for its young;
- (e) Obstruct access to a bat roost or otherwise deny use of a roost;
- (f) Disturb a bat in a manner or in circumstances likely to significantly affect the local distribution or abundance of the species;
- (g) Disturb a bat in a manner or in circumstances likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young;
- (h) Damage or destroy a breeding site or resting place of such an animal (whether or not deliberately or recklessly); and
- (i) Keep, transport, sell or exchange, or offer for sale or exchange any wild bat (or any part or derivative of one) obtained after 10 June 1994.

## **1.5 Report Usage**

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre.

If this report is to be submitted for regulatory approval more than 12 months following the report date, it is recommended that it is referred to EnviroCentre for review to ensure that any relevant changes in data, best practice, guidance or legislation in the intervening period are integrated into an updated version of the report.

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## 2 METHODOLOGY

All bat surveys were conducted in accordance with Bat Conservation Trust Good Practice Guidelines<sup>3</sup> by suitably trained and experienced surveyors who are members of the Chartered Institute for Ecology and Environmental Management (CIEEM). Surveyor profiles can be viewed in Appendix C. Table 2-1 below shows the dates, weather conditions and surveyors present for each of the surveys carried out.

**Table 2-1: Date, Weather and Surveyors Present for Each Survey**

Date	Survey Completed	Weather	Surveyors Present <sup>4</sup>
18 <sup>th</sup> January 2019	Preliminary Roost Assessment (PRA) and Winter Hibernation	Dry and sunny with temperatures between 0-3°C.	MM, NH
15 <sup>th</sup> February 2019	Winter Hibernation	Dry and sunny with temperatures c. 14°C.	MM, LM
1 <sup>st</sup> May 2019	Dusk Survey	Start temp of 11°C, dropping to 10°C, overcast. Wind 0-2 mph.	MM, LM, JP, BK, KA, NH
2 <sup>nd</sup> May 2019	Dusk Survey	Start temp of 8.5°C, dropping to 6°C. Dry with winds from 9 to 1mph.	MM, LM, JP, BK, NH, KA
13 <sup>th</sup> May 2019	Dusk Survey	Start temp of 14.5°C dropping to 8.5°C. Dry with winds between 1 – 6 mph.	MM, LM, JP, BK, KA
14 <sup>th</sup> May 2019	Dawn Survey	Start temp of 7°C, dropping to 5°C. Dry with winds between 0 – 2 mph.	MM, LM, JP, BK, KA

### 2.1 Preliminary Roost Assessment

The survey comprised a detailed inspection of the interior and exterior of Buildings 1-5. Any features such as those listed in Table 2-2 which bats could use for roosting, possible roost access points and evidence of bat presence were noted. A ladder, binoculars and endoscope were used to aid the survey. Suitable habitat features for foraging and commuting bats were identified on site, with connectivity to features in the wider landscape assessed via aerial imagery. Samples of any bat droppings found were collected and sent to Swift Ecology for DNA analysis to determine species present. Building 6 was not surveyed as this is due to be retained.

<sup>3</sup> Collins, J.(ed.) (2016). Bat Surveys for professional Ecologists: Good Practice Guidelines, 3rd edition, Bat Conservation Trust

<sup>4</sup> MM – Mhairi Mackintosh, NH – Natalie Hooton, LM – Laura Mann, JP – Jen Patterson, BK – Ben Kelly, KA – Karen Aldridge

**Table 2-2: Possible Roost Features, Access Points and Evidence of Bat Presence**

Frequently used roosting locations in structures	Access points in structures frequently used as bat roosts	Evidence of Bat Presence
<ul style="list-style-type: none"> <li>• Top of chimney breasts, gable ends and dividing walls;</li> <li>• Beams including ridge, hip etc.;</li> <li>• Junction of timber joints, mortise and tenon joints;</li> <li>• Behind purlins;</li> <li>• Between tiles/slates and the roof lining; and</li> <li>• Under flat roof materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Gaps in windowsills and window panes;</li> <li>• Underneath peeling paintwork or lifted rendering;</li> <li>• Behind hanging tiles, weatherboarding, eaves, soffit boxes, fascias and lead flashing;</li> <li>• Under tiles and slates;</li> <li>• Gaps in brickwork and stonework; and</li> <li>• Gaps in rendering behind gutters.</li> </ul>	<ul style="list-style-type: none"> <li>• Live or dead specimens;</li> <li>• Bat droppings;</li> <li>• Urine splashes;</li> <li>• Fur oil-staining;</li> <li>• Feeding remains (eg. moth wings);</li> <li>• Bat fly pupal cases; and</li> <li>• Audible 'chattering' or social calling</li> </ul>

Based on the inspection results, the suitability of buildings and habitats on site for bats was assessed using the criteria outlined in Table 2-3.

**Table 2-3: Suitability Classification of Roosting, Commuting and Foraging Habitats for Bats**

Suitability	Roosting Features	Foraging and Commuting Habitats
<b>High</b>	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	<p>Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edges.</p> <p>High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>The site is close to and connected to known roosts.</p>
<b>Moderate</b>	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and/or surrounding habitat but unlikely to support a roost of high conservation status.	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>

Suitability	Roosting Features	Foraging and Commuting Habitats
<b>Low</b>	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated.  Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree or a patch of scrub.
<b>Negligible</b>	A structure with negligible features likely to be used by roosting bats.	Negligible habitat features likely to be used by foraging or commuting bats.

## 2.2 Winter Hibernation Survey

The survey comprised a thorough inspection of PRFs with use of a ladder, endoscope and torch to search for hibernating bats or evidence of bats. An Anabat Express static detector was deployed within the internal roof space of Building 1 from the 18<sup>th</sup> – 25<sup>th</sup> January to gain additional information on bat activity. Sound analysis was conducted in Analook W<sup>5</sup>.

## 2.3 Activity Survey

Bat activity surveys were conducted for Buildings 1, 3, 4 and 5 (see section 2.4 for discussion on Building 2). Bat activity surveys aim to establish roost presence or absence and characterise any roosts found within, or adjacent to the site. Foraging and commuting routes in the surrounding landscape are also noted. The resulting data is used to inform the requirement for, and design of, mitigation and/or compensation, in line with current wildlife legislation. The survey effort (i.e. number of survey visits) is scoped from the suitability of the structures to host roosting bats, as determined by the Preliminary Roost Assessment (PRA) results.

Frequency division bat detectors (Bat Box Duet) coupled with audio recorders and time expansion detectors (Echo Meter Touch (EMT)) were used to gather digital sound file samples of bat activity during the surveys. Observations of bat activity were noted with species, time identified, location and behaviour all logged.

Accurate numbers of bats can be difficult to identify during flight, therefore bat passes are used as a proxy measurement for activity levels. A bat pass comprises one sound file triggered by a bat call being detected by the EMT. A minimum of one EMT was deployed per survey. Post survey analysis was conducted to confirm species identification and any observed species it was not possible to identify at the time of survey.

During the activity survey, surveyors were positioned at vantage points to gain visual and audible coverage of all building features which offer potential roosting sites to bats. The vantage point locations for each survey can be seen in Appendix D.

Dusk surveys began 15 minutes prior to sunset and continued for a minimum of 1.5 hours, until surveyors were satisfied enough time had elapsed to encapsulate any late emerging bats within the survey results. The dawn survey began 2 hours prior to sunrise and continued for 15 minutes after.

<sup>5</sup> Analook W for bat call analysis using ZCA. Version 4.2 (2017) Titley Scientific.

## **2.4 Other**

Building 2, consisting of four stone walls contained PRFs which were all easily visible from ground level. It was therefore decided that a thorough inspection with use of an endoscope and torch would be the most efficient method for determining bat presence within this structure. This was conducted at the end of the dawn survey on the 14<sup>th</sup> May 2019. An additional internal check of the roof space within Building 1 was also conducted after the dawn survey on the 14<sup>th</sup> May 2019 to search for evidence of bat activity.

## **2.5 Survey Constraints**

Temperatures during the dusk survey on the 2<sup>nd</sup> May 2019 were sub-optimal (below 10°C at sunset). The activity levels observed during this survey were also lower than the previous night. The Bat Conservation Trust Guidelines state that in *“cooler, windier or wetter weather bats may not emerge, emerge later, forage for shorter time periods, carryout fewer foraging bouts or use alternative, more sheltered habitat.”* As a result of this, it was not possible to conclude absence of roosts or activity on site. An additional dusk survey was therefore conducted on the 13<sup>th</sup> May 2019 in suitable conditions to confirm the result.

## 3 RESULTS

The following results sections should be read in conjunction with Appendix E: PRA results, Appendix F: Photographs and Appendix G: Survey Results.

### 3.1 Preliminary Roost Assessment

#### Buildings

The detailed results of the PRA inspection can be found in Appendix D. Three dropping samples were collected from Building 1. Two of these were found inside the building, in rooms on the 2<sup>nd</sup> floor (Photo 1 and 2). A third one was located on a lean to structure on the north aspect (Photo 3). DNA analysis confirmed that all samples were a 99% match for common pipistrelle (*Pipistrellus pipistrellus*). The location and spread of the droppings suggest they were from bats in flight rather than roosting bats.

Buildings 1 – 5 were assessed as having low suitability for winter hibernation roosts due to there being a small number of features which could provide suitable thermal and moisture conditions for hibernating bats, such as gaps in door lintels and wall cavities.

Buildings 2 – 5 were assessed as having low suitability for summer roosts with features suitable for occasional use by small numbers of crevice dwelling bats such as common and soprano pipistrelles. These included gaps in masonry and under roof slates. Building 1 was assessed as having moderate suitability for summer roosts as it had a greater number of features which could be utilised by various bat species for roosting such as an enclosed roof space. Despite the high number of potential roost features it was ruled out as having high suitability due to the lack of evidence which might be expected if the building was used by large numbers of bats regularly (e.g. large accumulations of droppings or staining). As the property is unoccupied and in poor repair in places it is also likely lacking the thermal properties which would be required by a maternity roost.

#### Habitat

The open buildings and scattered trees and scrub in the east of the site provide some sheltered areas for flying insects which could provide foraging resource for bats such as pipistrelles. Similarly the dune grassland within the north and east of the site provides habitat for insects such as spiders, beetles and moths which are suitable feeding resource for brown long-eared (*Plecotus auritus*) and natterers bats (*Myotis nattereri*). There are limited connections to suitable foraging habitat in the wider area such as woodland and freshwater via gorse scrub and scattered trees. There is bright flood lighting throughout the night on the adjacent Nigg Energy Park. Whilst there is currently no artificial lighting within the site there is light spill from the Energy Park, therefore the overall habitat suitability is assessed as being low.

### 3.2 Winter Hibernation Survey

No bats were identified utilising any of the buildings on site during the winter hibernation inspections. No bat calls were recorded during the static detector deployment in Building 1.

### **3.3 Activity Survey**

#### 1<sup>st</sup> May Dusk

No bats were observed emerging from any of the buildings.

Up to 3 common pipistrelle were observed foraging around mature trees and above scrub to the south and east of the site from five minutes after sunset until the end of the survey.

EMTs were deployed at the locations shown in Appendix D. The total number of bat passes recorded at locations 1, 2 and 3 were 18, 57 and 22 respectively.

#### 2<sup>nd</sup> May Dusk

No bats were observed emerging from any of the buildings.

One common pipistrelle was seen flying in from the east of the site to forage over the scrub on the eastern edge of the site.

EMTs were deployed at the locations shown in Appendix D. The total number of bat passes recorded at locations 4, 5 and 6, were 6, 0 and 0 respectively.

#### 13<sup>th</sup> May Dusk

One common pipistrelle was observed emerging from an open window on the east aspect of Building 5 (Photo 4).

From 13 minutes after sunset until the end of the survey there were up to three common pipistrelle observed foraging around mature trees and above the scrub in the south and east of the site. They were also observed utilising buildings 2, 3 and 4 for sheltered foraging.

EMTs were deployed at the locations shown in Appendix D. The total number of bat passes recorded at locations 7 and 8 were 227 and 229 respectively.

#### 14<sup>th</sup> May Dawn

No bat activity was recorded for the duration of the survey. No roosting bats or further evidence of bats were observed within Building 1 or 2 after close inspection with an endoscope and torch.

## **4 SITE ASSESSMENT AND POTENTIAL IMPACTS**

### **4.1 Site Assessment**

Building 5 is assessed as hosting a day roost for one common pipistrelle bat, most likely to be a male or non-breeding female. Due to its emergence from the interior of the building it is not possible to determine the exact roosting location within the property. Due to failing plasterboard the roof space is open in several places so it is possible the bat was utilising features such as gaps around roof beams and sarking. There were also potential roost features within the interior of the building such as behind peeling wall paper and within exposed wall cavities.

Bat activity was limited and concentrated on the eastern edge of the site containing scrub vegetation. This part of the site was also shielded somewhat from the light arising from the existing Nigg Energy Park in the west. The light levels throughout the night greatly reduce the building and habitat suitability elsewhere on the site. Buildings 2 – 4 were utilised for sheltered foraging with bats accessing the buildings through open doors and windows. The discovery of bat droppings within Building 1 suggest that this is, at times, also used as sheltered foraging with many of the windows open or smashed presenting adequate access for bats.

Although no hibernating bats were found during the surveys there is still potential for the buildings to be utilised by small numbers of hibernating bats as there are several features such as deep wall cavities that could provide appropriate thermal properties.

### **4.2 Potential Impacts**

The following potential impacts are predicted as a result of the proposed development:

- Loss of one day roost for a male or non-breeding female common pipistrelle through demolition of Building 5;
- Loss of potential summer and winter roosting resource for small numbers of opportunistic bats and loss of sheltered foraging through demolition of Buildings 1-4;
- Accidental death or injury to a bat as a result of demolition of all the buildings;
- Loss of foraging habitat through removal of scrub vegetation and mature trees within the site; and
- Disruption to foraging and commuting habitats outside the site as a result of increased artificial light.

## **5 RECOMMENDATIONS FOR FURTHER SURVEY, LICENCING, COMPENSATION AND MITIGATION**

### **5.1 Further Survey**

The result of these bat surveys are considered valid for a period of 12 months. If the buildings are not demolished before May 2020 further survey will be required to ensure baseline data is valid.

### **5.2 Licensing**

A protected species derogation licence will be required from Scottish Natural Heritage (SNH) to permit the destruction of one common pipistrelle day roost prior to demolition of Building 5. Licences can only be issued once planning permission has been approved.

### **5.3 Compensation**

SNH require 'like for like' compensation to be provided for the lost roost, however no replacement buildings are planned as part of the proposed development. It is also not known which feature within Building 5 the bat is utilising. Common pipistrelle bats are known to be 'crevice dwelling' bats and bat boxes have been shown to be suitable for use by non-breeding individuals<sup>6</sup>. It is therefore recommended that 3 woodcrete crevice style bat boxes<sup>7</sup> are mounted on a nearby structure such as a tree or building within 100m of the site, although closer if possible. The 3 boxes should be mounted at least 3m from the ground and placed on different aspects to increase the chance of occupation. The boxes should be placed in a location which is not illuminated by artificial lighting and is close to tree or scrub cover.

### **5.4 Mitigation**

The following mitigation is recommended to reduce potential negative impacts to bats as a result of the proposed development:

- To reduce risk of accidental injury or death to opportunistically roosting bats it is recommended that demolition occurs in the months of October, November or March to avoid the bat summer activity season and the sensitive hibernation period.
- The compensatory bat boxes should be installed prior to demolition works commencing site so that if any bats are unexpectedly found they can be relocated.
- All site personnel should be made aware of the presence of bats on site via a toolbox talk.
- If bats are discovered on site or seen flying during daylight hours, demolition works should be halted and the project ecologist contacted for advice.
- The trees and scrub in the east of the site is a key commuting and foraging habitat for bats in the locale. It is understood that this will be removed as part of the proposed development. A landscape bund with associated planting has been proposed to screen the development. The landscape design should incorporate a similar species mix to that present within the existing scrub habitat.
- Artificial lighting, and security lighting in particular, should be designed to reduce impacts to nocturnal animals such as bats. Measures could include the use of shades to prevent light spill outside of the

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<sup>6</sup> Mackintosh (2016) *Bats and Licensing: A report on the success of maternity roost compensation measures*. SNH Report 928.

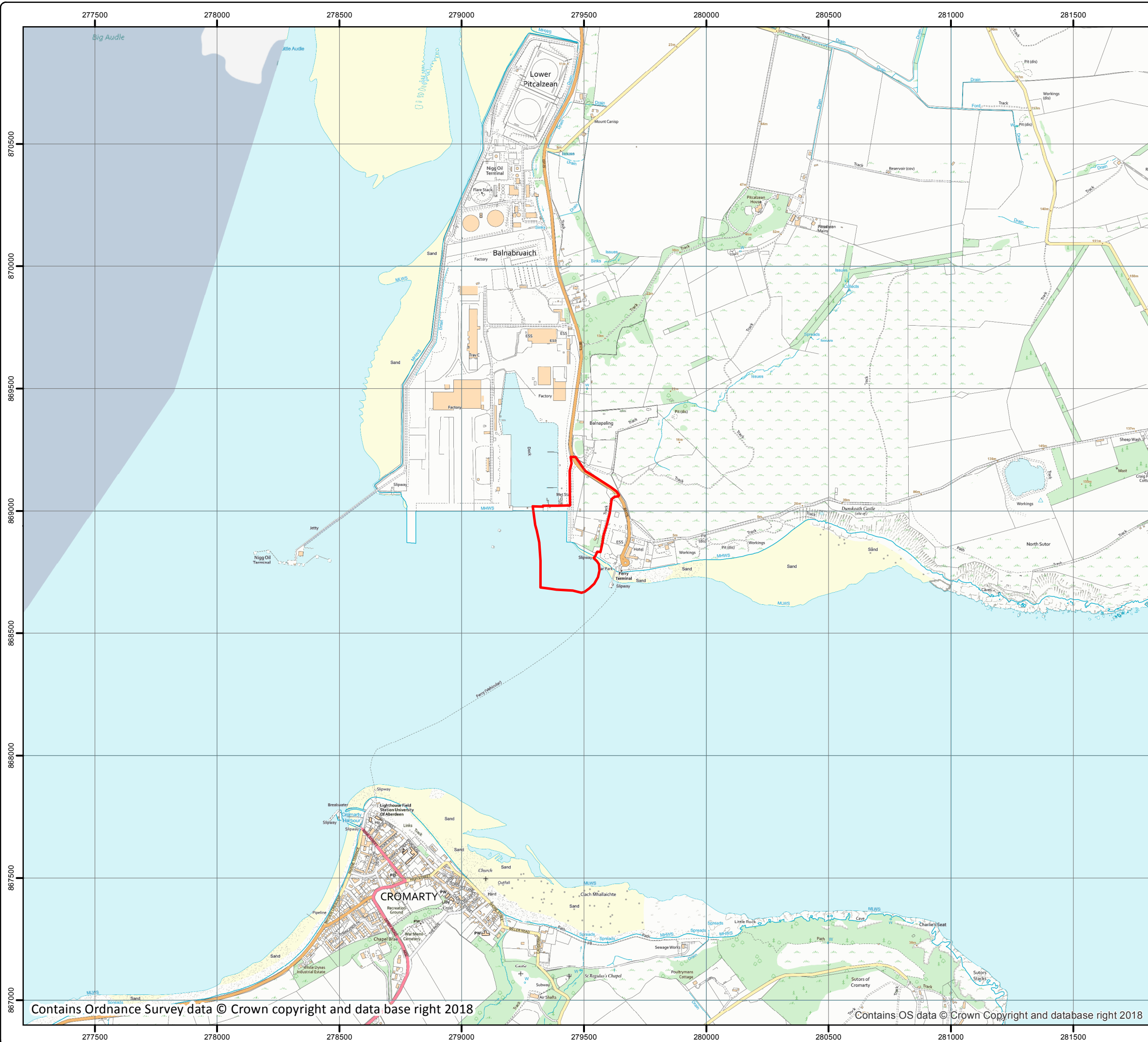
<sup>7</sup> Schwegler 1FF or Nestbox Crevice bat box would be suitable models.




site, use of vegetation to act as a screen for artificial lighting and the use of soft white light. The Lighting Institute guidance on appropriate lighting can be found here:

<https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>

## **A      SITE LOCATION PLAN**



Legend

 Site Boundary

Do not scale this map

Client  
**Global Energy Nigg Limited**

Project  
**Nigg East Quay**

Title  
**Figure 1.1 - Site Location Plan**

Status  
**FINAL**

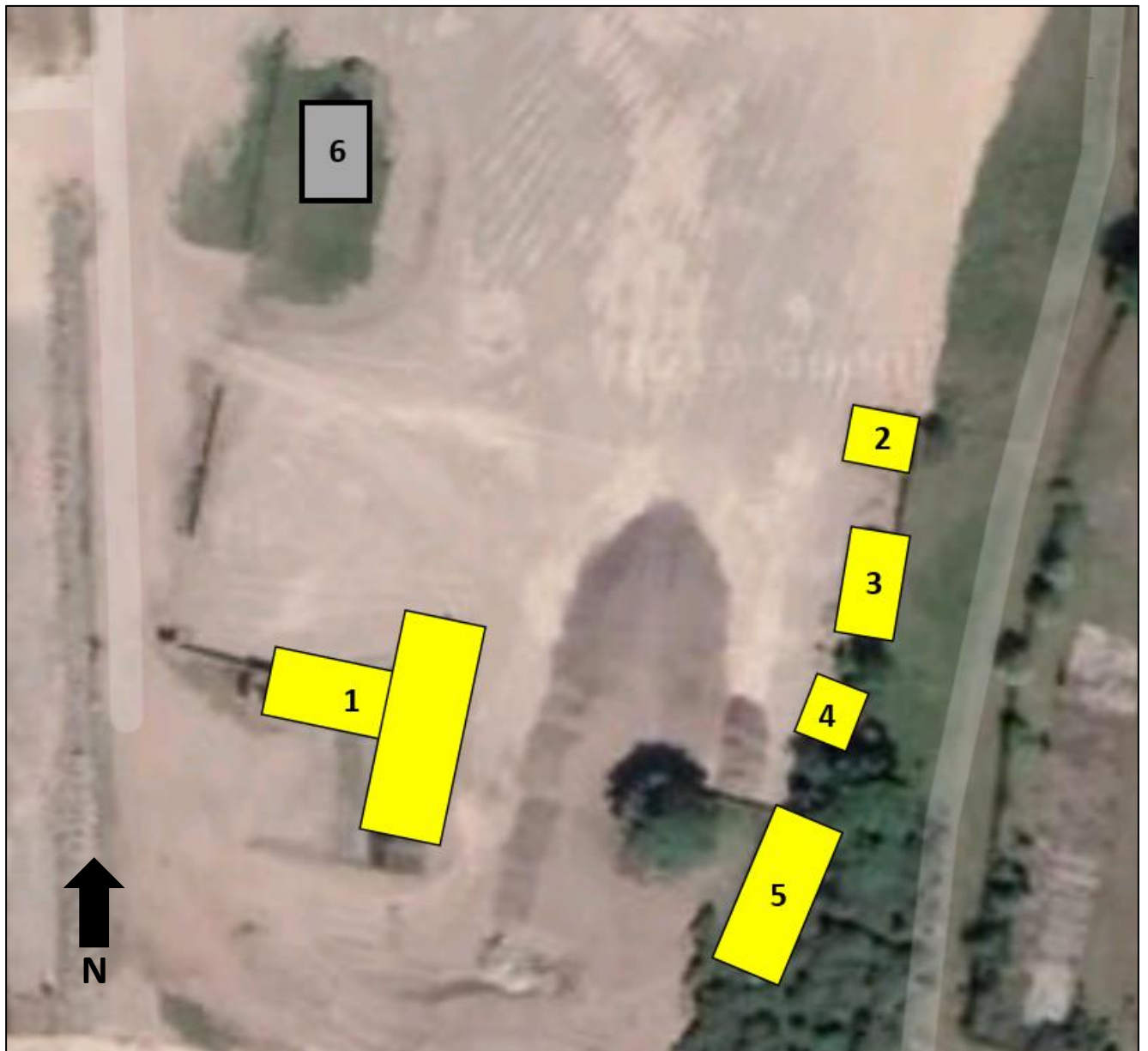
Drawing No. <b>671906-001</b>	Revision
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Scale <b>1:15,000</b>	<b>A3</b>	Date <b>12 Feb 2019</b>
Drawn <b>SMC</b>	Checked <b>JEP</b>	Approved <b>MH</b>



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## B BUILDING LAYOUT



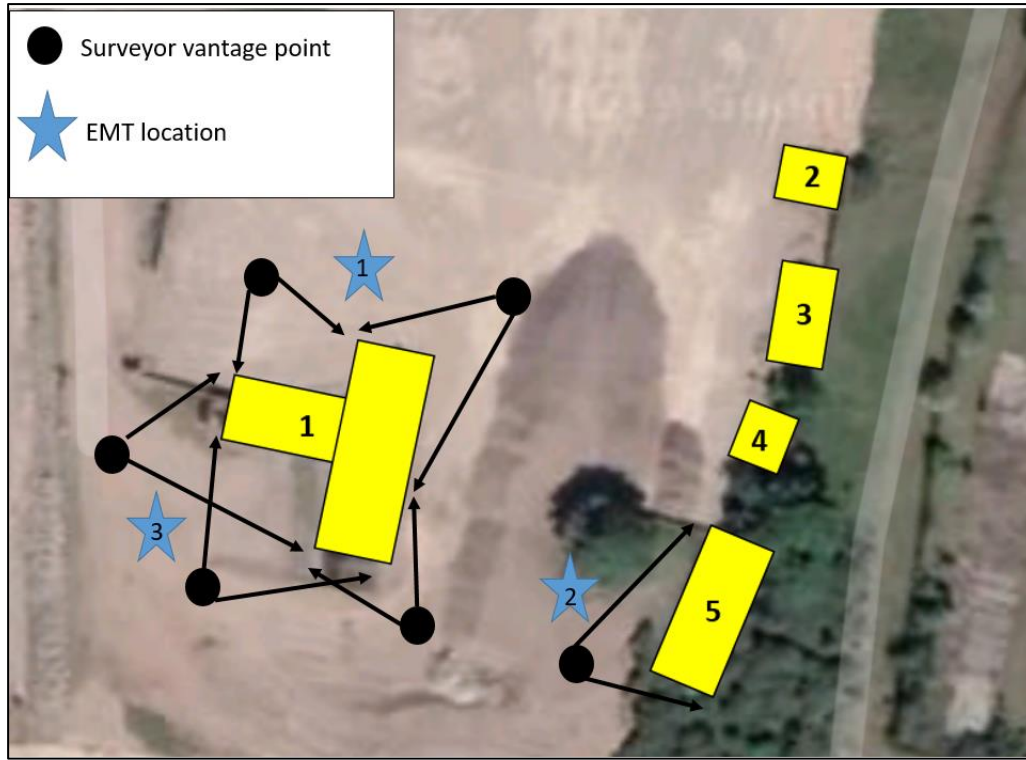
## C SURVEYOR PROFILES

Surveyor	Role	Profile
<b>Mhairi Mackintosh (MM)</b> BSc MSc ACIEEM Lead Consultant Ecologist	Lead Surveyor/Report Author	Mhairi is a licensed bat worker (licence number 108582) and has been carrying out commercial bat surveys since 2012. Whilst with EnviroCentre she has worked on a variety of bat related projects with private homeowners, housing developers and local authorities. She has previously worked for SNH and published research on bat licencing and mitigation. She is an SNH bats in houses roost visitor and chair of the North East Scotland Bat group.
<b>Gemma Nixon (GN)</b> BSc (Hons) MSc MCIEEM Senior Ecologist	Project Reviewer	Gemma has six years' consultancy experience specialising in bats and holds a SNH bat roost visitors licence (#63899) and a Bat Low Impact Licence (#137726). Gemma leads the bat survey team in the North East of Scotland and is highly competent in project managing, designing, undertaking and reporting bat surveys in relation to development projects across Scotland. She is particularly proficient in the logistics of large scale activity and transect surveys, and use of remote detection recording systems. She has experience in locating and mitigating for bat roosts in traditional Scottish buildings, plus providing technical support for exclusion and mitigation works for bat roosts found in trees.
<b>Natalie Hooton (NH)</b> BSc (Hons) GradCIEEM Consultant Ecologist	Field Surveyor/Report 1 <sup>st</sup> Reviewer	Natalie has three years' experience working as a consultant and has been undertaking bat surveys in Scotland since 2015 in both rural and urban environments. She is competent in managing and co-ordinating bat roost potential and activity surveys, analysing recordings of bat calls using specialist software; and report writing in relation to development projects in Scotland. She has also assisted with the deployment and collection of static 'Anabat' detectors. Natalie's project experience includes privately owned homes, local authority housing stock and school campuses and housing developments.
<b>Jennifer Paterson (JP_)</b> BSc (Hons) MSc GradCIEEM Consultant Ecologist	Field Surveyor	Jennifer studied to Masters level in Ecology and Environmental Sustainability at the University of Aberdeen. Jennifer has experience in bat surveys through conducting emergence/re-entry surveys on multiple buildings, and activity transects for both small and large scale projects. She is competent at conducting Preliminary Roost Assessments on trees and buildings, being involved in multiple rural and urban projects to date. Jennifer is also competent in the use, assessment and interpretation of Anabat recording systems.
<b>Karen Aldridge (KA)</b> BSc (Hons) GradCIEEM Consultant Ecologist	Field Surveyor	Karen is a licensed bat worker (roost visitor licence number 60948) and has been carrying out commercial bat surveys since 2011. Karen has extensive experience of surveying for bats on a variety of projects, including railway bridges, churches, commercial and residential buildings as well as conducting transect surveys and deploying static bat recording equipment. Karen also experience in suggesting and implementing mitigation measures for bat roosts. She is also an active member of the Inverness Bat Group.
<b>Ben Kelly (BK)</b> BSc (Hons) GradCIEEM Consultant Ecologist	Field Surveyor	Ben has three years' experience in bat surveys through conducting emergence/re-entry surveys and activity transects for both small and large scale projects within work and through volunteering for the Bat Conservation Ireland. Ben is competent at conducting Potential Roost Feature assessments

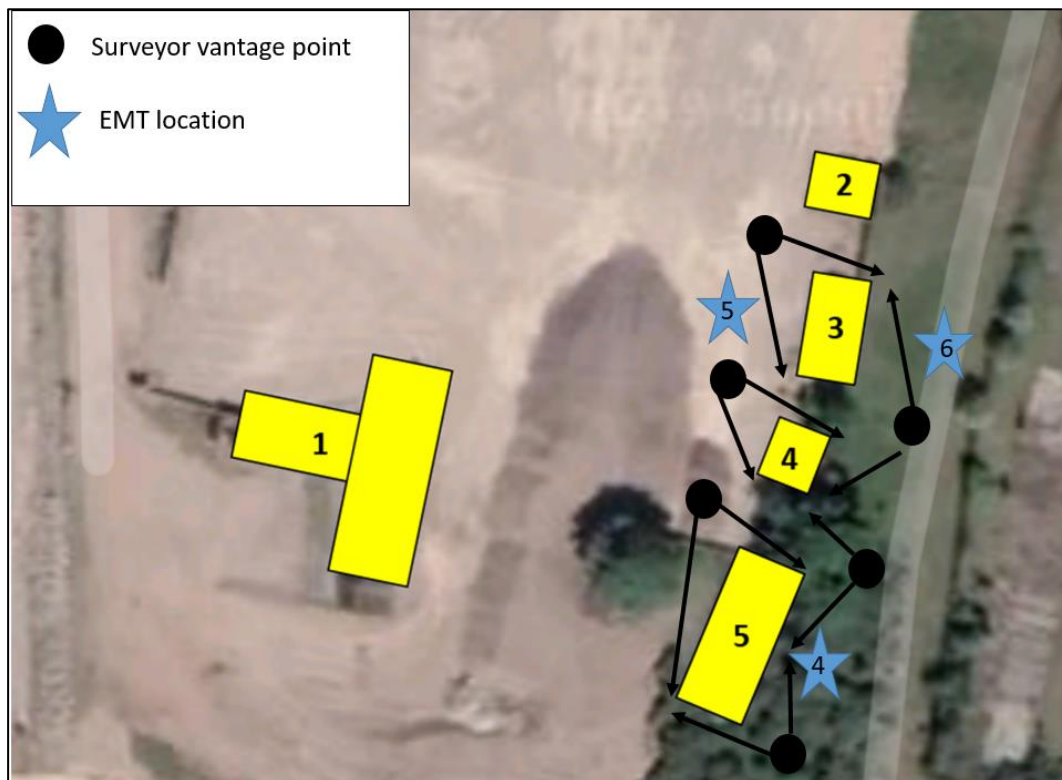
Surveyor	Role	Profile
		on trees. Ben is also competent in the use, assessment and interpretation of Anabat recording systems.
<b>Laura Mann (LM)</b> BSc (Hons) (CIEEM Qualifying member) Field Ecologist	Field Surveyor	Laura is trained to undertake background research, bat activity surveys and reporting in relation to development projects in Scotland. She has been undertaking commercial bat surveys since 2018 and is a member of the North East Scotland Bat Group.

## D SURVEYOR VANTAGE POINT LOCATIONS

1<sup>st</sup> May Dusk

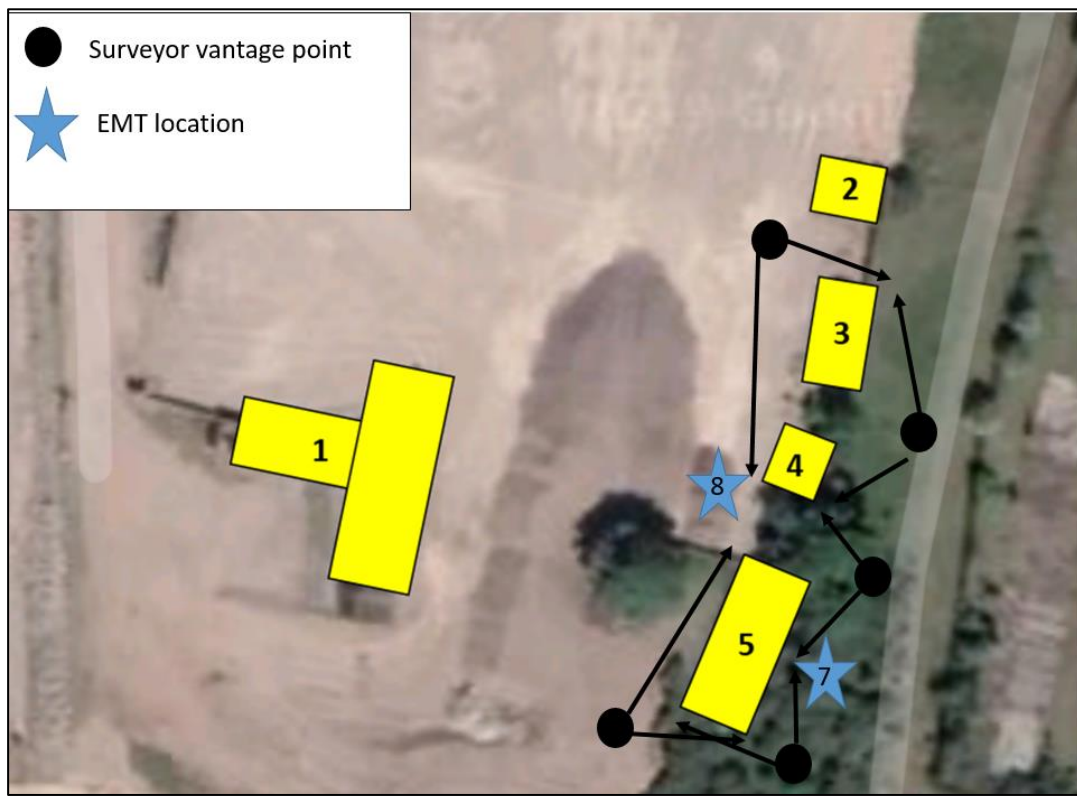


2<sup>nd</sup> May Dusk

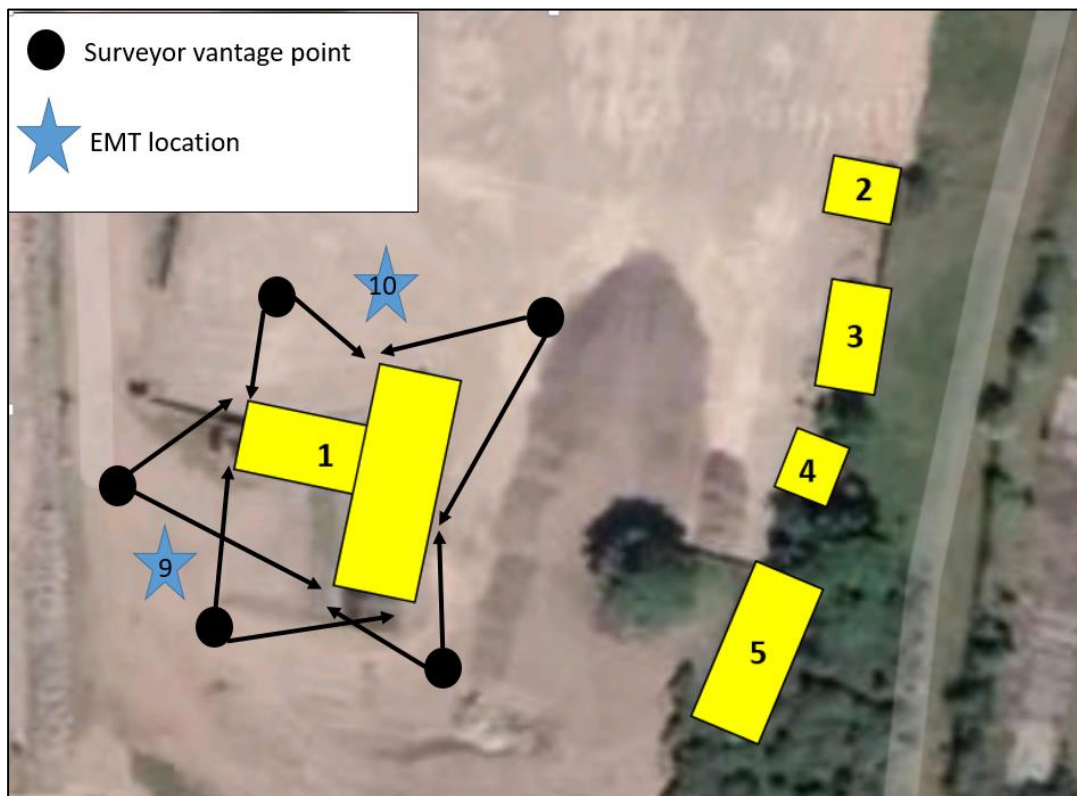




13<sup>th</sup> May Dusk





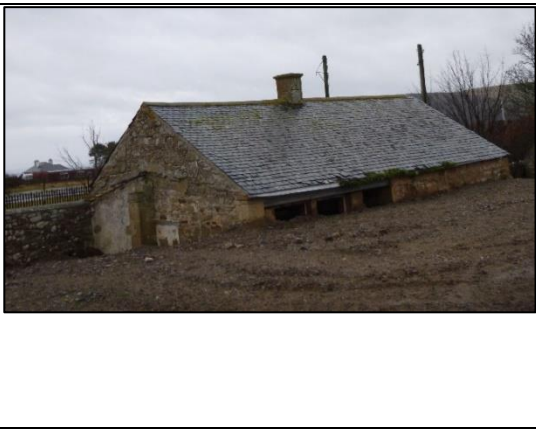

14<sup>th</sup> May Dawn






## E PRELIMINARY ROOST ASSESSMENT RESULTS

Building No.		Description and	PRFs and/or access points	Summer roost suitability	Winter roost suitability
1		<p>Two storey sandstone and mortar building, with a pitched slate roof. A small flat roofed, roughcast extension is present on the south east aspect of the building. A one storey sandstone and pitched roofed outbuilding is attached to the north east of the building. A section of the roof in the outbuilding has collapsed. The roof of the west aspect is missing as are several of the window panes and doors leaving sections exposed. Some of the windows have been boarded up.</p> <p>The internal roof space had a close coupled structure with wooden sarking and insulation laid between the roof joists.</p>	<ul style="list-style-type: none"> <li>• Dormer windows;</li> <li>• Gaps between rafters and the gable ends;</li> <li>• Under flat roof material;</li> <li>• Gaps at the wall head, behind guttering;</li> <li>• Slipped and missing slates;</li> <li>• Loose mortar between sandstone blocks;</li> <li>• Gaps behind boarded up windows;</li> <li>• Gaps under raised flashing;</li> <li>• Behind wooden fascia boards;</li> <li>• Gaps around window frames;</li> <li>• Missing glass in windows; and</li> <li>• Gaps in door lintels.</li> </ul>	Moderate	Low

2		<p>Stone built structure with missing roof, windows and doors. The four walls of the structure are still in place, however are very exposed.</p>	<ul style="list-style-type: none"> <li>• Gaps in mortar; and</li> <li>• Gaps within former windows frames.</li> </ul>	Low	Low
3		<p>One storey sandstone and slate pitched roof building. Glass is missing from windows and doors are missing. The compacted rubble present within the site reaches up to the top of the windows of the building.</p> <p>The collar beamed roof structure is open to the interior of the building. There is wooden sarking behind slates.</p>	<ul style="list-style-type: none"> <li>• Loose and missing slates;</li> <li>• Gaps in window frames</li> <li>• Missing pointing on the chimney stack</li> <li>• Under ridge tiles; and</li> <li>• Loose mortar between sandstone blocks.</li> </ul>	Low	Low
4		<p>One storey metal corrugated roof stone building. A large hole is present in the roof and the doors are open on both the north and south aspects.</p> <p>There is no internal roof space.</p>	<ul style="list-style-type: none"> <li>• Gaps in lintel above missing doors</li> <li>• Gaps in loose mortar within internal walls and at the wall head; and</li> <li>• Gaps between wooden roof beams and the metal roofing.</li> </ul>	Low	Low

5		<p>One storey, sandstone building with a slate pitched roof and harled north and south aspects. Three chimney stacks are present and glass in windows is missing as are the doors. The rubble adjacent reaches up to the roof of the building. Ivy covers the south aspect. Multiple areas of the roof have collapsed.</p> <p>It was not possible to access the internal roof space due to the collapsed nature of the building. Deteriorating ceilings showed that the internal roof space was of a close coupled construction with wooden sarking boards lining the slates.</p>	<ul style="list-style-type: none"><li>• Slipped and missing slates;</li><li>• Raised flashing;</li><li>• Gaps underneath ridge tiles;</li><li>• Gaps in pointing on chimney stacks;</li><li>• Behind peeling wall paper and exposed internal wall cavities; and</li><li>• Behind ivy growing on south aspect.</li></ul>	Low	Low
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## F PHOTOGRAPHIC RECORD



**Photograph 1: Dropping located under wall cavity in the upstairs bathroom, Building 1.**



**Photograph 2: Dropping located in west wing of building 1.**



**Photograph 3: External dropping location on Building 1.**



**Photograph 4: Location of bat emergence on Building 5.**

## G SURVEY RESULTS

### 1<sup>st</sup> May Dusk

Time	Species	Activity
21:07	Common pipistrelle	Flight from east to west between building 5 and 1.
21:10	Common pipistrelle	Foraging in a circular fashion around building 1
21:17	Common pipistrelle	Up to three individuals foraging above scrub vegetation to the east of building 5 and trees to the north.
21:22	Common pipistrelle	Foraging pass behind JP.
21:22	Common pipistrelle	Foraging pass from JP to KA (west to east)
21:23	Common pipistrelle	Foraging bat circling to south aspect of building 1.
27:28	Common pipistrelle	Up to two individuals seen foraging between the buildings 1 and 5
21:32	Common pipistrelle	Pass from south to north along vegetation line to east of building 5.
21:34	Common pipistrelle	Foraging around building 1 and vegetation to south and east of building 5 ongoing.
21:36	Common pipistrelle	Foraging above vegetation to east of building 5.
21:38	Common pipistrelle	Flight from JP to MM along south aspect of the site and vegetation line.
21:46	Common pipistrelle	Occasional foraging passes along vegetation to south and east of building 5 ongoing.
21:57	Common pipistrelle	Foraging around south and east of site continued.
22:06	Common pipistrelle	Occasional foraging around building 5 and vegetation to east and south of the site.
22:17	Common pipistrelle	Up to two individuals seen foraging over vegetation to east of the site.
22:35	Common pipistrelle	Survey ended. Occasional foraging across the site still ongoing.

### 2nd May Dusk

Time	Species	Activity
21:38	Common pipistrelle	Flight from east to west foraging briefly above scrub to east of building 5.

13th May Dusk

Time	Species	Activity
21:51	Common pipistrelle	Flight from north to south to west of building 3-5.
21:55	Common pipistrelle	1 individual emerged from open window on east aspect of building 5.
21:57	Common pipistrelle	Foraging around trees between buildings 3 and 4.
22:00	Common pipistrelle	Flew from east to west over the top of building 5.
22:02 – 22:24	Common pipistrelle	Up to 3 individuals continually foraging above scrub and trees to north, east and south of buildings.
22:11	Common pipistrelle	Sheltered foraging within building 2.

## **Technical Appendix 8.3**





## **Nigg Quay East Ornithology Baseline Report**



**June 2019**



# Nigg Quay East

## Ornithology Baseline Report

Client: Global Energy Group

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# **1 INTRODUCTION**

## **1.1 Terms of Reference**

EnviroCentre Limited has been commissioned by Global Energy to undertake an Environmental Impact Assessment (EIA) for the proposed development of a new quay and associated onshore laydown area to the south-east of Nigg Energy Park. This report summarises the ornithology baseline conditions, collated through desk based research.

## **1.2 Report Usage**

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## 2 BASELINE CONDITIONS

### 2.1 Designated Sites

The proposed development lies approximately 600m east of the Cromarty Firth Special Protection Area (SPA) which qualifies under Article 4.1 of the Birds Directive 2009/147/EC by regularly supporting populations of European importance of the following Annex 1 species: Osprey (*Pandion haliaetus*) forage throughout the SPA (2008 to 2012, five year mean of up to 25 territories within feeding range, 12.5% of the GB population, with 1 pair breeding within the site, 1% of the GB population); Common Tern (*Sterna hirundo*) (1989 to 1993 mean of 294 pairs; 2% of the GB population); Whooper Swan (*Cygnus cygnus*) (1992/93 to 1996/97 winter peak mean of 64 individuals, 1% of the GB population) and Bar-tailed Godwit (*Limosa lapponica*) (1,355 wintering individuals, 3% of the GB population).

Cromarty Firth SPA further qualifies under Article 4.2 by regularly supporting a population of European importance of the following migratory species: Greylag Goose (*Anser anser*) (1992/93 to 1996/97 winter peak mean of 1,782 individuals; 2% of the Iceland/UK/Ireland biogeographic population).

Cromarty Firth SPA also qualifies under Article 4.2 by regularly supporting in excess of 20,000 individual waterfowl. In the five-year period 1992/93 to 1996/97, a winter peak mean of 30,200 individual waterfowl was recorded, comprising 14,800 wildfowl and 15,400 waders including nationally important populations of the following species: Redshank (*Tringa totanus*) (1,149 individuals, 1% of the GB population); Curlew (*Numenius arquata*) (1,313 individuals, 1% of the GB population); Knot (*Calidris canutus*) (4,312 individuals, 1% of the GB population); Red-breasted Merganser (*Mergus serrator*) (204 individuals, 2% of the GB population); Scaup (*Aythya marila*) (295 individuals, 3% of the GB population); Pintail (*Anas acuta*) (319 individuals, 1% of the GB population); Wigeon (*Anas penelope*) (9,204 individuals, 3% of the GB population); Greylag Goose (1,782 individuals, 2% of the GB population); Bar-tailed Godwit (1,355 individuals) and Whooper Swan (64 individuals). In the five-year period 1991/92 to 1995/96, a winter peak mean of 34,847 individual waterfowl was recorded with the assemblage additionally including nationally important populations greater than 2,000 individuals of: Dunlin (*Calidris alpina alpina*) (3,384 individuals, 0.6% of the GB population) and Oystercatcher (*Haematopus ostralegus*) (2004/5 to 2009/10, 2,702 individuals, 0.8% of the GB population).

Approximately 2km east of the proposed development is the Moray Firth Proposed Special Protection Area (pSPA), with the proposed qualifying species being:

- Breeding and Non-breeding
  - European Shag (*Phalacrocorax aristotelis*) – 5,494+ breeding and 6,462+ non-breeding, representing 10.2% and 5.9% of the GB population respectively
- Non-breeding
  - Common Eider (*Somateria mollissima*) – 1,733, representing 2.9% of the GB population;
  - Common Goldeneye (*Clangula bucephala*) – 907, representing 4.5% of the GB population;
  - Common Scoter (*Melanitta nigra*) – 5479, representing 5.5% of the GB population;
  - Great Northern Diver (*Gavia immer*) – 144, representing 5.8% of the GB population;
  - Greater Scaup – 930, representing 17.9% of the GB population;
  - Long-tailed Duck (*Clangula hyemalis*) – 5001, representing 45.5% of the GB population;
  - Red-breasted Merganser – 151, representing 1.8% of the GB population;
  - Red-throated Diver (*Gavia stellata*) – 324, representing 1.9% of the GB population;
  - Slavonian Grebe (*Podiceps auritus*) – 43, representing 3.9% of the GB population; and
  - Velvet Scoter (*Melanitta fusca*) – 1488, representing 59.5% of the GB population.

The Cromarty Firth and Moray and Nairn Coast are also designated as RAMSAR sites, with the qualifying species being Greylag Goose and Bar-tailed Godwit (Cromarty Firth) and Greylag Goose and Long-tailed Duck (Moray and Nairn Coast).

## 2.2 Wetland Bird Surveys (WeBS) Data

Wetland Bird Survey (WeBS) data obtained from the British Trust for Ornithology (BTO) from within the Nigg Ferry count sector (which the proposed development lies within) shows that small numbers of birds are present in the area. These are recorded within Table 2-1 and 2-2 respectively and includes foraging and roosting waders and waterfowl offshore. Of the species recorded during WeBS counts, only five are qualifying species of the Cromarty Firth SPA and none of the species recorded comprise significant numbers against the overall populations of the Cromarty Firth SPA:

- Red-breasted Merganser – Peak count of 4 and a mean peak of 2 (between 2012 and 2017), comprising 2% and 1% of the SPA population respectively;
- Bar-tailed Godwit – Peak count of 3 and a mean peak of 2 (between 2012 and 2017), comprising 0.2% and 0.1% of the SPA population respectively;
- Curlew – Peak count of 32 and a mean peak of 13 (between 2012 and 2017), comprising 2.4% and 1% of the SPA population respectively;
- Redshank – Peak count of 12 and a mean peak of 6 (between 2012 and 2017), comprising 1% and 0.5% of the SPA population respectively; and
- Oystercatcher – Peak count of 122 and a mean peak of 72 (between 2012 and 2017), comprising 4.5% and 2.6% of the SPA population respectively.

Seven of the qualifying species of the Moray Firth pSPA were recorded and none of the species recorded comprise significant numbers against the overall populations of the pSPA:

- Eider – Peak count of 71 and a mean peak of 31 (between 2012 and 2107), comprising 4% and 2% of the pSPA population respectively;
- Long-tailed Duck – Peak count of 50 and a mean peak of 16 (between 2012 and 2107), comprising 1% and 0.3% of the pSPA population respectively;
- Common Scoter – Peak count of 1 and a mean peak of 0 (between 2012 and 2107), comprising 0.02% and 0% of the pSPA population respectively;
- Goldeneye – Peak count of 2 and a mean peak of 0 (between 2012 and 2107), comprising 0.2% and 0% of the pSPA population respectively;
- Red-breasted Merganser – Peak count of 4 and a mean peak of 2 (between 2012 and 2107), comprising 2.6% and 1.3% of the pSPA population respectively;
- Red-throated Diver – Peak count of 1 and a mean peak of 0 (between 2012 and 2107), comprising 0.3% and 0% of the pSPA population respectively;
- European Shag – Peak count of 7 and a mean peak of 0 (between 2012 and 2107), comprising 0.1% and 0% of the non-breeding pSPA population respectively.

**Table 2-1: BTO Wetland Bird Survey Data: Five-year peak monthly counts for each species**

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Eider	N/C	N/C	N/C	4	N/C	71	35	20	N/C	N/C	N/C	N/C
Long-tailed Duck	N/C	N/C	N/C	50	N/C	16	8	10	N/C	N/C	N/C	N/C
Common Scoter	N/C	N/C	N/C	0	N/C	1	0	0	N/C	N/C	N/C	N/C

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Goldeneye	N/C	N/C	N/C	0	N/C	0	2	0	N/C	N/C	N/C	N/C
Red-breasted Merganser	N/C	N/C	N/C	2	N/C	4	2	2	N/C	N/C	N/C	N/C
Red-throated Diver	N/C	N/C	N/C	0	N/C	0	0	1	N/C	N/C	N/C	N/C
Cormorant	N/C	N/C	N/C	3	N/C	0	0	5	N/C	N/C	N/C	N/C
Shag	N/C	N/C	N/C	7	N/C	0	1	0	N/C	N/C	N/C	N/C
Grey Heron	N/C	N/C	N/C	4	N/C	8	2	6	N/C	N/C	N/C	N/C
Oystercatcher	N/C	N/C	N/C	67	N/C	84	122	48	N/C	N/C	N/C	N/C
Bar-tailed Godwit	N/C	N/C	N/C	0	N/C	3	3	3	N/C	N/C	N/C	N/C
Curlew	N/C	N/C	N/C	18	N/C	6	6	32	N/C	N/C	N/C	N/C
Redshank	N/C	N/C	N/C	30	N/C	12	6	7	N/C	N/C	N/C	N/C

**Table 2-2: BTO Wetland Bird Survey Data: Five-year winter peak counts, and month in which this was recorded, of each species**

Species	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	Mean Peak
Eider	71 (DEC)	1 (JAN)	35 (JAN)	19 (DEC)	27 (JAN)	31
Long-tailed Duck	2 (JAN)	10 (FEB)	2 (DEC)	16 (DEC)	8 (JAN)	8
Common Scoter	1 (DEC)	0	0	0	0	0
Goldeneye	2 (JAN)	0	0	0	0	0
Red-breasted Merganser	4 (DEC)	0	0	2 (FEB)	2 (JAN)	2
Red-throated Diver	0	0	1 (FEB)	0	0	0
Cormorant	0	0	5 (FEB)	0	0	1
Shag	0	1 (JAN)	0	0	0	0
Grey Heron	1 (FEB)	7 (DEC)	8 (DEC)	1 (DEC)	6 (FEB)	5
Oystercatcher	43 (FEB)	84 (DEC)	122 (JAN)	55 (DEC)	57 (DEC)	72
Bar-tailed Godwit	3 (DEC)	3 (FEB)	1 (DEC)	2 (DEC)	2 (FEB)	2
Curlew	8 (FEB)	12 (FEB)	6 (JAN)	5 (DEC)	32 (FEB)	13
Redshank	7 (FEB)	4 (DEC)	6 (DEC)	2 (DEC)	12 (DEC)	6

The WeBS dataset also provides a table detailing the national and International importance of the site for the bird species recorded. This is presented in Table 2-3 below. The results show that the site does not support populations of species that meet the threshold for national or International importance.

**Table 2-3: National and International importance of the site for each species**

Species	Autumn peak cf National Threshold	Winter peak cf National Threshold	Spring peak cf National Threshold	Annual peak cf National Threshold	Autumn peak cf International Threshold	Winter peak cf International Threshold	Spring peak cf International Threshold	Annual peak cf International Threshold	Autumn 5yr mean of peaks	Winter 5yr mean of peaks	Spring 5yr mean of peaks	Annual 5yr mean of peaks
Eider	0%	6%	N/A	6%	0%	0%	N/A	0%	2	31		31
Long-tailed Duck	9%	7%	N/A	15%	0%	0%	N/A	0%	10	8		16
Red-breasted Merganser	1%	2%	N/A	2%	0%	0%	N/A	0%	1	2		2
Cormorant	0%	0%	N/A	1%	0%	0%	N/A	0%	1	1		2
Shag	0%	0%	N/A	0%	0%	0%	N/A	0%	2	0		2
Grey Heron	0%	1%	N/A	1%	0%	0%	N/A	0%	2	5		5
Oystercatcher	2%	2%	N/A	2%	1%	1%	N/A	1%	48	72		72
Bar-tailed Godwit	N/A	1%	N/A	1%	N/A	0%	N/A	0%		2		2
Curlew	1%	1%	N/A	1%	0%	0%	N/A	0%	7	13		13
Redshank	1%	1%	N/A	1%	1%	0%	N/A	1%	12	6		12

None of the species recorded within the proposed development area (Nigg Ferry count sector) represent important populations within the context of the Cromarty Firth SPA and Moray Firth pSPA sites.

## 2.3 Wader Roost Sites

The SNH Commissioned Report No.252: Moray Firth Wildfowl and Wader Roosts<sup>1</sup> identified a small wader roost east of the Nigg Ferry terminal, located approximately 1.2km from the proposed development. This roost site is relatively undisturbed and numbers have been stable since 1994, presumably due to the area being inaccessible to human disturbance. There are two further roost sites within the Nigg Oil Terminal, one at the north end of the terminal and one along the western boundary. Both these roost sites have seen major declines in use since 1995, with the northern roost site only being used by small numbers of Ringed Plover (*Charadrius hiaticula*), Dunlin and Curlew. The western roost site is now only used regularly by Oystercatcher.

The most important site for waders within the Cromarty Firth lie within the Inner Nigg Bay, where four main roost sites are located, supporting wader species such as Oystercatcher, Curlew, Golden Plover, Lapwing, Knot and Dunlin. All these roost sites are at least 4.5km from the proposed development site.

<sup>1</sup> Bob Swann. North of Scotland Ornithological Services (2007). Moray Firth Wildfowl & Wader Roosts. Scottish Natural Heritage Commissioned Report No.252 (ROAME No. F098LG02)

## 2.4 Common/Arctic Terns

Nigg Oil Terminal used to historically support a population of breeding Common and Arctic Terns (*Sterna paradisaea*).

Nesting Arctic terns have been using the western side of Nigg Energy Park (outside of the site boundary) between the existing finger quay and the Nigg Oil Terminal (per comms with Global Energy). This location is over 500m from the proposed development site, in an area already subject to disturbance. Nesting terns are also present at the quaysides at Invergordon, approximately 8km to the west.

## 2.5 Osprey

The Environmental Impact Assessment undertaken for the now constructed South Quay<sup>2</sup> established that there are no breeding Osprey within 5km of the proposed development. Preferred feeding areas for Osprey within the Cromarty Firth are located around Udale Bay and westward, in the shallower areas of the firth. Literature<sup>3</sup> states that the upper limit of disturbance to nesting Osprey is 750m. No suitable nesting habitat exists within 750m of the proposed development.

## 2.6 Terrestrial Bird Species

Within the terrestrial habitats on site, the following species were recorded during the Phase 1 Habitat Survey: Wren (*Troglodytes troglodytes*), Great Tit (*Parus major*), Robin (*Erithacus rubecula*), Jackdaw (*Corvus monedula*), Herring Gull (*Larus argentatus*) and Black-headed Gull (*Chroicocephalus ridibundus*).

Swallows (*Hirundo rustica*) were recorded nesting within the derelict buildings on site during bat surveys undertaken in May 2019.

Wren, Great Tit, Robin and Jackdaw are listed on the BOCC Green List.

Swallow and Black-headed Gull feature on the BOCC Amber List and Herring Gull on the BOCC Red List.

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<sup>2</sup> Eco-Fish Consultants (2013). Ecological Impact Assessment (Marine), South Quayside Development, Nigg Energy Park, Nigg.

<sup>3</sup> Ruddock, M & Whitfield, D.P (2007). A review of Disturbance Distances in Selected Bird Species. A report for Natural Research (Projects) to Scottish Natural Heritage.



### **3        POTENTIAL IMPACTS**

Potential impacts on the Cromarty Firth SPA and Moray Firth pSPA, as well as their qualifying species are assessed within the Habitats Regulations Appraisal (Technical Appendix 4.3). However, given the low numbers of birds present within the area of the proposed development, which comprise very small percentages of the SPA and pSPA populations, it is highly unlikely that any significant effect will occur on birds as a result of the proposed development.

Provided the mitigation measures outlined in Section 4 are adhered to, there will be no significant effect on birds utilising the terrestrial habitats on site, or birds nesting within the derelict buildings proposed for demolition.

## **4 MITIGATION**

The following mitigation measures are proposed for the proposed development:

- Timing of works; Vegetation clearance and demolition of buildings should be undertaken outwith the nesting bird season (March –August) to avoid impacts on breeding birds;
- If vegetation clearance or demolitions are undertaken within the breeding season, a suitably qualified ecologist will be required to undertake nesting bird checks no later than 24 hours prior to works; and
- Bird dissuasion methods should be employed (which include regular inspections by an Ecological Clerk of Works (ECoW) and artificial deterrents) to discourage nesting birds on site during construction works. Methods to be employed will be detailed within Environmental Management Plans for the site post-consent.

Although there is unlikely to be an impact on breeding terns from the proposed development, it would be good practice to provide artificial nest boxes for both Common and Arctic Terns where they currently nest, over 500m from the development site. These would include raft nests which are preferred by Common Tern and nest boxes which are preferred by Arctic Tern.

## **Technical Appendix 8.4**



## **NIGG EAST QUAY DEVELOPMENT, CROMARTY**

**Technical Appendix 8.4: Archaeological Desk-based Assessment  
for Envirocentre on behalf of Global Energy**

**6th June 2019**

# **NIGG EAST QUAY DEVELOPMENT, CROMARTY**

## **Technical Appendix 8.4: Archaeological Desk-based Assessment for Envirocentre on behalf of Global Energy**

**6th June 2019**

HA Job no.:	NEQC18
NGR:	279325, 868695
Parish:	Nigg (Ross and Cromarty)
Council:	Highland
Project Manager:	Tom Janes
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# NIGG EAST QUAY DEVELOPMENT, CROMARTY

## ARCHAEOLOGICAL DESK-BASED ASSESSMENT

### 1 INTRODUCTION

#### 1.1 Planning Background

Global Energy Nigg Limited are submitting an EIA in support of a proposed new development, comprising the construction and formation of a new eastern quay and associated laydown area, situated at Nigg Energy park approximately 1.5km north of Cromarty.

Following submission of the Scoping Report and post-Scoping consultation, it has been agreed (Table 1) that an Archaeology and Cultural Heritage Desk-Based Assessment is required in order to identify potential effects arising from the proposed development.

#### 1.2 Site Description

As summarised in Section 2.1 of the EIAR, and depicted on Figure 1 and Plates 1 to 6;

*"The site is situated south east of the Nigg Energy Park at an elevation of 5m above sea level .... The proposed entirety of the site boundary is approximately 11.27ha and is comprised of coastal waters and land of the former Dunskeath House, with derelict buildings associated with the former Dunskeath House situated within the site. The area above Mean Low Water Springs within the site boundary comprises approximately 4.78ha.*

*The site is dominated by bare ground with areas of dense and scattered scrub, grassland, tall ruderal vegetation and broadleaved trees. Sand and shingle above the high tide mark are also present in the south of the site and a sea wall exists in the west.*

*The Nigg Oil Terminal is located to the immediate north of Nigg Energy Park, with the B9175 and Fearn Peninsula to the east, the area where the Cromarty Firth meets the Moray Firth to the south (known as 'The Sutors') to the south, and Nigg Bay to the west (also part of the Cromarty Firth). Adjacent to the south-east of the site, the Cromarty Ferry crosses the entrance to the firth to the west of The Sutors in the summer season from May to September. Access to the facility can be gained from via the B9715.*

*The site is underlain by sandstone of the Raddery Formation, formed in a fluvial or estuary setting during the Devonian Period (383 – 393 million years ago). Coastal outcrops of the Devonian Period Cromarty Fish Bed Limestone are present to the west of the site. Further west metamorphic rocks (psammite and pelite) from the Moine Supergroup are present, these rocks were formed during the Neoproterozoic Era (541 – 1,000 million years ago).*

*Coastal superficial deposits in the vicinity of the site take the form of marine beach deposits, gravel, sand and silt formed up to 3 million years ago during the Quaternary Period. Immediately inland wind-blown sand deposits are present, also of the Quaternary Period, with glacial till present further inland."*



### 1.3 Consultation

Issues raised in Scoping Opinions and during post-scoping consultation are summarised in Table 1.

**Table 1: Consultees' Requests**

Consultee	Issues raised	Action taken
The Highland Council (THC), Pre-Application Advice Service: Consultee Response, 4 <sup>th</sup> April 2018	<p>The Site “contains the site of the former Dunskeath House (now demolished) and includes the surviving associated houses, outbuildings, walls and gate piers. Additionally, the remainder of the area has the potential for the survival of buried archaeological deposits.</p> <p>Any application made that includes the demolition of the historic buildings and landscape features associated with Dunskeath House would require to justify this to accord with Highland Council Planning Policy 57 (Natural, Built and Cultural Heritage).</p> <p>If justification can be argued successfully, then [THC] would recommend that elements of the historic assets – such as at least the boundary walls and gate piers - are retained and relocated rather than simply ground up for hard core. All upstanding historic structures and walls would need to be subject to building recording in advance of impacts.</p> <p>In addition, [THC] would recommend that evaluation of the remainder of the open ground would be required to assess the potential for buried remains to survive. Dependent on the results of this work, further study may be required in advance of, and during, construction works. The evaluation will be backed up by desk-based research to produce a report setting out the results and any required mitigation strategy.”</p>	Desk-based research and a site visit have been undertaken in order to inform a judgement of the Site’s archaeological potential. General recommendations for mitigation of adverse impacts have also been made.
THC, Scoping Opinion, 25 <sup>th</sup> March 2019	<p>“The ES needs to identify all designated [cultural heritage and archaeological] sites which may be affected by the development either directly or indirectly. This will require [it] to identify: -</p> <ul style="list-style-type: none"> <li>• The architectural heritage (Conservation Areas, Listed Buildings) and</li> <li>• The archaeological heritage (Scheduled Monuments),</li> <li>• The landscape (including designations such as National Parks, National Scenic Areas, Areas of Great Landscape Value, Gardens and Designed Landscapes and general setting of the development.</li> <li>• The inter-relationship between the above factors.</li> </ul>	The DBA has identified all designated and undesignated sites within a 2km radius of the development and has considered the potential for significant effects upon them.

Consultee	Issues raised	Action taken
	At the time of writing, no response has been received from the Council's Historic Environment Team however this can be forwarded to you when available. "	
Historic Environment Scotland (HES), Scoping Opinion, 25 <sup>th</sup> March 2019, and subsequent email correspondence	<p>HES "have reviewed the EIA Scoping Report for the proposals and, in this instance, are uncertain about the potential impacts of the proposals on marine and terrestrial cultural heritage assets. [HES] would therefore recommend that further assessment is undertaken ....</p> <p>[HES] note, for example, that a number of terrestrial heritage assets within our remit are located in proximity to the proposed development. These include Dunskeath Castle (Scheduled Monument, Index no. 3319), Cromarty House (Inventory Designed Landscape, GDL120) and Category A listed buildings located in north Cromarty. [HES] would therefore recommend that further assessment should be informed by a considered analysis of the setting of each heritage asset and underpinned by visualisations where impacts have the potential to be significant."</p>	<p>Dunskeath Castle (SM3319), Cromarty House IGD and the Category A Listed Buildings in Cromarty have all been included in the assessment, and a judgement of the potential for significant impacts has been made for each of them.</p> <p>Plates are included illustrating the views from certain heritage assets.</p>
HES, consultation on draft version of Technical Appendix 8.4, 5 <sup>th</sup> June 2019	<p>HES "have reviewed the Desk-Based Assessment and are broadly content that there is sufficient information within this document to reach a view on the scope of an EIA undertaken in support of the proposals.</p> <p>[HES] note that it is concluded that there are unlikely to be significant effects on the setting of terrestrial heritage assets within our remit including <i>Dunskeath Castle (Scheduled Monument, Index no. 3319), Cromarty House (Inventory Designed Landscape, GDL120)</i> and Category A listed buildings within the Cromarty Conservation Area. On the basis that the new development will not represent a significant change to the existing working marine environment in this area, we are content for terrestrial heritage assets within our remit to be scoped out of the assessment.</p> <p>[HES] also agree with the conclusion that there is a low risk of encountering unrecorded archaeological remains in the marine environment. We are therefore content for marine heritage to be scoped out of the assessment provided that the following steps are undertaken:</p>	<p>Any further underwater survey and assessment work relating to the proposed development will take regard of the need for analysis for archaeological potential.</p> <p>The EIA Report outlines proposed mitigation procedures for dealing with unexpected marine archaeological finds (EIA Report, Section 8.5).</p> <p>The potential significance of the crashed RAF aircraft has been discussed (Table 2 and Section 4.1 and 4.2)</p>

Consultee	Issues raised	Action taken
	<ul style="list-style-type: none"> <li>Any further underwater survey and assessment work relating to the proposed development should take regard of the need for analysis for archaeological potential.</li> <li>The EIA Report should contain suitable mitigation procedures for dealing with unexpected marine archaeological finds.</li> </ul> <p>Additionally, we note that the assessment identifies a record of a crashed/ditched Vickers Wellington bomber aircraft as potentially lying within the outer study area.... If any remains of this aircraft survive, they would constitute a “protected place” under the provisions of the Protection of Military Remains Act 1986. This should be referenced in the text of the DBA and Protected Places should be added to the list of assets with “High” importance in Table 2.”</p>	

## 2 AIMS AND OBJECTIVES

The assessment has been carried out according to the *Standard and guidance for historic environment desk-based assessment* published by the Chartered Institute for Archaeologists (CIfA 2014), and aims to:

- Collate all available written, graphic, photographic and electronic information relevant to the development site;
- Describe the nature, extent and significance of the historic environment within the area potentially affected by the development, identifying any uncertainties in existing knowledge;
- Determine the potential impact of the proposed development; and
- Identify any requirements for further investigation that may be necessary to understand the effects of the proposed development on the historic environment.

Potential impacts of the proposed development are most likely to relate to the disturbance of buried archaeology and currently upstanding historic structures within the site during the construction phase. The potential for impacts on the settings of heritage assets will also be considered.

## 3 METHODOLOGY

### 3.1 Study areas

Two study areas have been used in assembling and presenting the data;

- The Inner Study Area (ISA, Figure 1) – which corresponds to the Site boundary, and;
- The Outer Study Area (OSA, Figures 2 to 5) – this extends 2km from the Site boundary. Within this area background data has been collated to inform the archaeological potential of the Site, identify any heritage assets which may be affected as they continue into the site, and to identify assets which may be subject to setting effects.

### 3.2 Data sources

The assessment has been based on a study of all readily available documentary sources, following the ClfA Standards and Guidance (ClfA 2014). The following sources of information were referred to:

- Designation data downloaded from the Historic Environment Scotland (HES) website on 3<sup>rd</sup> March 2019;
- The National Record of the Historic Environment (NRHE), including the Canmore database and associated photographs, prints/drawings and manuscripts held by HES;
- Historic Landscape Assessment data, viewed through the HLAMap website;
- The Highland Council Historic Environment Record (HER), digital data extract received 4<sup>th</sup> March 2019;
- The National Collection of Aerial Photography (NCAP);
- Geological data available online from the British Geological Survey;
- Historic maps held by the National Library of Scotland;
- Ordnance Survey Name Books
- Unpublished maps and plans held by the National Records of Scotland, and
- Readily available published sources and unpublished archaeological reports.

A walkover survey of the ISA was carried out on the 29<sup>th</sup> April 2019, guided by modern mapping. The purpose of the survey was a visual inspection of the proposed development site and its environs, with the aim to identify any previously unrecorded cultural heritage assets, and to gather information about current site conditions relevant to the assessment. Heritage assets in the OSA were also visited to assess for potential effects on their settings.

### 3.3 Identification of heritage assets

The assessment aims to identify all known heritage assets potentially affected by the proposed development, and to estimate the potential for currently unknown heritage assets. A heritage asset is defined as any element of the historic environment which has cultural significance. Both discrete features, and extensive landscapes defined by a specific historic event, process or theme, can be defined as heritage assets; and assets may overlap or be nested within one another. Some heritage assets are designated as Scheduled Monuments, Listed Buildings, World Heritage Sites, Conservation Areas, Inventory Gardens and Designed Landscapes, Inventory Historic Battlefields, Historic Marine Protected Areas, or locally designated through policies in the Local Plan. Undesignated assets may be recorded in the NRHE or Historic Environment Records, while many other assets are currently unrecorded.

Heritage assets within the ISA are shown in Figure 1, with detailed descriptions compiled in a gazetteer (Appendix 1). Undesignated assets with the reference number in the HER (prefixed 'MHG' for finds and monuments). Previously unrecorded assets have been assigned an Asset number (prefixed HA for Heritage Asset). A single asset number can refer to a group of related features, which may be recorded separately in the HER and other data sources.

Heritage assets in the OSA are shown on Figures 2 to 5 and listed in Tables 5 and 6, and Appendices 2 to 4. Designated heritage assets are labelled with the reference number assigned by HES, with a prefix denoting which type of designation they are; undesignated assets with the reference number in the HER (prefixed 'MHG' for finds and monuments, 'EHG' for event records).

### 3.4 Assessment of cultural significance and importance

The Historic Environment Policy for Scotland (HEPS) was published in May 2019 and accompanied by Designation Policy and Selection Guidance (DPSG). DPSG (Annex 1, paragraph 3) retains the definition of cultural significance formerly contained in the Historic Environment Scotland Policy Statement (HESPS). The definition states that cultural significance can be found in "*artistic, archaeological, architectural, historic, traditional,*

*aesthetic, scientific and/or social interest.*" Heritage assets are assessed in terms of their cultural significance and importance; cultural significance is a quality that applies to all heritage assets.

Following 'Scottish Planning Policy' paragraph 137, the analysis of a heritage asset's cultural significance aims to identify its 'special characteristics' which should be protected, conserved or enhanced. Such characteristics may include elements of the asset's setting, which is defined in Historic Environment Scotland's guidance as *"the way in which the surroundings of a historic asset or place contribute to how it is experienced, understood and appreciated"* (HES 2016 'Managing Change in the Historic Environment: Setting', Section 1).

The importance of a heritage asset is the overall value assigned to it based on its cultural significance, reflecting its statutory designation or, in the case of undesignated assets, the professional judgement of the assessor (Table 2). Assets of national importance and international importance are assigned a high and very high level respectively.

DPSG Annex 2 states that the criterion for Listing is that a building is of 'special architectural or historic interest' (Paragraph 1). As defined in DPSG Annex 2, Paragraph 19; Category A refers to 'buildings of national or international importance', Category B to 'buildings of regional or more than local importance', and Category C to 'buildings of local importance'. Conservation Areas are not defined as being of national importance and are therefore assigned to a medium level. Any feature which does not merit consideration in planning decisions due to its cultural significance may be said to have negligible heritage importance; in general, such features are not considered as heritage assets and are excluded from the assessment.

**Table 2: Criteria for Assessing the Importance of Heritage Assets**

Importance	Criteria
Very high	World Heritage Sites and other assets of equal international importance
High	Category A Listed Buildings, Scheduled Monuments, Inventory Gardens and Designed Landscapes, Inventory Historic Battlefields, Historic Marine Protected Areas, Protected Places (as defined in the Protection of Military Remains Act 1986) and undesignated assets of national importance
Medium	Category B Listed Buildings, Conservation Areas, and undesignated assets of regional importance
Low	Category C Listed Buildings and undesignated assets of lesser importance

### 3.5 Potential for unknown heritage assets

Archaeological features are often impossible to identify through desk-based assessment. The likelihood that significant undiscovered heritage assets may be present within the Inner Study Area is referred to as *archaeological potential*. Overall levels of potential can be assigned to different landscape zones, following the criteria in Table 3, while recognising that the archaeological potential of any zone will relate to particular historical periods and types of evidence. The following factors are considered in assessing archaeological potential:

- The distribution and character of known archaeological remains in the vicinity, based principally on an appraisal of data in the HER;
- The history of archaeological fieldwork and research in the surrounding area, which may give an indication of the reliability and completeness of existing records;
- Environmental factors such as geology, topography and soil quality, which would have influenced land-use in the past and can therefore be used to predict the distribution of archaeological remains;

- Land-use factors affecting the survival of archaeological remains, such as ploughing or commercial forestry planting; and
- Factors affecting the visibility of archaeological remains, which may relate to both environment and land-use, such as soils and geology (which may be more or less conducive to formation of cropmarks), arable cultivation (which has potential to show cropmarks and create surface artefact scatters), vegetation, which can conceal upstanding features, and superficial deposits such as peat and alluvium which can mask archaeological features.

**Table 3: Archaeological potential**

Potential	Definition
High	Undiscovered heritage assets are almost certainly present, and these are likely to include assets of high or medium importance.
Medium	Undiscovered heritage assets are likely to be present, and it is possible, though unlikely, that these may include assets of high or medium importance.
Low	The study area may contain undiscovered heritage assets, but these are unlikely to be numerous and are highly unlikely to include assets of high or medium importance.
Negligible	The study area is highly unlikely to contain undiscovered heritage assets of any level of importance.
Nil	There is no possibility of undiscovered heritage assets existing within the study area.

## 4 RESULTS

### 4.1 Overview of the historic environment

#### *Previous investigations*

The HER records one previous survey as having taken place within the ISA. The Inner Moray Firth Coastal Survey (EHG459, Figure 1) was undertaken in 1998 as part of a wider survey of Scotland's coast commissioned by Historic Scotland. Five surveys in the OSA recorded in the HER all took place on the eastern edge of Cromarty (Figure 4). All five were undertaken as part of the Cromarty Medieval Burgh Community Archaeology Project and were prompted by the exposure of a number of archaeological deposits along the shoreline following winter storms in 2012. They comprise an archaeological evaluation (EHG3927), geophysical survey (EHG4160) and three phases of survey, test pitting and open area excavation (EHG4599, EHG5232, EHG5233).

#### *Geology and geomorphology*

As described in the Scoping Report, *"the site of the port is comprised of made ground, with intertidal and estuarine littoral rocks and sediments to the north, and agricultural improved grasslands comprising [the] 'Hill of Nigg' to the east. Hinterland consists of extensive coniferous woodlands of the Balnagowan Estates north-west of the enclosed estuary. Underlying geology is of weak red, brown sandstone overlain with coarse/medium sands and fine silts."*

#### *Prehistoric Period*

There are no known prehistoric deposits within the ISA.

In the OSA, the HER records two cropmarks comprising a circular enclosure (MHG8387, Figure 4) and a round barrow (MHG8619, Figure 4) near Pitcalzean. Neither has been dated, but their morphology suggests a prehistoric date. In the early twentieth century, several prehistoric burials were apparently discovered at

Balnabruaich (MHG8825, Figure 4, documentary record only and not assessed as a heritage asset), but no trace of these survives. Middens have also been recorded at Balnapaling (MHG8553 and MHG14287, Figure 4) and Castle Craig (MHG6346, Figure 4). Again, none of them have been dated, but their morphology indicates a prehistoric date.

### ***Medieval Period***

There are no known medieval deposits within the ISA.

The Scheduled Monument of Dunskeath Castle (SM3319, Figure 2), 1km east of the ISA, comprises the remains of a motte (upon which would have stood a timber castle) first recorded as being fortified by King William I in 1179. Despite being used as the site of a Second World War artillery battery, much of the mound and the encircling rampart survive.

In 2012 coastal erosion following a storm revealed substantial medieval and post-medieval deposits along the shoreline on the eastern edge of Cromarty. The Cromarty Medieval Burgh Community Archaeology Project was established in order to investigate and record these deposits (EHG4599, Figure 4). Between 2013 and 2016 surveys and excavations identified remains of buildings, property boundaries, middens and activity areas, and artefacts dating from the thirteenth to the fifteenth centuries. These discoveries revealed the status of Cromarty in the medieval and post-medieval periods as a relatively wealthy cod fishing port.

Further east of Cromarty, two HER entries record possible medieval holy wells on the Sutors of Cromarty (MHG6345 and MHG8554, Figure 4).

### ***Post-medieval and Early Modern Period***

Within the ISA, the remains of Dunskeath House (MHG21540, Figure 1, sometimes known as 'Dunscaith' House) are represented by the servants' quarters and some upstanding boundary walls and gate piers. The house itself was destroyed by fire in 1960, and later demolished, but a country house had stood in this location since the late sixteenth century. The 1<sup>st</sup> Edition OS 6-inch map of 1880 also depicts two buildings within walled fields to the north of Dunskeath House (HA1, Figure 1).

In the OSA, evidence of post-medieval and early modern activity is widespread and is represented by designated and undesignated assets. Designated assets representing the period include the listed buildings within Cromarty Conservation Area, and the estate policies and buildings of the Cromarty House Inventory Garden and Designed Landscape. The HER also records approximately 20 buildings, features and documentary records dating from this period. These include bridges, piers, storehouses and quarries, houses, walls and walled gardens, farmsteads, and crofts.

### ***Wartime Period and Military Activity***

The HER records 26 entries relating to First and Second World War military activity within the OSA. These are confined to the coast and shoreline on either side of the Cromarty Firth and comprise coastal batteries and their ancillary buildings; military camps, Nissen huts and magazines; pillboxes and searchlight batteries, and the remains of an anti-submarine defence established across the narrow Firth. The Canmore Maritime database also records an RAF aircraft which crashed in the Firth in 1944 (Figure 5, 311001).

Although none of these remains are recorded within the ISA, seven HER entries relating to military activity are within 100m of the eastern edge of the ISA. Five of these, comprising a pillbox, a submarine mine depot, remains of a Nissen hut, a water tower and a quay, are in a cluster between the ISA and the B9175 road (Figure 4, unlabelled). Dunskeath House, within the ISA, was also used as a military hospital during the First World War.

## **Maritime Activity**

The Canmore Maritime database records 31 shipwrecks and a crashed aircraft within the OSA (Figure 5). The ships comprise one sixteenth-century, 29 nineteenth century and one twentieth-century loss, and represent a variety of craft including schooners, smacks, yawls, brigs and sloops representative of the type of marine traffic to be found around a port like Cromarty. The aircraft is a Wellington bomber which crashed off Cromarty in 1944 (Figure 5, 311001).

## **4.2 Assessment of heritage significance**

### ***Known heritage assets within the Inner Study Area***

There are no designated cultural heritage assets within the ISA.

There are two undesignated heritage assets within the ISA. Dunskeath House, Nigg Ferry (MHG21540, Figure 1) represents the remains of Dunskeath House. First built in the mid-sixteenth century, the main house was destroyed by fire in the 1960s. The surviving remains comprise servants' quarters, two cottages and a garden building. The servants' quarters survive as upstanding buildings with modern alterations and additions from their conversion into offices for Cromarty Petroleum (Plates 1 and 2). The offices are now closed, and the buildings are unoccupied. Although the range of buildings is still roofed, and largely glazed, they are gradually falling into dereliction. The two cottages and the garden building are in a ruinous condition; the cottages are only partially roofed, and the garden building is roofless (Plate 3). Recorded on the HER and as an example of architecturally unremarkable nineteenth-century estate buildings, the remains of Dunskeath House are considered to be of low importance.

HA1 is the remains of two buildings depicted on historic OS mapping. The southernmost building is upstanding and comprises a roofed and whitewashed unoccupied cottage within a small walled yard (Plate 4). The northernmost has been largely reduced to rubble, with only the south-western corner of a wall surviving (Plate 5). The field walls depicted on the OS map have been almost completely removed by later clearance: only approximately 12m survives to a few courses high on the northern edge of the ISA. HA1 represents the remains of field walls and cottages on the former Dunskeath House estate and is considered to be of low importance.

**Table 4: Heritage assets within the Inner Study Area**

<b>Asset no.</b>	<b>Asset name</b>	<b>Period</b>	<b>Importance</b>
MHG21540	Dunskeath House, Nigg Ferry	Post-medieval to modern	Low
HA1	Balnaping, cottage, outbuilding and walls	Post-medieval to modern	Low

### ***Archaeological potential of the Inner Study Area***

The majority of the ISA has been levelled in preparation for potential future development (Plate 6), with made ground covering much of the ISA. It is considered possible, but unlikely, that archaeological features have survived within the ISA. These are likely to comprise remains of field walls and structures depicted on the 1<sup>st</sup> Edition OS mapping and represented by HA1.

Bathymetric surveys of the seabed within the construction footprint of the proposed East Quay have not identified any features that could represent wrecks. Two anomalies recorded on the survey appear to represent natural features (Figure 5). It is considered that no known or previously unknown wrecks are present within the ISA.

Following the methodology, it is considered that the archaeological potential of the ISA is low.



## ***Heritage assets in the Outer Study Area***

### **Scheduled Monuments**

There is one Scheduled Monument within the OSA. Dunskeath Castle (SM3319, Figure 2) comprises the remains of a twelfth-century motte with enclosing ditches and ramparts. It is 1km east of the ISA and as a Scheduled Monument it is considered to be of High importance. At the time of the site visit, the ditches and ramparts were visible, forming an arc with the cliff along the southern edge (Plate 7).

As well as the Monument's intrinsic value as a potential archaeological resource, setting also contributes to its cultural significance. Located 60m from the northern shore of the Cromarty Firth, the motte was clearly sited to overlook the mouth of the Firth to the south and south-east, as well as to monitor the crossing between Cromarty and Nigg at the Firth's narrowest point to the west and south-west. The maintenance of these open, commanding views is desirable.

**Table 5: Scheduled Monuments included in the assessment**

<b>SM no.</b>	<b>Name</b>	<b>Importance</b>
SM3319	Dunskeath Castle	High

### **Listed Buildings**

There is a total of 193 Listed Buildings (LBs) within 2km. However, 182 of them are within Cromarty Conservation Area (CA), and nine are within Cromarty House Inventory Garden and Designed Landscape (IGDL). They are considered in relation to those assets.

The two remaining LBs within 2km and outside CAs or IGDLs are 1.3km north-east of the ISA and comprise the Category B-listed Pitcalzean House and a Category C-listed Coach House adjacent to it (Figure 2). The buildings are considered to be of Medium and Low importance respectively.

Pitcalzean House, and the associated Coach House, was built in the early nineteenth century, with various additions and alterations made later the same century. It was originally designed to face south, but the later alterations re-focused the house's facade to face west. The house is approached from the north along a straight drive off the main road. This tree-lined avenue terminates at a driveway around the house, which is set amongst enclosed wooded grounds. The house and associated buildings are currently run as a self-catering holiday let and function venue.

**Table 6: Listed Buildings included in the assessment**

<b>LB no.</b>	<b>Name</b>	<b>Importance</b>
LB14049	Pitcalzean House	Medium
LB14050	Pitcalzean House, Coach House	Low

### **Conservation Areas**

Cromarty Conservation Area (CA) encompasses the historic Royal Burgh of Cromarty (Figures 2 and 3) and comprises the seventeenth- and eighteenth-century street plan and townscape. The CA includes 182 LBs within its boundaries (Figure 3, Appendix 4). As these buildings contribute to and share the setting characteristics of the CA, the potential for setting impacts upon the CA as a whole shall be considered.

THC's website entry describing the CA states that;

*“the designation of Cromarty as a Conservation Area reflects the quality of many of its individual buildings and their relationship to each other and to the wider spaces.*

*Its narrow streets are lined with symmetrically fronted houses and cottages, some with sophisticated detailing, such as date and marriage stones and others are quite plain. The earlier houses have steeply pitched roofs, their sharp profiles a reminder that the first quarter of the 18th century experienced a cycle of poor weather. The steep roof relieved both earlier thatch and later slates of excessive rain.*

*Cromarty fishertown lies between Church Street and Shore Street, linked to both by Big Vennel and Gordon's Lane. Randomly sited houses vary from small single storey former fishermen's cottages to two storey houses of the late 18th and early 19th century.”*

#### Inventory Gardens and Designed Landscapes

Cromarty House IGDL (GDL00120) comprises the informally landscaped grounds of Cromarty House (Figures 2 and 3). There are nine Listed Buildings within the IGDL. As their individual settings also relate to, and contribute to, the IGDL's setting they will be considered as part of the IGDL.

The HES listing entry for the IGDL rates it as having ‘outstanding’ historical, architectural, scenic and archaeological value. It also has high value as a work of art, and some nature conservation and horticultural value. On the north-facing slopes south-east of Cromarty, the wooded hillside provides a scenic backdrop to approaches into the harbour, as well as from the northern shore of the Firth. On landward approaches along the A832, the woodlands of the IGDL are a detail in views towards Cromarty (Plate 9).

The present policies and informal landscaping of the IGDL were established in the early nineteenth century and are based on the more formal mid-eighteenth-century designs of James May. The grounds were intended to enhance and complement the appearance of the Category A-listed Cromarty House (LB1818) located on a low bluff overlooking Cromarty. Ornamental lawns were laid out around the house, and woodland walks were laid out through the estate. A long driveway curves round to the House from the south-western Lodge (Category C, LB23616) and a shorter drive leads to the stables (Category A, LB1820) south-east of the house. The house is also linked to the Causeway (the closest road into Cromarty) by a servants' tunnel (Category B, LB1819). Cromarty House is currently private residence, occasionally open for limited guided tours, but the stables have been converted into an arts centre and community space.

The nine Listed Buildings within the IGDL comprise buildings and monuments associated with the estate and its functions (Figure 3). Cromarty House (LB1818) and the stables (LB1820), gardener's house and garden walls (LB23570) are all Category A-listed buildings. The servants' tunnel (LB1819), Cromarty Mains farmhouse (LB1821) and the Old Brewery (LB23568) are Category B-listed, and three Category C-listed buildings comprise an icehouse (LB23564), a Church Hall (LB23569) and the south-west Lodge on Denny Road (LB23616). As well as their architectural, historic and associative interest, these buildings derive varying degrees of cultural significance from their setting within the estate. Together, they contribute to the architectural and scenic value of the IGDL.

Views within the IGDL are often relatively restricted by topography and woodland, giving an enclosed feel to the grounds, and providing a sense of seclusion and privacy. From the ornamental lawns around the house, the views open up and views are available across Cromarty to the Firth beyond. This mixture of secluded woodland walks, glimpsed views and sudden wide vistas is typical of a nineteenth-century designed landscape.

#### Other Designations

There are no World Heritage Sites, Inventory Historic Battlefields or Historic Marine Protected Areas within the OSA.

### Undesignated heritage assets

There are 82 entries recorded on the HER within the OSA. Of these, 12 comprise documentary records and findspots of artefacts and/or archaeological deposits since removed. Three are recorded as void or non-antiquities, and one records a photographic view of Cromarty. None of these 16 entries are considered heritage assets for the purposes of this DBA. A further eight HER entries record shipwrecks also included on the Canmore Maritime database. There is therefore a total of 58 undesignated 'onshore' heritage assets within the OSA included in this assessment (Figure 4, Appendix 2).

These comprise 26 structures relating to military activity and the First and Second World War, as well as nine modern features relating to the oil and fabrication industries carried out on the Cromarty Firth. Sixteen post-medieval HER entries comprise a mix of wells, gate piers, crofts, houses, walled gardens, outbuildings and quarrying remains. One HER entry records the extent of the medieval activity discovered by the Cromarty Medieval Burgh Community Archaeology Project. Six HER entries are recorded as 'undated', although two of these are cropmarks likely to represent prehistoric activity. The remainder comprise two fish traps in the Firth, a wall and a shell midden.

All 58 of the 'onshore' heritage assets recorded in the HER are considered to be of Low importance.

There are 32 entries on the Canmore Maritime database (Figure 5, Appendix 3) recorded within the OSA. These comprise 31 recorded shipwrecks, and the site of an RAF aircraft which crashed in 1944.

Canmore categorises all 31 of the shipwrecks as 'Casualties', which indicates the unverified documentary record of the loss of a vessel, normally assigned to an approximate location or considered 'unlocated'. The location of the crashed aircraft is also uncertain. Therefore, the locations of all 32 entries recorded in Canmore Maritime (and depicted on Figure 5) should be considered arbitrary.

As the location of the RAF aircraft (Figure 5, 311001) is uncertain, it is not known if any remains survive within the OSA. However, if traces of the aircraft do survive, then they would constitute a "Protected Place" under the provisions of the Protection of Military Remains Act 1986. As such, Canmore Maritime entry 311001 should be considered a heritage asset of High importance.

## **5 PREDICTED EFFECTS OF THE DEVELOPMENT**

### **5.1 Construction Impacts**

Dunskeath House (MHG21540) and HA1 will both be subject to direct construction impacts, comprising their complete removal.

This would constitute a significant direct impact.

Due to previous ground clearance activities the ISA is considered to be of low archaeological potential. It is unlikely that the ISA will contain previously unrecorded heritage assets.

### **5.2 Setting Impacts**

#### ***Dunskeath Castle (SM3319)***

The proposed development will be visible from the castle, on lower ground approximately 1km to the west. However, the development will be absorbed into a modern landscape comprising drilling platforms and marine traffic in the Firth, and houses and the existing fabrication yard on land.

The views out over the Firth will remain substantively unaltered by the proposed development, and no significant effects are anticipated.

***Pitcalzean House (LB14049) and Coach House (LB14050)***

The ISA is 1.2km to the south-west, and intervening topography and buildings would screen any views of the proposed development from the house or coach house.

No significant effects are anticipated.

***Cromarty Conservation Area (CA104)***

The proposed development will only be glimpsed from within the heart of the CA as the buildings of the CA largely screen views north over the Firth. It will not be a dominant or obvious feature in views from the northern edge of the CA, along the shoreline, as it will be absorbed into views of the existing quaysides, sheds and the fabrication yard. Where buildings do not screen the views, the existing northward view from the CA is characterised by marine traffic and activity (Plate 8). As an industrial quay, the proposed development (and the shipping that will use it) will reflect and complement this activity.

No significant effects are anticipated.

***Cromarty House IGDL (GDL00120)***

At present the ISA and the sheds of the existing fabrication yard are visible from around Cromarty House, and in glimpsed views along the northern edge of the IGDL. However, the ISA is not a key focus of these views, but rather forms one element of the general view across the Firth and the land- and seascape beyond. Specific views of and towards Nigg and the ISA are not considered to be a key characteristic contributing to the cultural significance of the IGDL.

The proposed development will be visible from certain points within the IGDL, but it will not obstruct or otherwise obscure the wide views out across Cromarty and the landscape beyond. Views from within the IGDL will be of a coastal town and a working marine environment, as they have been since the estate was established.

No significant effects are anticipated.

***Undesignated Heritage Assets***

All 58 of the undesignated heritage assets recorded on the HER and all 32 of the Canmore Maritime entries within the OSA comprise buildings, features and monuments where wider views from and towards them either do not exist or are of limited relevance to understanding or appreciating their cultural significance.

No significant effects are anticipated.

## 6 MITIGATION

Any direct impacts upon standing buildings can be mitigated through a programme of historic building recording (HBR). Potential impacts upon unknown archaeological deposits can be mitigated with a programme of archaeological investigation and recording.

The finer details of the HBR should be agreed with THC, but it is anticipated that it would comprise, as a minimum, a measured photographic survey of the upstanding remains of Dunskeath House (MHG21540) and HA1, accompanied by a report outlining the methodology employed, relevant policy and guidance, and the historical context of the HBR work.

Since there is only a small risk of impacts upon unknown archaeological deposits, it is considered that any programme of archaeological investigation should be limited to archaeological monitoring of construction groundworks. However, as with the HBR, the finer details should be agreed with THC.

## 7 CONCLUSIONS

Significant direct impacts are predicted upon the upstanding remains of Dunskeath House (MHG21540) and the structures associated with it (HA1). In the absence of mitigation, this would constitute the total removal and loss of two heritage assets of Low importance. The ISA is considered to be of low archaeological potential, meaning that the risk of direct impacts upon previously unknown archaeological features or deposits is possible, but unlikely.

However, mitigation (in the form of historic building recording and monitoring of construction groundworks) would ensure that adverse impacts upon MHG21540 and HA1, and potential impacts upon unknown archaeological deposits, are minimised.

No significant setting impacts are predicted upon any designated or undesignated heritage assets in the OSA.

## REFERENCES

### ***Bibliographic references***

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### ***Historic maps - Cartographers***

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James Gordon: *A draught of the Firths of Tayne, Cromartie, & Inverness, wt ye true distances as yey do ly*, 1636-52

George Taylor and Andrew Skinner: *A Plan of the Cross Roads in the Shires of Ross and Cromartie*, 1776

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### ***Historic Maps - Ordnance Survey***

*Ross-shire & Cromartyshire (Mainland), Sheet LXVII (with inset of sheet LXXIX) (includes: Cromarty; Nigg)*, 6-inch, 1880

*Ross and Cromarty Sheet LXVII (includes: Cromarty; Nigg)*, 6-inch, 1904

*Ross and Cromarty Sheet LXVII (includes: Cromarty; Nigg)*, 6-inch, 1938

*Ross-shire and Cromartyshire LXVII.5 (Combined)*, 25-inch, 1894

*Ross-shire and Cromartyshire LXVII.5 (Cromarty; Nigg)*, 25-inch, 1904

*War Office, GSGS 3906 32/88 N.W.*, 1:25000, 1940

## APPENDICES

### Appendix 1: Gazetteer of Cultural Heritage Assets within the Inner Study Area

Asset no.	Asset name	Period	Description
MHG21540	Dunskeath House, Nigg Ferry	Post-medieval to modern	<p>“Surviving section of Dunskeath House. The main section would appear to have been demolished.</p> <p>The remaining building has had new window frames installed.</p> <p>At NH 79546 68889 are Cottages Nos. 1 and 2.</p> <p>At NH 79566 68957 is an unroofed structure with pointed arched windows, possibly a mausoleum or garden house.” – Canmore entry</p>
HA1	Balnapaling, cottage, outbuilding and walls	Post-medieval to modern	Structures recorded on the 1 <sup>st</sup> Edition OS map (1880) and subsequent mapping. The cottage survives as a whitewashed and relatively well -maintained roofed and glazed building within a small walled yard. The outbuilding and field walls are ruinous and partially buried with material from ground clearance.

### Appendix 2: Undesignated assets in the OSA

(NB: For ease of reference and clarity, only assets mentioned in the text are labelled on Figure 4)

HER Ref	Name	Type	Easting	Northing
MHG6345	St. Mary's Well, Cromarty	Holy Well	280500	867230
MHG8372	Battery, Dunskeath Castle	Battery	280533	869020
MHG8387	Lower Pitcalzean	Circular Enclosure	280000	870800
MHG8553	Midden, Balnapaling	Shell Midden	280480	871000
MHG8554	Fiddler's Well	Holy Well	280750	869010
MHG8556	Battery, North Sutor	Battery	281200	867330
MHG8619	Round Barrow, Pitcalzean	ROUND BARROW	279900	869000
MHG8790	Nigg Pier	Pier	279610	870800
MHG8793	Nigg Ferry	Storehouse	279680	867500
MHG14296	Mount Canisp	Fish Trap	279120	868000
MHG21907	Rosenberg, Cromarty	House	278664	869444
MHG21908	Outbuilding, Rosenberg, Cromarty	Building	278639	869324
MHG21909	Walled Garden, Rosenberg, Cromarty	Walled Garden	278685	868820
MHG21910	United Free Manse, Denny Road, Cromarty	Manse	278605	867800
MHG29384	Cromarty Sutors	Quarry	280700	868686
MHG29918	Cromarty, Fish Trap	FISH TRAP	278300	868760

HER Ref	Name	Type	Easting	Northing
MHG30240	Cromarty, Rifle Range	FIRING RANGE; RIFLE BUTTS	280200	867270
MHG30325	Pillbox, Nigg Ferry	Pillbox	279654	868970
MHG30326	Ww2 Defences, Nigg Pier	Military Installation	279600	868690
MHG30327	Submarine Mine Depot, Nigg	Submarine Mine Depot; Trade School	279641	869000
MHG30333	Cromarty, Boom	MILITARY INSTALLATION	280000	867220
MHG31299	Nigg Oil Terminal	Oil Fuel Berth	279208	868830
MHG31300	Nigg Fabrication Yard	Marine Construction Site; Dock	279118	867400
MHG33861	Cromarty	STOREHOUSE	278600	868000
MHG34269	South Sutor	Barracks	280046	867523
MHG35178	Gun Emplacememtns - Coastal Battery, North Sutor	Gun Emplacement	281269	866909
MHG36168	Nigg Ferry	Pillbox	279630	867400
MHG36173	Gun Emplacements - South Sutor, Coastal Battery	Coastal Battery; Gun Emplacement	280850	867230
MHG36209	Battery, Nigg	Battery	280310	869000
MHG36385	Nigg Pier	Pier	279600	867330
MHG36386	Cromarty, Rifle Range	Firing Range	279640	868000
MHG36395	South Sutor, Xdo Post	Extended Defence Officer Post	280700	868000
MHG36400	Nigg-Cromarty Anti-Submarine Boom	Anti-Submarine Defence	280200	868000
MHG41972	Seabank House, Garden Wall & Gatepiers, 49 Shore Street, Cromarty	Walled Garden	279018	869870
MHG42008	Lodge To Cromarty House & Gate Piers, Denny Road, Cromarty	Gate Pier	278652	868700
MHG45943	Nigg Ferry, Oil Platform Fabrication Yard	Site; Platform Fabrication Yard	279000	867400
MHG46240	Cromarty	SITE/Event	278450	867800
MHG50582	Cromarty	SLIPWAY	278600	869460
MHG50587	Cromarty	MOORING STAGE	278400	869655
MHG50764	Nigg	SITE; MARINE ENGINEERING WORKS	279140	867270
MHG50766	Nigg Oil Terminal	Site; Fuel Depot	279126	868790
MHG50845	Sutors Of Cromarty, Cromarty	Bridge	280000	868980
MHG50993	Nigg Ferry; Cromarty Firth	Quay	279650	868800



HER Ref	Name	Type	Easting	Northing
MHG50994	Nigg Ferry; Cromarty Firth	Quarry	280400	870000
MHG51002	Nigg; Cromarty Firth	Wall	279800	867259
MHG51018	Tarrel Burn; Moray Firth	Building	280000	870419
MHG51786	Medieval And Post- Medieval Settlement - Cromarty	SETTLEMENT	279410	868986
MHG52793	Croft-Nigg	Croft	281005	870660
MHG52971	Magazine, Submarine Mine Depot, Nigg	Magazine; Blast Wall	279635	869170
MHG52972	Water Tower, Submarine Mine Depot, Nigg	Water Tower	279674	868898
MHG52973	Concrete Hut Bases, Submarine Mine Depot, Nigg	Hard Standing; Nissen Hut?	279594	868899
MHG59094	Engine House - Coast Battery, North Sutor	Battery Engine House	281238	868740
MHG59145	Boom Anchor - Cromarty Defences, South Sutor	Boom Defence	280777	867345
MHG59147	Searchlight Battery - Coast Battery, South Sutor	Searchlight Battery	280821	867302
MHG59148	Military Camp - Coast Battery, South Sutor	Military Camp	280836	867268
MHG59149	Engine House - Coast Battery, South Sutor	Battery Engine House; Structure	280846	867263
MHG59168	Minefield - Cromarty Firth	Minefield	281000	868000
MHG59170	Searchlight Battery - Coast Battery, North Sutor	Searchlight Battery	281132	868681

### Appendix 3: Entries in the Canmore Maritime Database within the OSA

NB: The term 'Cas' (casualty) indicates the unverified documentary record of the loss of a vessel, normally assigned to an approximate location or considered 'unlocated'. All Maritime records are labelled.

Canmore ID	Name	Classification	Easting	Northing
209348	Angelica: West Sutor Head, Inner Moray Firth	Craft (19th Century), Cromarty Firth, Firth of Cromarty, Sutors Of Cromarty, North Sea, Angelica, Cas	280000	868000
252480	Ann: Cromarty, Cromarty Firth	Yawl (19th Century), Firth of Cromarty, Ann, Cas	278000	868000
326898	Atlas	Brig, Cas	279000	868000
283438	Bella: Cromarty, Cromarty Firth	Sloop (19th Century), Black Isle, Firth of Cromarty, Cas	278000	868000
310995	Diana: Cromarty, Cromarty Firth	Sloop (19th Century), 'off Cromartie', Black Isle, Firth of Cromarty, Diana, Cas	278000	868000
209724	Elizabeth Buchan: Cromarty Roads, Cromarty Firth	Sloop (20th Century), Cromarty Roadstead, Firth of Cromarty, Black Isle, Elizabeth Buchan, Cas	278000	868000

Canmore ID	Name	Classification	Easting	Northing
283646	Elizabeth: Cromarty, Cromarty Firth	Brig (19th Century), Black Isle, Firth of Cromarty, Cas	278000	868000
114882	Elizabeth: North Sutor, Cromarty Firth	Schooner (19th Century), Sutors Of Cromarty, Suturs Of Cromarty, Firth of Cromarty, Inner Moray Firth, Elizabeth, Cas	281400	868600
285335	Express: Cromarty Firth	Smack (19th Century), 'near Cromarty', Firth of Cromarty, Black Isle, Express, Cas	278000	868000
284580	Fair Kathleen: North Sutor, Cromarty Firth	Barque (19th Century), Inner Moray Firth, Firth of Cromarty, Sutors Of Cromarty, 'on The Point Of [the] North Sutter', Fair Kathleen, Cas	281500	868500
326514	Fraemaeltus	Schooner, Cas	279000	868000
283162	Garland: Nigg Pier, Cromarty Firth	Schooner (19th Century), 'on The North Side Of The Ferry', Firth of Cromarty, Cas	279000	868000
286331	Ionian: Cromarty Roads, Cromarty Firth	Ship (19th Century), Cromarty Roadstead, Firth of Cromarty, Black Isle, Cas	278000	868000
283484	Janette: Cromarty, Cromarty Firth	Craft (19th Century), Black Isle, Firth of Cromarty, Cas	278000	868000
275975	John And Mary: Cromarty, Cromarty Firth	Smack (19th Century), John And Mary, 'on A Beach Near Cromarty', Firth of Cromarty, Black Isle, Cas	278000	868000
310998	Lady Lovat: Cromarty, Cromarty Firth	Craft (19th Century), 'near Cromarty', Black Isle, Firth of Cromarty, Lady Lovat, Cas	278000	868000
297797	Laura: Cromarty Roads, Cromarty Firth	Schooner (19th Century), Cromarty Roadstead, Firth of Cromarty, Black Isle, Cas	278000	868000
285336	Lifeboat: Cromarty Firth	Schooner (19th Century), 'near Cromarty', Firth of Cromarty, Black Isle, Lifeboat, Cas	278000	868000
209576	Lookout: Cromarty Firth	Lugger (19th Century), 'off Nigg Pier', Firth of Cromarty, Lookout, Cas	279000	868000
324867	No Name	Ferry, Cas	279560	868010
311000	Praemaeltus: Cromarty, Cromarty Firth	Schooner (19th Century), Black Isle, Firth of Cromarty, Cas	278000	868000
209570	Primus: Cromarty, Cromarty Firth	Barque (19th Century), Firth of Cromarty, Black Isle, Primus, Cas	278000	868000
283129	Robert: Nigg, Cromarty Firth	Brig (19th Century), 'on The North Side Of The Ferry At Cromarty', Firth of Cromarty, Robert, Cas	279000	868000
286332	Snowdrop: Cromarty Roads, Cromarty Firth	Schooner (19th Century), Cromarty Roadstead, Firth of Cromarty, Black Isle, 'near Inverness', Snowdrop, Cas	278000	868000
310994	Union: Cromarty, Cromarty Firth	Sloop (19th Century), Black Isle, Firth of Cromarty, Union, Cas	278000	868000
297400	Union: Cromarty, Cromarty Firth	Schooner (19th Century), Black Isle, Firth of Cromarty, Union, Cas	278000	868000
297417	Unknown: Cromarty, Cromarty Firth	Skiff (19th Century), Black Isle, Firth of Cromarty, North Sea, Cas	278000	868000

Canmore ID	Name	Classification	Easting	Northing
310999	Unknown: Cromarty, Cromarty Firth	Craft (16th Century), Burntisland, Black Isle, Firth of Cromarty, Unknown 1597, Cas	278000	868000
310923	Unknown: Inner Moray Firth	Ferry (19th Century), '0.5 Mile North Of East Cromarty', Cromarty Firth, Firth of Cromarty, Cas	279000	868000
284012	Unknown: Nigg Pier, Cromarty Firth	Smack (19th Century), 'on The North Side Of The Ferry', Firth of Cromarty, Cas	279000	868000
310878	Unknown: North Sutor, Cromarty Firth	Craft (19th Century), 'on North Souter, Cromarty', Firth of Cromarty, Sutors Of Cromarty, Cas	281500	868500
311001	Vickers Wellington: Inner Moray Firth	Aircraft (20th Century), Df 604, 'near Cromarty', Cromarty Firth, Firth of Cromarty, North Sea, A/c Vickers	279000	868000

#### Appendix 4: Listed Buildings within Cromarty CA

Ref	Designation Title	Category	Easting	Northing
LB23585	Cromarty Court House Museum Including Prison, Gatepiers, Boundary Wall And Railings, Church Street, Cromarty	A	278977	867390
LB23587	Church Street, Miller House	A	278996	867390
LB23588	Church Street, Hugh Miller's Cottage	A	278999	867381
LB23595	Church Street, East Parish Church	A	279095	867267
LB23680	George Street, Lighthouse And Lighthouse Keeper's House	A	278670	867735
LB23695	Cromarty, High Street Townlands Barn	A	278739	867457
LB23700	Cromarty Harbour	A	278540	867723
LB23526	3 Allan Square	B	278680	867567
LB23528	Allan Square Bank Cottage, Gatepiers	B	278659	867578
LB23531	12 Allan Square	B	278660	867527
LB23532	10 Allan Square Ivydene	B	278670	867536
LB23535	Bank Street, Mount Eagle	B	278764	867510
LB23536	Bank Street, Ardyne	B	278723	867564
LB23537	Bank Street, Allanbank House, And 1 Barkly Street	B	278715	867568
LB23538	27 Bank Street, Beach Brae	B	278688	867598
LB23539	29 Bank Street	B	278682	867611
LB23541	Bank Street, The Old Bank House	B	278671	867593
LB23543	16 And 18 Bank Street	B	278720	867531
LB23549	2 Barkly Street	B	278720	867583
LB23550	4 Barkly Street	B	278728	867593
LB23552	1 Braehead	B	278883	867538

Ref	Designation Title	Category	Easting	Northing
LB23553	2 Braehead	B	278854	867554
LB23554	3 Braehead	B	278860	867558
LB23559	Braehead Primary School And School House	B	278802	867605
LB23560	Braehead, Servants' House To Barkly House	B	278758	867664
LB23561	Braehead, Barkly House	B	278746	867678
LB23562	Braehead, Alvara And Speybank Villa	B	278726	867689
LB23565	Burnside Place, Burnside	B	279133	867282
LB23566	Burnside Place, Farndale	B	279153	867303
LB23567	Burnside Place, Burnside Cottage	B	279196	867322
LB23571	The Causeway, The Kennels	B	279328	867225
LB23572	The Causeway, Clunes Cottage	B	279334	867241
LB23573	The Causeway, Clunes House	B	279333	867278
LB23574	5 Church Street	B	278896	867486
LB23575	7 Church Street	B	278899	867478
LB23576	9 Church Street	B	278911	867474
LB23586	Church Street, Mercat Cross (Within Grounds Of Courthouse)	B	278984	867397
LB23589	Church Street Bellevue	B	279019	867349
LB23590	Church Street, The Retreat	B	279049	867343
LB23591	Church Street, Wellington House	B	279046	867319
LB23592	47 Church Street, Albion House	B	279069	867322
LB23593	49 Church Street	B	279076	867310
LB23594	51 Church Street, Buzancy	B	279088	867292
LB23596	Church Street East Parish Churchyard And Churchyard Walls	B	279104	867260
LB23598	62 Church Street	B	279096	867324
LB23600	Church Street, St Anne's	B	279087	867348
LB23604	24 Church Street	B	278942	867467
LB23605	22 Church Street	B	278940	867474
LB23618	1 And 5 Duke Street	B	278683	867622
LB23619	7 Duke Street	B	278691	867623
LB23620	9 Duke Street, York House	B	278704	867639
LB23621	11 Duke Street	B	278707	867642
LB23622	13 Duke Street	B	278718	867645
LB23623	18 Duke Street	B	278722	867681

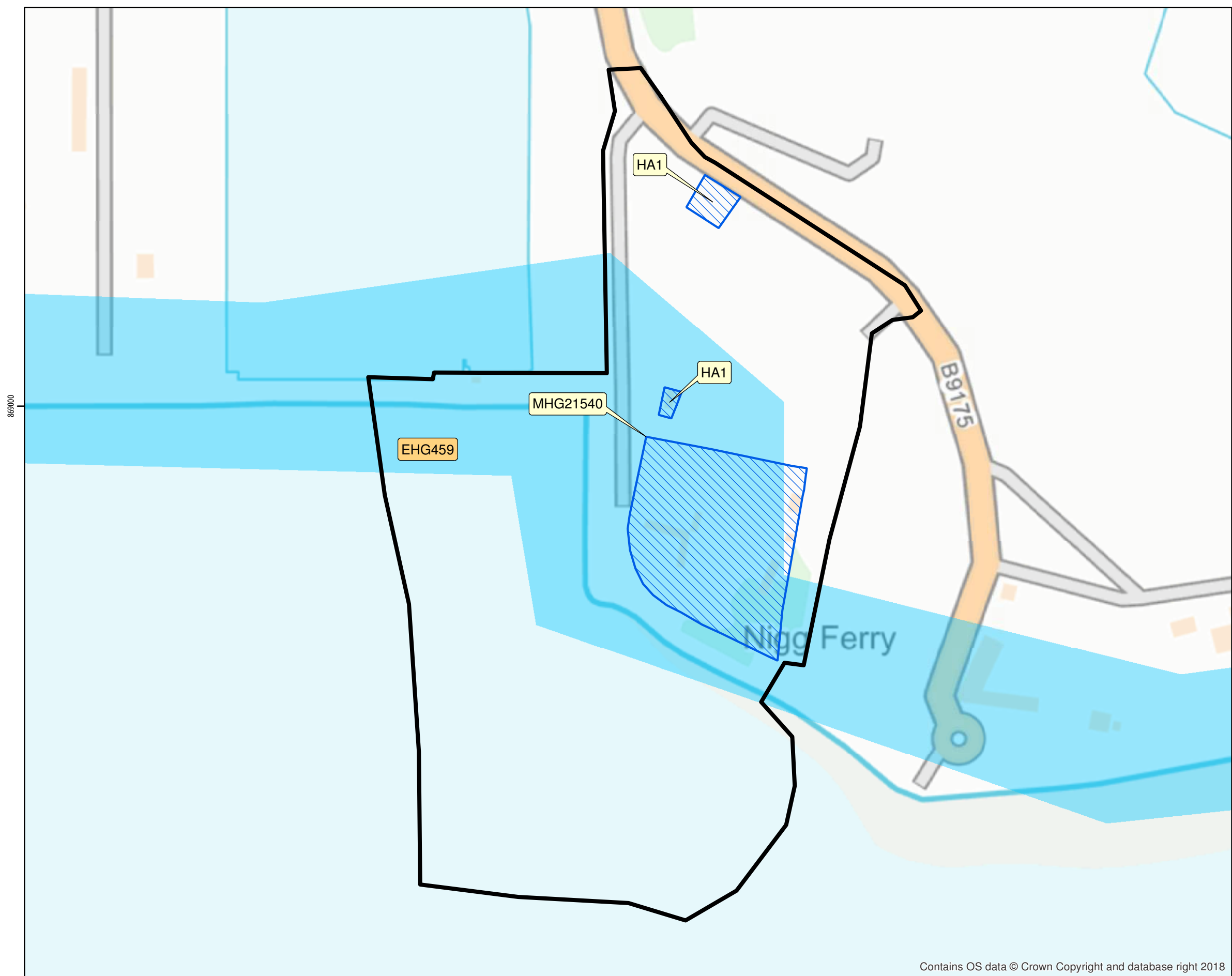
Ref	Designation Title	Category	Easting	Northing
LB23624	15 Duke Street (The Haven)	B	278715	867675
LB23625	14 Duke Street	B	278705	867666
LB23626	12 Duke Street	B	278695	867657
LB23627	8 Duke Street	B	278680	867644
LB23628	6 Duke Street	B	278671	867637
LB23629	2 Duke Street (And Bank Street) Kintail Cottage	B	278664	867631
LB23635	Fishertown, 66 Big Vennel	B	279043	867384
LB23640	Fishertown 34 Gordon's Lane	B	278990	867476
LB23644	Fishertown, 35 Gordon's Lane	B	278999	867472
LB23645	Fishertown, Russell House 55 Gordon's Lane	B	279014	867471
LB23667	Fishertown, Shore Street Seabank House, Garden Walls And Gatepiers	B	278984	867498
LB23671	Fishertown, 99 Shore Street	B	279143	867354
LB23672	1 Forsyth Place (Gable And Shop Entrance To Church Street)	B	278892	867509
LB23675	14 Forsyth Place	B	278930	867511
LB23676	George Street, Frith View	B	278652	867668
LB23677	George Street, The Cliff	B	278647	867663
LB23678	George Street, Mary Ness	B	278658	867680
LB23679	George Street, Reay House	B	278684	867714
LB23681	High Street, Forsyth House (Former Manse) Gates And Gatepiers	B	278844	867534
LB23686	23 High Street	B	278757	867488
LB23687	25 And 27 High Street	B	278748	867484
LB23688	Roseville, 29 High Street	B	278731	867479
LB23689	37 High Street (Off High Street)	B	278711	867489
LB23690	High Street, Laurel House	B	278698	867476
LB23693	High Street "Fuinary"	B	278605	867392
LB23696	High Street, Bank Of Scotland	B	278772	867471
LB23699	2 And 4 High Street	B	278865	867498
LB23702	Marine Terrace, Hemp Works	B	278582	867527
LB23705	The Paye, Paye House (Corner The Paye And Church Street	B	279006	867372
LB23706	The Paye, Gaelic Chapel Graveyard And Graveyard Wall	B	278836	867283
LB23707	The Paye, Hugh Miller Monument	B	278883	867342
LB23708	High Street/Forsyth Place, K6 Telephone Kiosk	B	278866	867517

Ref	Designation Title	Category	Easting	Northing
LB23525	1 Allan Square And Bank Street, Lusaka	C	278688	867576
LB23527	Allan Square And Bank Street, Sandstones	C	278682	867585
LB23529	Allan Square, Bank Cottage	C	278658	867586
LB23530	5 Allan Square	C	278651	867593
LB23533	6 And 8 Allan Square	C	278679	867544
LB23534	2 And 4 Allan Street	C	278687	867552
LB23540	33 Bank Street	C	278647	867651
LB23542	20 Bank Street	C	278713	867545
LB23544	14 Bank Street	C	278727	867530
LB23545	8, 10 And 12 Bank Street	C	278733	867521
LB23546	4 And 6 Bank Street	C	278749	867502
LB23547	Barkly Street, Fire Station	C	278721	867608
LB23548	3 And 3a Barkly Street	C	278717	867600
LB23551	6 And 8 Barkly Street, The Moorings	C	278744	867608
LB23555	5 Braehead	C	278856	867563
LB23556	7 Braehead	C	278847	867568
LB23557	8 Braehead	C	278840	867574
LB23558	9 Braehead	C	278832	867585
LB23563	Braehead, Braehead Cottage	C	278872	867571
LB23564	Braehead, Icehouse	C	278881	867560
LB23577	11 Church Street	C	278918	867468
LB23578	13 And 15 Church Street	C	278929	867457
LB23579	19 Church Street	C	278931	867452
LB23580	21 Church Street	C	278939	867444
LB23581	Church Street, St Regulus' Episcopal Church	C	278942	867426
LB23582	Church Street Hugh Miller Institute	C	278952	867412
LB23583	Church Street, Drinking Fountain In Garden In Front Of Hugh Miller Institute	C	278962	867425
LB23584	Church Street, Braefoot	C	278965	867400
LB23597	50 Church Street, The Cobbles	C	279097	867317
LB23599	60 Church Street	C	279089	867328
LB23601	Church Street, Lydia Cottage	C	279023	867389
LB23602	Church Street, Arms Cottage	C	279007	867399
LB23603	Church Street, Cromarty Arms	C	279002	867405

Ref	Designation Title	Category	Easting	Northing
LB23606	18 Church Street, Victoria House	C	278929	867483
LB23607	16 Church Street, Struy House	C	278920	867485
LB23608	14 Church Street	C	278912	867491
LB23609	10 Church Street	C	278909	867494
LB23610	2 Church Street	C	278899	867505
LB23611	Denny Road, Hadley	C	278663	867360
LB23612	2 Denny Road	C	278669	867350
LB23613	3 Denny Road (D Mcclean)	C	278675	867339
LB23614	13 Denny Road (Miss Cameron)	C	278680	867329
LB23615	15 Denny Road	C	278682	867318
LB23617	1914-1918 And 1939-45 War Memorial, Off Denny Road	C	278759	867283
LB23630	Fishertown, Big Vennel The Creel	C	279031	867395
LB23631	Fishertown, 67 Big Vennel	C	279039	867400
LB23632	Fishertown, 81 Big Vennel	C	279063	867426
LB23633	Fishertown, 78 Big Vennel	C	279072	867415
LB23634	Fishertown, 70 Big Vennel	C	279064	867390
LB23636	Fishertown, 27 Gordon's Lane	C	278962	867464
LB23637	Fishertown, 28/29 Gordon's Lane	C	278969	867462
LB23638	Fishertown, 31 Gordon's Lane	C	278980	867460
LB23639	Fishertown, 32 Gordon's Lane	C	278985	867458
LB23641	Fishertown, 36 Gordon's Lane	C	278994	867487
LB23642	Fishertown 38 Gordon's Lane ("Shoreline")	C	279001	867498
LB23643	Fishertown, 39 Gordon's Lane	C	279007	867491
LB23646	Fishertown, 58 Gordon's Lane	C	279006	867454
LB23647	Fishertown, 59 Gordon's Lane	C	279013	867448
LB23648	Fishertown, 60 Gordon's Lane	C	279020	867444
LB23649	Fishertown, 62 Gordon's Lane	C	279030	867447
LB23650	Fishertown 63 Gordon's Lane	C	279038	867445
LB23651	Fishertown, 65 Gordon's Lane	C	279032	867429
LB23652	Fishertown, 64 Gordon's Lane	C	279047	867454
LB23653	Fishertown, 86 Little Vennel	C	279060	867376
LB23654	Fishertown, 87 Little Vennel	C	279066	867380
LB23655	Fishertown, 88 Little Vennel	C	279071	867383

Ref	Designation Title	Category	Easting	Northing
LB23656	Fishertown, 89 Little Vennel	C	279078	867388
LB23657	Fishertown, 93 Little Vennel	C	279097	867405
LB23658	Fishertown, 92 Little Vennel	C	279105	867394
LB23659	Fishertown, 45 Seabank (Off Shore Street)	C	278965	867504
LB23660	Fishertown, 46 Seabank (Off Shore Street)	C	278962	867498
LB23661	Fishertown, 47 Seabank	C	278987	867483
LB23662	Fishertown, 49 Seabank (Now In Grounds Of Seabank House)	C	278977	867481
LB23663	Fishertown, 4 Shore Street	C	278922	867536
LB23664	Fishertown, 6 Shore Street	C	278931	867531
LB23665	Fishertown, Shore Street Stornoway House	C	278942	867530
LB23666	Fishertown, Shore Street Moonfleet	C	278973	867511
LB23668	Fishertown, Adjoining Russell House: In Shore Street	C	279017	867478
LB23669	Fishertown, 56 Shore Street	C	279030	867467
LB23670	Fishertown, Shore Street Weatherglass House	C	279059	867435
LB23673	2 Forsyth Place	C	278901	867518
LB23674	3 Forsyth Place	C	278906	867522
LB23682	3 And 5 High Street	C	278824	867505
LB23683	7 And 9 High Street	C	278818	867503
LB23684	11 And 13 High Street	C	278808	867500
LB23685	19 And 21 High Street	C	278774	867493
LB23691	High Street, Denoon Villa (Corner High Street/Denoon Place)	C	278660	867471
LB23692	High Street, "Rurki"	C	278601	867423
LB23694	High Street "Mizpah"	C	278621	867407
LB23697	12 High Street, Sidney House	C	278817	867487
LB23698	8 And 10 High Street	C	278832	867490
LB23701	Marine Terrace, The Royal Hotel	C	278598	867646
LB23703	1 Miller Lane	C	279018	867406
LB23704	5 And 6 Miller Lane	C	279043	867435
LB23709	Fishermen's Bothy Forsyth Place	C	278931	867588
LB52384	Victoria Hall Excluding Flat-Roofed Rendered Extensions To Southwest And Southeast, High Street, Cromarty	C	278720	867440





**KEY**

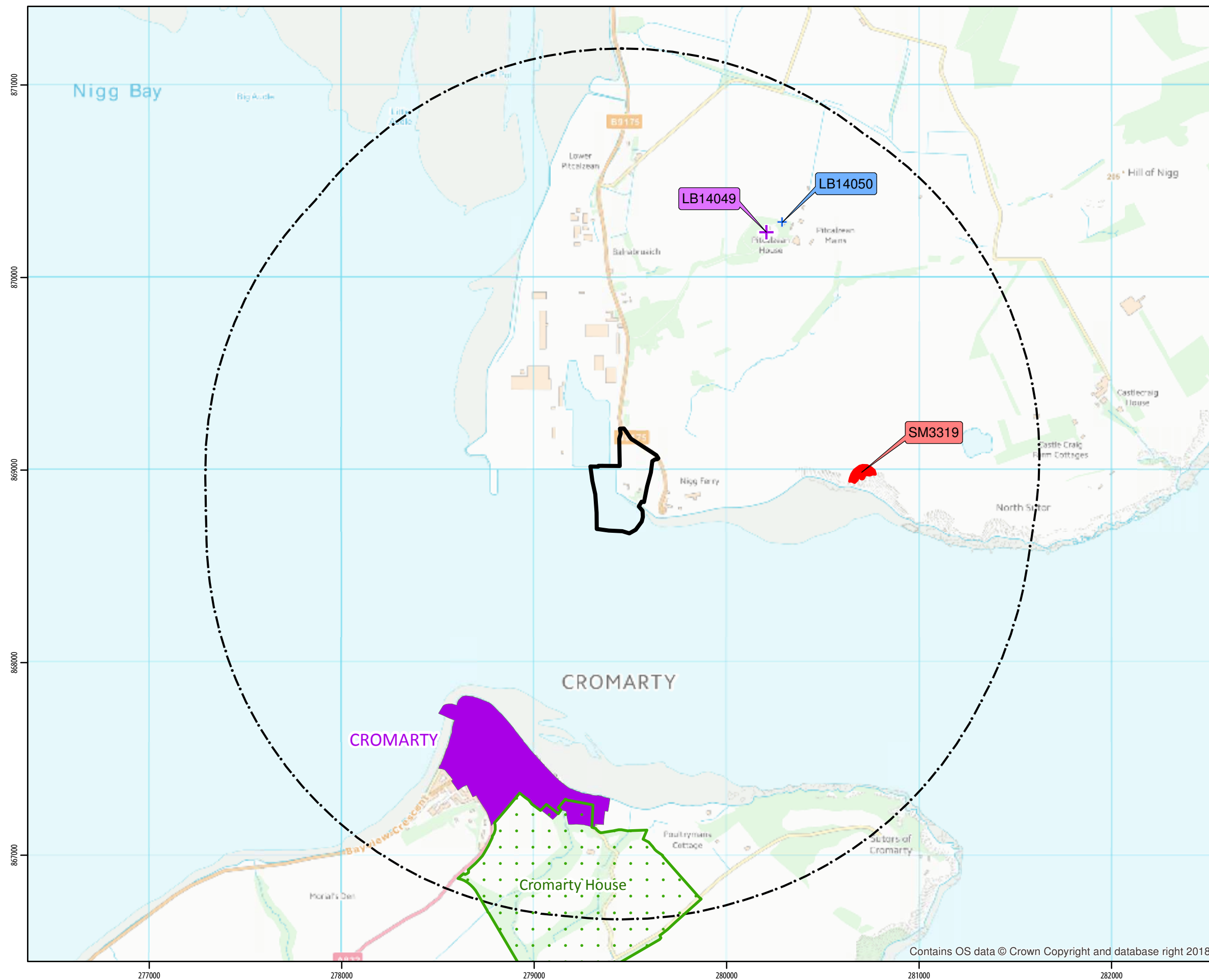
- Heritage Asset
- HER Event Record
- Inner Study Area

Non-designated heritage asset information  
derived from NRHE data via Pastmap website  
dated 2019 and from Highland Council HER data  
received 4/3/19.  
© Crown Copyright

1:2,500 @ A3  
0 15 30 60 m



**Figure 1**  
Heritage Assets within  
Inner Study Area



**KEY**

- Scheduled Monument
- + Category B Listed Building
- + Category C Listed Building
- Inventory Garden and Designed Landscape
- Conservation Area
- Inner Study Area

Designations area information  
derived from HES data downloaded 4/3/19.  
© Crown Copyright

1:20,000 @ A3  
0 125 250 500 m



**Figure 2**  
Designated Heritage Assets  
within Outer Study Area

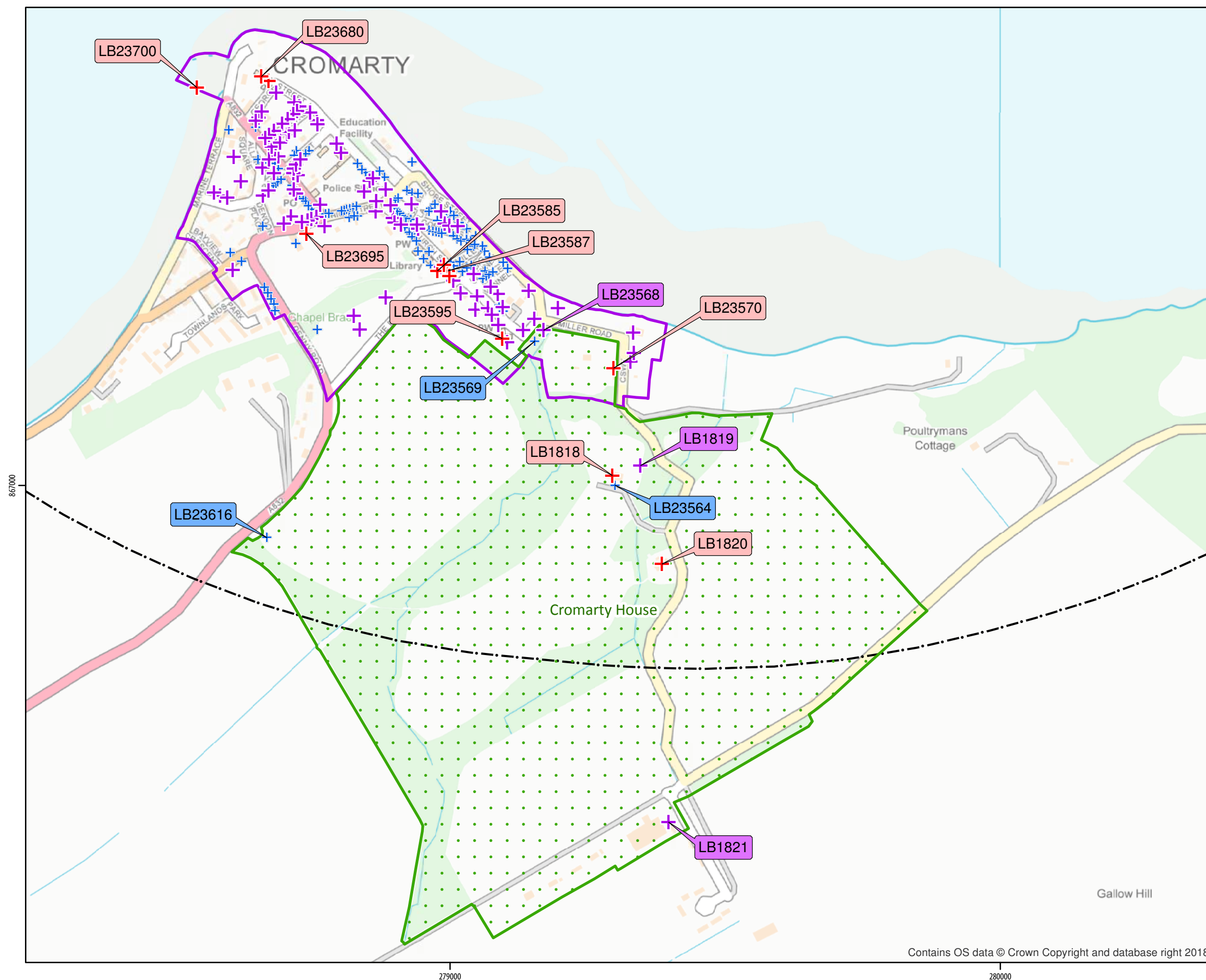
KEY

- + Category A Listed Building
- + Category B Listed Building
- + Category C Listed Building
- Inventory Garden and Designed Landscape
- Conservation Area

Designations area information  
derived from HES data downloaded 4/3/19.  
© Crown Copyright

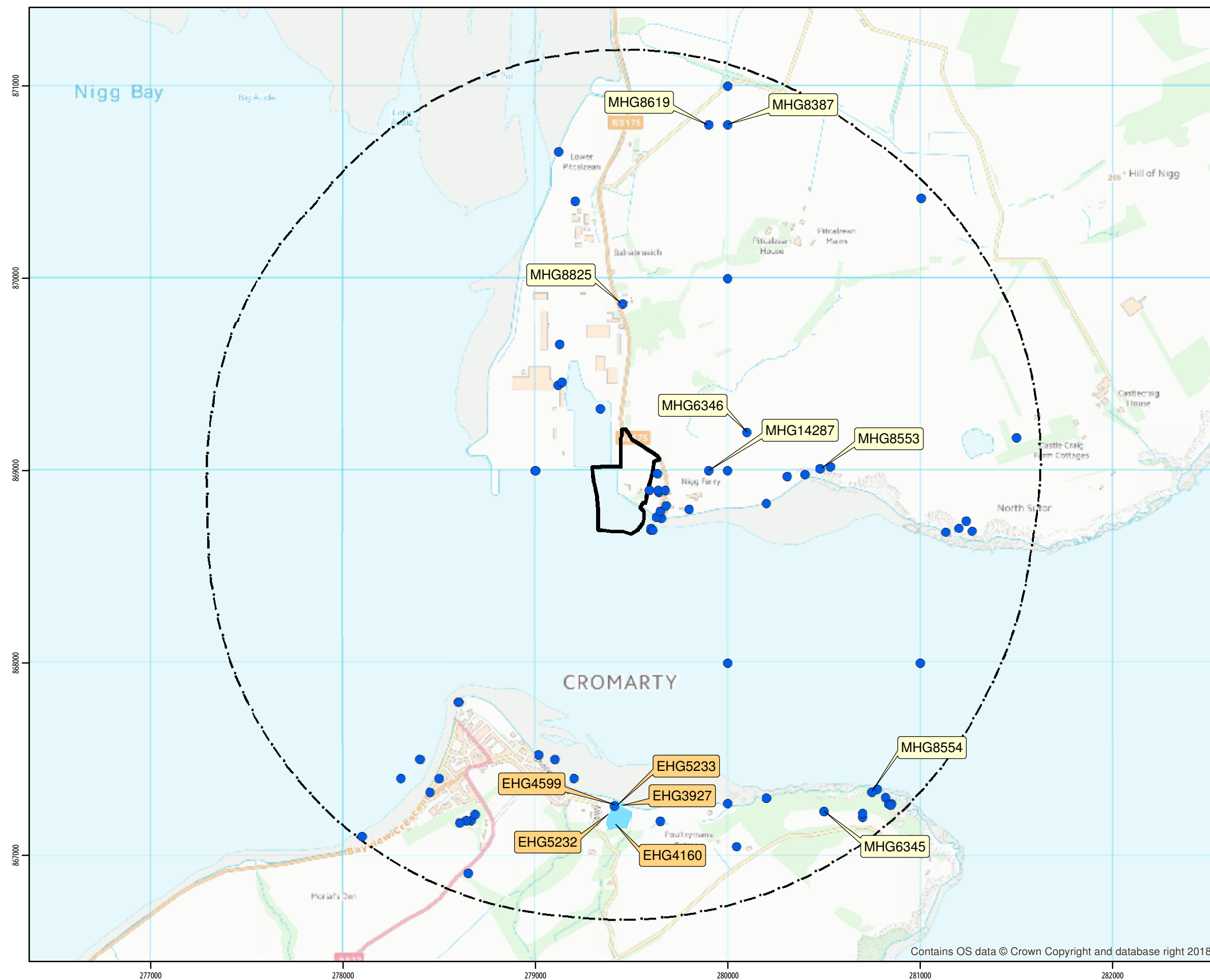
1:7,000 @ A3

0 40 80 160 m



Contains OS data © Crown Copyright and database right 2018

**Figure 3**  
Listed Buildings within Cromarty CA  
and Cromarty House IGDL



**KEY**

- HER Entry
- HER Event Record
- ▭ Inner Study Area
- 2km Radius

Heritage Asset area information  
from HER data received 4/3/19.  
© Crown Copyright

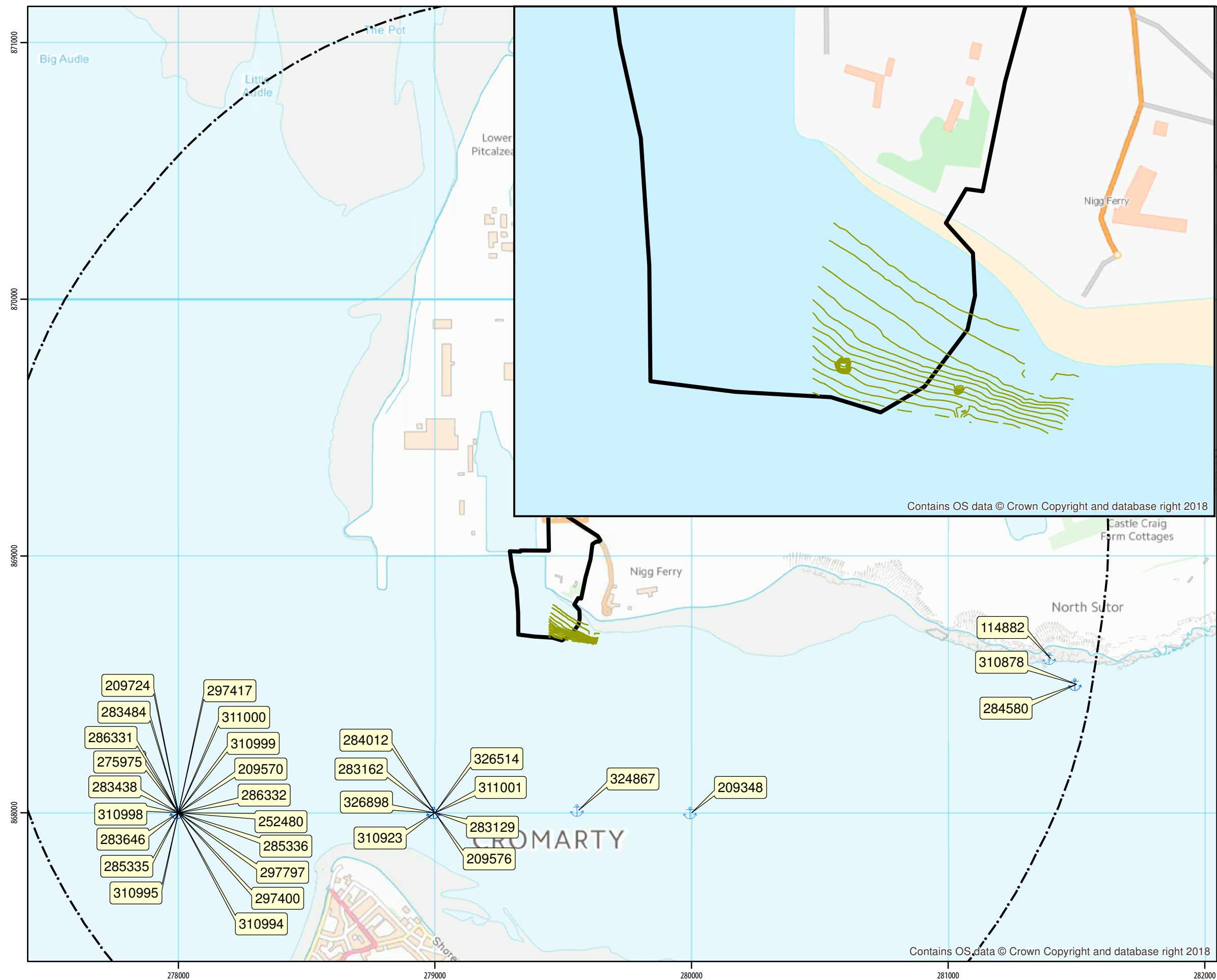
1:20,000 @ A3

0 125 250 500 m







**Figure 4**  
Undesignated Heritage Assets  
within Outer Study Area





**KEY**

-  Canmore Maritime Entry
-  Bathymetric Survey
-  2km Radius
-  Inner Study Area

Canmore Maritime information  
derived from Canmore/NRHE data  
via Pastmap website  
dated 2019 © Crown Copyright

1:15,000 @ A3

0 95 190 380 m



**Figure 5**  
Canmore Maritime Entries and  
Bathymetric Survey Results

## Plates



Plate 1: Dunskeath House, western end of surviving buildings



Plate 2: Dunskeath House, south-eastern end of surviving buildings, with modern addition





Plate 3: Dunskeath House, garden building and cottages, looking south-west



Plate 4: General view of ISA, with southernmost element of HA1 (white cottage), looking north-west





Plate 5: Northernmost element of HA1, adjacent to B9175, looking north



Plate 6: General view of ISA from north-east





Plate 7: View from ramparts of Dunskeath Castle (SM3319) towards ISA and existing fabrication yard



Plate 8: View from northern edge of Cromarty CA towards ISA and existing fabrication yard



Plate 9: View towards Cromarty CA and Cromarty House IGD along the A832

## **Technical Appendix 8.5**

## TECHNICAL APPENDIX 8.5 LANDSCAPE AND VISUAL

### 8.5.1 Introduction

This Technical Appendix sets out a Landscape and Visual Appraisal (LVA) for the proposed construction of a new East Quay [‘the proposed development’], at Nigg Energy Park, Nigg, Ross-shire. The primary purpose of this is to identify any likely significant effects predicted during the construction and operational phases of the proposed development, as described in detail within Chapter 2: Proposed Development, on the landscape and visual resources of the site and surrounding study area.

The LVA has been undertaken by Douglas Harman Landscape Planning (DHLP). Douglas Harman is a sole practitioner and Chartered Member of the Landscape Institute (CMLI).

#### 8.5.1.1 Overview of approach

Although Landscape and Visual interests have been scoped out of the Environmental Impact Assessment (EIA) Report (see Section 8.5.2), the approach taken to assess landscape and visual effects broadly follows that of a typical EIA development. As such, the methodology (see Section 8.5.4) is primarily based on the *Guidelines for Landscape and Visual Impact Assessment*<sup>1</sup> and other current best practice guidance where relevant. As an overview, the objectives of the assessment to:

- describe the assessment methodology and significance criteria used to inform the assessment process;
- identify any relevant landscape related policy, legislation and guidance;
- identify and assess the landscape and visual baseline conditions;
- identify design principles and other mitigation measures embedded into the design of the project to help minimise any likely significant adverse effects; and
- identify and evaluate any residual landscape and visual effects, including direct and indirect, based on the worst case parameters as currently known.

This LVA has been informed by a desk-based analysis of existing data and other information gathered through a comprehensive field survey. Based on a 15 km study area, the assessment identifies the baseline against which the effects of the proposed development are assessed, and concentrates on predicting the likely significant effects during the operational phase. Although inter-related, landscape effects are assessed separately to the effects on views and visual amenity.

Landscape effects consider the fabric, character and quality of the site and surrounding landscape/seascape and are concerned with:

- landscape elements (e.g. hedgerows, trees and woodlands);
- landscape/seascape character (local and regional distinctiveness); and
- special interests (e.g. designations, conservation areas and cultural associations).

Visual effects are primarily concerned with the changes in people’s views through intrusion or obstruction and whether important opportunities to enjoy views may be improved or reduced.

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<sup>1</sup> Landscape Institute and the Institute of Environmental Management and Assessment (2013), *The Guidelines for Landscape and Visual Impact Assessment*, version 3.

### **8.5.1.2 LVA sections**

Following this introductory section, the findings of the LVA are presented in the following sections:

- Section 8.5.2: *Scoping and Consultation* - a summary description of the scoping and consultation responses relating to landscape and visual issues;
- Section 8.5.3: *Landscape Policy Context* - a summary of landscape related planning policies and associated guidance relevant to the proposed development;
- Section 8.5.4: *LVA Methodology* - a detailed description of the methods and associated guidance used to inform the assessment process;
- Section 8.5.5: *Baseline Assessment* - a description and analysis of the landscape and visual resource of the study area conducted through desk study and site survey, along with a summary of the design process in response to landscape and visual issues;
- Section 8.5.6: *Impact Assessment* - an overview of the impact assessment sections and associated assumptions, and analysis of the zone of theoretical visibility;
- Section 8.5.7: *Viewpoint Assessment* - a detailed assessment of landscape change and visual effects predicted from a selection of representative viewpoints;
- Section 8.5.8: *Construction Effects* - an assessment of the landscape and visual effects resulting from the construction phase of the proposed development;
- Section 8.5.9: *Landscape Effects* - an assessment of effects predicted on the landscape resource, landscape character types and designated landscapes;
- Section 8.5.10: *Visual Effects* - an assessment of effects predicted on the views of people through obstruction and whether important opportunities to enjoy views may be improved or reduced; and
- Section 8.5.11: *Conclusion* - a summary of landscape and visual effects and associated statement of significance.

### **8.5.1.3 LVA Figures**

In support of the LVA, the following figures (see Volume 2 of this EIA Report) are referenced throughout this chapter:

- Figure 8.5 - Study Area
- Figure 8.6 - Landscape Character
- Figure 8.7 - Coastal Character
- Figure 8.8 - Landscape Designations
- Figure 8.9 – Zone of Theatrical Visibility (ZTV)
- Figure 8.10 - Proposed Viewpoints with ZTV
- Figure 8.11 - Landscape Character with ZTV
- Figure 8.12 - Coastal Character with ZTV
- Figure 8.13 - Landscape Designations with ZTV
- Figure 8.14 - Recreational Routes
- Figure 8.15 - Recreational Routes with ZTV
- Figures 8.16-23 - Visualisations

## 8.5.2 Scoping and Consultation

Initially, the Scoping Opinion identified that the Highland Council (THC) expects the landscape and visual impact of the proposed development to be considered as part of an EIA. On further discussion however, it was agreed with THC<sup>2</sup> that in context of the large-scale existing industrial site in which the proposed development would be located, any changes resulting from its introduction would be relatively limited. The presence of an additional temporary rig within a seascape that is already occupied by several existing rigs, would also limit the potential for any widespread significant effects. Consequently, the Council was content for the landscape and visual assessment to be scoped out of a formal EIA.

Other responses relevant to landscape issues identified the Scoping Report, and other consultations undertaken as part of this process, are summarised in Table 8.5.1.

**Table 8.5.1: Summary of Consultation Responses**

Organisation	Consultation Response	How and where addressed
THC	THC expects the EIA to consider the landscape and visual impact of the development. THC makes a distinction between the two. While not mutually exclusive, these elements require separate assessment and therefore presentation of visual material in different ways.	As noted in the preceding text, it was agreed with THC that a landscape and visual assessment need not be considered as part of the EIA. Nonetheless, the approach to this LVA broadly follows that of a typical EIA development and as part of this, landscape and visual interests are considered separately within this Technical Appendix.
	It is the THC's position that it is not possible to use panoramic images for the purposes of visual impact assessment. THC, while not precluding the use of panoramic images, require single frame images with different focal lengths taken with a 35mm format full frame sensor camera <sup>3</sup> – not an 'equivalent.' The preferred focal lengths are 50mm and 75mm. The former gives an indication of field of view and the latter best represents the scale and distance in the landscape i.e. a more realistic impression of what we see from the viewpoint. These images should form part of the ES and not be separate from it.	Figures 8.16-23 (see Volume 2 of this EIA Report) provide visualisations of the proposed development from 8 viewpoint locations. For each viewpoint, the following views are provided: <ul style="list-style-type: none"> <li>a. existing and model views towards the site at 50mm focal lengths;</li> <li>b. photomontage towards the site at 50mm focal lengths;</li> <li>c. photomontage towards the site at 75mm focal lengths; and</li> <li>d. wider/panoramic 80° view of site in context of the temporary rig.</li> </ul>
	I have provided advice to the Landscape Consultant acting on behalf of the applicant on proposed viewpoints, as follows: <ul style="list-style-type: none"> <li>1. Nigg Ferry</li> <li>2. Cromarty shore</li> </ul>	The list of proposed viewpoints, as listed in the Scoping Report (see opposite), was identified prior to a detailed field survey. Although the finalised viewpoints (on undertaking the field survey) remain largely

<sup>2</sup> Email correspondence received from Gillian Pearson on the 15<sup>th</sup> May, 2019.

<sup>3</sup> On taking viewpoint photography, the requirement for a full frame sensor camera was unknown. On subsequent discussion with Council (email of 15th May, 2019) it was agreed that the specification of the camera used to undertake photography (Canon EOS 7D) was fit for purpose.

Organisation	Consultation Response	How and where addressed
	<p>3. Dunskeath Castle</p> <p>4. Minor road, North Sutor</p> <p>5. Sutors of Cromarty viewpoint</p> <p>6. A9, Lower Tullich</p> <p>7. Invergordon/Saltburn</p> <p>8. Newhall Point</p>	<p>as intended, the following changes have been made:</p> <p>a. VP 3 (Dunskeath Castle) - as access to Dunskeath Castle is difficult (and it does not appear to attract many visitors), this viewpoint was not considered to be particularly relevant to include. In addition, although from a slightly more distant and higher elevation, the view from Dunskeath Castle is similar to the view from VP 4 (Minor road, North Sutor).</p> <p>b. In considering the open views towards the site from a relatively busy road, an additional viewpoint on the B9163 to west of Cromarty has been included.</p>
	<p>The purpose of the selected and agreed viewpoints shall be clearly identified and stated in the supporting information. For example, it should be clear that the VP has been chosen for landscape assessment, or visual impact assessment, or cumulative assessment, or sequential assessment, or to show a representative view or for assessment of impact on designated sites, communities or individual properties.</p>	<p>The finalised viewpoints and the landscape and visual receptors they represent are set out in Table 8.5.13 of this LVA.</p> <p>Further information on each viewpoint is also set out in the 'context' section of the Viewpoint Assessment tables (see Section 8.5.7)</p>
Marine Scotland	<p>SNH advise there are no national landscape designations relevant to this proposal although the sea and coast are within the East Ross Special Landscape Area (SLA) and the site is a major feature within the SLA. They understand that advice on landscape aspects will be provided by THC. The consultation response received from THC regarding the marine aspect of the works did not refer to landscape and visual impacts.</p>	<p>As detailed in section 8.5.5.6 of this LVA, the <i>Sutors of Cromarty, Rosemarkie and Fort George</i> SLA (not the <i>East Ross</i> SLA as suggested) falls within the 15 km study area. As such, a detailed assessment of the SLA designation, based on the characteristics as detailed in the <i>Assessment of Highland Special Landscape Areas</i><sup>4</sup>, has been undertaken as part of this LVA.</p>
	<p>The Scottish Ministers are content that there will be no significant impact on landscape and visuals from a marine perspective but understand that this will be considered in the EIA report from a terrestrial planning perspective.</p>	<p>Noted.</p>

<sup>4</sup> Highland Council in partnership with Scottish Natural Heritage (2011). *Assessment of Highland Special Landscape Areas*.

### 8.5.3 Landscape Policy Context

#### 8.5.3.1 Regulatory Framework

As noted in Chapters 1 and 3, the EIAR has been prepared to support both terrestrial and marine applications under the Town and Country Planning (Scotland) Act 1997 (as amended) and the Marine (Scotland) Act 2010 respectively. As landscape and visual issues are largely covered by terrestrial planning frameworks, this section focuses on a review of relevant landscape policy in context of the Local Development Plan. Notwithstanding this, it is recognised that the conservation and enhancement of the seascape is an important part of marine considerations and to this end, the LVA addresses the impact on coastal character, which includes an assessment of some inshore waters along the coastline of the study area.

#### 8.5.3.2 Highland-wide Local Development Plan

The development plan relevant to this application consists of the Highland-wide Local Development Plan (2012) and as noted in section 4 (Spatial Strategy), it sets out a *'balanced strategy to support the growth of all communities across Highland. However, it is important to ensure that development is, in the first instance, directed to places with sufficient existing or planned infrastructure and facilities to support sustainable development'*. As part of this, THC aims to ensure that the special quality of the natural, built and cultural environment is protected and enhanced by assessing the proposed development against the following landscape related policies:

##### Policy 28 Sustainable Design

*"The Council will support developments which promote and enhance the social, economic and environmental wellbeing of the people of Highland. Proposed developments will be assessed on the extent to which they....impact on landscape and scenery.... demonstrate sensitive siting and high quality design in keeping with local character and historic and natural environment and in making use of appropriate materials...."*

##### Policy 49 Coastal Development

*"Proposals will be assessed against the requirements of the Highland Coastal Development Strategy: Supplementary Guidance. The principal aims of the strategy are to....guide the sustainable development and use of Highland's coastal zone whilst safeguarding its natural and cultural heritage assets...."*

##### Policy 57 Natural, Built and Cultural Heritage

*"All development proposals will be assessed taking into account the level of importance and type of heritage features, the form and scale of the development, and any impact on the feature and its setting, in the context of the policy framework detailed in Appendix 2. The following criteria will also apply:*

- 1. For features of local/regional importance we will allow developments if it can be satisfactorily demonstrated that they will not have an unacceptable impact on the natural environment, amenity and heritage resource.*
- 2. For features of national importance we will allow developments that can be shown not to compromise the natural environment, amenity and heritage resource. Where there may be any significant adverse effects, these must be clearly outweighed by social or economic benefits of national importance. It must also be*



*shown that the development will support communities in fragile areas who are having difficulties in keeping their population and services....”*

Table 8.5.2 identifies the policy context of landscape designations (as listed in Appendix 2 of the Highland-wide Local Development Plan) that are located in the study area of the proposed development.

**Table 8.5.2: Policy Context of Landscape Designations**

Designation	Background	Policy Framework
<b>Features of National Importance</b>		
Gardens and Designed Landscapes (GDLs)	Contained within the Inventory of Historic GDLs in Scotland compiled and maintained by Historic Scotland. The garden and designed landscape and its setting are protected by national policy. Under the Town and Country Planning (General Development Procedure) (Scotland) Amendment Order 2007, Historic Scotland must be consulted on any proposed development that may affect these sites or their setting.	Scottish Planning Policy, Scottish Historic Environment Policy (SHEP). The Highland Council Historic Environment Strategy.
<b>Features of Local/Regional Importance</b>		
Special Landscape Areas (SLAs)	SLAs were identified by THC by virtue either as being large scale areas of regional importance for scenic quality, or as being small scale areas of local scenic and recreational value. THC will consider the potential impacts of development proposals on the integrity of the SLAs, including impacts on the wider setting. There may be cases where the setting of an SLA could be adversely affected by development in the foreground which would interrupt important views into and out of the SLA. When determining the impact on the landscape character and scenic quality and overall integrity of the SLA, attention will be given to its citation and in particular the Key Landscape and Visual Characteristics, its Special Qualities, and its Sensitivities to Change.	Scottish Planning Policy

#### Policy 61 Landscape

*“New developments should be designed to reflect the landscape characteristics and special qualities identified in the Landscape Character Assessment of the area in which they are proposed. This will include consideration of the appropriate scale, form, pattern and construction materials, as well as the potential cumulative effect of developments where this may be an issue. THC would wish to encourage those undertaking development to include measures to enhance the landscape characteristics of the area. This will apply particularly where the condition of the landscape characteristics has deteriorated to such an extent that there has been a loss of landscape quality or distinctive sense of place. In the assessment of new developments, THC will take account of Landscape Character Assessments, Landscape Capacity Studies and its supplementary guidance on Siting and Design and Sustainable Design, together with any other relevant design guidance.”*

#### **8.5.3.3 Nigg Development Masterplan**

The purpose of the Nigg Development Masterplan (2013) for the former oil fabrication yard, oil terminal and surrounding land at Nigg is to outline a ‘vision’ and feasible options for the development of the site as a multi-user industrial facility. As part of this, section 2.6.4 (Landscape and Recreational Amenity) notes that:

*“Historically, the Cromarty Firth has been an important source of recreation for local people. A wide range of recreation activities are practised such as wildfowling, boating, walking, bird watching and fishing. Bottlenose dolphins are regularly seen at the mouth of the Firth and are now a tourist attraction. In addition, the wide range of bird life in the Firth attracts ornithologists.*

*The Nigg and Udale bays area, approximately 200m to the north of the development boundary, is an extensive area of mudflat, saltmarsh and wet grassland, which is part of an RSPB reserve. A hide and car parking exist at both sites and each attracts more than 5,000 visitors per annum.*

*Temporary disruption to recreation could be offset by the local economic development benefits presented by redevelopment and post-construction improvements to the wider infrastructure.”*

#### **8.5.3.4 Summary of Landscape Policy Context**

The LDP aims are to ensure that special quality of the natural, built and cultural environment is protected and enhanced. In doing so, the landscape related policy framework sets out a clear suite of criteria in which to assess the landscape acceptability of the proposed development in the context of wider social and economic material considerations. In summary, the proposed development should:

- demonstrate sensitive siting and high quality design in keeping with local character and historic and natural environment;
- safeguard natural and cultural heritage assets within the coastal zone;
- demonstrated it will not have an unacceptable impact on the natural environment, amenity and heritage resource of SLAs;
- not compromise the natural environment, amenity and heritage resource of GDLs; and
- be designed to reflect the landscape characteristics and special qualities identified in the Landscape Character Assessment of the area in which they are proposed.

### **8.5.4 Methodology**

#### **8.5.4.1 Approach and Guidance**

This LVA follows the approach as set out in the *Guidelines for Landscape and Visual Impact Assessment (GLVIA)*<sup>5</sup> and other current best practice guidance where relevant<sup>6</sup>. It aims to identify, predict and evaluate the key effects of the proposed development on the landscape and visual resources of the study area. In line with best practice, landscape and visual effects are considered separately throughout.

As a brief overview, the assessment involved a combination of desk study, computer analysis, field work and interpretation using professional judgement. The site and surrounding area have been visited to gain a clear understanding of the landscape and the likely effects of the proposed development. Fieldwork was undertaken during a period of good visibility during March 2019, by a Chartered Member of the Landscape Institute.

#### **8.5.4.2 The Study Area and Viewpoint Selection**

To ensure the extent of any potential significant effects are fully considered, the assessment is based on a study area radius of 15 km. In selecting assessment viewpoints, a map showing the zone of theoretical visibility (ZTV), based on computer manipulation of a digital terrain model, was prepared. This indicates areas from which the proposed development may theoretically be seen and enabled the assessment to be focused upon those locations that are most likely to be affected.

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<sup>5</sup> Landscape Institute and the Institute of Environmental Management and Assessment (2013), *'The Guidelines for Landscape and Visual Impact Assessment, version 3'*.

<sup>6</sup> 1) Countryside Agency and SNH (2002), *'Landscape Character Assessment Guidance for England and Scotland'*.

2) SNH (2017) *'Guidance Note – Coastal Character Assessment'*.

The ZTV, as illustrated on Figure 8.9 in Volume 2 of this ES, is based solely on topography (50 m contours) and identifies the maximum theoretical visibility of the proposed development. When interpreting the ZTV, it is important to bear the following points in mind:

- the East Quay ZTV is based on a height of 6.0 m above chart datum (ACD) and a receptor viewing height of 1.8 m above ground level. Chart datum was assumed to be 2.22m below Ordnance datum (<https://www.ntsif.org/tides/datum>).
- the Jack-up Rig ZTV is based on a height of 150 m above Ordnance datum and a receptor viewing height of 1.8m above ground level. The location shown is indicative for the purposes of this assessment and is ca. 1.5 km WSW from Nigg Energy Park.
- the map does not account for any screening effects provided by vegetation, buildings or minor landforms, which are not contained within the digital terrain model;
- the map does not take the orientation of the viewer into account, for example when travelling in a vehicle; and
- the map does not convey the likely nature or magnitude of visual effects of the proposed development, which can only be determined by further assessment, including fieldwork.

As a result, the visibility shown on the ZTV map is more extensive than would actually be visible on the ground, but where the ZTV indicates no visibility, the proposed development would not be seen.

The viewpoints used for this assessment (see Figure 8.10 and Table 8.5.13) were selected according to the criteria set out in the best practice guidance where relevant. Note that not all these criteria necessarily apply to all viewpoints:

- publicly accessible;
- reasonably high potential number of viewers or being of particular significance to the viewer(s) affected;
- range of viewing distances (i.e. short, medium and long distance views) and elevations;
- range of viewing experiences (i.e. static views, for example from settlements, recognised viewpoints, car parks or points along sequential views, for example from roads, walking and cycling routes);
- range of view types, (e.g. panoramas, glimpses);
- views with different extents of the development visible; and
- locations with potential cumulative views of the proposed development and other relevant developments.

Informed by desk and field work, the viewpoints have been selected to offer the clearest view within the vicinity of the chosen point where potentially significant effects are likely to occur. Viewpoints have been excluded where the ZTV indicates that the proposed development would not be visible, or where the viewpoint is too distant for any potentially significant effects to occur.

#### **8.5.4.3 Landscape Resources**

Landscape resources within the study area that could be affected by the proposed development include:

- physical resources, such as landform, landcover, tracks, watercourses, etc.;
- landscape character types/areas;
- landscape designations e.g. Special Landscape Areas (SLAs); and
- other important recreational, natural or cultural heritage interests that contribute to landscape character.

The landscape baseline (see Section 8.5.5) establishes the physical components of the landscape that may be directly affected by the proposed development (i.e. those within the site), as well as the landscape resources

within the wider study area from which the proposed development could be visible. The ZTV analysis and field assessment studies have been used to check the potential visibility of the landscape resources within the study area.

#### **8.5.4.4 Seascape Character**

In addition to landscape character, this LVA also provides an assessment of coastal character. Coastal character is made up of the often narrow margin of the coastal edge, its immediate hinterland, and the sea. These three key components of coastal character include what is commonly known as 'seascape' which refers to "*an area, as perceived by people, from land, sea or air, where the sea is a key element of the physical environment*" (Council of Europe, 2000). 'Seascape' is a widely used term which is included in the definition of landscape within the European Landscape Convention.

In describing coastal character, there is no published report (similar to the *Inner Moray Firth Landscape Character Assessment*) on which to base this assessment on. In addressing this, a local assessment has been undertaken specifically for this LVA, based on best practice guidance<sup>7</sup>.

In understanding coastal character, the process focused on identifying areas of distinct character defined on the basis of:

- physical landform, degree of enclosure or openness, and an assessment of horizontal and vertical scale;
- degree of influence of the sea and 'maritime' qualities on both the landscape and coast of the area, including coastal dynamics;
- shape, scale and degree of fragmentation of the coastline;
- presence of human artefacts, distribution of settlement, pattern and degree of human activity;
- landscape features, including historic features and their setting;
- experience of the coast, landscape and seascape, including the degree of remoteness and potential opportunity to appreciate wildness; and
- visual catchments.

#### **8.5.4.5 Visual Resources**

Visual receptors are defined as those individuals or groups of people within the study area who may have views towards the site and are likely to be affected by the proposed development. The main groups of visual receptors in this case are considered to be:

- residents in Cromarty and other main settlements in the surrounding landscape;
- walkers and other recreational users along Core Paths and other accessible parts of the coastline and wider landscape;
- tourists and visitors in and around Cromarty;
- road users; and
- boat users.

The visual baseline (see Section 8.5.5) establishes the parts of the study area from which the proposed development may be visible; the viewpoints from which different groups of people may experience views of the proposed development, and the approximate number of people who will be affected by the changes in views or visual amenity.

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<sup>7</sup> Scottish Natural Heritage (2017) '*Guidance note – Coastal Character Assessment*'.

#### 8.5.4.6 Assessment of Predicted Effects

Having established the baseline conditions, the assessment of landscape and visual effects was then undertaken. Initially, the assessment focused on a viewpoint assessment to establish the potential effects on the landscape and visual resources experienced at specific locations. The field work was informed by a range of maps, photographs, the ZTV analysis and computer-generated photomontages.

Existing and predicted views from each of the viewpoints were assessed in order to identify, predict and evaluate the potential effects arising from the proposed development. Wherever possible, identified effects are quantified and the prediction of magnitude and assessment of significance of the landscape and visual effects is based on pre-defined criteria in order to provide greater consistency. Note that these criteria are not used as prescriptive tools, and the methodology and analysis of potential effects at any particular location allows for the exercise of professional judgement. In practice, all factors need to be considered in combination and applied using careful judgement, particularly in terms of the relative weight given to each. In some instances, one criterion may be considered to have a determining effect.

In addition to the viewpoint assessment, field work was also undertaken to inform the general assessment of the landscape and visual receptors as identified in the baseline assessment. The findings of the detailed viewpoint assessment were also used to inform the general assessment of landscape and visual effects within the wider study area.

The criteria used in this assessment have been based upon paragraph 3.26 of the GLVIA, which recommends that factors affecting the sensitivity of the receptor (susceptibility and value), and those affecting the magnitude of the effect (size, extent, duration and reversibility) are each assessed separately. The description of effects takes account of changing seasonal conditions and the effects of on-going changes to the landscape over time, such as the predicted growth of vegetation or woodland operations.

#### 8.5.4.7 Duration and Reversibility of Effects

As described within Chapter 2: Proposed Development, the construction phase is likely to take place for approximately ten months. Effects due to construction are therefore considered to be short-term, whilst effects arising during the operational phase would be long-term, albeit largely reversible.

#### 8.5.4.8 Significance of Effects

As with an EIA report, the degree of significance of effects on landscape resources and visual receptors is determined from a combined evaluation of the sensitivity of the receptor and the magnitude of the effect.

**Table 8.5.3: Determining Significance of Effects**

	Sensitivity of receptor		
Magnitude of effect	High	Medium	Low
Very large	substantial	major	moderate-major
Large	major	moderate-major	moderate
Medium	moderate-major	moderate	moderate-minor
Small	moderate	moderate-minor	minor
Very small	moderate-minor	minor	negligible

Table 8.5.3 shows how the significance of the landscape/visual effect increases from **negligible** to **substantial** with increasing receptor sensitivity and with greater magnitude of effect. The most substantial effects would occur where a receptor of highest sensitivity is affected by an effect of very large magnitude. Conversely, negligible effects would result where a receptor of lowest sensitivity is affected by an effect of negligible magnitude. Between these two extremes the significance of effect would vary continuously and the significance of any one effect is determined by professional judgement, taking into account all the relevant factors.

The assessment of significance of the landscape and visual effects is based on pre-defined criteria. Tables 8.5.4-8 provide a framework that helps to ensure consistency and transparency in the decision-making process but are not used as prescriptive tools, allowing for the exercise of professional judgement in determining sensitivity, magnitude and significance.

The assessment of general effects and the detailed viewpoint assessments provide further details of how the significance of effects has been determined in each case where relevant. Where overall effects are predicted to be **moderate-major**, **major** or **substantial**, these are considered to be significant in the context of material considerations. (shaded grey in Table 8.5.3).

#### **8.5.4.9 Positive and Negative Effects**

Negative effects result in a direct loss of physical resources, weaken key characteristics, negatively affect the integrity of landscape designations or result in a reduction in visual amenity. Positive effects occur where a development replaces physical resources, strengthens the landscape characteristics or improves the visual amenity. Effects may also be neutral, where there is no net effect on the landscape or visual resources.

Changes to undeveloped coastal landscapes, for example, that involve the construction of engineered man-made objects of a modest or large-scale generally have a negative effect on character, although this effect can be mitigated by the contribution to the landscape that a development may make in its own right, usually by virtue of good design, even if it is in contrast to the existing character.

Changes to views and visual amenity can be more subjective, in that people may like or dislike what they see, or may be used to seeing nearby development of similar nature and therefore more ambivalent about them. Whether the visual effect is perceived as positive or negative depends upon individual preferences, the context in which a person experiences the view, and upon their attitude towards this type of development in general. It should be recognised therefore that some people may be more neutral or ambivalent in their opinions about the proposed changes in views.

#### **8.5.4.10 Direct and Indirect Effects**

Direct effects result directly from the proposed development itself, such as the loss of woodland to development. Indirect effects are consequential changes resulting from a development, such as changes in rural character of a landscape character type/area that would result from the introduction of an industrial development located in its setting, for example.

#### **8.5.4.11 Acceptability of Effects**

In theory, a proposed development may be considered by some to be an unacceptable intrusion in the landscape, but could be seen as an essential contributor to the local economy. It is not the effects on the landscape that change but the judgements about the acceptability of those effects.

Acceptability is therefore a matter for the decision maker to determine, taking into account the overall balance of environmental benefits and effects of the proposed development, on the basis all of the available evidence. The GLVIA notes in paragraph 2.17 that *“it is for the competent authority to judge the balance of weight between policy considerations and the effects that such proposals may have.”*

There are no specific accepted, legal requirements or published criteria to use as a basis on which to judge whether a change in the landscape, or in a view, is acceptable. Nor is there any published guidance on establishing a threshold, beyond which further changes should be prevented. This LVA sets out, in an impartial way, the nature and extent of landscape and visual effects that are likely to result from the proposed development and does not draw conclusions as to acceptability.

#### **8.5.4.12 Landscape Effects**

Landscape effects arise from changes to the physical components of the landscape, its character and how this is experienced. The significance of landscape effects is assessed by considering the sensitivity of the landscape receptors and the magnitude of the landscape effect.

##### Sensitivity of Landscape Receptors

The GLVIA indicates that landscape receptors need to be assessed firstly in terms of their sensitivity, combining judgements of their susceptibility to the type of proposal and the value attached to the landscape.

Best practice guidance – Topic paper 6 (Scottish Natural Heritage and Countryside Agency 2004, page 3) states that *“Sensitivity is related...to landscape character and how vulnerable this is to change...Landscapes which are highly sensitive are at risk of having their key characteristics fundamentally altered by development, leading to a change to a different landscape character i.e. one with a different set of key characteristics. Sensitivity is assessed by considering the physical characteristics and the perceptual characteristics of landscapes in the light of particular forms of development.”*

These aspects of sensitivity distinguish one Landscape Character Type (LCT) from another, but it is important to recognise that sensitivity can also vary across a particular LCT. Some landscape assessments provide information concerning the sensitivity of LCTs to different types of development although in the case, no information is available.

This LVA therefore includes an assessment of factors affecting the susceptibility of the landscape to the changes brought about by the proposed development. Table 8.5.4 sets out attributes of landscape character that have been considered in assessing susceptibility, adapted from best practice guidance.

**Table 8.5.4: Landscape Susceptibility**

<b>Susceptibility</b>	<i>Lower</i>	<i>Higher</i>
<i>Scale</i>	Large-scale or vast	Intimate or small-scale
<i>Landform</i>	Flat, smooth, regular, rolling, gently undulating, or flowing landform	Dramatic, steep, mountainous, rugged, or complex landform with prominent peaks or ridges
<i>Diversity</i>	Simple or uniform, e.g. Moorland or forestry plantations	Complex or diverse, variety of land cover
<i>Landcover pattern and line</i>	Sweeping lines, or indistinct or irregular patterns	Strong and regular linear features, geometric or rectilinear patterns, or planned landscapes
<i>Settlement and infrastructure</i>	Frequent masts, pylons, industrial elements, modern buildings, infrastructure, settlements	No obvious modern settlement, buildings, infrastructure or main roads

<b>Susceptibility</b>	<i>Lower</i>	<i>Higher</i>
	or main roads	
<i>Perception of landscape change</i>	Modern or clearly dynamic showing obvious land use changes	Little or no land use changes, or with obvious historical continuity
<i>Tranquillity</i>	Busy, with evidence of human activity, noise or regular movement	Remote or tranquil with strong sense of stillness or solitude
<i>Settings and skylines</i>	Low lying areas that do not tend to feature in views from populated areas or main transport routes	Areas with topographic features that define the setting, backdrop, outlook or skyline of populated areas or main transport routes

### Landscape Value

The assessment takes as its starting point the recognised value of the landscape, for example, as identified by landscape designations.

In addition, the assessment considers the following factors, in order to identify how the relative landscape value may vary at the local scale. The factors set out in Table 8.5.5 are adapted from paragraphs 5.28-5.31 of the GLVIA and other guidance (Scottish Natural Heritage and Countryside Agency 2004 Figure 1b).

**Table 8.5.5: Landscape Value**

<b>Factors affecting Landscape Value</b>	
<i>Condition/intactness</i>	The degree to which the landscape is unified or intact
<i>Scenic quality</i>	The extent to which the landscape appeals, primarily to the visual senses
<i>Perceptual aspects</i>	The degree to which the landscape is recognised for perceptual qualities, such as its sense of remoteness
<i>Rarity</i>	The presence of unusual elements or features in the landscape or the presence of an unusual LCT
<i>Representativeness</i>	The degree to which the landscape contains important examples of elements or features, or is of a particular character that is considered important
<i>Conservation interests</i>	Cultural or natural heritage interests that add to the value of the landscape and/or are of value in themselves
<i>Recreational value</i>	Evidence of recreational activity where experience of the landscape is important, such as recognised scenic routes
<i>Associations</i>	Recognised cultural or historical associations that contribute to perceptions of the natural beauty of the landscape

#### **8.5.4.13 Magnitude of Landscape Effects**

Each effect on landscape receptors is also assessed in terms of its size or scale, the geographical extent of the area influenced and its duration and reversibility.

#### Size or Scale of Effect

This is judged using the factors set out in Table 8.5.6.



**Table 8.5.6: Size or Scale of Landscape Effect**

<b>Class</b>	<b>Criteria</b>
<i>Very large</i>	Highly obvious change, affecting the majority of the key characteristics and defining the experience of the landscape
<i>Large</i>	Obvious change, affecting many key characteristics and the experience of the landscape
<i>Medium</i>	Noticeable but not obvious change, affecting some key characteristics and the experience of the landscape
<i>Small</i>	Minor change, affecting some characteristics and the experience of the landscape slightly
<i>Very small</i>	Little perceptible change

#### Geographical Extent of Effect

The geographical area over which the landscape effects would be experienced (regional, local or restricted to the site) is also taken into account. This is distinct from the scale of the change. For example, a small change to the landscape over a large geographical area could be comparable to a very large change affecting a much more localised area.

#### **8.5.4.14 Significance of Landscape Effects**

The assessment of significance is based on professional judgement, considering both the sensitivity of the receptor and the predicted magnitude of effect resulting from the proposed development, as described in Section 8.5.4.8.

Major loss of landscape features or characteristics across an extensive area that are important to the integrity of a nationally valued landscape are likely to be of greatest significance. Short-term effects on landscape features or characteristics over a restricted part of a landscape of lower value are likely to be of least significance.

#### **8.5.4.15 Visual Effects**

Visual effects result from the changes in the content or character of views and visual amenity, due to changes in the landscape. The assessment of visual effects takes account of both the sensitivity of the visual receptors (individuals or groups of people) and the magnitude of the change on their views and visual amenity.

#### Sensitivity of Visual Receptors

The sensitivity of each visual receptor is assessed in terms of susceptibility to change in views or visual amenity as well as the value attached to particular views.

#### Susceptibility to Change

People generally have differing responses to views and visual amenity depending on the context (e.g. location, time of day, degree of exposure), and their purpose for being in a particular place (e.g. whether for recreation, travelling through the area, residence or employment). Susceptibility to change is therefore a function of:

- the occupation or activity of people experiencing the view or visual amenity; and
- the extent to which their attention or interest may be focused on the landscape around them.

Table 8.5.7 sets out some examples of the relative susceptibility of some of the key visual receptors within the Study Area. Note that different individuals or groups of people at one location may have different levels of susceptibility.

**Table 8.5.7: Examples of Susceptibility to Change in Views or Visual Amenity**

High	Medium	Low
Residents within dwellings or curtilage	People at their place of work, where views are an important part of the setting, such as a countryside ranger	People at their place of work whose attention is likely to be focused on their work or activity, not on their surroundings
Users of recognised footpaths paths, whose attention or interest is likely to be focused on the landscape or on particular views		People engaged in active outdoor sports or recreation and less likely to focus on the view
Road and ferry users where appreciation of the landscape is an important part of the experience, such as recognised scenic routes	Road users likely to be travelling for other purposes than just the view, such as commuter routes	
Visitors to heritage assets or to other attractions, such as recognised beauty spots, where views of the surroundings are an important part of the experience		

#### Value attached to particular views

Judgments are also be made about the value attached to views, based on the following considerations:

- recognised value – such as views from heritage assets or designated landscapes;
- inclusion in guidebooks or on tourist maps, the facilities provided for visitors or references to the view in literature or art; and
- the relative number of people who are likely to experience the view.

People that are more susceptible to change at viewpoints of recognised value are more likely to be significantly affected by any given change.

#### **8.5.4.16 Magnitude of Visual Effect**

The magnitude of the visual effect resulting from the proposed development is evaluated in terms of size or scale, geographical extent, duration and reversibility.

#### Size or Scale of Effect

This is based on the interpretation of a combination of a range of factors, described in Table 8.5.8. Some of these are largely quantifiable and include:

- distance and direction of the viewpoint from the proposed development;
- extent of the proposed development visible from the viewpoint;
- scale of the change in the view, including the proportion of the field of view occupied by the proposed development;
- degree of contrast with the existing landscape elements and characteristics in terms of background, form, pattern, scale, movement, colour, texture, mass, line or height;
- the relative amount of time during which the effect would be experienced and whether views would be full, partial or glimpses; and

- orientation of receptors in relation to the proposed development, e.g. whether views are oblique or direct.

**Table 8.5.8: Size or Scale of Visual Effect**

<b>Class</b>	<b>Description</b>	<b>Appearance in field of vision</b>
<i>Very large</i>	Dominant	<ul style="list-style-type: none"> <li>- Commanding, controlling the view</li> <li>- Creation/removal of a dominant visual focus</li> <li>- Highly uncharacteristic elements or pattern introduced</li> <li>- Most of the view affected</li> </ul>
<i>Large</i>	Prominent	<ul style="list-style-type: none"> <li>- Major change to the view, striking, sharp, unmistakable, easily seen</li> <li>- Creation/removal of major visual focus</li> <li>- Uncharacteristic elements or pattern introduced</li> <li>- Large proportion of the view affected</li> </ul>
<i>Medium</i>	Conspicuous	<ul style="list-style-type: none"> <li>- Noticeable change to the view, distinct, clearly visible, well defined</li> <li>- Creation or removal of a visual focus that may compete</li> <li>- Some elements of the Development fit the existing pattern</li> <li>- Some of the view affected</li> </ul>
<i>Small</i>	Apparent	<ul style="list-style-type: none"> <li>- Minor change to the view but still evident</li> <li>- Little change to focus of the view</li> <li>- Fits intrinsic visual composition</li> <li>- Little of the view affected</li> </ul>
<i>Negligible</i>	Inconspicuous	<ul style="list-style-type: none"> <li>- No real change to perception of the view</li> <li>- Weak, not legible, hardly discernible</li> </ul>

#### Geographical Extent

The extent over which the changes would be visible is also taken into account.

#### **8.5.4.17 Significance of Visual Effects**

The degree of significance of effects on visual receptors is determined from a combined evaluation of the sensitivity of the visual receptor and the magnitude of the visual effect, as described in paragraph 8.5.4.8.

Effects are more likely to be significant on people who are particularly sensitive to changes in views and visual amenity, or who experience effects at important viewpoints, or from recognised scenic routes. Large scale changes which introduce new, discordant or intrusive elements into the view are also more likely to be significant than small changes or changes involving features already present within the view.

### **8.5.5 Baseline Assessment**

#### **8.5.5.1 Overview**

The baseline assessment establishes the existing landscape and visual resource within a 15 km study area against which the effects of the proposed development are predicted. It describes the site and its setting, landscape and coastal/seascape character, landscape designations, and associated sensitivity to change. Visual receptors, including residents, road users and those undertaking recreational activity, are also assessed.

Following on from this, a selection of viewpoints is identified at which a detailed assessment of landscape and visual effects is undertaken as part of the subsequent Impact Assessment.

#### **8.5.5.2 The Site and its Setting**

As illustrated in Figure 2.1 (See Volume 2 of the EIAR), the site is at an elevation of 5 m above sea level and is situated immediately to the south-east of Nigg Energy Park, on the northern shore of the mouth to the Cromarty Firth. In total, the site is approximately 11.27 ha and is comprised of coastal waters and land of the former Dunskeath House, with derelict buildings associated with the former Dunskeath House situated within it. The area above Mean Low Water Springs within the site boundary is approximately 4.78 ha.

Landcover across site is dominated by bare ground with areas of dense and scattered scrub, grassland, tall ruderal vegetation and some broadleaved trees. Sand and shingle above the high tide mark are also present in the south of the site and a sea wall exists in the west.

Nigg Energy Park is situated to the immediate north of the proposed development site where a dry dock, extensive laydown and some 900 m of heavy load bearing quayside (with depths of up to 12 m) are located. Technical services currently provided by Nigg Energy Park include:

- large scale and complex fabrication projects for subsea and offshore equipment;
- shot blasting and painting of infrastructure;
- specialist diving (i.e. anode replacement, subsea solutions);
- survey and engineering;
- architectural repair and refurbishment of offshore rigs;
- specialist rig access and inspection; and
- construction and decommission of offshore and subsea infrastructure.

The South Quay development is approximately 30 m west of the proposed development site. Construction of this was completed in 2015 and the facility is now fully constructed and fully utilised, and in great demand with the Applicant's North Sea oil and energy sector clients.

The Nigg Oil Terminal is located to the immediate north of Nigg Energy Park, with the B9175 and Fearn Peninsula to the east, the area where the Cromarty Firth meets the Moray Firth to the south (known as 'The Sutors') to the south, and Nigg Bay to the west (also part of the Cromarty Firth). Adjacent to the south-east of the site, the Cromarty Ferry crosses the entrance to the firth to the west of The Sutors from May to September. Access to the facility can be gained from via the B9715.

Nearby settlements include the hamlets of Balnabruich and Balnapaling to the immediate north, with CastleCraig located approximately 1.5 km to the east, and the small town of Cromarty nestled on the southern shore of the Firth, at 1.5 km to the south. The village of Nigg is approximately 2 km north and in the wider area, Arabella, Ankerville, Ballintore and the Ag are located further to the north.

Views from the site are largely focused on the panoramic view over the Cromarty Firth where several large rigs exert a prominent industrial influence. The distant mountain backdrop to the west provides a distinctive Highland context to the interplay of views over the firth. The twin headlands at North and South Sutor which stand guard over the entrance to the Cromarty Firth are another important visual feature.

### **8.5.5.3 Landscape Character**

The landscape character of the study area has been mapped and described based on the latest SHN data<sup>8</sup> and as illustrated in Figure 8.6 (see Volume 2 of the EIAR), the site is located within the *Lowland Farmed Plain* Landscape Character Type (LCT). Ten other LCTs are also within the study area.

#### *Lowland Farmed Plain LCT*

The *Lowland Farmed* LCT occupies the majority of the peninsula bounded by Tain, Tarbet Ness and Nigg, excluding the high ground to the south-east. It has a simple landform, flat to inclined (to the north-east) area of alluvial and estuarine deposits draining to the south west via wetlands to the Cromarty Firth, and rising up to the *Cliffs and Rocky Coasts* LCT. The area is intensively farmed, and there are few natural habitats. Tree cover is in occasional, fragmented, small scale plantations and small areas of broadleaf woodland exist, with occasional tree clumps, policy woodlands and infrequent patches of heath and scrub. Small areas of salt marsh exist to the south.

The land use is mainly farming, with a mix of arable and pasture on mainly large, rectangular fields. To the north sandy soils support grassy pastures divided by fences and with occasional patches of gorse, gradually giving way to natural sand and maritime habitats in the adjacent coastal shelf. To the south the soils are wetter and fields are very large, divided by drains. Here there are few natural habitats other than the outer coastal margin of mudflats and salt marsh. In the central area gently undulating glacial tills support occasional trees in groups and small plantations, fields are divided by occasional tree lines, as well as by stone dykes on higher ground to the south-east.

Settlement consists mainly of farms, small estates or small villages, connected by a network of minor, often straight roads. Portmahomack is the site of an important early medieval monastic settlement. The area has a significant number of fine Pictish carved stones with the cross slab of the Hilton of Cadboll being the most famous example. There is also a concentration of medieval chapels and the remains of an abbey at Fearn. Tower houses and grand country houses, with their attendant buildings, and extensive areas of historic designed landscape are also found in the area. Early 20th Century military activity relating to the defence of the harbour and anchorage in the Cromarty Firth has left a significant legacy in the local landscape, for example the naval airfield at Fearn. Tall and major built structures are limited to the industrial area near Nigg which is largely screened from this area by high land near the North Sutor.

The occasional, subtle landform changes increase visual interest and, combined with occasional tree cover, views within much of this landscape can be surprisingly short. From more elevated land to the south-east, views open out across the plain to the sea, Tarbet Ness, Morrich More, Cromarty Firth and mountains to the west. Across the majority of the area structures are absent, resulting in a consistent farming character with few punctuating features other than the Tarbet Ness lighthouse and occasional modern farm silos. Consequently, the nearby headland north of Nigg is dominant in views from most of the area.

### **8.5.5.4 Landscape key characteristics**

Table 8.5.9 sets out the key characteristics of each LCT within 5 km of the site (see Figure 8.6 of Volume 2) and based on an assessment of susceptibility to change and landscape value, its overall sensitivity to the proposed development. The LCTs within 5-15km are also listed.

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<sup>8</sup> [www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions](http://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions)

**Table 8.5.9: Landscape Character**

LCT	Key Characteristics	Sensitivity
<b>Within 5 km</b>		
<i>Lowland Farmed Plain</i> (344)	<ul style="list-style-type: none"> <li>• Low-lying, flat to gently undulating plain rising to a gentle incline to the south-east, ending abruptly at a line of cliffs on the south east coastline.</li> <li>• Mainly open, large fields, enclosed by drains and fences, with stone walls on higher ground.</li> <li>• Occasional tree groups, and small plantations of broadleaves and conifers, often associated with farms.</li> <li>• Minor roads and occasional small settlements, and distance from the major trunk road.</li> <li>• Limited impact of industrial development at Nigg on the rest of the area within the plain, due its physical containment on a low coastal shelf, and the screening and backdrop provide by the headland at the North Sutor.</li> <li>• Wide views from elevated areas towards the Cromarty Firth, Morrich More, and mountains to the west.</li> <li>• Visual prominence of the hill and smooth pastures and gorse at the North Sutor</li> </ul>	Medium
<i>Open Farmed Slopes</i> (346)	<ul style="list-style-type: none"> <li>• Open, convex, generally north-east facing farmed slopes.</li> <li>• Smooth slopes of arable and pasture fields forming a regular pattern, lined with occasional small trees, fences or gorse hedges.</li> <li>• Mix of crofting, small holdings and large farms giving rise to a patchwork of rectangular fields of different sizes.</li> <li>• Areas of distinctive crofting patterns with generally smaller fields and regularly scattered croft buildings.</li> <li>• Areas of distinctive, large, regular fields of large farms, with occasional small patches of birch woodland and conifer plantations and lines of trees descending the slopes.</li> <li>• Scattered settlement patterns and network of minor roads running along contour lines, with few groupings in villages or towns.</li> <li>• Ever present views which are open, expansive and outward looking.</li> </ul>	Medium-high
<i>Cliffs and Rocky Coasts</i> (348)	<ul style="list-style-type: none"> <li>• Mainly natural, narrow, rugged coastline of angular rocky cliffs and partially submerged rocky shores, interspersed with pebbly beaches, and steeply eroded glacial till cliffs.</li> <li>• Straight, almost uninterrupted alignment of the rocks signifying the location of the Great Glen Fault.</li> <li>• Abrupt transition to adjacent farmed slopes.</li> <li>• Sharp contrast between the smooth, managed farmland to the north-west and the rough, angular, vertical lines of the cliffs.</li> <li>• Lack of roads, general inaccessibility and low levels of built development, creating a sense of isolation.</li> <li>• Very infrequent, compact, linear settlements of small scale traditional buildings, overlooking inlets or pebble beaches.</li> <li>• Coastal vegetation of grasses, heather and gorse, with characteristic seasonal flowers.</li> <li>• Airy, open cliff tops and summits, with long distance, 360 degree views.</li> <li>• Enclosed sheltered backdrop of cliffs at sea level, contrasting with the dynamic movements and sounds of the sea, and focusing views sea-ward.</li> </ul>	High
<b>LCTs within 5-15 km</b>		
<ul style="list-style-type: none"> <li>• <i>Beaches, Dunes and Links</i> (281)</li> <li>• <i>Farmed and Forested Slopes</i> (345)</li> <li>• <i>Coastal Shelf</i> (343)</li> <li>• <i>Coastal Farmlands</i> (284)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Coastal Forest</i> (283)</li> <li>• <i>Forest Edge Farming</i> (341)</li> <li>• <i>Rounded Hills and Moorland Slopes</i> (330)</li> <li>• <i>Rolling Farmland and Forests</i> (285)</li> </ul>	

### 8.5.5.5 Coastal Character

Given the coastal location of the proposed development, the potential effects on coastal character (or seascape) are important to consider. Coastal character is made up of the often narrow margin of the coastal edge, its immediate hinterland, and the sea. A Coastal Character Assessment therefore examines coastal influences in more detail than a Landscape Character Assessment. These three key components of coastal character include what is commonly known as 'seascape' which refers to *"an area, as perceived by people, from land, sea or air, where the sea is a key element of the physical environment"* (Council of Europe, 2000).

In describing coastal character, there is no published information (such as the SNH landscape character assessments) on which to base this assessment on. In addressing this, a local assessment has been undertaken specifically for this LVA, based on best practice guidance<sup>9</sup>. As illustrated in Figure 8.7 (see Volume 2 of the EIAR), this focuses on identification of coastal character areas (CCAs) within a 5 km radius and Table 8.5.10 sets out overview of the key characteristics of each CCA and their associated sensitivity change.

**Table 8.5.10: Coastal Character**

CCA	Key Characteristics	Sensitivity
<i>Nigg Bay</i>	<ul style="list-style-type: none"> <li>• A gently sloping coastal edge with extensive intertidal areas contained within a distinctive bay landform.</li> <li>• Small dispersed settlements scattered along open coastal roads.</li> <li>• Wide panoramic views over open mudflats with complex natural patterns and textures across intertidal areas.</li> <li>• Diurnal rhythms of water, and seasonally migrating birds.</li> <li>• Reflections on calm days mirror the changing skies.</li> <li>• Areas of semi-natural mudflats notably contrast with prominent industrial landuses.</li> </ul>	Medium-high
<i>Cromarty Bay</i>	<ul style="list-style-type: none"> <li>• Gently sloping coastal edge with extensive intertidal areas of shingle and mudflats contained within a gently curved bay landform.</li> <li>• Open coastal road backed by rising ground of rough grass and patches of gorse.</li> <li>• Wide panoramic views over the inner firth and associated rigs.</li> <li>• Complex natural patterns and textures of intertidal shingle and mudflats;</li> <li>• Diurnal rhythms of water, and seasonally migrating birds.</li> <li>• Reflections on calm days mirror the changing skies.</li> <li>• Areas of semi-natural habitat contrast with the nearby town of Cromarty.</li> </ul>	Medium-high
<i>North Sutor Coast</i>	<ul style="list-style-type: none"> <li>• Gently shelving coastal edge of pebble beaches backed by undulating rough coastal grasses and patches of gorse, with a more rugged coastline of angular rocky cliffs and partially submerged rocky shores further to the east.</li> <li>• Short-medium range views over the mouth of the Cromarty Firth towards the village of Cromarty.</li> <li>• Longer range to the west over the firth (and associated rigs) towards distant mountains and eastwards out to open sea.</li> <li>• Complex natural patterns and textures of intertidal shingle and waves crashing on rocky cliffs.</li> <li>• Diurnal rhythms of water, and seasonally migrating birds.</li> <li>• Reflections on calm days mirror the changing skies.</li> <li>• Small dispersed settlements scattered along open coastal roads and tracks.</li> <li>• Areas of semi-natural habitat contrast with prominent industrial landuses.</li> </ul>	Medium-high
<i>Cromarty Coast</i>	<ul style="list-style-type: none"> <li>• Gently shelving coastal edge of pebble and some sandy beaches backed by undulating rough coastal grasses and patches of gorse, with a more rugged coastline of angular rocky cliffs and partially submerged rocky shores further to the east.</li> </ul>	Medium-high

<sup>9</sup> Scottish Natural Heritage (2017) 'Guidance note – Coastal Character Assessment'.

CCA	Key Characteristics	Sensitivity
	<ul style="list-style-type: none"> <li>• Short-medium range views over the mouth of the Cromarty Firth towards North Sutor.</li> <li>• Longer range to the west over the firth (and associated rigs) towards distant mountains and eastwards out to open sea.</li> <li>• Complex natural patterns and textures of intertidal shingle and waves crashing on rocky cliffs.</li> <li>• Diurnal rhythms of water, and seasonally migrating birds.</li> <li>• Reflections on calm days mirror the changing skies.</li> <li>• Small dispersed settlements scattered along open coastal roads.</li> <li>• Areas of semi-natural woodland above rocky cliffs to the east contrast with the nearby town of Cromarty.</li> </ul>	
<i>Southern and Northern Outer Firths</i>	<ul style="list-style-type: none"> <li>• Mainly natural, narrow, rugged coastline of angular rocky cliffs and partially submerged rocky shores, interspersed with pebbly beaches, and steeply eroded glacial till cliffs.</li> <li>• Straight, almost uninterrupted alignment of the rocks signifying the location of the Great Glen Fault.</li> <li>• Abrupt transition to adjacent farmed slopes.</li> <li>• Sharp contrast between the smooth, managed farmland to the north-west and the rough, angular, vertical lines of the cliffs.</li> <li>• Lack of roads, general inaccessibility and low levels of built development, creating a sense of isolation.</li> <li>• Very infrequent, compact, linear settlements of small scale traditional buildings, overlooking inlets or pebble beaches.</li> <li>• Coastal vegetation of grasses, heather and gorse, with characteristic seasonal flowers.</li> <li>• Airy, open cliff tops and summits, with long distance, 360 degree views.</li> <li>• Enclosed sheltered backdrop of cliffs at sea level, contrasting with the dynamic movements and sounds of the sea, and focusing views sea-ward.</li> </ul>	High

#### 8.5.5.6 Landscape Designations

##### Gardens and Designed Landscapes

Gardens and Designed Landscapes (GDLs) are nationally important landscapes whose grounds are consciously laid out for artistic effect. Historic Environment Scotland (HES) selects nationally important sites for the Inventory under the terms of the Ancient Monuments and Archaeological Areas Act 1979. Due to their national significance, GDLs are assessed as having a *high* sensitivity to change.

As illustrated on Figure 8.8 in Volume 2 of the EIAR, there are four GDLs within the study area and based on the HES inventory, Table 8.5.11 sets out a summary description of the two GDLs within the Zone of Theoretical Visibility (ZTV) - Cromarty House and Balnagown Castle. As the Fairy Glen and House of Geanies GDLs are outside of the ZTV (see Figure 8.13), no further description and associated assessment is therefore necessary.

##### Special Landscape Areas

In 2010, THC undertook an assessment of Special Landscape Areas (SLAs) in support of the interpretation of policy within the Highland-wide Local Development Plan. In essence, the report identifies SLAs on the basis of being large scale areas of regional importance for scenic quality, or as being small scale areas of local scenic and recreational value. The report also provides a brief citation for each area which summarises its key landscape and visual characteristics, the special qualities for which it is valued, its key sensitivities to landscape



change, and possible measures for its enhancement. Due to their regional significance, SLAs are assessed as having a *medium-high* sensitivity to change.

Within the study area, the *Sutors of Cromarty, Rosemarkie and Fort George* SLA encompasses some of the key landscape features of the Inner Moray Firth. It is an area of contrasts which forms the gateway between the open coast and expansive waters of the Moray Firth and the intimate landscapes of the Cromarty and Inverness Firths. The twin headlands at North and South Sutor which stand guard over the entrance to the Cromarty Firth are another key feature, visible from a considerable distance.

Another important juxtaposition is formed by the opposing low lying promontories at Chanonry and Fort George which reach out to each other and mark the entrance to the Inner Moray Firth. Both promontories have landmark buildings at their seaward extremities and are vantage points in their own right. However as landforms and as examples of human geography, they are perhaps best appreciated from the higher ground adjacent and to the north. This elevated perspective also reveals the extensive sandbanks between Fort George and Whiteness Head. The steep coast between the South Sutor and Rosemarkie provides further contrasts and has some qualities of wildness in an area which is otherwise man-modified or inhabited to some degree.

**Table 8.5.11: Landscape Designations**

Designation	Description	Sensitivity
Cromarty House GDL	<p><u><i>Location and landscape setting</i></u></p> <p>Cromarty House and policies adjoin the east end of Cromarty town. The designed landscape lies on the lower, north-facing slopes of Gallow Hill, directly on the shores of the Cromarty Firth. The house faces northwards with parkland to its south and south-west. The parkland is enclosed by woodlands, which screen the town and the Firth. Principal views from the house lead south-westwards over the parkland.</p> <p>The site of Cromarty Castle lies to the north-west of the house above the Chapel Burn, which flows from the south-west to form a deeply incised valley. To the north-east of Cromarty House, the opposite side of Chapel Brae is the site of St. Regulus, a pre-reformation chapel with its graveyard, set within a triangular-shaped terrace. The Coalheugh Well, below the graveyard, is a domed masonry structure adapted c 1850 to form part of the public water supply.</p> <p>The woodlands surrounding Cromarty House and forming the policies' field boundaries are prominent in the coastal landscape. To the south-east is Gallow Hill, originally planted as part of the designed landscape that retains remnants of a 19th century footpath network leading across the South Sutor. There are good vantage points from which to view Nigg Bay, the Cromarty and Moray Firths.</p> <p>The designed landscape relating to Cromarty Castle and subsequently Cromarty House, incorporated Gallow Hill and most of the South Sutor. This formal landscape became progressively informal during the late 18th/early 19th century. By the mid-19th century when the policies were largely remodelled by the Ross family, the ornamental policies included the vestiges of earlier formal plantings in the form of avenues and perimeter belts delimiting formal enclosure fields. These survive as important landscape features. The extent of the designed landscape remains unchanged.</p>	High

Designation	Description	Sensitivity
Balnagown Castle GDL	<p><u>Location and landscape setting</u></p> <p>Built to guard the Easter Ross lands, Balnagown Castle is located between the Cromarty Firth and the Dornoch Firth, commanding fine views to the southwest and east over the coastal flats. The castle stands above the narrow wooded valley of the Balnagown River on a cliff formed by a fault line and with views of the hills on the edge of Easter Ross to the west and north. The nearest town is Invergordon some 5 miles (9km) to the southwest.</p> <p>The extent of the designed landscape remains similar to that shown on the 1st edition Ordnance Survey map (surveyed 1872), extending west to the kennels on Mill Hill, south to the South Lodge, and bounded by the roads to the northeast and southeast. The main views from the Castle are northwest along the wooded valley of the Balnagown River and southwest across the parks to the Firth beyond. The boundary encompasses some 403 acres (163ha) of land.</p>	High
Sutors of Cromarty, Rosemarkie and Fort George Special Landscape Area	<p><u>Key Landscape and Visual Characteristics</u></p> <ul style="list-style-type: none"> <li>• The diverse coastal edge includes straight and indented geometry, soft shingle bars and hard cliffs, developed and undeveloped land uses and distinctive coastal landforms (including the spits at Chanonry Point, Fort George, and Whiteness, and the headlands of the Cromarty Sutors).</li> <li>• Contrasting and distinctive visual experiences are provided by the juxtaposition of elevated and sea level viewpoints and views across enclosed and open firths. Contrasting perceptions of exposure and shelter are associated with the open coast and enclosed firth.</li> <li>• The dominant undeveloped coastal edge is punctuated by the occurrence of settlements, and isolated dwellings and farmsteads dot the higher ground above the cliff tops. Huddled close to the shoreline, and densely packed, settlements retain core historical and cultural integrity and strongly and distinctively reflect their exposed coastal position.</li> <li>• Most of the coastline in this SLA, the stretch between Rosemarkie and Port an Righ, is however steep and undeveloped, punctuated only by the occurrence of isolated dwellings and farmsteads dotting the higher ground above the cliff top.</li> <li>• The distant mountain backdrop in many views gives distinctive Highland context to the interplay of views back and forth across the firth.</li> <li>• The regular pattern of farmland on inland slopes provides an attractive contrast to the more natural shorelines of cliffs, shingle banks and mudflats.</li> <li>• Unusual contrasts in scale are experienced where huge oil-rigs or large ships are viewed within the enclosed firths in the context of small scale settlement and in contrast to the horizontal arrangement of sea, land and sky.</li> <li>• The citadel of Fort George is a substantial and distinctive man-made feature in the landscape, which itself offers views of the SLA from a historical 'defended' position. The fort is linked to Ardersier by the B9006, a road that follows the line of the original military road.</li> <li>• The remains at the South Sutor form part of what is probably one of the most complete coastal batteries surviving in Scotland.</li> <li>• Some sense of remoteness and tranquillity is obtained in the less accessible areas and the cliffs and thickly wooded gullies on the steep outer edge of the Black Isle are local havens for wildlife. However, with the presence nearby of coastal settlements, ports and an airport, human activity is usually noticeable in this area – on the land, in the sea, or overhead.</li> </ul>	Medium-high

#### **8.5.5.7 Conservation Areas**

A conservation area is an area of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance and although not specifically a landscape designation, the landscape setting of the Cromarty Conservation Area is relevant to this assessment.

The harbour town of Cromarty was one of the first conservation areas to be designated in Scotland in 1974 and was subsequently granted "Outstanding" status by the Secretary of State in recognition of its outstanding architectural and historical interest.

The designation of Cromarty as a Conservation Area reflects the quality of many of its individual buildings and their relationship to each other and to the wider spaces. Its narrow streets are lined with symmetrically fronted houses and cottages, some with sophisticated detailing, such as date and marriage stones and others are quite plain. The earlier houses have steeply pitched roofs, their sharp profiles a reminder that the first quarter of the 18th century experienced a cycle of poor weather. The steep roof relieved both earlier thatch and later slates of excessive rain. Cromarty fishertown lies between Church Street and Shore Street, linked to both by Big Vennel and Gordon's Lane. Randomly sited houses vary from small single storey former fishermen's cottages to two storey houses of the late 18th and early 19th century.

A detailed assessment on the cultural significance of the designation is set out in Technical Appendix 8.4 although as part of this LVA, its value in relation landscape/coastal character and associated effects on setting are considered.

#### **8.5.5.8 Settlement**

As illustrated on Figure 8.5 (see Volume 2 of the EIAR), the landscape surrounding the site exhibits a pattern of scattered dwellings and small villages. Nearby settlements include the hamlets of Balnabruich and Balnapaling to the immediate north, with Castlecraig located approximately 1.5 km to the east, the small town of Cromarty nestled on the southern shore of the Cromarty Firth at 1.5 km to the south, and the village of Nigg approximately 2 km to the north. Main settlements in the wider landscape include Invergordon, Saltburn and Alness, all located on the northern coast of the Cromarty Firth.

All residential receptors are assessed as having a *high* susceptibility to change and considering the relatively high scenic quality of their surrounding landscape (primarily influenced by the firth and the nearby *Sutors of Cromarty, Rosemarkie and Fort George* SLA), a view towards the Site of *medium-high* value. Overall sensitivity is therefore *high*.

#### **8.5.5.9 Roads**

The site is accessed via the B9175 that leads towards the busy A9 trunk route, located approximately 6 km to the north-west at its closest point. A network of other local roads and tracks also provide access to nearby settlements to the north and east of the site. In addition to the A9, other main and minor roads include the B817 that leads along northern coast of the firth and to the south of the water, the B9163 connects Cromarty with the A9 and to its south, the A832.

Considering their partial use as important tourist routes, the overall sensitivity of those travelling along main and local roads is assessed as *medium-high* and for local roads and tracks used primarily for local access, *medium* sensitivity.

#### 8.5.5.10 Recreational Routes and Visitors

As illustrated on Figure 8.14, (see Volume 2 of the EIAR), the study area includes sections of relatively fragmented Core Path. Within 5 km, this includes a circular coastal route that leads east from the site to Castlecraig and to the south of the firth, several sections in around the coast and hinterland of Cromarty. Some passengers of the Cromarty Ferry would also be visitors/recreational users.

In addition to those using designated recreational routes, the town of Cromarty is a popular visitor destination and with its several hotels and other accommodation types, is frequently used a base to explore the coast and surrounding landscape. Parts of the firth are also important for bird watching and other informal recreational activities.

All visitors and recreational users are assessed as having a *high* susceptibility to change and considering the relatively high scenic quality of their surrounding landscape, a view towards the Site of *medium-high* value. Overall sensitivity is therefore *high*.

**Table 8.5.12: Key Visual Receptors**

Receptor	Sensitivity
<b>Settlements</b>	
Balnabruich, Balnapaling, Castlecraig, Cromarty, Nigg, Saltburn, Invergordon, Ballintore, Tain, Kildary, Fortrose.	High
<b>Roads</b>	
A9, A832, B9175, B9163, B817	Medium-high
Local roads near to site	Medium
<b>Recreational Routes and Visitors</b>	
Core Path users, ferry passengers, visitors to Cromarty and those undertaking informal recreational activity in and around the Cromarty Firth	High

#### 8.5.5.12 Viewpoint Selection

Based on the preceding identification and assessment of landscape and visual receptors, the following eight viewpoints (see Table 8.5.13 and Figure 8.10 in Volume 2 of this EIAR) have been selected to undertake a detailed investigation of landscape, seascape and visual effects. These represent the typical views experienced by a variety of visual receptors, at varying distances across the study area.

The viewpoints have been identified as those which are sensitive to change and where the most open views towards the site are generally experienced. The locations have been carefully selected to demonstrate the worst case scenario and in identifying these, a detailed analysis of the surrounding landscape was undertaken to establish the visibility of the site.

**Table 8.5.13: Viewpoint Selection**

Viewpoint	LANDSCAPE & SEASCAPE		VISUAL	
	LCT (& CCA where relevant)	Sensitivity	Receptor	Sensitivity
1. Nigg Ferry Terminal	Lowland Farmed Plain LCT	Medium	Visitors & recreational users	High
	North Sutor Coast CCA	Medium-high		
2. Cromarty Beach	Open Farmed Slopes LCT	Medium-high	Residents	High
	Cromarty Coast CCA	Medium-high	Visitors & recreational users	High
3. Track nr. Sutors of Cromarty viewpoint	Cliffs and Rocky Coasts LCT	High	Visitors & recreational users	High
	Cromarty Coast CCA	Medium-high		
4. B9163, west of Cromarty	Open Farmed Slopes LCT	Medium-high	Minor road users	Medium-high
	Cromarty Bay CCA	Medium-high		
5. Minor road, north Sutor	Open Farmed Slopes LCT	Medium-high	Visitors & recreational users	High
	North Sutor Coast CCA	Medium-high	Local road users	Medium
6. A9, nr. Kilmuir	Farmed and Forested Slopes LCT	Medium	Main road users	Medium-high
7. Saltburn	Farmed and Forested Slopes LCT	Medium	Residents	High
			Minor road users	Medium-high
8. Newhall Point	Open Farmed Slopes LCT	Medium-high	Visitors & recreational users	High
			Residents	High

**8.5.5.13 Design Mitigation**

The outline design of the proposed development is described in full within Chapter 2 of this EIAR. This has evolved as part of an iterative process that aims to provide an optimal design in environmental terms, but also takes into account technical and economic factors. As part of this, objectives to minimise any adverse landscape and visual effects have been considered and to help ensure that the proposed development integrates positively with its landscape and coastal setting, the following landscape design and mitigation measures have been embedded in the project proposals:

- The construction of a 2 m landscape bund formed from reclaimed material on the eastern and northern extents of the laydown area;
- To help integrate the bund with local landscape character (in addition to ecological benefits), it is proposed to plant this up with a neutral grassland mix with shrub species such as dog rose (*Rosa canina*), broom (*Cytisus scoparius*), gorse (*Ulex europaeus*) and juniper (*Juniperis communis*); and
- Considering the large-scale industrial landuses of the operational Nigg Energy Park, the overall design and selection of materials would generally reflect existing infrastructure.

If consented, it is expected that other relevant landscape mitigation measures would also be considered as part of a Construction Environmental Management Plan (CEMP) to be provided post-consent.

## 8.5.6 Impact Assessment

### 8.5.6.1 Overview

The remaining part of this LVA addresses the landscape and visual effects predicted during the construction and operational phase of the proposed development, taking into account the embedded mitigation measures as described in the preceding section. This is structured as follows:

- Assessment Parameters and Assumptions (see section 8.5.6.2 )
- Zone of theoretical visibility (see section 8.5.6.3)
- Viewpoint Assessment (see section 8.5.7)
  - Landscape and visual effects during construction phase
  - Landscape and visual effects during operational phase
- Construction Phase (see section 8.5.8)
  - Landscape Effects (physical landscape resources, landscape character, coastal character and landscape designations)
  - Visual Effects (residents, recreational users and road users)
- Landscape Effects: Operational Phase (see section 8.5.9)
  - physical landscape resources, landscape character, coastal character and landscape designations
- Visual Effects: Operational Phase (see section 8.5.10)
  - residents, recreational users and road users

### 8.5.6.2 Assessment Parameters and Assumptions

The purpose of this impact assessment is to predict the worst case effects based on parameters as currently known. In doing so, the impact assessment is based on the following outline design assumptions:

- A proposed east quay of plan area 250 m by 50 m (0.88 ha) constructed using perimeter piling to retain locally dredged material as infill, with concrete cope.
- Associated rock armouring.
- Dredging (via suction dredging, with barge mounted excavator used if needed) of approximately 165000 m<sup>3</sup> to achieve a minimum sea bed level at the main west facing berth of 12m below chart datum to facilitate the proposed development.
- High level lighting to quayside in accordance with Port Regulations.
- Sea water extraction for fire-fighting capability.
- Re-use of approximately 15,000 m<sup>3</sup> to 30,000 m<sup>3</sup> of dredged materials within the quay structure.
- Disposal of excess suitable dredged material (up to 150,000 m<sup>3</sup>) within The Sutors licenced disposal site at the mouth of the Cromarty Firth.
- Demolition and removal of buildings on site associated with the former Dunskeath House.
- Preparatory groundwork and associated landscaping for provision of a concrete laydown area for handling and temporary storage of plant and renewable energy components.
- A landscaped bund of 2 m height formed from reclaimed material on the eastern and northern extents of the laydown area.
- Access provision from the B1975.
- Security lighting and fencing associated with the laydown area.
- The temporary presence of a 150 m high jack-up rig in the Cromarty Firth for 10-18 weeks a year.

### 8.5.6.3 Zone of Theoretical Visibility

Figure 8.9 (see Volume 2 of this EIAR) illustrates the zone of theoretical visibility (ZTV) of the proposed development and temporary jack-up rig. The East Quay ZTV is based on a height of 6.0 m above chart datum (ACD) and a receptor viewing height of 1.8 m above ground level. Chart datum was assumed to be 2.22m below Ordnance datum. The jack-up rig ZTV is based on a height of 150 m above Ordnance datum. The location shown is indicative for the purposes of this assessment and is located approximately 1.5 km WSW from Nigg Energy Park.

In general, the ZTV of the proposed development is focused on the majority of the landscape to the west of the site. This includes most of the Cromarty Firth and areas of rising ground from the south-west to the north of the site. As part of this, long sections of main and minor roads, and the settlements of Cromarty and Invergordon, are within the ZTV. All of the landscape to the east, including most of the open sea, is outside of theoretical visibility although a relatively small proportion of the ZTV extends past the headlands at the mouth of the Cromarty Firth and out to sea.

At 150 m high, the ZTV of the jack-up rig is more extensive and in addition to those areas of ZTV as described for the East Quay ZTV, theoretical visibility of the rig also extends across Nigg Bay and in a north-easterly direction across rural areas of the *Lowland Farmed Plain* LCT. To the south of the site, the Carse of Delnies and the western part of Nairn is also within the ZTV.

In considering the extent the ZTV, it is important to note that this does not take into account the screening effect of minor variations in landform, built development, trees and woodlands, and other vegetation and manmade features. In practice therefore, it is very likely that from within most areas of settlement, intervening buildings would screen the proposed development from view, particularly the quay. The pattern of extensive forestry on areas of higher ground and the smaller woodland blocks on lower lying areas to the north and south of the Cromarty Firth would also screen views towards the site from many locations.

### 8.5.7 Viewpoint Assessment

The Viewpoint Assessment provides a detailed understanding of the landscape, coastal and visual effects predicted at eight representative viewpoint locations (see Table 8.5.13 and Figure 8.10 in Volume 2 of this EIAR). For each viewpoint, a suite of photomontages have been prepared (see Figures 8.16-23 in Volume 2 of this EIAR) which indicatively illustrate the main parts of the proposed development that would be visible. These are:

- the extent of the proposed quayside; and
- the indicative location and scale of the temporary rig.

At each viewpoint, the following images are provided:

- existing and model views towards the site at 50mm focal lengths;
- photomontage towards the site at 50mm focal lengths;
- photomontage towards the site at 75mm focal lengths; and
- wider/panoramic 80° view of site in context of the temporary rig.

In addition to providing an assessment at specific locations, the viewpoint findings are also used to inform a more general assessment of landscape, coastal and visual effects during the construction and operational phases (see Sections 8.5.9-10). It should be noted that where landscape/coastal effects are identified at each viewpoint, no conclusion on the overall significance are provided as this requires an analysis of the overall extent of any changes experienced across each receptor (e.g. LCT).

<b>VIEWPOINT 1 - Nigg Ferry Terminal</b> (see Figure 8.16)	
<i>Grid reference:</i>	NH 79625 68744
<i>View direction:</i>	290°
<i>Distance to nearest part of Development:</i>	0.18 km
<i>Landscape Character Type/Coastal Character Area:</i>	Lowland Farmed Plain LCT/ North Sutor Coast CCA
<i>Landscape designations:</i>	None
<b>Baseline Assessment</b>	
<p><i>Context:</i></p> <p>At an elevation of approximately 4 m AOD, the viewpoint is located in close proximity to the east of the site on a jetty that serves the Nigg to Cromarty ferry. An hourly service operates for a small number of cars and foot passengers during the summer months only. In addition to representing the views of visitors and other passengers using the ferry, it also represents the views of walkers and other recreational users along a short section of Core Path that leads eastwards from the jetty towards a circular coastal route around the southern part of the North Sutor headland. Although several dwellings are located nearby, due to intervening ground and/or orientation of buildings, the views of residents are not representative of this viewpoint.</p>	
<p><i>Landscape sensitivity:</i></p> <p>The viewpoint is located within the <i>Lowland Farmed Plain</i> LCT which exhibits the following key characteristics:</p> <ul style="list-style-type: none"> <li>• Low-lying, flat to gently undulating plain rising to a gentle incline to the south-east, ending abruptly at a line of cliffs on the south east coastline.</li> <li>• Mainly open, large fields, enclosed by drains and fences, with stone walls on higher ground.</li> <li>• Occasional tree groups, and small plantations of broadleaves and conifers, often associated with farms.</li> <li>• Minor roads and occasional small settlements, and distance from the major trunk road.</li> <li>• Limited impact of industrial development at Nigg on the rest of the area within the plain, due its physical containment on a low coastal shelf, and the screening and backdrop provide by the headland at the North Sutor.</li> <li>• Wide views from elevated areas towards the Cromarty Firth, Morrich More, and mountains to the west.</li> <li>• Visual prominence of the hill and smooth pastures and gorse at the North Sutor.</li> </ul> <p>The sensitivity of this LCT is assessed as <b>medium</b>.</p>	
<p><i>Coastal sensitivity:</i></p> <p>The viewpoint is located within the <i>North Sutor Coast</i> CCA which exhibits the following key characteristics:</p> <ul style="list-style-type: none"> <li>• Gently shelving coastal edge of pebble beaches backed by undulating rough coastal grasses and patches of gorse, with a more rugged coastline of angular rocky cliffs and partially submerged rocky shores further to the east.</li> <li>• Short-medium range views over the mouth of the Cromarty Firth towards the village of Cromarty.</li> <li>• Longer range to the west over the firth (and associated rigs) towards distant mountains and eastwards out to open sea.</li> <li>• Complex natural patterns and textures of intertidal shingle and waves crashing on rocky cliffs.</li> <li>• Diurnal rhythms of water, and seasonally migrating birds.</li> <li>• Reflections on calm days mirror the changing skies.</li> <li>• Small dispersed settlements scattered along open coastal roads and tracks.</li> <li>• Areas of semi-natural habitat contrast with prominent industrial landuses.</li> </ul> <p>The sensitivity of this CCA is assessed as <b>medium-high</b>.</p>	
<p><i>Visual sensitivity:</i></p> <p><u>Visitors, ferry passengers and recreational users</u> - <b>high</b> susceptibility.</p> <p>Considering the coastal setting, the scenic views over the Cromarty Firth are an important part of the experience for a relatively small number of people - <b>medium-high</b> value.</p> <p>With a <b>high</b> susceptibility and <b>medium-high</b> value, the overall sensitivity of visitors, passengers and recreational users is assessed as <b>high</b>.</p>	



VIEWPOINT 1 - Nigg Ferry Terminal (see Figure 8.16)	
Assessment of Predicted Effects	
<p><i>Parts of proposed development potentially visible:</i></p> <p>In the centre of view, a large part of the quay and associated rock armour would be visible where it extends into the firth. Lighting and temporary storage of plant and renewable energy components would also be visible on the quay and for several weeks every few months, a jack-rig would also be visible in the firth.</p>	
<p><i>Construction effects:</i></p> <p>Construction activity including pilling operations, the dredging of the seabed, potential rock armour placement and concrete works associated with the quay would be very obvious. Some land based construction activity associated with the clearance of buildings and landform regrading would also be noticeable to the right of view.</p> <p>These relatively complex and large scale engineering operations on land and sea would result in relatively widespread views of construction infrastructure, storage of materials, noise, activity and movement of large vehicles in close proximity. To some degree however, the effects of construction activity are offset by the industrial nature of the locality and the presence of existing large-scale infrastructure and associated activity taking place in the nearby backdrop to the site. The magnitude of landscape, coastal and visual effect is therefore assessed as <b>medium-large</b>.</p>	
<p><i>Landscape effects (operational):</i></p> <p>During the operational stages, the quayside and associated storage of equipment would be experienced in context of a heavily industrialised setting and as such, any changes would be entirely characteristic to the locality. Although the quay would be very noticeable, it would not detract from or affect the large majority key characteristics of the <i>Lowland Farmed Plain</i> LCT. In particular, there would be very limited change on the wider landscape due to the site's physical containment on a low coastal shelf, and the screening and backdrop provided by the headland of North Sutor.</p> <p>Overall, the proposed development would result in a noticeable change that only affects some key characteristics and experience of the landscape slightly. As such, the magnitude of landscape effect is predicted to be <b>small-medium</b>.</p>	
<p><i>Coastal effects (operational):</i></p> <p>As with landscape effects, the proposed development would be entirely characteristic to its coastal locality of large-scale industrial development and activity taking place on and around existing quays. The coastal grasses and rugged coastline of rocky cliffs further to the east of the <i>North Sutor Coast</i> CCA would remain largely unaffected, as would most of the more natural marine character and qualities of the Cromarty Firth. Considering the presence several existing rigs in the firth, the addition of a further jack-up rig for 10-18 weeks a year would also be characteristic to the seascape.</p> <p>Consequently, the magnitude of coastal effect is predicted to be <b>small-medium</b>.</p>	
<p><i>Visual effects (operational):</i></p> <p>Once operational, the quayside and associated infrastructure, while occupying a large proportion of the view, would be viewed entirely within the visual envelope of existing industrial development and activity taking place at Nigg Energy Park and the nearby oil terminal. As such, any changes are minimised by the proposed development reflecting the visual composition of existing infrastructure. Although development and activity would appear closer to the viewer, there would be little change to the focus of the view and the important views over the Cromarty Firth and out to sea would be largely unaffected.</p> <p>The magnitude of visual effect is assessed as <b>small-medium</b>.</p>	
Summary	
<i>Significance of visual effects (construction)</i>	Visitors/recreational users: <i>moderate-major</i> (adverse) - <b>significant</b>
<i>Magnitude of landscape/coastal effects (construction)</i>	Lowland Farmed Plain LCT: <i>medium-large</i> (adverse)
	North Sutor Coast CCA: <i>medium-large</i> (adverse)

<b>VIEWPOINT 1 - Nigg Ferry Terminal</b> (see Figure 8.16)	
<i>Significance of visual effects (operational)</i>	Visitors/recreational users: <i>moderate</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape/coastal effects (operational)</i>	Lowland Farmed Plain LCT: <i>small-medium</i> (adverse)
	North Sutor Coast CCA: <i>small-medium</i> (adverse)

<b>VIEWPOINT 2 - Cromarty Beach</b> (see Figure 8.17)	
<i>Grid reference:</i>	NH 78909 67619
<i>View direction:</i>	350°
<i>Distance to nearest part of Development:</i>	1.25 km
<i>Landscape Character Type/Coastal Character Area:</i>	Open Farmed Slopes LCT / Cromarty Coast CCA
<i>Landscape designations:</i>	Cromarty Conservation Area
<b>Baseline Assessment</b>	
<p><i>Context:</i></p> <p>At an elevation of approximately 4 m AOD, the viewpoint is from Cromarty Beach, located immediately to the north of Cromarty town centre. A small nearby car park provides access to the beach which is backed by an area of informal open space. In addition to representing the views of visitors to the town and those undertaking recreational activity along the coastline, the viewpoint also represents the views of some nearby residents whose rear-facing dwellings provide views over the firth. The viewpoint is also located on the edge the Cromarty Conservation Area and in close proximity to the Sutors of Cromarty, Rosemarkie and Fort George SLA. Cromarty House GDL also provides a backdrop to the town.</p>	
<p><i>Landscape sensitivity:</i></p> <p>The viewpoint is located within the <i>Open Farmed Slopes</i> LCT which exhibits the following key characteristics:</p> <ul style="list-style-type: none"> <li>• Open, convex, generally north-east facing farmed slopes.</li> <li>• Smooth slopes of arable and pasture fields forming a regular pattern, lined with occasional small trees, fences or gorse hedges.</li> <li>• Mix of crofting, small holdings and large farms giving rise to a patchwork of rectangular fields of different sizes.</li> <li>• Areas of distinctive crofting patterns with generally smaller fields and regularly scattered croft buildings.</li> <li>• Areas of distinctive, large, regular fields of large farms, with occasional small patches of birch woodland and conifer plantations and lines of trees descending the slopes.</li> <li>• Scattered settlement patterns and network of minor roads running along contour lines, with few groupings in villages or towns.</li> <li>• Ever present views which are open, expansive and outward looking.</li> </ul> <p>The sensitivity of this LCT is assessed as <b>medium-high</b>.</p>	
<p><i>Coastal sensitivity:</i></p> <p>The viewpoint is located within the <i>Cromarty Coast</i> CCA which exhibits the following key characteristics:</p> <ul style="list-style-type: none"> <li>• Gently shelving coastal edge of pebble and some sandy beaches backed by undulating rough coastal grasses and patches of gorse, with a more rugged coastline of angular rocky cliffs and partially submerged rocky shores further to the east.</li> <li>• Short-medium range views over the mouth of the Cromarty Firth towards North Sutor.</li> <li>• Longer range to the west over the firth (and associated rigs) towards distant mountains and eastwards out to open sea.</li> <li>• Complex natural patterns and textures of intertidal shingle and waves crashing on rocky cliffs.</li> <li>• Diurnal rhythms of water, and seasonally migrating birds.</li> <li>• Reflections on calm days mirror the changing skies.</li> <li>• Small dispersed settlements scattered along open coastal roads.</li> <li>• Areas of semi-natural woodland above rocky cliffs to the east contrast with the nearby town of Cromarty.</li> </ul>	

<b>VIEWPOINT 2 - Cromarty Beach</b> (see Figure 8.17)
The sensitivity of this CCA is assessed as <b>medium-high</b> .
<p><i>Visual sensitivity:</i></p> <p><u>Residents, visitors and recreational users</u> - <i>high</i> susceptibility.</p> <p>Considering the coastal setting and proximity to designated landscapes, the scenic views over the Cromarty Firth are an important part of the experience for a relatively large number of people - <i>high</i> value.</p> <p>With a <i>high</i> susceptibility and <i>high</i> value, the overall sensitivity of residents, visitors and recreational users is assessed as <b>high</b>.</p>
<b>Assessment of Predicted Effects</b>
<p><i>Parts of proposed development potentially visible:</i></p> <p>Located immediately to the right of the existing Nigg Energy Park, all of the quay and associated rock armour would be visible where it extends along the coastline of the firth. Lighting and temporary storage of plant and renewable energy components would also be visible on the quay and for several weeks every few months, a jack-rig would also be visible in the firth.</p>
<p><i>Construction effects:</i></p> <p>Construction activity including pilling operations, the dredging of the seabed, potential rock armour placement and concrete works associated with the quay would be noticeable in views over the firth. Most land based construction activity associated with the clearance of buildings and landform regrading would also be noticeable on gently rising ground behind the quay construction. These engineering operations on land and sea would result in relatively localised views of construction infrastructure, storage of materials, noise, activity and movement of large vehicles in a short-medium range view. To some degree however, the effects of construction activity are offset by the industrial nature of the locality and the presence of existing large-scale infrastructure and associated activity taking place immediately to the left of the site.</p> <p>The magnitude of landscape, coastal and visual effect is therefore assessed as <b>medium</b>.</p>
<p><i>Landscape effects (operational):</i></p> <p>During the operational stages, the quayside and associated storage of equipment would be experienced in context of a heavily industrialised setting and as such, any changes would be entirely characteristic to the locality. Although the quay and associated infrastructure would be noticeable, it would not detract from or affect most key characteristics of the <i>Open Farmed Slopes</i> LCT. As it would extend the influence of development along the opposing coastline however, the 'ever present views which are open, expansive and outward looking' would be compromised to a degree.</p> <p>Overall, the proposed development would result in a noticeable change that only affects some key characteristics and experience of the landscape slightly. As such, the magnitude of landscape effect is predicted to be <b>small-medium</b>.</p>
<p><i>Coastal effects (operational):</i></p> <p>As with landscape effects, the proposed development would be entirely characteristic to its coastal locality of large-scale industrial development and activity taking place on and around existing quays located in the backdrop to the <i>Cromarty Coast</i> CCA. Important characteristics such as the 'longer range to the west over the firth 'towards distant mountains and eastwards out to open sea' and the 'areas of semi-natural woodland above rocky cliffs to the east' would remain largely unaffected, as would most of the more natural marine character and qualities of the Cromarty Firth. Considering the presence several existing rigs in the firth, the addition of a further jack-up rig for 10-18 weeks a year would also be characteristic to the local seascape.</p> <p>Consequently, the magnitude of coastal effect is predicted to be <b>small-medium</b>.</p>
<p><i>Visual effects (operational):</i></p> <p>Once operational, the quayside and associated infrastructure would be viewed outwith the visual envelope of existing industrial development and activity taking place at Nigg Energy Park although at this distance, it would only occupy a relatively small proportion of the view. In general, any changes are minimised by the proposed development reflecting the visual composition of existing infrastructure. Development and activity would not appear noticeably closer to the viewer, nor would it be the most noticeable element in view.</p>

<b>VIEWPOINT 2 - Cromarty Beach</b> (see Figure 8.17)	
Furthermore, there would be little change to the focus of the view and the wider views over the Cromarty Firth and out to sea would be largely unaffected. The magnitude of visual effect is assessed as <b>small-medium</b> .	
<b>Summary</b>	
<i>Significance of visual effects (construction)</i>	Visitors/recreational/residents: <i>moderate-major</i> (adverse) - <b>significant</b>
<i>Magnitude of landscape/coastal effects (construction)</i>	<i>Open Farmed Slopes LCT: medium</i> (adverse)
	<i>Cromarty Coast CCA: medium</i> (adverse)
<i>Significance of visual effects (operational)</i>	Visitors/recreational/residents: <i>moderate</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape/coastal effects (operational)</i>	<i>Open Farmed Slopes LCT: small-medium</i> (adverse)
	<i>Cromarty Coast CCA: small-medium</i> (adverse)

<b>VIEWPOINT 3 - Track nr. Sutors of Cromarty viewpoint</b> (see Figure 8.18)	
<i>Grid reference:</i>	NH 80610 67129
<i>View direction:</i>	310°
<i>Distance to nearest part of Development:</i>	1.99 km
<i>Landscape Character Type/Coastal Character Area:</i>	Cliffs and Rocky Coasts LCT / Cromarty Coast CCA
<i>Landscape designations:</i>	Sutors of Cromarty, Rosemarkie and Fort George SLA
<b>Baseline Assessment</b>	
<p><i>Context:</i></p> <p>At an elevation of approximately 116 m AOD, the viewpoint is located alongside an access track (also designated a Core Path) that leads towards a nearby scenic viewpoint and associated carpark that overlooks the Moray Firth. From the scenic viewpoint located approximately 100m to the east of this assessment viewpoint, views towards the site are screened by intervening trees woodland along the northern slopes of the headland. When travelling along the access track, the large majority of views towards the site also screened by adjacent woodland. Located within the Sutors of Cromarty, Rosemarkie and Fort George SLA, the appreciation of scenic views are an important part of the visitor experience.</p>	
<p><i>Landscape sensitivity:</i></p> <p>The viewpoint is located within the <i>Cliffs and Rocky Coasts</i> LCT which exhibits the following key characteristics:</p> <ul style="list-style-type: none"> <li>• Mainly natural, narrow, rugged coastline of angular rocky cliffs and partially submerged rocky shores, interspersed with pebbly beaches, and steeply eroded glacial till cliffs.</li> <li>• Straight, almost uninterrupted alignment of the rocks signifying the location of the Great Glen Fault.</li> <li>• Abrupt transition to adjacent farmed slopes.</li> <li>• Sharp contrast between the smooth, managed farmland to the north-west and the rough, angular, vertical lines of the cliffs.</li> <li>• Lack of roads, general inaccessibility and low levels of built development, creating a sense of isolation.</li> <li>• Very infrequent, compact, linear settlements of small scale traditional buildings, overlooking inlets or pebble beaches.</li> <li>• Coastal vegetation of grasses, heather and gorse, with characteristic seasonal flowers.</li> <li>• Airy, open cliff tops and summits, with long distance, 360 degree views.</li> <li>• Enclosed sheltered backdrop of cliffs at sea level, contrasting with the dynamic movements and sounds of the sea, and focusing views sea-ward.</li> </ul> <p>The sensitivity of this LCT is assessed as <b>high</b>.</p>	

<b>VIEWPOINT 3 - Track nr. Sutors of Cromarty viewpoint (see Figure 8.18)</b>
<p><i>Coastal sensitivity:</i></p> <p>The viewpoint is located within the <i>Cromarty Coast</i> CCA which exhibits the following key characteristics:</p> <ul style="list-style-type: none"> <li>• Gently shelving coastal edge of pebble and some sandy beaches backed by undulating rough coastal grasses and patches of gorse, with a more rugged coastline of angular rocky cliffs and partially submerged rocky shores further to the east.</li> <li>• Short-medium range views over the mouth of the Cromarty Firth towards North Sutor.</li> <li>• Longer range to the west over the firth (and associated rigs) towards distant mountains and eastwards out to open sea.</li> <li>• Complex natural patterns and textures of intertidal shingle and waves crashing on rocky cliffs.</li> <li>• Diurnal rhythms of water, and seasonally migrating birds.</li> <li>• Reflections on calm days mirror the changing skies.</li> <li>• Small dispersed settlements scattered along open coastal roads.</li> <li>• Areas of semi-natural woodland above rocky cliffs to the east contrast with the nearby town of Cromarty.</li> </ul> <p>The sensitivity of this CCA is assessed as <b>medium-high</b>.</p>
<p><i>Visual sensitivity:</i></p> <p><u>Visitors and recreational users</u> - <i>high</i> susceptibility.</p> <p>Considering the coastal setting of the SLA, the scenic views over the Cromarty and Moray firths are an important part of the experience near to an important viewpoint - <i>high</i> value.</p> <p>With a <i>high</i> susceptibility and <i>high</i> value, the overall sensitivity of visitors and recreational users is assessed as <b>high</b>.</p>
<p><b>Assessment of Predicted Effects</b></p>
<p><i>Parts of proposed development potentially visible:</i></p> <p>Appearing on the immediate foreshore to the existing Nigg Energy Park, all of the quay and associated rock armour would be visible as it extends into the firth. Lighting and temporary storage of plant and renewable energy components would also be visible on the quay and for several weeks every few months, a jack-rig would also be visible in the firth.</p>
<p><i>Construction effects:</i></p> <p>Construction activity including pilling operations, the dredging of the seabed, rock armour placement and concrete works associated with the quay would be quite noticeable in views over the firth. All land based construction activity associated with the clearance of buildings and landform regrading would also be quite noticeable on gently rising ground behind the quay construction. These engineering operations on land and sea would result in localised views of construction infrastructure, storage of materials, noise, activity and movement of large vehicles in a short-medium range view. To some degree however, the effects of construction activity are offset by the industrial nature of the locality and the presence of existing large-scale infrastructure and associated activity taking place in the immediate backdrop to the site.</p> <p>The magnitude of landscape, coastal and visual effect is therefore assessed as <b>small</b>.</p>
<p><i>Landscape effects (operational):</i></p> <p>During the operational stages, the quayside and associated storage of equipment would be experienced in context of a heavily industrialised setting and as such, any changes would be entirely characteristic to the locality. Although the quay and associated infrastructure would be quite noticeable, it would not detract from or affect most key characteristics of the <i>Cliffs and Rocky Coasts</i> LCT. Furthermore, it would not appear to extend the influence of development along the opposing coastline although the 'open cliff tops and summits, with long distance, 360 degree views' would be compromised to a small degree.</p> <p>Overall, the proposed development would only result in a relatively minor change that only affects some key characteristics and experience of the landscape slightly. As such, the magnitude of landscape effect is predicted to be <b>small</b>.</p>
<p><i>Coastal effects (operational):</i></p> <p>As with landscape effects, the proposed development would be entirely characteristic to its coastal locality of</p>

VIEWPOINT 3 - Track nr. Sutors of Cromarty viewpoint (see Figure 8.18)	
<p>large-scale industrial development and activity taking place on and around existing quays located in the backdrop to the <i>Cromarty Coast</i> CCA. Important characteristics such as the 'longer range to the west over the firth 'towards distant mountains and eastwards out to open sea' would remain largely unaffected, as would most of the more natural marine character and qualities of the Cromarty Firth. Considering the presence several existing rigs in the firth, the addition of a further jack-up rig for 10-18 weeks a year would also be characteristic to the local seascape.</p> <p>Consequently, the magnitude of coastal effect is predicted to be <b>small</b>.</p>	
<p><i>Visual effects (operational):</i></p> <p>Once operational, the quayside and associated infrastructure would be viewed within the visual envelope of existing industrial development and activity taking place at Nigg Energy Park and at this distance, it would only occupy a relatively small proportion of the view. Any changes to visual amenity are minimised by the proposed development reflecting the visual composition of existing infrastructure. Although development and activity would appear slightly closer to the viewer, it would not be the most noticeable element in view. Furthermore, there would be little change to the focus of the view and the wider views over the Cromarty Firth and out to sea would be largely unaffected.</p> <p>The magnitude of visual effect is assessed as <b>small</b>.</p>	
Summary	
<i>Significance of visual effects (construction)</i>	Visitors and recreational users: <i>moderate</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape/coastal effects (construction)</i>	Cliffs and Rocky Coasts LCT: <i>small</i> (adverse)
	Cromarty Coast CCA: <i>small</i> (adverse)
<i>Significance of visual effects (operational)</i>	Visitors and recreational users: <i>moderate</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape/coastal effects (operational)</i>	Cliffs and Rocky Coasts LCT: <i>small</i> (adverse)
	Cromarty Coast CCA: <i>small</i> (adverse)

VIEWPOINT 4 - B9163, west of Cromarty (see Figure 8.19)	
<i>Grid reference:</i>	NH 77650 66939
<i>View direction:</i>	30°
<i>Distance to nearest part of Development:</i>	2.55 km
<i>Landscape Character Type/Coastal Character Area:</i>	Open Farmed Slopes LCT / Cromarty Bay CCA
<i>Landscape designations:</i>	None
Baseline Assessment	
<p><i>Context:</i></p> <p>At an elevation of approximately 4 m AOD, the viewpoint is located alongside the B9163, approximately 1 km to the south-west of Cromarty. This relatively busy minor road links Cromarty to the A9 and considering its open nature, similar views towards the site are experienced for several kilometres along it.</p>	
<p><i>Landscape sensitivity:</i></p> <p>The viewpoint is located within the <i>Open Farmed Slopes</i> LCT which exhibits the following key characteristics:</p> <ul style="list-style-type: none"> <li>• Open, convex, generally north-east facing farmed slopes.</li> <li>• Smooth slopes of arable and pasture fields forming a regular pattern, lined with occasional small trees, fences or gorse hedges.</li> <li>• Mix of crofting, small holdings and large farms giving rise to a patchwork of rectangular fields of different sizes.</li> <li>• Areas of distinctive crofting patterns with generally smaller fields and regularly scattered croft buildings.</li> </ul>	

<b>VIEWPOINT 4 - B9163, west of Cromarty</b> (see Figure 8.19)
<ul style="list-style-type: none"> <li>• Areas of distinctive, large, regular fields of large farms, with occasional small patches of birch woodland and conifer plantations and lines of trees descending the slopes.</li> <li>• Scattered settlement patterns and network of minor roads running along contour lines, with few groupings in villages or towns.</li> <li>• Ever present views which are open, expansive and outward looking.</li> </ul> <p>The sensitivity of this LCT is assessed as <b>medium-high</b>.</p>
<p><i>Coastal sensitivity:</i></p> <p>The viewpoint is located within the <i>Cromarty Bay</i> CCA which exhibits the following key characteristics:</p> <ul style="list-style-type: none"> <li>• Gently sloping coastal edge with extensive intertidal areas of shingle and mudflats contained with a gently curved bay landform.</li> <li>• Open coastal road backed by rising ground of rough grass and patches of gorse.</li> <li>• Wide panoramic views over the inner firth and associated rigs.</li> <li>• Complex natural patterns and textures of intertidal shingle and mudflats;</li> <li>• Diurnal rhythms of water, and seasonally migrating birds.</li> <li>• Reflections on calm days mirror the changing skies.</li> <li>• Areas of semi-natural habitat contrast with the nearby town of Cromarty.</li> </ul> <p>The sensitivity of this CCA is assessed as <b>medium-high</b>.</p>
<p><i>Visual sensitivity:</i></p> <p><u>Road users</u> - <i>medium</i> susceptibility.</p> <p>Considering the scenic views over the Cromarty firth, the views of a relatively large number of road users, some of which are tourists, are assessed as having a <i>high</i> value.</p> <p>With a <i>medium</i> susceptibility and <i>high</i> value, the overall sensitivity of road users is assessed as <b>medium-high</b>.</p>
<b>Assessment of Predicted Effects</b>
<p><i>Parts of proposed development potentially visible:</i></p> <p>Appearing immediately to the right of the existing Nigg Energy Park, all of the quay and associated rock armour would be visible where it extends along the coastline of the firth. Lighting and temporary storage of plant and renewable energy components would also be visible on the quay and for several weeks every few months, a jack-rig would also be visible in the firth.</p>
<p><i>Construction effects:</i></p> <p>Construction activity including pilling operations, the dredging of the seabed, rock armour placement and concrete works associated with the quay would be quite noticeable in views over the firth. Most land based construction activity associated with the clearance of buildings and landform regrading would also be quite noticeable on gently rising ground behind the quay construction. These engineering operations on land and sea would result in localised views of construction infrastructure, storage of materials, noise, activity and movement of large vehicles in a short-medium range view. To some degree however, the effects of construction activity are offset by the industrial nature of the locality and the presence of existing large-scale infrastructure and associated activity taking place in the immediate backdrop to the site.</p> <p>The magnitude of landscape, coastal and visual effect is therefore assessed as <b>small</b>.</p>
<p><i>Landscape effects (operational):</i></p> <p>During the operational stages, the quayside and associated storage of equipment would be experienced in context of a heavily industrialised setting and as such, any changes would be entirely characteristic to the locality. Although the quay and associated infrastructure would be quite noticeable, it would not detract from or affect most key characteristics of the <i>Open Farmed Slopes</i> LCT. As it would extend the influence of development along the opposing coastline however, the 'ever present views which are open, expansive and outward looking' would be compromised to a small degree.</p> <p>Overall, the proposed development would only result in a relatively minor change that only affects some key characteristics and experience of the landscape slightly. As such, the magnitude of landscape effect is predicted to be <b>small</b>.</p>

<b>VIEWPOINT 4 - B9163, west of Cromarty</b> (see Figure 8.19)	
<p><i>Coastal effects (operational):</i></p> <p>As with landscape effects, the proposed development would be entirely characteristic to its coastal locality of large-scale industrial development and activity taking place on and around existing quays located in the backdrop to the <i>Cromarty Bay</i> CCA. Important characteristics such as the wide panoramic views over the inner firth would remain largely unaffected, as would the semi-natural character of the coastal edge and the marine character and qualities of the Cromarty Firth. Considering the presence several existing rigs in the firth, the addition of a further jack-up rig for 10-18 weeks a year would also be characteristic to the local seascape.</p> <p>Consequently, the magnitude of coastal effect is predicted to be <b>small</b>.</p>	
<p><i>Visual effects (operational):</i></p> <p>Once operational, the quayside and associated infrastructure would be viewed outwith the visual envelope of existing industrial development and activity taking place at Nigg Energy Park although at this distance, it would only occupy a relatively small proportion of the view. Any changes to visual amenity are minimised by the proposed development reflecting the visual composition of existing infrastructure. The development and activity would not appear any closer to the viewer, nor would it be the most noticeable element in view. Furthermore, there would be little change to the focus of the view and the wider views over the Cromarty Firth and out to sea would be largely unaffected.</p> <p>The magnitude of visual effect is assessed as <b>small</b>.</p>	
<b>Summary</b>	
<i>Significance of visual effects (construction)</i>	Road users: <i>minor-moderate</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape/coastal effects (construction)</i>	Open Farmed Slopes LCT: <i>small</i> (adverse)
	Cromarty Bay CCA: <i>small</i> (adverse)
<i>Significance of visual effects (operational)</i>	Road users: <i>minor-moderate</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape/coastal effects (operational)</i>	Open Farmed Slopes LCT: <i>small</i> (adverse)
	Cromarty Bay CCA: <i>small</i> (adverse)

<b>VIEWPOINT 5 - Minor road, North Sutor</b> (see Figure 8.20)	
<i>Grid reference:</i>	NH 80828 69041
<i>View direction:</i>	260°
<i>Distance to nearest part of Development:</i>	1.41 km
<i>Landscape Character Type/Coastal Character Area:</i>	Open Farmed Slopes LCT / North Sutor Coast CCA
<i>Landscape designations:</i>	None
<b>Baseline Assessment</b>	
<p><i>Context:</i></p> <p>At an elevation of approximately 72 m AOD, the viewpoint is located alongside a quiet local road that leads up the hillside towards Castlecraig. In addition to representing the views of road users, the viewpoint also represents the views of recreational users travelling along a section of Core Path that provides a circular route around of the headland.</p>	
<p><i>Landscape sensitivity:</i></p> <p>The viewpoint is located within the <i>Open Farmed Slopes</i> LCT which exhibits the following key characteristics:</p> <ul style="list-style-type: none"> <li>• Open, convex, generally north-east facing farmed slopes.</li> <li>• Smooth slopes of arable and pasture fields forming a regular pattern, lined with occasional small trees, fences or gorse hedges.</li> </ul>	



<b>VIEWPOINT 5 - Minor road, North Sutor</b> (see Figure 8.20)
<ul style="list-style-type: none"> <li>• Mix of crofting, small holdings and large farms giving rise to a patchwork of rectangular fields of different sizes.</li> <li>• Areas of distinctive crofting patterns with generally smaller fields and regularly scattered croft buildings.</li> <li>• Areas of distinctive, large, regular fields of large farms, with occasional small patches of birch woodland and conifer plantations and lines of trees descending the slopes.</li> <li>• Scattered settlement patterns and network of minor roads running along contour lines, with few groupings in villages or towns.</li> <li>• Ever present views which are open, expansive and outward looking.</li> </ul> <p>The sensitivity of this LCT is assessed as <b>medium-high</b>.</p>
<p><i>Coastal sensitivity:</i></p> <p>The viewpoint is located within the <i>North Sutor Coast</i> CCA which exhibits the following key characteristics:</p> <ul style="list-style-type: none"> <li>• Gently shelving coastal edge of pebble beaches backed by undulating rough coastal grasses and patches of gorse, with a more rugged coastline of angular rocky cliffs and partially submerged rocky shores further to the east.</li> <li>• Short-medium range views over the mouth of the Cromarty Firth towards the village of Cromarty.</li> <li>• Longer range to the west over the firth (and associated rigs) towards distant mountains and eastwards out to open sea.</li> <li>• Complex natural patterns and textures of intertidal shingle and waves crashing on rocky cliffs.</li> <li>• Diurnal rhythms of water, and seasonally migrating birds.</li> <li>• Reflections on calm days mirror the changing skies.</li> <li>• Small dispersed settlements scattered along open coastal roads and tracks.</li> <li>• Areas of semi-natural habitat contrast with prominent industrial landuses.</li> </ul> <p>The sensitivity of this CCA is assessed as <b>medium-high</b>.</p>
<p><i>Visual sensitivity:</i></p> <p><u>Recreational users</u> - <i>high</i> susceptibility.</p> <p>Considering the coastal setting, the scenic views over the Cromarty Firth are an important part of the experience for a relatively small number of people - <i>medium-high</i> value.</p> <p>With a <i>high</i> susceptibility and <i>medium-high</i> value, the overall sensitivity of recreational users is assessed as <b>high</b>.</p> <p><u>Road users</u> - <i>medium</i> susceptibility.</p> <p>Considering the scenic views over the Cromarty firth, the views of a very small number of road users, some of which are tourists, are assessed as having a <i>medium-high</i> value.</p> <p>With a <i>medium</i> susceptibility and <i>medium-high</i> value, the overall sensitivity of road users is assessed as <b>medium</b>.</p>
<b>Assessment of Predicted Effects</b>
<p><i>Parts of proposed development potentially visible:</i></p> <p>Appearing on the immediate foreshore to the existing Nigg Energy Park, part of the quay and associated rock armour would be visible as it extends into the firth. Lighting and temporary storage of plant and renewable energy components would also be visible on the quay and for several weeks every few months, a jack-rig would also be visible in the firth.</p>
<p><i>Construction effects:</i></p> <p>Construction activity including pilling operations, the dredging of the seabed, rock armour placement and concrete works associated with the quay would be quite noticeable in views over the firth although intervening vegetation would screen this in places. Most land based construction activity associated with the clearance of buildings and landform regrading would also be quite noticeable on gently rising ground to the right of the quay construction. These engineering operations on land and sea would result in relatively localised views of construction infrastructure, storage of materials, noise, activity and movement of large vehicles in a long range view. To some degree however, the effects of construction activity are offset by the industrial nature of the locality and the presence of existing large-scale infrastructure and associated activity</p>

<b>VIEWPOINT 5 - Minor road, North Sutor</b> (see Figure 8.20)	
<p>taking place in the immediate backdrop to the site.</p> <p>The magnitude of landscape, coastal and visual effect is therefore assessed as <b>small</b>.</p>	
<p><i>Landscape effects (operational):</i></p> <p>During the operational stage, the quayside and associated storage of equipment would be experienced in context of a heavily industrialised setting and as such, any changes would be entirely characteristic to the locality. Although the quay and associated infrastructure would be quite noticeable, it would not detract from or affect most key characteristics of the <i>Open Farmed Slopes</i> LCT. From this location, it would appear to extend the influence of development along the coastline to a small degree although the ‘ever present views which are open, expansive and outward looking’ would only be affected to very a limited degree.</p> <p>Overall, the proposed development would only result in a relatively minor change that only affects some key characteristics and experience of the landscape slightly. As such, the magnitude of landscape effect is predicted to be <b>small</b>.</p>	
<p><i>Coastal effects (operational):</i></p> <p>As with landscape effects, the proposed development would be entirely characteristic to its coastal locality of large-scale industrial development and activity taking place on and around existing quays located in the backdrop to the <i>Sutor Coast</i> CCA. Important characteristics such as the ‘longer range to the west over the firth ‘towards distant mountains and eastwards out to open sea’ would remain largely unaffected, as would most of the more natural marine character and qualities of the Cromarty Firth. Considering the presence several existing rigs in the firth, the addition of a further jack-up rig for 10-18 weeks a year would also be characteristic to the local seascape.</p> <p>Consequently, the magnitude of coastal effect is predicted to be <b>small</b>.</p>	
<p><i>Visual effects (operational):</i></p> <p>Once operational, the quayside and associated infrastructure would be viewed largely within the visual envelope of existing industrial development and activity taking place at Nigg Energy Park and at this distance, it would only occupy a relatively small proportion of a wide view. Any changes to visual amenity are minimised by the proposed development reflecting the visual composition of existing infrastructure and in places, the proposed bund and intervening vegetation would provide some limited screening. Although development and activity would appear closer to the viewer, it would not be the most noticeable element in view. Furthermore, there would be little change to the focus of the view and the wider views over the Cromarty Firth and out to sea would be largely unaffected.</p> <p>The magnitude of visual effect is assessed as <b>small</b>.</p>	
<b>Summary</b>	
<i>Significance of visual effects (construction)</i>	Recreational users: <i>moderate</i> (adverse) – <b>not significant</b>
	Road users: <i>minor-moderate</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape/coastal effects (construction)</i>	Open Farmed Slopes LCT: <i>small</i> (adverse)
	Sutor Coast CCA: <i>small</i> (adverse)
<i>Significance of visual effects (operational)</i>	Recreational users: <i>moderate</i> (adverse) – <b>not significant</b>
	Road users: <i>minor-moderate</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape/coastal effects (operational)</i>	Open Farmed Slopes LCT: <i>small</i> (adverse)
	Sutor Coast CCA: <i>small</i> (adverse)

VIEWPOINT 6 - A9, nr. Kilmuir (see Figure 8.21)	
Grid reference:	NH 75546 73619
View direction:	145°
Distance to nearest part of Development:	6.24 km
Landscape Character Type	Farmed and Forested Slopes LCT
Landscape designations:	None
<b>Baseline Assessment</b>	
<p><b>Context:</b></p> <p>At an elevation of approximately 28 m AOD, the viewpoint is located in lay-by alongside the busy A9 to the north of Kilmuir and the south-west of Kildary. The views of road users towards the site from the large majority of the route that leads along the northern part of the firth are screened by intervening roadside trees and woodlands in the wider landscape.</p>	
<p><b>Landscape sensitivity:</b></p> <p>The viewpoint is located within the <i>Farmed and Forested Slopes</i> LCT which exhibits the following key characteristics:</p> <p>Complex pattern of farmland, tree cover, forests and woodland on sloped, often terraced land rising from firths or river plains to mid-elevations and often backed by large scale forest plantations where there are adjacent hills.</p> <ul style="list-style-type: none"> <li>• Overall impression of a well-treed landscape, but within which farming is the dominant land use.</li> <li>• Generally higher proportion of trees, woodland and forest plantations in upper slopes forming a well-connected network within which fields are located.</li> <li>• Terraces of open land, interspersed with forest plantations and woodlands on mid slopes.</li> <li>• Gradual change to more open landscapes at lower levels.</li> <li>• Wide range and distribution of archaeological sites indicating a long history of human settlement.</li> <li>• Occasional large settlements in a predominantly rural landscape.</li> <li>• Views from more open, terraced areas across lowlands or firth to hills or out to sea.</li> </ul> <p>The sensitivity of this LCT is assessed as <b>medium</b>.</p>	
<p><b>Road users - medium susceptibility.</b></p> <p>Considering the scenic views over the Cromarty firth, the views of a very large number of road users, some of which are tourists, are assessed as having a <i>high</i> value.</p> <p>With a <i>medium</i> susceptibility and <i>high</i> value, the overall sensitivity of road users is assessed as <b>medium-high</b>.</p>	
<b>Assessment of Predicted Effects</b>	
<p><b>Parts of proposed development potentially visible:</b></p> <p>All of the of the quay would be screened from view by a large intervening building at Nigg Energy Park although possibly, some small areas of lighting and temporary storage of plant and renewable energy components might just be visible to the right of the large building. For several weeks every few months, a jack-rig would also be visible in the firth.</p>	
<p><b>Construction effects:</b></p> <p>Construction activity including pilling operations, the dredging of the seabed, rock armour placement and concrete works associated with the quay would almost entirely be screened from view by a large intervening building at Nigg Energy Park, as would land based clearance works.</p> <p>The magnitude of landscape and visual effect is therefore assessed as <b>very small</b>.</p>	
<p><b>Landscape effects (operational):</b></p> <p>During the operational stage, only a very small amount of infrastructure on the quayside might be evident and experienced in context of a heavily industrialised setting. At this distance, any changes at the site would be very difficult to discern although the rig would sometimes be noticeable amongst other rigs in the firth. Overall, the proposed development would result little perceptible change to the character of the <i>Farmed and Forested Slopes</i> LCT and as such, the magnitude of landscape effect is predicted to be <b>very small</b>.</p>	

VIEWPOINT 6 - A9, nr. Kilmuir (see Figure 8.21)	
<p><i>Visual effects (operational):</i></p> <p>Once operational, a very small amount of infrastructure and activity might be evident on the quayside although almost all would be screened from view by a large intervening building at Nigg Energy Park. At this distance, any open views of the proposed development would only occupy a very small proportion of a wide view that reflects the visual composition of existing infrastructure. Apart from the temporary rig, and changes would hardly discernible. The magnitude of visual effect is assessed as <b>very small</b>.</p>	
<b>Summary</b>	
<i>Significance of visual effects (construction)</i>	Road users: <i>minor</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape effects (construction)</i>	Farmed and Forested Slopes LCT: <i>very small</i> (adverse)
<i>Significance of visual effects (operational)</i>	Road users: <i>minor</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape effects (operational)</i>	Farmed and Forested Slopes LCT: <i>very small</i> (adverse)

VIEWPOINT 7 - Saltburn (see Figure 8.22)	
<i>Grid reference:</i>	NH 72548 69787
<i>View direction:</i>	100°
<i>Distance to nearest part of Development:</i>	6.97 km
<i>Landscape Character Type</i>	Farmed and Forested Slopes LCT
<i>Landscape designations:</i>	None
<b>Baseline Assessment</b>	
<p><i>Context:</i></p> <p>At an elevation of approximately 1 m AOD, the viewpoint is located in lay-by alongside the busy B817 in Saltburn and similar views towards the site are experienced for several kilometres along it. In addition to road users, the viewpoint also represents the views of nearby residents whose front facing rooms provide open views over the firth.</p>	
<p><i>Landscape sensitivity:</i></p> <p>The viewpoint is located within the <i>Farmed and Forested Slopes</i> LCT which exhibits the following key characteristics:</p> <p>Complex pattern of farmland, tree cover, forests and woodland on sloped, often terraced land rising from firths or river plains to mid-elevations and often backed by large scale forest plantations where there are adjacent hills.</p> <ul style="list-style-type: none"> <li>• Overall impression of a well-treed landscape, but within which farming is the dominant land use.</li> <li>• Generally higher proportion of trees, woodland and forest plantations in upper slopes forming a well-connected network within which fields are located.</li> <li>• Terraces of open land, interspersed with forest plantations and woodlands on mid slopes.</li> <li>• Gradual change to more open landscapes at lower levels.</li> <li>• Wide range and distribution of archaeological sites indicating a long history of human settlement.</li> <li>• Occasional large settlements in a predominantly rural landscape.</li> <li>• Views from more open, terraced areas across lowlands or firth to hills or out to sea.</li> </ul> <p>The sensitivity of this LCT is assessed as <b>medium</b>.</p>	
<p><u>Residents</u> - <i>high</i> susceptibility.</p> <p>The scenic views over the Cromarty Firth are an important part of the experience for a relatively large</p>	

VIEWPOINT 7 - Saltburn (see Figure 8.22)	
<p>number of residents - <i>high</i> value.</p> <p>With a <i>high</i> susceptibility and <i>high</i> value, the overall sensitivity of residents is assessed as <b>high</b>.</p> <p><u>Road users</u> - <i>medium</i> susceptibility.</p> <p>Considering the scenic views over the Cromarty firth, the views of a very large number of road users, some of which are tourists, are assessed as having a <i>high</i> value.</p> <p>With a <i>medium</i> susceptibility and <i>high</i> value, the overall sensitivity of road users is assessed as <b>medium-high</b>.</p>	
Assessment of Predicted Effects	
<p><i>Parts of proposed development potentially visible:</i></p> <p>It is very likely that the quay would be screened from view by intervening infrastructure at Nigg Energy Park although some lighting and temporary storage of plant and renewable energy components would be visible in places. For several weeks every few months, a jack-rig would also be visible in the firth.</p>	
<p><i>Construction effects:</i></p> <p>It is likely that the majority construction activity including pilling operations, the dredging of the seabed, rock armour placement and concrete works associated with the quay would be screened from view intervening infrastructure although in places, some activity might be evident. This however would be experienced within the industrial nature of the locality and the presence of existing large-scale infrastructure and associated activity taking place around the site. The magnitude of landscape and visual effect is therefore assessed as <b>very small</b>.</p>	
<p><i>Landscape effects (operational):</i></p> <p>During the operational stage, only a small amount of infrastructure on the quayside would be evident and experienced in context of a heavily industrialised setting. At this distance, any changes would be difficult to discern although the rig would sometimes be noticeable amongst other rigs in the firth. Overall, the proposed development would result little perceptible change to the character of the <i>Farmed and Forested Slopes</i> LCT and as such, the magnitude of landscape effect is predicted to be <b>very small</b>.</p>	
<p><i>Visual effects (operational):</i></p> <p>Once operational, a small amount of infrastructure and activity would be evident on the quayside although in places, it would be screened from view by intervening infrastructure. At this distance, any open views of the proposed development would only occupy a very small proportion of a wide view that reflects the visual composition of existing infrastructure. Apart from the temporary rig, and changes would be quite difficult to discern and the magnitude of visual effect is assessed as <b>very small</b>.</p>	
Summary	
<i>Significance of visual effects (construction)</i>	Road users: <i>minor</i> (adverse) – <b>not significant</b>
	Residents: <i>minor-moderate</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape effects (construction)</i>	Farmed and Forested Slopes LCT: <i>very small</i> (adverse)
<i>Significance of visual effects (operational)</i>	Road users: <i>minor</i> (adverse) – <b>not significant</b>
	Residents: <i>minor-moderate</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape effects (operational)</i>	Farmed and Forested Slopes LCT: <i>very small</i> (adverse)

VIEWPOINT 8 - Newhall Point (see Figure 8.23)	
Grid reference:	NH 70967 67151
View direction:	80°
Distance to nearest part of Development:	8.63 km
Landscape Character Type	Open Farmed Slopes LCT
Landscape designations:	None
Baseline Assessment	
<p><b>Context:</b></p> <p>At an elevation of approximately 3 m AOD, the viewpoint is located at an area of informal open space that overlooks the mudflats of Udale Bay. In addition to those enjoying views over the firth, this small promontory is a popular location for bird watching and a small car park provides access to the local area. In addition to those undertaking recreational activity, the viewpoint also represents the views of several nearby residents whose front facing rooms provide open views over the firth.</p>	
<p><b>Landscape sensitivity:</b></p> <p>The viewpoint is located within the <i>Open Farmed Slopes</i> LCT which exhibits the following key characteristics:</p> <ul style="list-style-type: none"> <li>• Open, convex, generally north-east facing farmed slopes.</li> <li>• Smooth slopes of arable and pasture fields forming a regular pattern, lined with occasional small trees, fences or gorse hedges.</li> <li>• Mix of crofting, small holdings and large farms giving rise to a patchwork of rectangular fields of different sizes.</li> <li>• Areas of distinctive crofting patterns with generally smaller fields and regularly scattered croft buildings.</li> <li>• Areas of distinctive, large, regular fields of large farms, with occasional small patches of birch woodland and conifer plantations and lines of trees descending the slopes.</li> <li>• Scattered settlement patterns and network of minor roads running along contour lines, with few groupings in villages or towns.</li> <li>• Ever present views which are open, expansive and outward looking.</li> </ul> <p>The sensitivity of this LCT is assessed as <b>medium-high</b>.</p>	
<p><b>Residents - high susceptibility.</b></p> <p>The scenic views over the Cromarty Firth are an important part of the experience for a small number of residents - <i>high</i> value.</p> <p>With a <i>high</i> susceptibility and <i>high</i> value, the overall sensitivity of residents is assessed as <b>high</b>.</p> <p><b>Recreational users - high susceptibility.</b></p> <p>Considering the coastal setting, the scenic views over the Cromarty Firth are an important part of the experience for a relatively small number of people - <i>medium-high</i> value.</p> <p>With a <i>high</i> susceptibility and <i>medium-high</i> value, the overall sensitivity of recreational users is assessed as <b>high</b>.</p>	
Assessment of Predicted Effects	
<p><b>Parts of proposed development potentially visible:</b></p> <p>At present, the quay would be largely screened from view by an intervening rig although if this moves, the lighting and temporary storage of plant and renewable energy components would be visible. For several weeks every few months, a jack-rig would also be visible in the firth.</p>	
<p><b>Construction effects:</b></p> <p>It is likely that the majority construction activity including pilling operations, the dredging of the seabed, rock armour placement and concrete works associated with the quay would be evident. This however would be experienced within the industrial nature of the locality and the presence of existing large-scale infrastructure and associated activity taking place around the site. The magnitude of landscape and visual effect is therefore assessed as <b>very small</b>.</p>	
<p><b>Landscape effects (operational):</b></p>	

<b>VIEWPOINT 8 - Newhall Point</b> (see Figure 8.23)	
During the operational stage, some infrastructure on the quayside would be evident and experienced in context of a heavily industrialised setting. At this distance, any changes would be difficult to discern although the rig would sometimes be noticeable amongst other rigs in the firth. Overall, the proposed development would result little perceptible change to the character of the <i>Open Farmed Slopes</i> LCT and as such, the magnitude of landscape effect is predicted to be <b>very small</b> .	
<p><i>Visual effects (operational):</i></p> <p>Once operational, infrastructure and activity would be evident on the quayside although at this distance, any open views of the proposed development would only occupy a very small proportion of a wide view that reflects the visual composition of existing infrastructure. Apart from the temporary rig, and changes would be quite difficult to discern and the magnitude of visual effect is assessed as <b>very small</b>.</p>	
<b>Summary</b>	
<i>Significance of visual effects (construction)</i>	Recreational users: <i>minor-moderate</i> (adverse) – <b>not significant</b>
	Residents: <i>minor-moderate</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape effects (construction)</i>	Open Farmed Slopes LCT: <i>very small</i> (adverse)
<i>Significance of visual effects (operational)</i>	Recreational users: <i>minor-moderate</i> (adverse) – <b>not significant</b>
	Residents: <i>minor-moderate</i> (adverse) – <b>not significant</b>
<i>Magnitude of landscape effects (operational)</i>	Open Farmed Slopes LCT: <i>very small</i> (adverse)

## 8.5.8 Construction Phase

### 8.5.8.1 Scope

This section identifies the likely landscape and visual effects predicted during the 4 month construction phase, as detailed in Chapter 2 of the EIAR. As the purpose of the LVA is to focus on the identification of potentially significant effects, it is evident that from the eight locations assessed in the preceding Viewpoint Assessment, (see Section 8.5.7) significant effects are only predicted from two viewpoint locations in relatively close proximity to the site. These are:

- Viewpoint 1: Nigg Ferry Terminal - *moderate-major* (adverse) effects on visitors and recreational users; and
- Viewpoint 2: Cromarty Beach - *moderate-major* (adverse) effects on visitors, recreational users and some nearby residents.

### 8.5.8.2 Nigg Ferry Terminal

#### Ferry Passengers

In applying these static significant visual effects to how people use and enjoy the wider landscape, it is likely that passengers travelling on the ferry from Cromarty could experience some *moderate-major* and **significant** effects for much of the short distance across the firth. In general, construction activity and operations on land and sea would tend to result in relatively localised views of infrastructure, storage of materials, noise, activity and movement of large vehicles in quite close proximity.

Although significant, it is important to recognise that to some degree, effects are somewhat restricted by the industrial nature of the locality and the presence of existing large-scale infrastructure and associated activity taking place in the nearby backdrop to the site. Furthermore, the ferry operates for only four months a year and perhaps more importantly, construction activity would not compromise the visual amenity of the wider firth and open sea.

#### Recreational Users

In addition to ferry passengers, significant effects are also predicted on walkers and recreational users near to a section of Core Path that leads eastwards from the jetty towards a circular coastal route around the southern part of the North Sutor headland. As the Core Path follows a track approximately 200m to the north-east of the viewpoint location however, views of marine/coastal edge based construction activity would tend to be screened from view by intervening buildings and patches of gorse.

In practice, it is likely that when walking west along approximately a 100 m section of the path, the main views of recreational users would only be of some land based clearance activity. From lower-lying sections of Core Path further to the east, it is apparent that most of the site is screened from view by undulations in landform and/or gorse. From Viewpoint 5 (Minor road, North Sutor) which also represents the views of walkers from the Core Path on higher ground to the east, effects are predicted to be *moderate* (not significant). Considering these factors, it is judged that effects on Core Path users in close proximity to the site are judged to be **not significant** overall.

#### Residents

Several residential dwellings are located in close proximity to Viewpoint 1 although as the primary views from front-facing rooms are orientated to the south, it is likely that most, or all, of construction activity would take place outwith resident's main views. As such, effects are judged to be **not significant**.

#### **8.5.8.3 Cromarty Beach**

From Cromarty Beach, *moderate-major* and **significant** effects are predicted on visitors, recreational users and some nearby residents. From other open locations within the locality, people would experience relatively localised views of construction infrastructure, storage of materials, noise, activity and movement of large vehicles in a short-medium range view. Although the effects of construction activity are offset by the industrial nature of the locality and the presence of existing large-scale infrastructure and associated activity taking place immediately to the left of the site, the views of people are mainly focused towards the site and it is within this context, some significant visual could be experienced in the worst case scenario.

#### **8.5.8.4 Physical Landscape Resources**

As detailed in the Baseline Assessment, the site is comprised of coastal waters and land of the former Dunskeath House, with derelict buildings associated with the former Dunskeath House situated within it. Landcover across site is dominated by bare ground with areas of dense and scattered scrub, grassland, tall ruderal vegetation and some broadleaved trees. Sand and shingle above the high tide mark are also present in the south of the site and a sea wall exists in the west. As such, the site's sensitivity to change is assessed as *low*.

As construction activity would largely take place across bare ground and a modified coastal edge, the loss of important landscape features would largely be limited to grass, several broadleaved trees and a small area of beach. With a *medium* magnitude of effect, the overall effect on the landscape resources of the site are predicted to be *minor-moderate* (adverse) and **not significant**.



#### **8.5.8.5 Wider Effects**

As the assessments from the eight viewpoints represent the worst case scenario from sensitive locations across the study area, it is very unlikely therefore that any significant effects above and beyond those already identified in the preceding sections would be experienced. As such, no further detailed assessment of the effects of construction on other landscape and visual resources in the wider study area is considered necessary.

In general, where any views are experienced these would only occupy a small part of the view and always experienced within context of the industrial nature of the locality and the presence of existing large-scale infrastructure and associated activity taking place around the site. In relation to effects on landscape/coastal character and landscape designations, the industrial character and activity taking place in the immediate locality of the site would also restrict the degree of change.

### **8.5.9 Operational Phase**

#### **8.5.9.1 Scope**

This section sets out an assessment of the long-term effects of the proposed development predicted during its operational phase. In addition to desk and field work undertaken across the study area, this has been informed by the findings of the preceding Viewpoint Assessment (see Section 8.5.7).

As the purpose of the assessment is to focus on the identification of potentially significant effects, it is evident that from the eight locations assessed in the Viewpoint Assessment, significant effects are only predicted from one viewpoint located in close proximity to the site. This is:

- Viewpoint 1: Nigg Ferry Terminal - *moderate-major* (adverse) effects on visitors and recreational users.

#### **8.5.9.2 Nigg Ferry Terminal**

##### Ferry Passengers

In applying this static significant visual effect to how people use and enjoy the wider landscape, it is likely that passengers travelling on the ferry from Cromarty could experience some *moderate-major* and **significant** effects for a short distance across the firth. When crossing the firth in closer proximity to Cromarty however, effects are unlikely to be significant, as evidenced in visual assessment at Viewpoint 2 (Cromarty Beach).

When approaching the operational site, significant effects are largely a result of the quayside and associated infrastructure occupying a large proportion of the view. Although this would be experienced in a context of existing industrial development and activity taking place at Nigg Energy Park and the nearby oil terminal, it would notably extend the influence of development along the coastal edge.

To some extent however, any changes are minimised by the proposed development reflecting the visual composition of other nearby existing infrastructure. Although development and activity would appear closer to the viewer, there would be little change to the focus of the view and the important views over the Cromarty Firth and out to sea would be largely unaffected. As noted previously, the ferry operates for only four months a year and the addition of another rig (in context of several other rigs in the firth) for several weeks of the year would also limit the permanence of any significant effects that could be experienced in close proximity to the site.

### Recreational Users

In addition to ferry passengers, significant effects during the operational phase are also predicted on walkers and recreational users near to a section of Core Path that leads eastwards from the jetty towards a circular coastal route around the southern part of the North Sutor headland. As the Core Path follows a track approximately 200m to the north-east of the viewpoint location however, views of marine/coastal edge based development and activity would tend to be screened from view by intervening buildings and patches of gorse.

In practice, it is likely that when walking west along approximately a 100 m section of the path, the main views of recreational users would only be of some land based development although a vegetated bund would provide some screening. From lower-lying sections of Core Path further to the east, it is apparent that most of the site is screened from view by undulations in landform and/or gorse. From Viewpoint 5 (Minor road, North Sutor) which also represents the views of walkers from the Core Path on higher ground to the east, effects are predicted to be *moderate* (not significant). Considering these factors, it is judged that effects on Core Path users in close proximity to the site are judged to be **not significant** overall.

### Residents

Several residential dwellings are located in close proximity to Viewpoint 1 although as the primary views from front-facing rooms are orientated to the south, it is likely that most, or all, of the proposed development would be located outwith resident's main views. As such, effects are judged to be **not significant**.

### **8.5.9.3 Effects on Wider Study Area**

As the eight viewpoints represent the worst case scenario from sensitive locations across the study area, it is unlikely therefore that any adverse visual effects much beyond the locality of these viewpoints would be significant. Nonetheless, for completeness, the following sections provide an overview of the main operational effects on all relevant landscape and visual receptors in the wider study area.

### **8.5.9.4 Landscape Character**

As described in the Baseline Assessment, the site is located within the *Lowland Farmed Plain* Landscape Character Type (LCT) with ten other LCTs within the study area. Figure 8.11 illustrates the ZTV of the proposed development across these LCTs and the following sub-sections focus on an assessment of those within 5 km from the site.

### Lowland Farmed Plain

Viewpoint 1 (Nigg Ferry) is the only location within this LCT that was assessed as part of the Viewpoint Assessment and from here, a *small-medium* magnitude of landscape effect is predicted. This is a result of the quayside and associated storage of equipment experienced in context of a heavily industrialised setting and as such, any changes would be entirely characteristic to the locality. Although the quay would be very noticeable, it would not detract from or affect the large majority key characteristics of the *Lowland Farmed Plain* LCT.

In relation to the wider LCT, the ZTV illustrates that only a small proportion is within theoretical views of the quayside and although the ZTV of the rig is much extensive, its temporary nature and the presence of several other existing rigs limit the degree of change. In support of this, SNH assessment of key characteristics notes the '*limited impact of industrial development at Nigg on the rest of the area within the plain, due its physical containment on a low coastal shelf, and the screening and backdrop provide by the headland at the North Sutor*'.

In considering all of these factors, the overall magnitude of landscape effect is predicted to be *very-small* to *small*, resulting in a *minor-moderate* and **not significant** effect.

#### Open Farmed Slopes

Of the four viewpoints located within the two areas of *Open Farmed Slopes* to the north and south of the firth, a *small-medium* magnitude of landscape effect is predicted from viewpoint 2, reducing to *small* at viewpoints 4 and 5 and from viewpoint 8, *very small*. In general, the quayside and associated storage of equipment would be experienced in context of a heavily industrialised setting and as such, any changes would be entirely characteristic to the locality. Although the quay and associated infrastructure would be evident, it would not detract from or affect most key characteristics of the Open Farmed Slopes LCT.

As illustrated in Figure 8.11, the ZTV across these open landscapes is quite extensive although in considering the decreasing magnitude of effect with distance, there would be little perceptible change on the integrity of the LCT as whole. Taking all of these factors into account, the overall magnitude of landscape effect is predicted to be *very-small* to *small*, resulting in a *minor-moderate* and **not significant** effect.

#### Cliffs and Rocky Coasts

From viewpoint 3, a *small* magnitude of magnitude of landscape effect is predicted largely as a result of the proposed development appearing to extend the influence of development along the coastline. As illustrated in Figure 8.11, most of the LCT is however outwith theoretical views and as such, would be unaffected. The overall magnitude of landscape effect is therefore predicted to be *very-small* and considering its *high* sensitivity, a *minor-moderate* and **not significant** effect.

#### LCTs beyond 5 km

For the eight LCTs beyond 5 km from the site, (see Table 8.5.9) it is clearly evident from the preceding assessment that **no significant** effects would result and as such, no further assessment is considered necessary.

### **8.5.9.5 Landscape Designations**

#### Sutors of Cromarty, Rosemarkie and Fort George Special Landscape Area

As illustrated in Figure 8.13, most of the SLA is outside of the ZTV and from those small parts where theoretical visibility extends across it, the assessment at viewpoint 3 provides a good indication of the nature of localised effect. Although just outside of the SLA boundary, the assessment at viewpoint 5 is also relevant to consider.

From both of these locations, a *small* magnitude of magnitude of landscape effect is predicted. In general, the quayside and associated storage of equipment would be experienced in context of a heavily industrialised setting and as such, any changes would be entirely characteristic to the locality. Although the quay and associated infrastructure would be quite noticeable from some nearby parts of the SLA, it would not detract from or affect most key landscape and visual characteristics of the designation. The overall magnitude of landscape effect is therefore predicted to be *very-small*, resulting in a *minor* and **not significant** effect.

#### Cromarty House Garden and Designed Landscape

Although no viewpoints are located within this designation, the assessments from viewpoints 2 and 3 provide a relatively useful guide of effect at this distance. From viewpoint 2, a *small-medium* magnitude of landscape effect is predicted and viewpoint 3, this reduces to *small*.

As illustrated in Figure 8.13, all of the grounds are within theoretical visibility although in practice, it is apparent that the dense policy woodlands would screen the proposed development from view from nearly all locations, especially lower-lying areas towards the town. This is also evidenced in the GDL citation that states '*the parkland is enclosed by woodlands, which screen the town and the Firth. Principal views from the house lead south-westwards over the parkland.*'

Considering these factors, the magnitude of landscape effects is judged to be *very small*, resulting in a *minor* and **not significant** effect.

#### Balnagown Castle Garden and Designed Landscape

As noted in the citation, the GDL commands fine views to the southwest and east over the coastal flats. As such, the assessment from viewpoint 6 provides a relatively useful guide as to the indicative nature of views towards the site. Although intervening woodlands are likely to provide some screening, any open views are likely to result in a *very small* magnitude of landscape effect at this distance. This would result in a *minor* and **not significant** effect.

#### Cromarty Conservation Area

At viewpoint 2 located on the northern edge of the Conservation Area, a *small-medium* magnitude of landscape effect is predicted. From open parts of the designation therefore, the proposed development would be noticeable in the wider setting to the Conservation Area where it extends the influence of development along the opposing coastline. From most parts of the designation however, intervening buildings would prevent visibility. Furthermore, any changes would be experienced in context of a heavily industrialised setting and as such, would be entirely characteristic to its locality.

Overall, the magnitude of landscape effect is judged to be *very small*, resulting in a *minor-moderate* and **not significant** effect on the landscape setting of the Conservation Area.

### **8.5.9.10 Settlements**

#### Dwellings near to the site

As noted previously, several residential dwellings are located in close proximity to Viewpoint 1 although as the primary views from front-facing rooms are orientated to the south, it is likely that most, or all, the proposed development would be located outwith resident's views. As such, effects are judged to be **not significant**.

From any dwellings in relatively close proximity to the north of the site, any open views of the proposed development would be experienced within a foreground context of extensive industrial development of the Oil Terminal and Nigg Energy Park. As such, **no significant** effects are predicted.

### Cromarty

As evidenced in the assessment from viewpoint 2, those residents with open views towards the site are predicted to experience a *moderate* (not significant) effect where the proposed development would be viewed outwith the visual envelope of existing industrial development and activity taking place at Nigg Energy Park. At this distance however, it would only occupy a relatively small proportion of the view and in general, any changes are minimised by the proposed development reflecting the visual composition of existing infrastructure. Development and activity would not appear noticeably closer to the viewer, nor would it be the most noticeable element in view. Furthermore, there would be little change to the focus of the view and the wider views over the Cromarty Firth and out to sea would be largely unaffected.

From the large majority of dwellings within the town, views towards the site are screened by nearby intervening buildings and as such no effects would be experienced. Considering of these factors, the overall effect on the settlement of Cromarty is judged to be **not significant**.

### Saltburn

From viewpoint 7 (Saltburn), a small amount of infrastructure and activity would be evident on the quayside although in places, it would be screened from view by intervening infrastructure. At this distance, any open views of the proposed development would only occupy a very small proportion of a wide view that reflects the visual composition of existing infrastructure. Apart from the temporary rig, and changes would be quite difficult to discern and the magnitude of visual effect is assessed as *very small*, resulting in a minor-moderate and **not significant** effect

### Other settlements

In considering the findings of the preceding assessment, it is clearly apparent that from the remaining settlements listed in Table 8.5.12, **no significant effects** are likely to be experienced. As such, no further assessment is considered necessary.

## **8.5.9.11 Roads**

### Local roads near to the site

When travelling along the network of local roads and tracks near to site, it is apparent that any open views of the proposed development would tend to be experienced within a foreground/background context of extensive industrial development of the Oil Terminal and Nigg Energy Park.

At viewpoint 3 (Minor road, North Sutor) for example, a *minor-moderate* effect is predicted on road users. From here, the proposed development would be viewed within the visual envelope of existing industrial development and activity taking place at Nigg Energy Park and at this distance, it would only occupy a relatively small proportion of the view. Any changes to visual amenity are minimised by the proposed development reflecting the visual composition of existing infrastructure. Although development and activity would appear slightly closer to the viewer, it would not be the most noticeable element in view. Furthermore, there would be little change to the focus of the view and the wider views over the Cromarty Firth and out to sea would be largely unaffected.

Considering all of these factors, effects on road users when travelling in close proximity to site are predicted to be **not significant**.

#### A9

From viewpoint 6 (A9 nr. Kilmuir) the effect on road users is predicted to be *minor* and not significant. Although large sections of the road are within the ZTV, considering for the majority of the route that leads along the northern part of the firth the views of road users towards the site are screened by intervening roadside trees and woodlands in the wider landscape, it is clearly evident that the overall effect on A9 road users is **not significant**.

#### B9163

From viewpoint 4 (B9163, west of Cromarty) the effect on road users is predicted to be *minor-moderate* and not significant. At this distance, the proposed development would only occupy a relatively small proportion of the view. Any changes to visual amenity are minimised by the proposed development reflecting the visual composition of existing infrastructure. The development and activity would not appear any closer to the viewer, nor would it be the most noticeable element in view. Furthermore, there would be little change to the focus of the view and the wider views over the Cromarty Firth and out to sea would be largely unaffected.

In travelling along parts/all of the wider route therefore, it is clearly evident that the overall effect on road users is **not significant**.

#### B817

At viewpoint 7 (Saltburn) the effect on road users travelling along the B817 is predicted to be *minor* and not significant. Although the magnitude of visual effect could increase towards the site, the effects of intervening industrial development would help to ensure that effects are **not significant** when travelling along parts/all of the route.

#### Core Paths

The effects on those people using the Core Path network in close proximity to the site is addressed in Section 8.5.9.2 and in conclusion to this, no significant effects are predicted. From other sections of Core Path in the wider landscape, the preceding findings of this assessment indicate that the effect on all Core Paths would be **not significant**.

### **8.5.10 Conclusion**

Sections 8.5.7-9 of this Landscape and Visual Appraisal (LVA) set out a detailed assessment of the landscape and visual effects predicted during the construction and operational phases of the proposed development. As noted in the Methodology, (Section 8.5.4) effects that are predicted to be *moderate-major*, *major* or *substantial* are considered to be 'significant' in the context of material considerations.

#### **8.5.10.1 Summary of Significant Effects**

During the temporary construction phase, **significant** visual effects are predicted at the following viewpoint locations:

- Viewpoint 1: Nigg Ferry Terminal - *moderate-major* (adverse) effects on visitors and recreational users; and
- Viewpoint 2: Cromarty Beach - *moderate-major* (adverse) effects on visitors, recreational users and some nearby residents.

**No significant** effects are predicted on any other landscape or visual receptors in the study area during the construction phase.

During the long-term operational phase, **significant** visual effects are predicted at the following viewpoint location:

- Viewpoint 1: Nigg Ferry Terminal - *moderate-major* (adverse) effects on visitors and recreational users.

**No significant** effects are predicted on any other landscape or visual receptors in the study area during the operational phase.

#### **8.5.10.2 Statement of Significance**

As detailed in Section 8.5.3, the *Highland-wide Local Development Plan (2012)* aims to ensure that special quality of the natural, built and cultural environment is protected and enhanced. In doing so, the landscape related policy framework sets out a clear suite of criteria in which to assess the landscape acceptability of the proposed development in the context of wider social and economic material considerations. In summary, the proposed development should:

- demonstrate sensitive siting and high quality design in keeping with local character and historic and natural environment;
- safeguard natural and cultural heritage assets within the coastal zone;
- demonstrated it will not have an unacceptable impact on the natural environment, amenity and heritage resource of Special Landscape Areas;
- not compromise the natural environment, amenity and heritage resource of Gardens and Designed Landscapes; and
- be designed to reflect the landscape characteristics and special qualities identified in the Landscape Character Assessment of the area in which they are proposed.

Although some significant visual effects are predicted during the construction and operational phases, these are relatively localised in extent and considering the scale of the proposed development, such significant effects would generally be expected for a project of this nature.

The Viewpoint Assessment also reflects the worst case scenario as the viewpoint locations were carefully selected to ensure these provide the most open views towards the site. In many instances, due to the screening effect of nearby intervening built development/and or rising ground and vegetation, the experience of any significant visual effect would often be restricted to a very small part of the locality.

In context of material considerations relevant to landscape, the findings of this LVA have demonstrated that the proposed development would not significantly compromise any important landscape and visual interests within the study area.

In relation to landscape receptors, the absence of any significant effects is primarily due to the proposed development being experienced in context of a heavily industrialised setting and as such, any changes would be entirely characteristic to the locality. In general, there would be very limited change on the wider landscape due to the site's physical containment on a low coastal shelf, and the screening and backdrop provided by the headland of North Sutor.

In relation to coastal character (or seascape), the large majority of terrestrial key characteristics would remain largely unaffected, as would most of the more natural marine character and qualities of the Cromarty Firth.

Considering the presence of several existing rigs in the firth, the addition of a further jack-up rig for 10-18 weeks a year would also be characteristic to the seascape.

The very limited extent of any significant effects is largely in response to the proposed development reflecting the visual composition of other nearby and more prominent existing infrastructure and activity. In general, there would be little change to the focus of the view and the important views over the Cromarty Firth and out to sea would be largely unaffected from most locations.