NORTH CORMORANT DECOMMISSIONING

North Cormorant Topsides
Decommissioning Environmental Appraisal

77IFS-156680-H99-0001-000

TAQA INTERNAL REVISION SUMMARY					
Document Owner:	TAQA Bratani Limited				
Revision No:	08		**Revision Date:**	26/06/2020	
Revision Summary:	Issued for Approval				
Authorisation:	**Prepared by**		**Verified by**		**Approved by**

OPRED REVISION SUMMARY			
Revision No.	Reference	Changes/Comments	Issue Date

DISTRIBUTION LIST		
Company	Name	No. Copies
TAQA Bratani Limited		1
Offshore Petroleum Regulator for Environment and Decommissioning (OPRED)		1

CONTENTS

EXECUTIVE SUMMARY 11
Introduction and Background 11
Decommissioning Overview 13
Proposed Schedule 13
Options for Decommissioning 13
Environmental and Socio-Economic Baseline 14
Impact Assessment Process 16
Environmental Management 19
Conclusions 20
1.0 INTRODUCTION 21
1.1 Project Overview 21
1.2 Purpose of the Environmental Appraisal 25
1.3 Regulatory Context 25
1.4 Scope and Structure of this Environmental Appraisal Report 26
2.0 PROJECT SCOPE 27
2.1 Description of the Infrastructure being Decommissioned 27
2.2 Description of Proposed Decommissioning Activities 28
2.3 General Assumptions 29
2.4 Method Statements 30
2.4.1 Single Lift Method Statement 30
2.4.2 Modular Removal Method Statement 31
2.4.3 Hybrid: Piece Small and Modular Removal Method Statement 32
2.5 Navigational aids 34
2.6 Proposed Schedule 34
2.7 Summary of Materials Inventory 35
2.8 Waste Management 37
2.9 Environmental Management Strategy 38
3.0 ENVIRONMENTAL AND SOCIETAL BASELINE 39
3.1 Physical Environment 41
3.1.1 Bathymetry 41
3.1.2 Currents, Waves and Tides 41
3.1.3 Meteorology 43
3.1.4 Seabed sediments 43
3.2 Biological Environment 46
3.2.1 Plankton 46
3.2.2 Benthos 46
3.2.3 Potential sensitive habitats and species 47
3.2.4 Fish and Shellfish 50

3.2.5 Seabirds 56
3.2.6 Marine Mammals 57
3.3 Conservation 59
3.3.1 Offshore Conservation 59
3.3.2 Protected Species 60
3.3.3 Onshore Conservation 60
3.3.4 National Marine Plan 60
3.4 Socio-Economic Environment 63
3.4.1 Commercial Fisheries 63
3.4.2 Shipping 67
3.4.3 Oil and Gas Activity 69
3.4.4 Military Activities 70
3.4.5 Renewable Energy 70
3.4.6 Telecommunication Cables 70
3.4.7 Wrecks 70
4.0 EA METHODOLOGY 71
4.1 Stakeholder Engagement 71
4.2 EA Methodology 72
4.2.1 Overview 72
4.2.2 Baseline Characterisation and Receptor 73
4.2.3 Impact Definition 73
4.2.4 Receptor Definition 76
4.2.5 Consequence and Significance of Potential Impact 79
4.2.6 Cumulative Impact Assessment 80
4.2.7 Transboundary Impact Assessment 80
4.2.8 Mitigation 80
5.0 IMPACT ASSESSMENT AND JUSTIFICATION 81
5.1 Assessment of Potential Impacts 81
5.2 Aspects Taken Forward for Further Assessment 84
5.3 Proposed Mitigation and Control Measures 84
6.0 CONCLUSIONS 86
7.0 REFERENCES 87
8.0 APPENDIX A: ENERGY AND EMISSIONS 91
9.0 APPENDIX B: TAQA HSSE POLICY 92

ABBREVIATIONS

Abbreviation	Meaning
AIS	Automatic Identification System
ALARP	As low as reasonably practicable
AtoN	Aid to Navigation
AWMP	Active Waste Management Plan
BAP	Biodiversity Action Plan
BEIS	Department for Business, Energy and Industrial Strategy
CFC	Chlorofluorocarbon
CNS	Central North Sea
CoP	Cessation of Production
CPR	Continuous Plankton Reader
DECC	Department for Energy and Climate Change
DFPV	Drained, Flushed, Purged and Vented
DP	Decommissioning Programme
DR MPA	Demonstration and Research Marine Protected Areas
EA	Environmental Appraisal
EDC	Engineering Down and Cleaning
EIA	Environmental Impact Assessment
EMS	Environmental Management System
EPS	European Protected Species
ERL	Effects Range Low
ES	Environmental Statement
EU	European Union
EUNIS	European Nature Information System
EWC	European Waste Catalogue Codes
FOCI	Feature of Conservation Importance
FRS	Fisheries Research Services
GJ	Gigajoules
HLV	Heavy Lift Vessel
HSE	Health, Safety and Environment
HSSE	Health, Safety, Security and Environment

ICES	International Council for the Exploration of the Sea
IDS	Integrated Deck Structure
IEEM	Institute of Ecology and Environmental Management
IEMA	Institute of Environmental Management and Assessment
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
kg	kilogram
LAT	Lowest Astronomical Tide
m	metre
MarLin	Marine Life Information Network
MCZ	Marine Conservation Zone
MMO	Marine Management Organisation
MSF	Module Support Frame
NC MPA	Nature Conservation Marine Protected Area
NDE	Non-Destructive Evaluation
NLB	Northern Lighthouse Board
NMP	National Marine Plan
NMPI	National Marine Plan Interactive
NNS	Northern North Sea
NRC	National Response Corporation
OGA	Oil and Gas Authority
OPEP	Oil Pollution Emergency Plan
OPEX	Operating Expenditure
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	The Oslo Paris Convention
PETS	Portal Environmental Tracking System
PEXA	Practice and Exercise Areas
PMF	Priority Marine Feature
POB	Personnel on Board
ROV	Remotely Operated Vehicle
SAC	Special Area of Conservation
SACFOR	Super abundant, Abundant, Common, Frequent, Occasional, Rare

SAHFOS	Sir Alister Hardy Foundation for Ocean Science
SCOL	Self-contained Offshore Lighthouse
SCOS	Special Committee on Seals
SEA	Strategic Environmental Assessment
SFF	Scottish Fishermen's Federation
SLV	Single Lift Vessel
SMRU	Sea Mammal Research Unit
SNH	Scottish Natural Heritage
SOPEP	Shipboard Oil Pollution Emergency Plan
SOSI	Seabird Oil Sensitivity Index
SPA	Special Protection Area
TAQA	TAQA Bratani Limited
te	Tonne
THC	Total Hydrocarbon
UKCS	United Kingdom Continental Shelf
UKOOA	United Kingdom Offshore Operators
VMS	Vessel Monitoring System

Tables

Table i Topsides Removal Methods 14
Table ii Key Environmental and Social Sensitivities for Cormorant North Field 14
Table iii Environmental Impact Screening Summary for North Cormorant Topside Removal 16
Table 2-1 Summary of Proposed Fate of Non-Hazardous Materials from the North Cormorant Topsides 35
Table 2-2 Summary of Hazardous Materials and NORM from the North Cormorant Topsides 35
Table 3-1 Seabed Characteristics for the North Cormorant Platform 43
Table 3-2 Fisheries Sensitivities within ICES Rectangle 51F1 (Coull *et al.*, 1998 and Ellis *et al.*, 2012) 50
Table 3-3 Seabird Oil Sensitivity in Block 211/21 and Surrounding Vicinity (Webb *et al.*, 2016) 56
Table 3-4 Densities of Cetaceans in the North Cormorant platform Area (Hammond *et al.*, 2017) 57
Table 3-5 Live Weight and Value of Fish and Shellfish from ICES Rectangle 51F1 from 2014-2018 (Scottish Government, 2019) 64
Table 3-6 Number of Fishing Days per Month (all gear) in ICES Rectangle 51F1 from 2014-2018 (Scottish Government, 2019) 64
Table 3-7 Installations located within 40 km of the North Cormorant Platform 70
Table 4-1 Stakeholder responses 72
Table 4-2 Nature of Impact 74
Table 4-3 Type of Impact 74
Table 4-4 Duration of Impact 75
Table 4-5 Geographical Extent of Impact 75
Table 4-6 Frequency of Impact 75
Table 4-7 Impact Magnitude Criteria 76
Table 4-8 Sensitivity of Receptor 77
Table 4-9 Vulnerability of Receptor 77
Table 4-10 Value of Receptor 78
Table 4-11 Assessment of Consequence 79
Table 5-1 Proposed Mitigation and Control Measures 85

Figures

Figure i Location of the North Cormorant Installation 11
Figure 1-1 Location of the North Cormorant Installation 22
Figure 1-2 Location of the North Cormorant Installation in Relation to Other Installations 23
Figure 2-1 North Cormorant Topsides 27
Figure 2-2 North Cormorant Topsides Modular Construction 28
Figure 2-3 AtoN deployment via helicopter 34
Figure 2-4 Indicative Schedule 34
Figure 2-5 Bulk Materials from the North Cormorant Topsides Infrastructure (Source: D3, 2019) 36
Figure 2-6 Hazardous Material from the North Cormorant Topsides Infrastructure (Source: D3, 2019) 36
Figure 2-7 Waste Hierarchy Model 37
Figure 3-1 Location of surveys around the TAQA infrastructure 40
Figure 3-2 Sea Currents around the North Cormorant Platform 42
Figure 3-3 Broad-Scale Predicted Habitat around the North Cormorant Platform (JNCC, 2017) 45
Figure 3-4 Features of Conservation Importance in the Region of Interest 49
Figure 3-5 Potential Fish Spawning Grounds 52
Figure 3-6 Potential Fish Nursery Habitats adapted from Aires *et al.* (2014) (1 of 2) 53
Figure 3-7 Potential Fish Nursery Habitats adapted from Aires *et al.* (2014) (2 of 2) 54
Figure 3-8 Seal Densities around the North Cormorant platform (per 25 km^2) 58
Figure 3-9 Location of the North Cormorant platform in relation to Nature Conservation Marine Protected Areas (NC MPAs), Special Protection areas (SPAs) Special Areas of Conservation (SAC), Demonstration and Research Marine Protected Areas (DR MPA) and Sites of Special Scientific Interest (SSSIs) 59
Figure 3-10 Average landings (tonnes) and values (£) of demersal, pelagic and shellfish fisheries by ICES rectangle (2014-2018) 65
Figure 3-11 Fishing intensity (hours) in the region of the North Cormorant Development between 2009 – 2017 grouped by fishing method 66
Figure 3-12 Fishing effort (days) (by UK vessels >10m length) per ICES rectangle for demersal, passive and pelagic gears (2014 – 2018) 67
Figure 3-13 Annual Density of Vessel Transits (number of transits per 2 km^2) around North Cormorant Platform in 2015 (MMO, 2017) 68
Figure 3-14 Other Users in the Vicinity of the North Cormorant Platform 69

APPENDICES

Appendix	Description	Page
A	Energy and Emissions	91
B	TAQA HSSE Policy	92

EXECUTIVE SUMMARY

Introduction and Background

This section provides a non-technical summary of the findings of the Environmental Appraisal (EA) conducted by TAQA Bratani Limited (TAQA) for the proposed decommissioning of the North Cormorant platform topsides[1]. The North Cormorant platform is located in Block 211/21a of the Northern North Sea (NNS), approximately 113 km north east of Shetland and 35 km west of the UK/Norway median line (Figure 1).

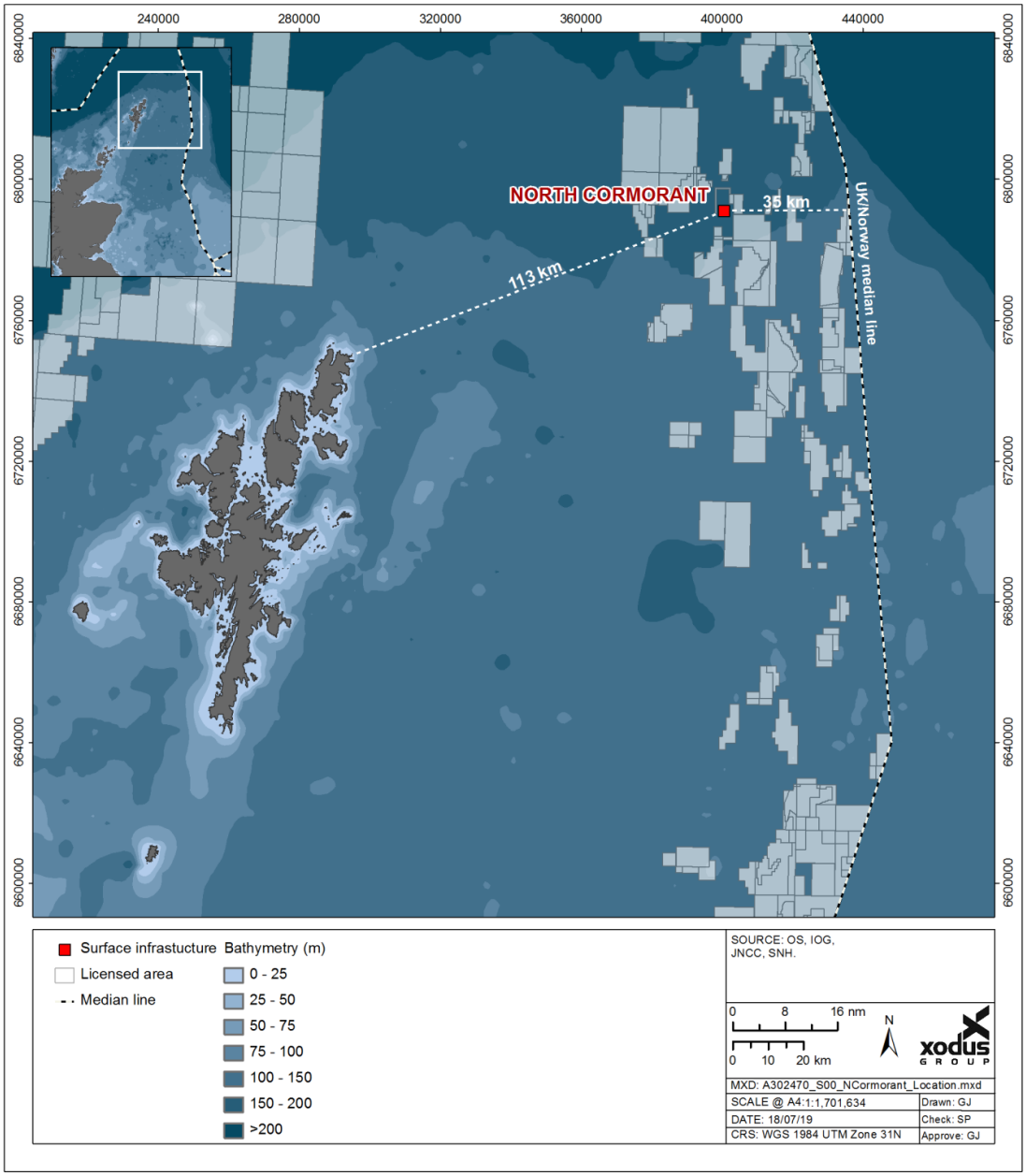

Figure 1 **Location of the North Cormorant Installation**

[1] On an offshore installation, the topsides are the deck and all the modular facilities on it including accommodation, drilling unit, processing equipment, cranes and helideck.

The North Cormorant platform is a fixed installation which consists of an 8-legged steel jacket[2] substructure, anchored by piles to the seabed, supporting a module support frame (MSF) and two levels of modules including accommodation and drilling facilities that incorporate a well bay, process bay and utilities bay. The platform was installed in 1981 and production started in 1982. A CoP (Cessation of Production) application for North Cormorant will be submitted to the Oil & Gas Authority (OGA) in Q2 2020.

North Cormorant has 41 well slots, 24 of which are production wells and 16 are water injection wells, the final well slot remains unused. The installed total weight of the topsides is currently estimated to be approximately 16,177 te. The North Cormorant platform facilitates production from the Cormorant North and Cormorant East Fields. Oil and gas is separated out and processed via the North Cormorant process facilities. The oil is then routed to Cormorant Alpha for onward transmission through the Brent Oil Pipeline System to Sullom Voe. Associated gas, and gas imported from Tern Alpha, is exported through the Western Leg and the Far north Liquids and Associated Gas System (FLAGS) Pipeline to the St. Fergus terminal.

A schematic figure illustrating North Cormorant in the context of other installations in the vicinity, together with connecting infrastructure including pipelines, umbilicals and power cables, is shown in Figure 2.

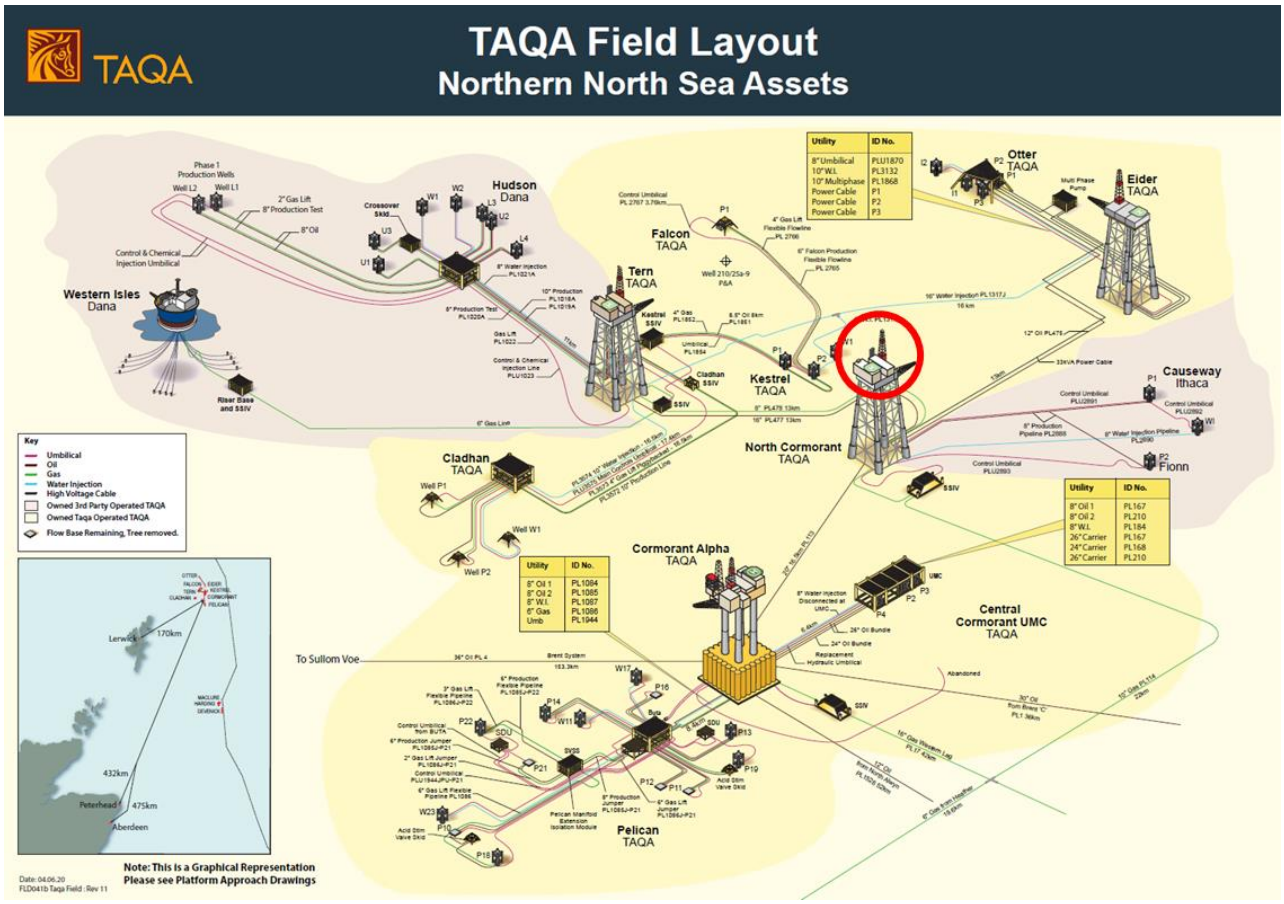

Figure 2 **Location of the North Cormorant Installation in Relation to Other Installations**

[2] On an offshore installation, the jacket is the steel lattice tower sitting on the seabed that supports the topsides.

Decommissioning Overview

As part of the planning for decommissioning and to obtain regulatory approval for the activities, further Decommissioning Programmes (DPs) will be prepared, each supported by an EA:

- Topsides decommissioning, covered by this EA;
- Substructure decommissioning, to be carried out at a time yet to be confirmed and covered by a separate DP and supporting EA; and
- Jacket and subsea infrastructure decommissioning, including the North Cormorant substructure, associated pipelines, power cables and umbilicals, to be prepared at a time yet to be confirmed and to be covered by a separate DP and supporting EA.

The DP for topsides removal (TAQA, 2020) and this supporting EA do not cover well plugging and abandonment, or the flushing and cleaning operations that will be undertaken on the topsides. These activities will be carried out as part of the preparatory work preceding decommissioning, under existing field operational permits.

Proposed Schedule

The precise timing of the topside decommissioning activities is not yet confirmed and will be subject to market availability of cost-effective removal services and contractual agreements. Once the North Cormorant platform and associated fields reach the end of their economic life and cease to produce hydrocarbons, it is intended to shut down and isolate the platform and clean the topsides to a standard that allows them to be deemed ‘Hydrocarbon Free’, such that removal activities can safely proceed (TAQA, 2020).

Since topsides integrity degrades rapidly following the platform becoming unoccupied, TAQA has decided that the most effective management option is to remove the topsides infrastructure as soon as possible. The removal of the North Cormorant topside will not prejudice any decommissioning options for the remaining substructure. This will minimise the period between CoP and the removal of the topsides. This has both financial and safety and environmental benefits, as it limits the amount of post CoP Operating Expenditure (OPEX) that TAQA and the UK Taxpayer are exposed to and reduces the length of time that people and equipment are mobilised to the platform to perform maintenance of the topsides to ensure they are in a safe condition for dismantling.

Options for Decommissioning

A study conducted to assess options for reuse of the North Cormorant platform (TAQA, 2018a) concluded that there are no credible reuse options for the topsides principally due to the limited remaining life of the jacket structure due to fatigue and obsolescence issues, and economic factors associated with converting the installation for any intended reuse purpose. Components from the platform may be re-used if a suitable use can be found.

Therefore, in line with the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) guidelines on decommissioning, it is proposed to fully remove the North Cormorant topsides and transport it to a suitable onshore yard facility for dismantling and recycling.

Three possible methods of removal are under consideration; single lift, modular removal and hybrid removal (including piece small and modular removal). At this stage, the specific method by which the removal activity will take place has not been determined. All are potentially suitable. These decisions will depend to some degree on the proposals made by the eventual contractor. All three approaches are summarised in Table 1, and all will involve the following steps for the preparation for removal:

- Removal of under deck objects and cutting of Risers, J-tubes and caissons;

- Leg cutting for topsides/ jacket separation using diamond wire cutting tools;
- MSF strengthening;
- Equipment and loose items sea fastening/removal;
- Installation of clamps and/or beams to provide lifting points; and
- Installation of an above-water guiding system mounted on the jacket legs.

Table i Topsides Removal Methods

Item	Method
1	**Single Lift Method:** Removal of topsides as a complete unit and transportation to shore for re-use of selected equipment, recycling, break up, and / or disposal. using a Single Lift Vessel (SLV) of Heavy Lift Vessel (HLV).
2	**Modular Removal:** The removal of parts/ modules of the topsides and transportation to shore via HLV for use in alternative location(s) and/ or recycling/ disposal.
3	**Hybrid (Piece Small and Modular Removal):** Combination of removal of topsides: *Piece Small:* Breaking up offshore and transporting to shore using work barge. Items will then be sorted for re-use, recycling or disposal. *Modular Removal:* The removal of parts/ modules of the topsides and transportation to shore via HLV for use in alternative location(s) and/ or recycling/ disposal.

During removal operations, navigational aid requirements will be fulfilled by the decommissioning contractor. TAQA proposes to pre-install a supporting platform at the top of one of the substructures to support an Aid to Navigation (AtoN) unit. Once removal of the topside has been completed, the HLV will install the AtoN on top of the supporting platform using the vessel crane. TAQA proposes to undertake monitoring and maintenance of the AtoN through a service contract with a specialist contractor, including real time status and analysis.

Environmental and Socio-Economic Baseline

The key environmental and social sensitivities in the North Cormorant area are summarised in Table ii.

Table ii Key Environmental and Social Sensitivities for North Cormorant Field

Sediment type and seabed features
The North Cormorant platform is located at a water depth of 160 m. The annual mean wave height within the Cormorant North field ranges from 2.1 m – 2.4 m, and current speeds are low (0.11 – 0.25 m/s). The combined energy at the seabed from wave and tide action is also low. Recent survey work indicates that the seabed sediments range from fine silt to fine sands, with patches of coarse material. This is consistent with mapped information which classifies this region of the North Sea as the EUNIS broadscale habitats 'Offshore Circalittoral Sand', 'Deep Circalittoral Coarse Sediment' and '*Capitella capitata, Thyasira spp*. in organically – enriched Offshore Circalittoral Mud and Sandy Mud'.
Seabed habitats and species

Invertebrate communities living within the sediments are dominated by annelid species characteristic of background conditions in this part of the NNS, and evident in baseline surveys. The North Cormorant area has a high abundance of polychaetes, however, a high abundance of the taxa Nematoda is present closer to the North Cormorant platform, potentially as a result of the high barium concentrations associated with the drill cuttings here. Four individual ocean quahog (bivalves) were observed in a recent survey.

No OSPAR threatened and/or declining species/habit, or other species/habitat of conservation concern were found to be present in the offshore decommissioning Project area.

Fish and shellfish

The North Cormorant platform sits within known spawning grounds for haddock, Norway pout, saithe, whiting and cod. The area is known to be an area of high intensity spawning for cod. The area is also a potential nursery ground for haddock, Norway pout, whiting, blue whiting, hake, herring, ling, mackerel and spurdog. The area is known to be a high intensity nursery ground for blue whiting.

However, published sensitivity maps indicate that the probability of aggregations of juvenile cod, common sole, haddock, herring, horse mackerel, mackerel, plaice, sprat, whiting and Norway pout occurring in the offshore decommissioning Project area is low, and blue whiting and hake are medium.

Seabirds

Offshore in the NNS, the most numerous species present are likely to be northern fulmar, black-legged kittiwake and common guillemot. The North Cormorant decommissioning area is located within or close to hotspots for northern fulmar, northern gannet and Atlantic puffin during their breeding season, when adults of these species can be seen foraging far from their coastal breeding colonies. In addition, after the breeding season ends in June, large numbers of moulting auks (common guillemot, razorbill and Atlantic puffin) disperse from their coastal colonies and into the offshore waters from July onwards. At this time these high numbers of birds are particularly vulnerable to oil pollution.

Seabird sensitivity to oil pollution in the region of the offshore decommissioning Project area is considered low throughout the year.

Marine mammals

Harbour porpoise are the most abundant and frequently recorded species recorded in the survey block covering the offshore decommissioning Project area, which is reflective of these being the most abundant and widely distributed cetaceans in the North Sea.

Around the North Cormorant platform, both grey and harbour seal densities are predicted to be between 0 and 1 seals per 25 km^2, which is considered to be low.

Conservation

There are no Nature Conservation Marine Protected Areas (NCMPAs), Special Protection Areas (SPAs), Special Areas of Conservation (SACs) or Demonstration and Research Marine Protected Areas (MPAs) within 40 km of the North Cormorant platform.

The closest designated site is the Pobie Bank Reef SAC (77 km), located to the south west of the North Cormorant Decommissioning area.

Fisheries and shipping

The North Cormorant platform is located in International Council for the Exploration of the Sea (ICES) Rectangle 51F1. This region is primarily targeted for demersal species, with some minor shellfish and pelagic fishing occurring therein. Annual fishery landings by live weight and value in 2018 are considered low for shellfish and pelagic fisheries and moderate for demersal fisheries in comparison to other areas of the North Sea. According to the Scottish Government (2019) fisheries statistics, fishing effort has remained low within this region for the last five fishing years and is dominated by bottom-towed demersal fishing gears. Fishing effort generally peaks in the summer months within ICES Rectangle 51F1.

Shipping density in the NNS in the vicinity of the proposed decommissioning activities is low. Between 200 - 300 vessels transit through Block 211/21a annually.
Other sea users
The proposed decommissioning operations are located in a well-developed area for oil and gas extraction. However, there is little activity from other sea users recorded in the area. Apart from pipelines and cables associated with the Cormorant North field, there are no other cables or pipelines in the vicinity, no designated military practice and exercise areas, no offshore renewable or wind farm activity and no designated or protected wrecks which could interact with the decommissioning activities.

Impact Assessment Process

This EA Report has been prepared in line with the OPRED Decommissioning Guidelines and also with Decom North Sea's EA Guidelines for Offshore Oil and Gas Decommissioning. The OPRED Decommissioning Guidance states that an EA in support of a DP should be focused on the key issues related to the specific activities proposed; and that the impact assessment write-up should be proportionate to the scale of the project and to the environmental sensitivities of the project area.

The environmental impact assessment has been informed by a number of different processes, including identification of potential environmental issues through project engineer and marine environmental specialist review in a screening workshop, and consultation with key stakeholders (OPRED, Marine Scotland, Joint Nature Conservation Committee (JNCC) and Scottish Fisherman's Federation (SFF)).

The impact assessment screening workshop discussed the proposed decommissioning activities and any potential impacts these may pose. This discussion identified eleven potential impact areas based on the three proposed removal methods. All eleven potential impacts were screened out of further assessment based on the low level of severity, or likelihood of significant impact occurring. The eleven potential impacts are tabulated in Table iii, together with justification statements for the screening decisions.

Table iii Environmental Impact Screening Summary for North Cormorant Topside Removal

Impact	Further assessment	Rationale
Emissions to air	No	Emissions during decommissioning activities, (largely comprising fuel combustion gases) will occur in the context of the cessation of production. As such, emissions from operations and vessels associated with operation of the North Cormorant topsides will cease. Reviewing historical European Union (EU) Emissions Trading Scheme data and comparison with the likely emissions from the proposed workscope suggests that emissions relating to decommissioning will be small relative to those during production. The majority of emissions for the North Cormorant topsides decommissioning can be attributed to vessel time or are associated with the recycling of material returned to shore Appendix A). As the decommissioning activities proposed are of such short duration this aspect is not anticipated to result in significant impact. The estimated CO_2 emissions to be generated by the worst-case decommissioning option (Single Lift) is 17,018 te (Appendix A). Of this total, vessel emissions equate to 4,485 te, representing less than 0.06 % of the total UKCS vessel emissions in 2017 (7,800,000 te; BEIS, 2019). Considering the above, atmospheric emissions do not warrant further assessment.
Disturbance to the seabed	No	Currently it is envisaged that all vessels undertaking the decommissioning and removal works would be dynamically

Impact	Further assessment	Rationale
		positioned vessels. As a result, there will be no anchoring associated with the decommissioning of the topsides. Should this change following the commercial tendering process and an anchor vessel be required, any potential seabed impact would be assessed and captured in the Consent to Locate application, Marine Licence application and supporting Environmental Impact Assessment (EIA) justification within the Portal Environmental Tracking System (PETS). On this basis, no further assessment needs to be undertaken.
Physical presence of vessels in relation to other sea users	No	The presence of a small number of vessels for topsides decommissioning activities will be short-term in the context of the life of the North Cormorant installation. Activity will occur using similar vessels to those currently deployed for oil and gas installation, operation and decommissioning activities. The decommissioning of the North Cormorant topsides is estimated to require up to seven vessels depending on the selected method of removal. If applicable, Notices to Mariners will be made in advance of activities occurring. This may not be a requirement as decommissioning/ installation activities will only take place within the existing 500 m safety exclusion zone. Stakeholders will have time to make any necessary alternative arrangements for the very limited period of operations. Considering the above, temporary presence of vessels does not need further assessment.
Physical presence of infrastructure decommissioned in situ in relation to other sea users	No	As topsides will be fully removed, there will be no mechanism for associated long-term impact through physical presence. Considering the above, no further assessment related to long term presence of infrastructure is justified.
Discharges to sea (short-term and long-term)	No	Discharges from vessels are typically well-controlled activities that are regulated through vessel and machinery design, management and operation procedures. In addition, the topsides will be Drained, Flushed, Purged and Vented (DFPV) using the TAQA DFPV philosophy prior to any decommissioning activities commencing. There would be no planned discharges from the topsides. Any residual remaining material will be in trace levels/volumes following the DFPV regime and therefore would not pose any significant risk. Oil spill modelling conducted for a release of hydrocarbons associated with vessel collision was conducted for the field's operational phase; this was based on a volume of 450 m^3 of diesel and indicated no significant impact due to the remote offshore Project location. Any hydrocarbon inventories on site during decommissioning will be of significantly smaller volume than those modelled. As the topsides will be fully removed, there will be no potential for releases in the longer term from the facilities. Considering the above, discharges to sea from the topsides should not be assessed further.
Underwater noise emissions	No	Cutting required to remove the topsides will take place above the waterline, and there will be no other noise-generating activities. Vessel presence will be limited in duration. The project is not located within an area protected for marine mammals.

Impact	Further assessment	Rationale
		With industry-standard mitigation measures and JNCC guidance, EAs for offshore oil and gas decommissioning projects typically show no injury, or significant disturbance associated with these projects. On this basis, underwater noise assessment does not need assessed further.
Resource use	No	Generally, resource use from the proposed activities will require limited raw materials and be largely restricted to fuel use. Such use of resources is not typically an issue of concern in offshore oil and gas. The estimated worst-case (Single Lift option) total energy usage for the project is 197,027 GJ (Appendix A). Material will be returned to shore as a result of project activities, and expectation is to recycle at least 97% of this returned material. There may be instances where infrastructure returned to shore is contaminated and cannot be recycled, but the weight/volume of such material is not expected to result in substantial landfill use. Considering the above, resource use does not warrant further assessment.
Onshore activities	No	The onshore waste management process is likely to have negligible consequences for the human population in terms of an increase in dust, noise, odour and reduced aesthetics. It should be noted that, through TAQA's Waste Management Strategy, only licenced contractors will be considered who can demonstrate they are capable of handling and processing the material to be brought ashore (e.g. permitted capacity to accept the relevant waste streams). This will form part of the commercial tendering process, including duty of care audits and due diligence on the successful contractor. Approval is determined through due-diligence assessment comprising site visits, review of permits and consideration of the facilities design and construction has been developed to minimise environmental impact. TAQA understands that dismantling sites will also require consents and approvals from onshore regulators such as the Environment Agency, who apply conditions relating to mitigation, management and who are responsible for the provision of permits for such work.
Waste	No	It is waste management, not generation, that is the issue across DPs, with capacity to handle waste within the UK often cited as a stakeholder concern. The limited waste to be brought to shore, which will be routine in nature, will be managed in line with TAQA's Waste Management Strategy as part of the project Active Waste Management Plan, using approved waste contractors. On this basis, no further assessment of waste is necessary.
Employment	No	TAQA will communicate regularly with all crew members throughout. TAQA will also be working closely with its contractor companies to retain and redeploy crew where possible. Following the above measures and continued communications further assessment is not warranted for this aspect.
Unplanned events	No	The topsides process system will have been through the DFPV process prior to the decommissioning activities described herein being carried out. Release of a live hydrocarbon and chemical inventory is therefore not a relevant impact mechanism.

Impact	Further assessment	Rationale
		The lift vessel to be used for removing the topsides is likely to have the largest fuel inventory of the few vessels involved in the decommissioning activities. However, the inventory is likely to be less than the worst-case crude oil spill from loss of well containment modelled and assessed in the Cormorant North field oil pollution emergency plan (OPEP). In addition, the vessel's fuel inventory is likely to be split between a number of separate fuel tanks, significantly reducing the likelihood of an instantaneous release of a full inventory. Overall, therefore, the potential impact from fuel inventory release will be at worst equivalent to that already assessed and mitigated for the operational phase of North Cormorant. The current OPEP for the North Cormorant topsides considers a diesel release of approx. 850 m^3. For such a spill, no beaching is expected, and under normal weather conditions, the spill will disperse naturally within 9 hours As the methodology for the removal to shore of the topsides has not been defined in detail, there exists the possibility that during transport of the topsides materials, elements may dislodge and drop from the transport vessel. Dropped object procedures are industry-standard and there is only a very remote probability of any interaction with any live infrastructure. Considering the above, the potential impacts from accidental chemical/ hydrocarbon releases during decommissioning activities do not warrant further assessment. Although the risk of oil spill is remote, an OPEP will be in place for the North Cormorant Decommissioning activities. Any spills from vessels in transit and outside the 500 m zone are covered by separate Shipboard Oil Pollution Emergency Plans (SOPEPs). Up to seven vessels will be deployed during decommissioning activities, including a heavy lift vessel, tug vessels (4), a barge vessel, a standby vessel and supply vessels (2). Any dropped objects of significant size will be removed (i.e. those reported to OPRED via PON2 notifications). Any small non-significant objects will be marked and will be within the safety zone of the substructure. These dropped objects will be addressed during the debris clearance survey post decommissioning activities associated with the substructure decommissioning activities.
Dropped Objects	No	Any dropped objects of significant size will be removed (i.e. those reported to OPRED via PON2 notifications). Any small non-significant objects will be marked and will be within the safety zone of the substructure. These dropped objects will be addressed during the debris clearance survey post decommissioning activities associated with the substructure decommissioning activities.

Based on this initial screening, there are no aspects which warrant further assessment within the EA as any potential impact will be short in duration and of low impact severity, and therefore poses no significant risk to environmental or societal receptors.

Environmental Management

The project has limited activity associated with it beyond the main period of preparation for decommissioning and removal of the North Cormorant topsides. The focus of environmental

performance management for the project is therefore to ensure that the activities that will take place during the limited period of decommissioning happen in a safe, compliant and acceptable manner. The primary mechanism by which this will occur is through TAQA's accredited Environmental Management System and Health, Safety, Security and Environment Policy.

To support this, a project Health, Safety and Environment (HSE) Plan will be developed which outlines how HSE issues will be managed and how the policies will be implemented effectively throughout the project. The plan will apply to all work carried out, whether onshore or offshore. Performance will be measured to satisfy both regulatory requirements including compliance with environmental consents, as well as to identify progress on fulfilment of project objectives and commitments.

TAQA also operates a Waste Management Strategy and will develop an Active Waste Management Plan (AWMP) for the project in order to identify and describe the types of materials identified as decommissioning waste and to outline the processes and procedures necessary to support the Decommissioning Programme for the North Cormorant topsides. The AWMP will detail the measures in place to ensure that the principles of the waste management hierarchy are followed during the decommissioning.

In terms of activities in the NNS, the National Marine Plan has been adopted by the Scottish Government to help ensure sustainable development of the marine area. This Plan has been developed in line with UK, EU and OSPAR legislation, directives and guidance. With regards to decommissioning, the Plan states that 'where re-use of oil and gas infrastructure is not practicable, either as part of oil and gas activity or by other sectors such as carbon capture and storage, decommissioning must take place in line with standard practice, and as allowed by international obligations. As part of the conclusions to this assessment (Section 6.0), TAQA has given due consideration to the Scottish National Marine Plan during Project decision making and the interactions between the Project and Plan.

Conclusions

Given the remote offshore location of the Cormorant North field, there is no potential for North Cormorant topsides decommissioning to impact any European or nationally designated protected sites.

This EA has considered the Scottish National Marine Plan, adopted by the Scottish Government to help ensure sustainable development of the marine area. TAQA considers that the proposed decommissioning activities are in alignment with its objectives and policies.

Based on the findings of this EA including the identification and subsequent application of appropriate mitigation measures, and Project management according to TAQA's Health, Safety, Security and Environment Policy and Environmental Management System (EMS), it is considered that the proposed North Cormorant topside decommissioning activities do not pose any significant threat of impact to environmental or societal receptors within the UKCS.

1.0 INTRODUCTION

In accordance with the Petroleum Act 1998, TAQA Bratani Limited (TAQA), an established United Kingdom Continental Shelf (UKCS) operator and on behalf of the Section 29 notice holders, is applying to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for decommissioning the North Cormorant topside. Once the Coromrant North Field reaches the end of its economic life and ceases to produce hydrocarbons, it is intended to shut down and isolated the platform and clean the topside to a standard that allows them to be deemed 'Hydrocarbon Free', such that removal activities can safely proceed

The Cormorant North field is 100% owned and operated by TAQA.

This Environmental Appraisal (EA) has been conducted to assess the potential environmental impacts that may result from undertaking the topsides decommissioning activities as part of a staged decommissioning of the North Cormorant facilities. This EA supports the Decommissioning Programme (DP) being submitted to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED), the offshore decommissioning regulator under the Department for Business, Energy and Industrial Strategy (BEIS), which covers decommissioning the North Cormorant topsides only (TAQA, 2020).

Separate decommissioning programmes and Environmental Appraisals covering the remainder of the Cormorant North field, including substructure, associated pipelines, power cables and umbilicals, will be provided at a later date yet to be determined.

1.1 Project Overview

The North Cormorant platform is a drilling/production unit located in Block 211/21a of the Northern North Sea (NNS), approximately 113 km north east of Shetland and 35 km west of the UK/Norway median line (Figure 1-1). The platform stands in 160 m of water.

The North Cormorant platform is a fixed installation which consists of an 8-legged steel jacket sub-structure, anchored by piles to the seabed, supporting a module support frame (MSF) and two levels of modules including accommodation and drilling facilities that incorporate a wellbay, process bay and utilities bay. The platform was installed in 1981 and production started in 1982. A CoP (Cessation of Production) application for North Cormorant is currently under preparation and will be submitted to the Oil & Gas Authority (OGA) in Q2 2020.

North Cormorant has 41 well slots, 24 of which are production wells and 16 are water injection wells, the final well slot remains unused. The installed total weight of the topsides is currently estimated to be approximately 16,177 te. The North Cormorant platform facilitates production from the Cormorant North and Cormorant East Fields. Oil and gas imported from Otter is separated out and processed via the North Cormorant process facilities. The oil is then routed to Cormorant Alpha for onward transmission through the Brent Oil Pipeline System to Sullom Voe. Associated gas, and gas imported from Tern Alpha, is exported through the Western Leg and the Far north Liquids and Associated Gas System (FLAGS) Pipeline to the St. Fergus terminal.

A schematic figure illustrating the North Cormorant platform in the context of other installations in the vicinity, together with connecting infrastructure including pipelines, umbilicals and power cables, is shown in Figure 1-2.

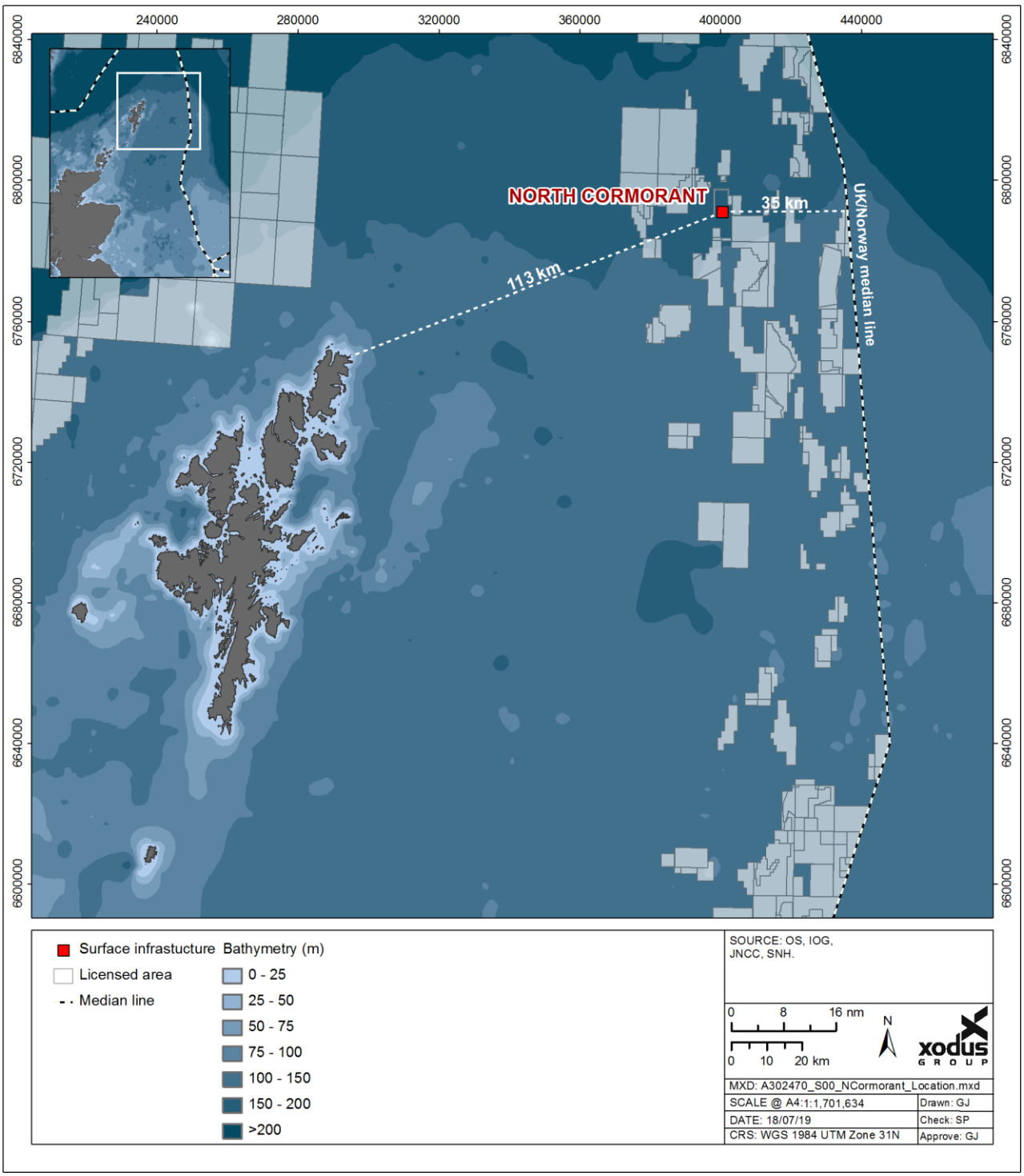

Figure 1-1 **Location of the North Cormorant Installation**

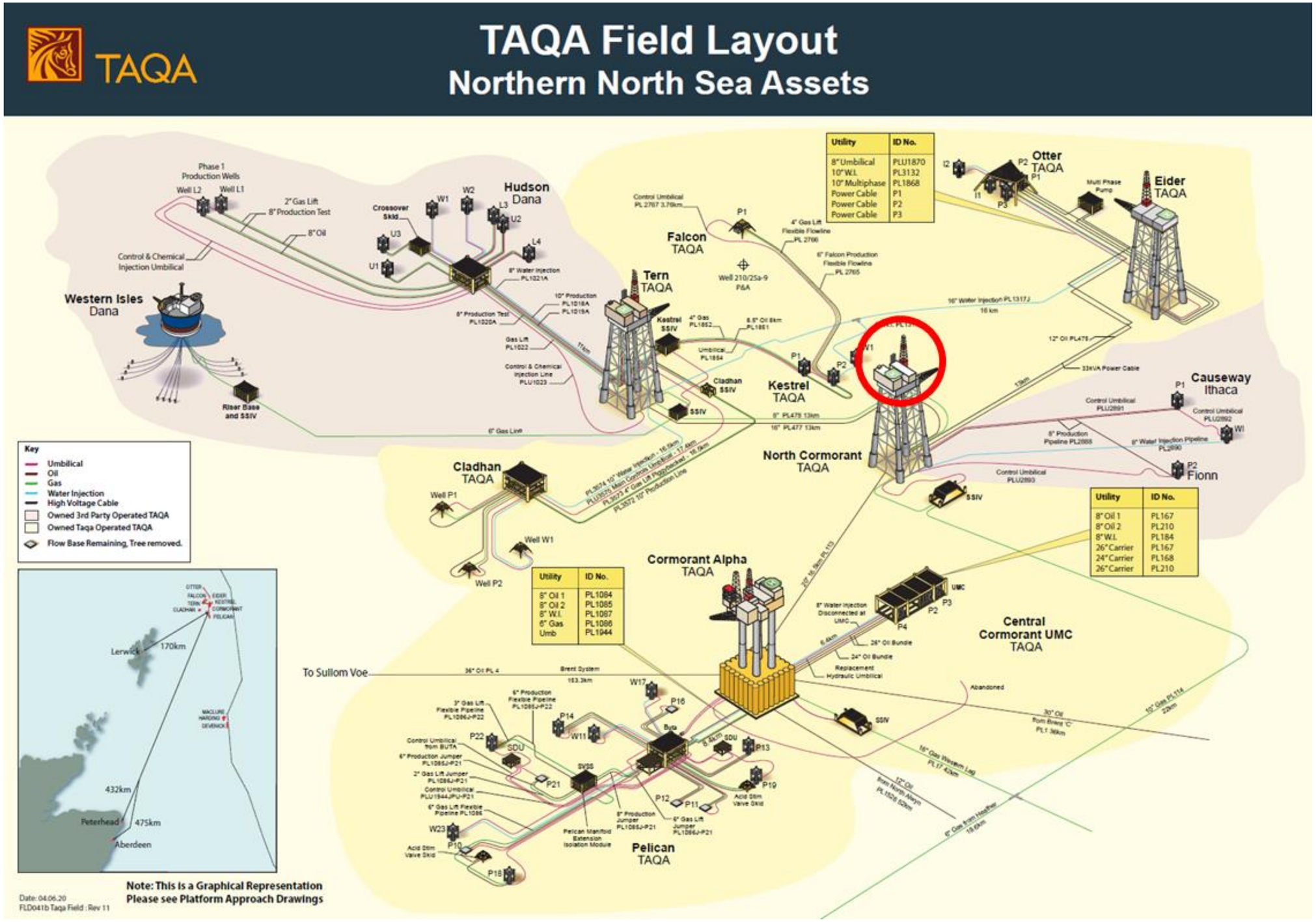

Figure 1-2 Location of the North Cormorant Installation in Relation to Other Installations

Intentionally blank page

As outlined above in Section 1.0, decommissioning at the Cormorant North field will be split into two programmes:

- Topsides decommissioning, covered by this EA and the associated DP;
- Substructure decommissioning, to be carried out at a time yet to be confirmed and covered by a separate DP and supporting EA; and
- Subsea infrastructure decommissioning, to be carried out at a time yet to be confirmed and to be covered by a separate DP and supporting EA.

With uncertainties in the timing of North Cormorant decommissioning in relation to other TAQA decommissioning scopes, splitting the decommissioning programme into three provides TAQA with greater flexibility as to the timing of specific decommissioning activities. Allowing topsides decommissioning in the short term could also potentially result in cost savings, since the requirement for a long period of topsides maintenance can be avoided in the eventuality that full facilities decommissioning is significantly delayed. The removal of the North Cormorant topside will not prejudice any decommissioning options for the remaining substructure. This will minimise the period between CoP and the removal of the topsides. This also has safety and environmental benefits, as it reduces the length of time that people and equipment are mobilised to the platform to perform maintenance of the topsides to ensure they are in a safe condition for dismantling.

Well plugging and abandonment will have been assessed, permitted and completed as updates/variations to existing operational permits prior to any of the platform and subsea decommissioning activities progressing. This means that each well will be systematically and permanently closed in accordance with well abandonment best practice. Similarly, flushing and cleaning operations for pipeline systems subsea and on the North Cormorant substructure and topsides will also have been completed under existing operational permits prior to commencement of decommissioning activities.

1.2 Purpose of the Environmental Appraisal

This EA assesses the potential environmental impacts associated with the proposed North Cormorant topsides decommissioning activities. The impact identification and assessment process also accounts for stakeholder engagement, comparison of similar decommissioning projects undertaken in the UKCS, expert judgement, and the results of supporting studies which aim to refine the scope of the DP. This EA Report documents this process and details, in proportionate terms, the extent of any potential impacts and any necessary mitigation/control measures proposed.

1.3 Regulatory Context

The decommissioning of offshore oil and gas installations and pipelines on the UKCS is controlled through the Petroleum Act 1998 (as amended). Decommissioning is also regulated under the Marine and Coastal Act 2009 and Marine (Scotland) Act 2010. The UK's international obligations on decommissioning are primarily governed by the 1992 Convention for the Protection of the Marine Environment of the North East Atlantic (the Oslo Paris (OSPAR) Convention). The responsibility for ensuring compliance with the Petroleum Act 1998 rests with OPRED.

The Petroleum Act 1998 (as amended) governs the decommissioning of offshore oil and gas infrastructure, including pipelines, on the UKCS. The Act requires the operator of an offshore installation or pipeline to submit a draft DP for statutory and public consultation, and to obtain approval of the DP from OPRED, part of BEIS, before initiating decommissioning work. The DP must outline in detail the infrastructure being decommissioned and the method by which the decommissioning will take place.

The primary guidance for offshore decommissioning from the regulator (OPRED, 2018), details the need for an EA to be submitted in support of the DP. The guidance sets out a framework for the required environmental inputs and deliverables throughout the approval process. It now describes a proportionate EA process that culminates in a streamlined EA report rather than a lengthy Environmental Statement. The OPRED guidance is supported by Decom North Sea's (Decom North Sea, 2017) Environmental Appraisal Guidelines for Offshore Oil and Gas Decommissioning, which provide further definition on the requirements of the EA report.

In terms of activities in the NNS, the Scottish National Marine Plan has been adopted by the Scottish Government to help ensure sustainable development of the marine area. This Plan has been developed in line with UK, European Union (EU) and OSPAR legislation, directives and guidance. With regards to decommissioning the Plan states that 'where re-use of oil and gas infrastructure is not practicable, either as part of oil and gas activity or by other sectors such as carbon capture and storage, decommissioning must take place in line with standard practice, and as allowed by international obligations. Re-use or removal of decommissioned assets from the seabed will be fully supported where practicable and adhering to relevant regulatory process. As part of the conclusions to this assessment (Section 6.0), TAQA has given due consideration to the National Marine Plan during Project decision making and the interactions between the Project and Plan.

1.4 Scope and Structure of this Environmental Appraisal Report

This EA report sets out to describe, in a proportionate manner, the potential environmental impacts of the proposed activities associated with decommissioning of the North Cormorant topsides and to demonstrate the extent to which these can be mitigated and controlled to an acceptable level. This is achieved in the following sections, which cover:

- The process by which TAQA has arrived at the selected decommissioning strategy (Section 2.0);
- A description of the proposed decommissioning activities (Section 2.0);
- A review of the potential impacts from the proposed decommissioning activities and justification for the assessments that support this EA (Section 5.0);
- A summary of the baseline sensitivities and receptors relevant to the assessment area that support this EA (Section 3.0);
- Assessment of key issues (Section 5.1); and
- Conclusions (Section 6.0).

This EA report has been prepared in line with TAQA's environmental assessment requirements and has given due consideration to the regulatory guidelines (OPRED, 2018) and to Decom North Sea's Environmental Appraisal Guidelines for Offshore Oil and Gas Decommissioning (Decom North Sea, 2017).

2.0 PROJECT SCOPE

2.1 Description of the Infrastructure being Decommissioned

The North Cormorant installation comprises an 8-legged steel jacket weighing 20,052 tonnes (te), which is designed to supporting a topsides operating weight of 16,177 te (Figure 2-1). The topsides infrastructure is of modular construction with a MSF and two levels of modules including accommodation and drilling facilities including utilities (M1), power generation (M2), water injection (M3), process wellhead (M4), gas compression (M6), living quarters (M7), drilling pump (M8), drilling engine (M9), flare boom (M10), MSF (M12), drilling derrick (M13), shale shaker (M14) and skidbase (M15) as shown in Figure 2-2.

Figure 2-1 North Cormorant Topsides

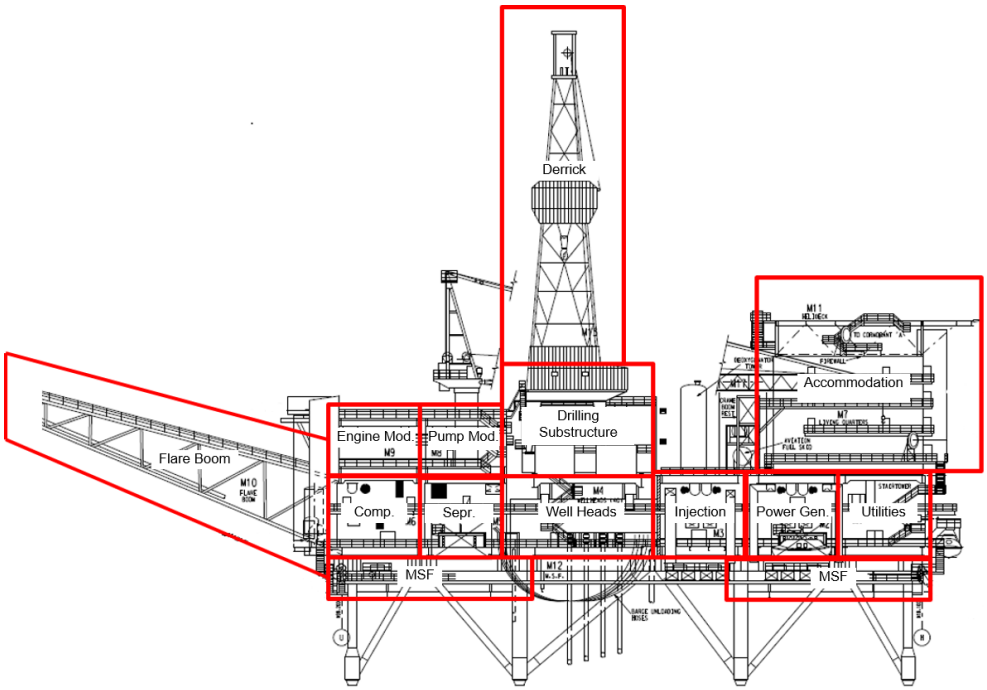

Figure 2-2 North Cormorant Topsides Modular Construction

A study assessing the options for reuse of the North Cormorant platform has been conducted (TAQA, 2018a). The alternatives for reuse included: an offshore renewable energy generation station (wind, wave or tidal), a marine research station, a training centre, fish farming site, carbon capture and storage site and reuse of the facilities at an alternative location. The report concluded that there are no credible reuse options for the topsides principally due to the limited remaining life of the jacket structure due to fatigue issues, obsolescence issues associated with the installed topsides/equipment, and economic factors associated with converting the installations for any intended reuse purpose. Components from the platform maybe reused if a suitable use can be found.

2.2 Description of Proposed Decommissioning Activities

The topsides removal methodology detail has not been finalised yet, as this will be subject to a commercial tendering process. TAQA has conducted a Topsides Removal Study (TAQA, 2019), which reviewed the technically feasible options and provides detailed method statements for each approach. As outlined in Section 1.1, all engineering down and cleaning (EDC) associated with the topsides will be managed through updates/variations to existing operational permits prior to commencement of topsides removal activities.

The methods for removal of the topsides have been reviewed by TAQA (TAQA, 2020). The resulting feasible options; single lift, modular removal and hybrid removal (including piece small and modular removal). Details of these are summarised in Section 2.4.

Upon completion of topside decommissioning activities, the substructure will be placed in a cold stack prior to its removal. During this period, the substructure will have a temporary ‘Aid to Navigation’ (AtoN) unit installed ensuring the installation meets all operational and regulatory requirements. It is envisaged that the system will be developed in consultation with the Northern Lighthouse Board (NLB) and monitoring and maintenance of the system will be via a service contract with a specialist contractor. The existing 500 m safety exclusion zone will remain in operation during the cold stack phase.

In addition to the maintenance of navigational aids, TAQA will continue to maintain an Oil Pollution Emergency Plan (OPEP) for the installation and a Dismantling Safety Case will be in place to cover all activities required to complete the substructure removal operations.

2.3 General Assumptions

Within TAQA (2018b) a number of assumptions have been made in the preparation of method statements for each of the topsides removal options considered:

- North Cormorant platform is hydrocarbon free (and has been flushed/cleaned to <100mg/ l of oil in water);
- Substructure removal is out of the scope of these method statements;
- All essential systems (lighting, power), navigation aids (as required by the Consent to Locate permit) and escape/egress facilities (escape routes, lifeboats etc.) will be in place for all removal methodologies;
- Additional essential services (lighting, power) and escape/egress facilities (escape routes, lifeboats etc.) are required to be in place for Single Lift methodology and appropriately managed in conjunction with full 175 personnel on board (POB);
- Suitable cranage will be available on the platform/ vessels as required;
- Installation of required temporary services (e.g. welding, burning, compressed air, water, power generation etc.) by contractor;
- The estimated durations do not take account of weather delays;
- During piece small removal (Hybrid Methodology) spare capacity of existing supply vessels supporting concurrent TAQA decommissioning projects will be utilised during this period;
- Assumes 14 days on, 21 days off rota pattern for all personnel on the platform and 28 days on, 28 days off for any HVL vessel;
- All helicopter flights have a maximum capacity for 19 people, but only 14 seats assigned to scheduled flights to accommodate ad-hoc requirements and visitors.
- Assume 1 supply vessel visit per week for food, diesel, water whilst platform supports existing accommodation;
- Minor lifts - assume 10 tonne lifts (skips) offshore, 2 tonne lifts (components) onshore and offshore and normal food/material transfers from supply vessel;
- Heavy Lift Vessel POB 320;
- Single Lift Vessel POB 200;
- Tug POB assumed to be 12;
- Barge POB assumed to be 20; and
- Onshore demolition estimate is based on industry feedback, including information from the Murchison and Brent Delta decommissioning projects.

During topside decommissioning activities, the existing 500 m safety exclusion zone will be maintained and will remain in operation until wider field decommissioning is complete. Vessels other than standby and supply boats will be required to remain outside of this exclusion zone.

2.4 Method Statements

The methods reviewed by TAQA were; single lift, modular removal and hybrid removal (including piece small and modular removal). The processes involved in each case are detailed in the following sections. All three options are considered potentially suitable and as such any decision on the selection will be open to the contractor in the commercial tendering process.

This EA considers all three options, and selects the worst-case impact posed for each aspect or receptor rather than assessing all three options simultaneously against each aspect or receptor.

2.4.1 Single Lift Method Statement

This method would entail the removal of the topsides infrastructure in one piece via a single lift vessel (SLV) or Heavy Lift Vessel (HLV) or device for transport to shore for size reduction, reuse, recycling or disposal. A maximum of seven vessels will be used during decommissioning operations, but not all concurrently (SLV or HLV, guard/support vessel, cargo barge and tugs x4).

2.4.1.1 Preparation

The required preparation works, to avoid clashes between the topsides and the topsides lift system equipment and to ensure structural integrity and stability of the topsides structures during the lift and transport operations, consist of:

Under deck and Integrated Deck Structure (IDS) preparations:

- Removal of under deck objects;
- Leg cutting for topsides – jacket separation (diamond wire); and
- MSF strengthening.

Lift point preparations (installation of support points):

- Access for under deck preparations.

Module deck preparations:

- Equipment and loose items sea fastening/removal.

Transfer of personnel between the SLV or HLV (when in field) and platform would be likely to be by basket transfer or walk to work via bridge link. Otherwise helicopter to platform would be used;

Installation of clamps and/or beams to provide lifting points. This activity may also involve the removal of some braces connected to the legs;

Installation of an above-water guiding system mounted on the jacket legs due to clearance requirements between the vessel hull and jacket legs;

Rigging installation; and

Flare boom and drill derrick removal.

2.4.1.2 Removal

The topsides would be raised and then lifted using hydraulic clamps mounted to horizontal lifting beams on the SLV or HLV. This would be subject to stringent sea state limits (although a motion compensation system will be used).

2.4.1.3 Transport to shore

1. Topsides legs would be tensioned via the clamps in order to secure to the SLV or HLV for transport;
2. Topsides transferred to a cargo barge; and
3. Final loading on to the quayside.

2.4.1.4 Onshore handling

1. Rigging installation;
2. Size reduction of entire topsides including module separation, module internals and the external structure of each module. This would involve significant cutting and grinding etc;
3. Lifting (small and large lifts would be required, this would be dependent on how the topsides are dismantled);
4. Waste segregation; and
5. Re-use, recycle or disposal.

2.4.2 Modular Removal Method Statement

The topsides would be removed in modular sections, in a manner similar to their original installation by using a HLV. The modules would then be transported to shore for re-use, recycling or disposal. A total of four vessels would be on site at any one time (HLV, tug, supply vessel and guard/support vessel).

2.4.2.1 Preparation

1. Installation of between 1% and 5% of the topsides weight in steel reinforcements/bracings. These would be installed prior to the arrival of the HLV.
2. Transfer of personnel between the HLV (when in field) and platform would be likely to be by basket transfer. Otherwise helicopter to platform will be used whilst the helideck is in place;
3. Installation of required temporary services (e.g. welding, compressed air, water, power generation etc.) would be supplied via HLV (when in field);
4. Installation of module lift off bumpers and guides (requires welding and non-destructive examination activities);
5. Removal and recovery of any temporary securing;
6. Installation of access/rigging laydown platforms (these will require modifications as the modules are removed);

7. Diamond wire cutting would be undertaken between modules to ensure adequate clearance between modules. This would typically require two cuts and removal of material between the modules; and

8. Installation of rigging on modules, infills and laydown/access areas.

2.4.2.2 Removal

Modules would be lifted clear of the platform using HLV crane(s) and placed on the HLV deck.

2.4.2.3 Transport to shore

1. Each module would be adequately sea-fastened to the HLV deck for transport to shore; and

2. Each module would be lifted to quayside using HLV crane.

2.4.2.4 Onshore handling

3. Rigging installation;

4. Size reduction of entire topsides including module separation, module internals and the external structure of each module. This will involve significant cutting and grinding etc.;

5. Lifting (small and large lifts will be required, this being dependent on how the topsides are dismantled);

6. Waste segregation; and

7. Re-use recycle or disposal.

2.4.3 Hybrid: Piece Small and Modular Removal Method Statement

This method is a combination of piece small and modular removal techniques. The piece small element involves removing certain elements of the topsides infrastructure in manageable sections for transport via conventional supply vessels to shore for re-use, recycling or disposal. It is envisaged that the piece small methodology would only be utilised when supported from existing facilities e.g. cranes, accommodation and helideck. The remaining modules would then be removed via the modular removal methodology, using an HLV for multiple lifts rather than SLV as this would present worst case in terms of duration and number of vessels. A total of four vessels would be on site at any one time (supply vessel, guard/support vessel and HLV and tug).

2.4.3.1 Preparation

8. No specific preparation required for piece small removal of drilling derrick, substructure and flare boom;

9. Preparation for the HLV including the installation of between 1% and 5% of the topsides weight in steel reinforcements/bracings. This would be installed prior to the arrival of the HLV.

10. Transfer of personnel between the HLV (when in field) and platform would be undertaken by basket transfer. Otherwise helicopter to platform transfer would be used whilst the helideck is in place;

11. Installation of required temporary services (e.g. welding, compressed air, water, power generation etc.) to be supplied via HLV (when in field);

12. Installation of module lift off bumpers and guides (requires welding);

13. Removal and recovery of any temporary securing installed in step 4;

14. Installation of access/rigging laydown platforms (these will require modifications as the modules are removed);

15. Diamond wire cutting would be performed between modules to ensure adequate clearance between modules, this would typically involve two cuts and removal of material between the modules; and

16. Installation of rigging on modules, infills and laydown/access areas.

2.4.3.2 Topsides removal

Piece small

17. Removal of drilling derrick (M13), drilling skidbase (M15) and shale shaker module (M14) via piece small methodology, creating laydown area on the roof of the drilling pump module (M8) and the drilling engine module (M9);

18. Remove flare boom (M10) via piece small methodology utilising roof of drilling pump module (M8) and the drilling engine module.

It is envisaged that existing waste management and utilisation of spare capacity on existing vessels, helicopters and accommodation will be used during phase 1 & 2.

Modular Removal

Modules would be lifted clear of the platform using HLV crane(s) and placed on the HLV deck.

2.4.3.3 Transport to shore

19. Each module would be adequately sea-fastened to the HLV deck for transport to shore; and

20. Each module would be lifted to the quayside using HLV crane.

2.4.3.4 Onshore handling

21. Rigging installation;

22. Size reduction of entire topsides including module separation, module internals and the external structure of each module. This will involve significant cutting and grinding etc.;

23. Lifting (small and large lifts will be required, this will be dependent on how the topsides are dismantled);

24. Waste segregation; and

25. Reuse, recycle or disposal.

2.5 Navigational aids

During removal operations, navigational aid requirements will be fulfilled by the decommissioning contractor. TAQA proposes to pre-install a supporting platform at the top of one of the substructures to support an AtoN unit. Once removal of the topside has been completed, the HLV will install the AtoN on top of the supporting platform using the vessel crane. Replacement of the module following any failure will be undertaken via helicopter deployment (Figure 2-3).

TAQA will consult with the NLB to ensure that the design of the AtoN unit meets all regulatory requirements. It is anticipated that the unit will be of a self-contained offshore lighthouse (SCOL) design and will be helicopter portable to facilitate maintenance and replacement as required (Figure 2-3). TAQA proposes to undertake monitoring and maintenance of the AtoN through a service contract with a specialist contractor, including real time status and analysis. Further information on the long-term monitoring and management of AtoN requirements will be provided within the North Cormorant Topsides Decommissioning Programme.

Figure 2-3 AtoN deployment via helicopter

2.6 Proposed Schedule

The precise timing of the topsides decommissioning activities is not yet confirmed and will be subject to market availability of cost-effective removal services and contractual agreements and following permanent down-manning of the platform in a window between 2024 and 2028 (Figure 2-4).

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Well Plug & Abandonment										
Topsides & Pipelines Clean & Make Safe										
Removal Contract Tender & Award										
Topsides Removal										
Close Out Report Submission										

KEY:
Potential Activity Window

Figure 2-4 Indicative Schedule

The North Cormorant topsides will not be decommissioned until the associated fields cease production. Since topsides integrity degrades rapidly following the platform becoming unoccupied, the most effective management option is to remove the topside infrastructure as soon as possible.

2.7 Summary of Materials Inventory

During the decommissioning of the North Cormorant topsides infrastructure, there will be a wide range of materials that will need to be processed and, where possible either reused or recycled.

Table 2-1 and Table 2-2 present the estimated total tonnage of infrastructure to be decommissioned and recovered to shore for processing and its high-level constituent material. Figure 2-5 and Figure 2-6 present the bulk and hazardous waste material breakdowns, respectively, for the North Cormorant topsides infrastructure (D3, 2019). The total amount of hazardous and non-hazardous waste is 16,177 te (Table 2-1 and Table 2-2).

Table 2-1 Summary of Proposed Fate of Non-Hazardous Materials from the North Cormorant Topsides

Material	Estimated total weight to be recovered to shore (te)	Proposed fate %		
		Reuse/	Recycling	Disposal
Iron and Steel	13,046.38	0	100	0
Copper, bronze, brass	22.51	0	100	0
Other	2,359.72	<10	90-97	<3
Total	**15,428.61**			

Table 2-2 Summary of Hazardous Materials and NORM from the North Cormorant Topsides

Material	Estimated total weight to be recovered to shore (te)
Miscellaneous equipment	298.48
Waste paint and varnish	151.35
Cholorofluorocarbons (CFCs)	0.05
Packaging	0.30
End-of-life vehicles	25.2
Metal waste	124.19
Batteries (Pb)	10.46
Batteries (NiCd)	2.00
Asbestos	2.87
Fluorescent lighting	0.03
Total Hazardous	**614.93**
Naturally occurring radioactive material (NORM)	134.20
Total Hazardous (including NORM)	**749.13**
Total Topsides Inventory (Table 2-1 and Table 2-32)	**16,177.74**

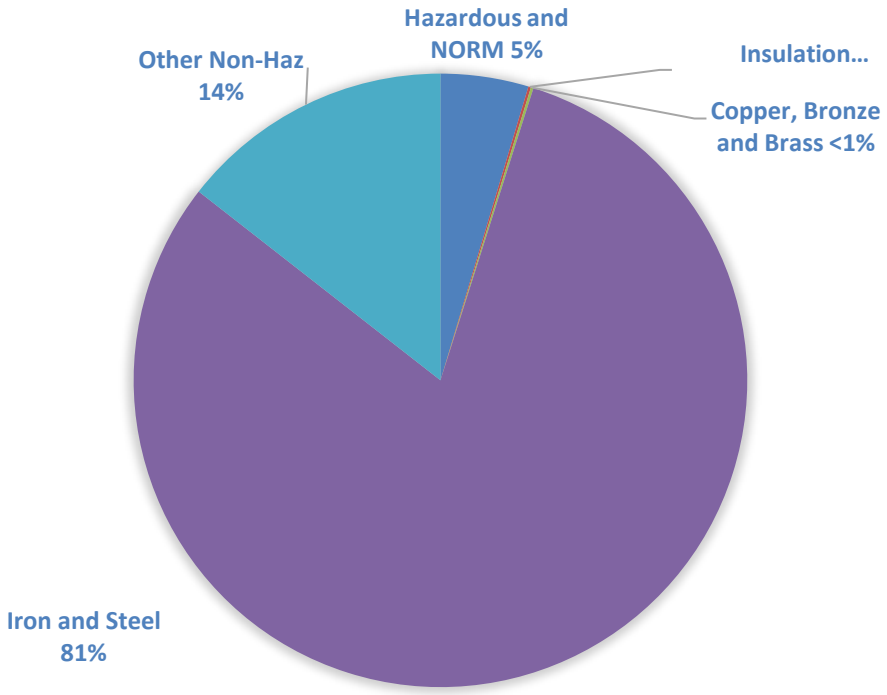

Figure 2-5 Bulk Materials from the North Cormorant Topsides Infrastructure (Source: D3, 2019)

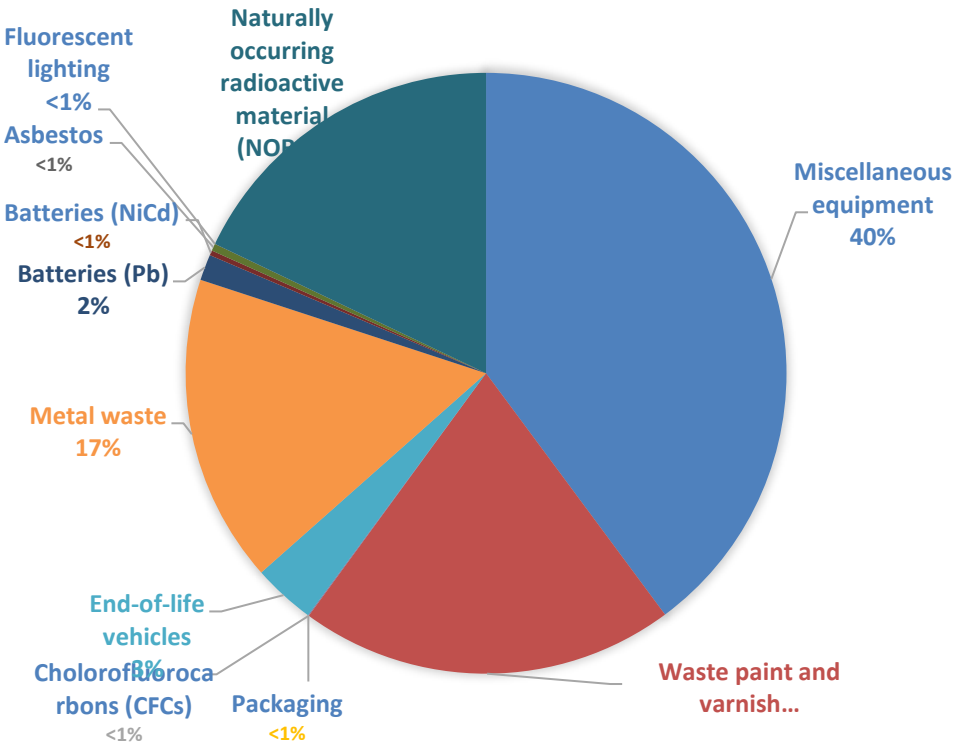

Figure 2-6 Hazardous Material from the North Cormorant Topsides Infrastructure (Source: D3, 2019)

2.8 Waste Management

TAQA will comply with the Duty of Care requirements under the UK Waste Regulations and The Environmental Protection (Duty of Care) (Scotland) Regulations 2014. The hierarchy of waste management will also be followed at all stages of disposal (see Figure 2-7) and industry best practice will be applied (Decom North Sea, 2018 Managing Offshore Decommissioning Waste, November 2018). Driving waste management up the waste hierarchy is central to the development of sustainable waste management and the ambition of a zero-waste society in Scotland.

All waste will be managed in compliance with relevant waste legislation by a licenced and/or permitted waste management contractor. The selected contractor will be assessed for competence through due diligence and duty of care audits.

Most of the material recovered during the North Cormorant topsides decommissioning activities will be non-hazardous, including steel, non-ferrous metals, plastics and concrete as outlined in Section 2.7.

Preventing waste is ultimately the best option, achieved through reducing consumption and using resources more efficiently. However, this is followed by re-use of goods. TAQA intends to review North Cormorant's critical equipment and stores with the objective of identifying the re-use opportunities that potentially exist and ensuring application of the principles of the circular economy. By re-using items, it may be possible to address prospective equipment obsolescence issues or as a way to fulfil the first principal of the waste hierarchy (Figure 2-7): reducing consumption of resources. If all re-use opportunities have been taken by TAQA we will look to canvass other Operators for their interest in items. An auditable trail of items removed for re-use will be available via asset register updates, manifests/consignment notes and Maximo records. These materials are not defined as waste as they are to be used for the same purpose.

Figure 2-7 Waste Hierarchy Model

The next preferable option is for recycling of materials and specifically, closed loop recycling of materials. Evidence shows that there are greater environmental benefits to closed loop recycling, where a product is used, discarded, captured, and then the component materials recycled into a new product of similar functionality. Which can then again travel through this cycle, continuously moving the material through the supply chain.

The Material Inventory has also classified each material according to the European Waste Catalogue Codes (EWC) as required for disposal of wastes within the EU and a further

categorisation of hazardous/special or non-hazardous/non-special wastes. The EWC is a standardised way of describing waste and was established by the European Commission. The use of EWC codes to describe waste is a legal requirement of the Duty of Care for waste which requires the holder of waste to take all reasonable steps to ensure that waste is described in a way that permits its safe handling and management.

Until a waste management contractor has been selected and disposal routes identified, the final disposal options for waste materials are not yet known. The project aspiration is that all ferrous and non-ferrous metals and concrete will be recycled. Approximately 97% of material recovered is anticipated to be recycled, with a target of less than 3% to go to landfill.

As part of TAQA's standard processes, all sites and waste carriers will have appropriate environmental and operating licences and/or permits to carry out this work and will be closely managed within TAQA's contractor assurance processes.

Should naturally occurring radioactive material (NORM) be encountered TAQA will hold a permit for the onshore disposal of radioactive waste arising from the decommissioning of the topsides infrastructure under the Environmental Authorisations (Scotland) Regulations 2018

An Active Waste Management Plan (AWMP) including an inventory of hazardous waste will be compiled to aid the segregation and recycling of waste.

2.9 Environmental Management Strategy

TAQA Bratani has an established and independently verified Environmental Management System (EMS) which operates in accordance with the requirements of ISO14001:2015. The scope of the TAQA EMS is defined to include all activities, onshore and offshore, in relation to the planning of decommissioning activities in defined license areas of the UK sector of the North Sea and in relation. This scope encompasses the North Cormorant platform plus associated infrastructure, all under the control of the TAQA Aberdeen headquarters. The EMS meets the requirements of OSPAR Recommendation 2003/5 which promotes the use and implementation of the EMS by the offshore industry.

Relevant to the EA, and to all of TAQA's activities, is the company's commitment to managing all environmental impacts associated with its activities. Continuous improvement in environmental performance is sought through effective project planning and implementation, emissions reduction, waste minimisation and waste management; this mindset has fed into the development of the mitigation measures developed for the Project; these include both industry-standard and project-specific measures. A signed copy of TAQA's Health, Safety, Security and Environment Policy is presented in Section 8.0.

3.0 ENVIRONMENTAL AND SOCIETAL BASELINE

The North Cormorant facility is located in UK Continental Shelf (UKCS) Block 211/21a, in the NNS. The North Cormorant Platform is located approximately 113 km north east of the Shetland coastline and 35 km from the UK/Norway median line (see Figure 1-1). The water depth at the installation is 160 m lowest astronomical tide (LAT).

As part of the EA process it is important that the main physical, biological and societal sensitivities of the receiving environment are well understood. This environmental baseline describes the main characteristics of the offshore environment in and around the North Cormorant platform and highlights the key sensitivities. This section draws on several information sources including published papers, relevant strategic environmental assessments (SEAs) and site-specific investigations.

A survey gap analysis study commissioned by TAQA, mapped and assessed all available survey reports covering TAQA assets across the wider NNS area including North Cormorant (Xodus, 2018). The full coverage of this study, including sampling station locations and listings of the survey reports consulted, are shown in Figure 3-1. These surveys have all indicated similar species and sediment compositions which provide evidence of the relatively uniform nature of the seabed habitats and communities within the vicinity and the wider region.

Four environmental survey reports have been used to inform the seabed and benthos sections of this environment description for the immediate area adjacent to the North Cormorant platform:

- *North Cormorant Baseline Environmental Survey (Environment and Resource Technology Limited (for Shell), 1991):*

  This report provides the results of an environmental baseline survey which was conducted around the North Cormorant platform by Environment and Resource Technology Limited in 1991. A total of 22 stations were sampled within 10 km of the platform. The main objectives of this survey were to establish the current gradients of physical, chemical and biological indices around the platform.

- *Post- Drilling Environmental Survey of the Benthic Sediments at North Cormorant (Environment and Resource Technology Limited (for Shell), 1995):*

  This seabed environmental survey was carried out in August as part of a wider North Sea study to collect and analyse seabed sediments following the cessation of the permitted discharge of oil-based mud during offshore drilling operations.

- *North Cormorant – Combined Environmental Baseline and Habitat Assessment Survey Report (Benthic Solutions, 2019):*

  This report provides the results of a pre-decommissioning environmental baseline and habitat assessment survey was conducted around the North Cormorant platform by Benthic Solutions in April 2019. Seabed ground-truthing at 10 stations within 500 m of the platform. The main objectives of this survey were to establish the current gradients of physical, chemical and biological indices around the platform and to identify and quantify any species/features of conservation importance near to the structure.

- *North Cormorant Cuttings Pile UKCS Block 211/21a (Fugro, 2019):*

  The survey associated with this report included remotely operated vehicle (ROV) core sampling for physico-chemical analyses and ROV grab sampling for biological analysis of the sediments within the North Cormorant cuttings pile. Twelve cores and five ROV grab samples were collected from corresponding locations so that biological data could be related to physico-chemical sample results.

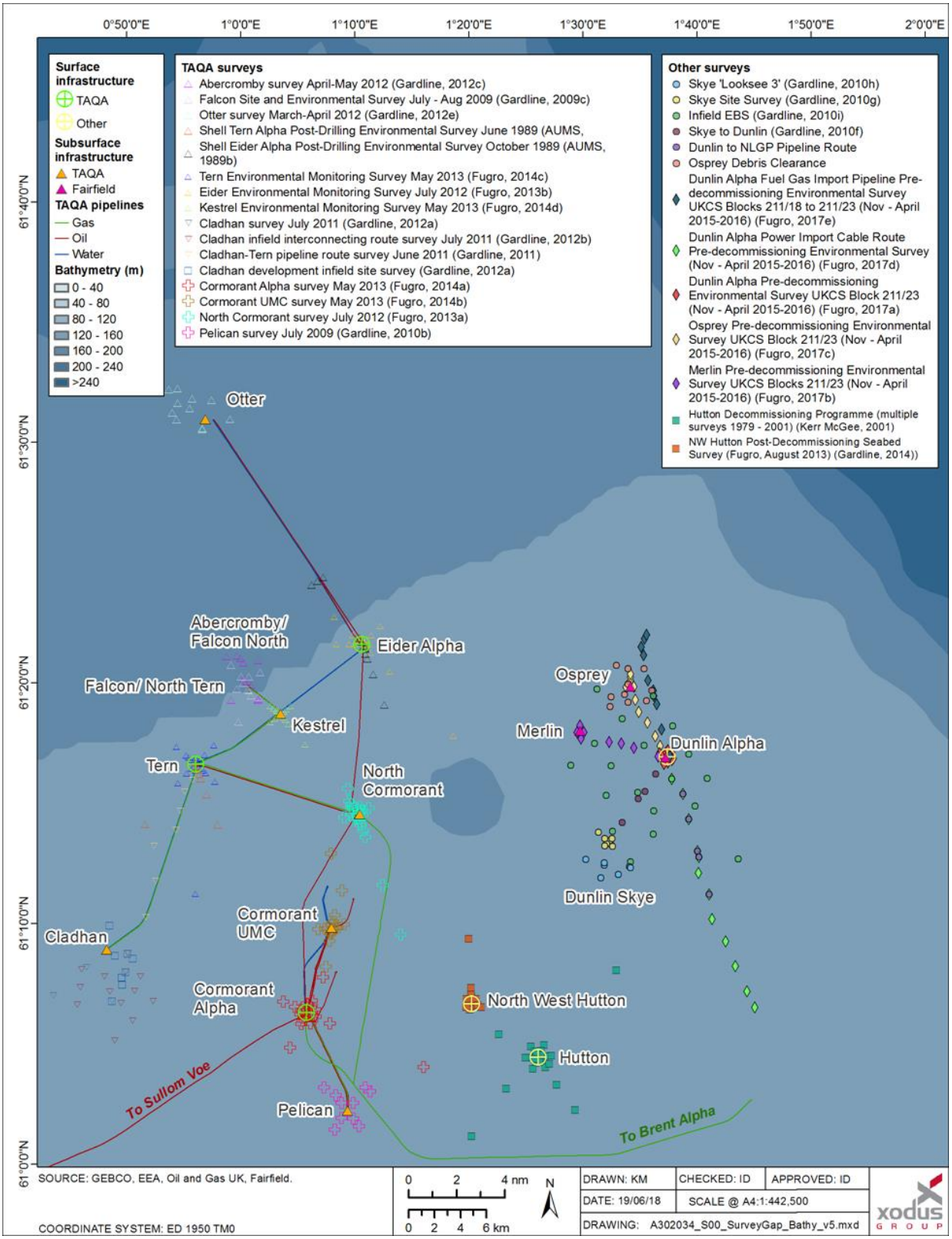

Figure 3-1 **Location of surveys around the TAQA infrastructure**

3.1 Physical Environment

3.1.1 Bathymetry

The North Cormorant platform is located at a water depth of 160 m. The North Cormorant platform is not located on any large-scale features of functional significance such as shelf deeps, shelf banks and mounds, seamounts, or continental slopes (NMPI, 2019).

3.1.2 Currents, Waves and Tides

The annual mean wave height in the NNS region follows a gradient increasing from the southern point in the Fladen/Witch Ground to the northern area of the East Shetland Basin. In the south, the mean wave height ranges from 2.71 - 2.30 m whilst in the north it ranges from 2.41 - 3.00 m (NMPI, 2019). McBreen *et al.* (2011) shows wave energy at the seabed is 'low' (less than 0.21 N/m^2) within the Cormorant North field. The annual mean wave height within the Cormorant North field ranges from 2.71 m – 3.00 m and the annual mean wave power is 40.35 kW/m (NMPI, 2019).

The anti-clockwise movement of water through the North Sea and around the NNS region originate from the influx of Atlantic water, via the Fair Isle Channel and around the north of Shetland (as shown on Figure 3-2), and the main outflow northwards along the Norwegian coast (DECC, 2016). Against this background of tidal flow, the direction of residual water movement in the NNS is generally to the south or east (DTI, 2001; DECC, 2016). The peak flow for mean spring tide ranges between low velocities of 0.11 to 0.25 m/s (DECC, 2016). The mean residual current through the Cormorant North field is approximately 0.05 to 0.1 m/s (Wolf *et al.*, 2016).

The NNS is seasonally stratified and the strength of the thermocline is determined by solar energy, tidal and wave forces (DECC, 2016). Distinct density stratification occurs in the NNS region in summer at a depth of around 50 m and the thermocline becomes increasingly distinct towards deeper water in the north of the region (DECC, 2016). This stratification breaks down in September as the frequency and severity of storms increases causing mixing in the water column (DECC, 2009).

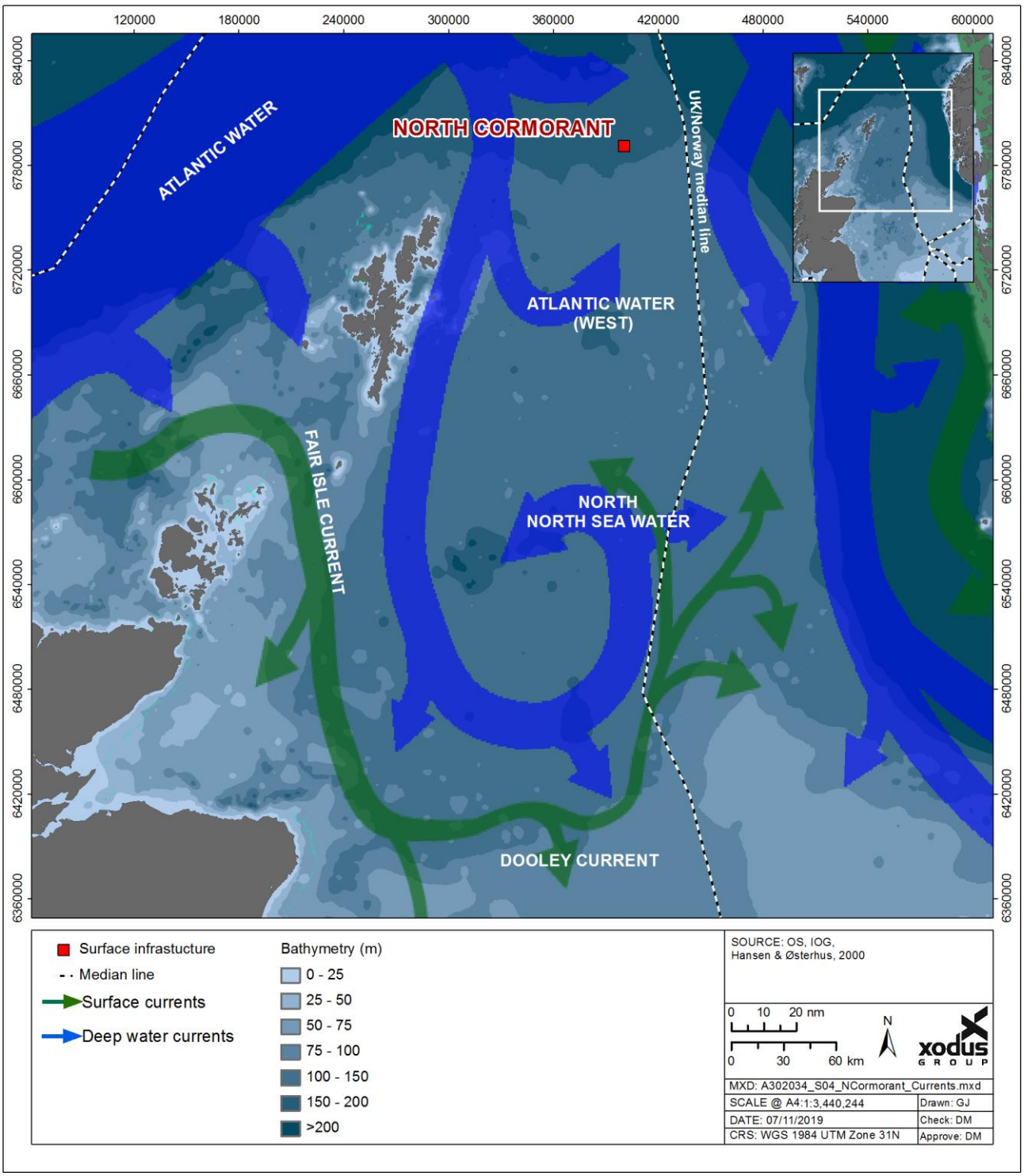

Figure 3-2 Sea Currents around the North Cormorant Platform

3.1.3 Meteorology

The prevailing winds in the NNS are from the south west and north north-east. Wind strengths in winter are typically in the range of Beaufort scale force 4-6 (6-11 m/s) with higher winds of force 8-12 (17-32 m/s) being much less frequent. Winds of force 5 (8 m/s) and greater are recorded 60-65% of the time in winter and 22-27% of the time during the summer months. In April and July, winds in the open, central to NNS, are highly variable and there is a greater incidence of north westerly winds (DECC, 2016).

3.1.4 Seabed sediments

In the NNS, and indeed across the North Sea, seabed sediments generally comprise a veneer of unconsolidated terrigenous and biogenic deposits, generally much less than 1 m thick, although areas of outcropping rock occur in coastal waters around and between Shetland, Orkney and the Scottish mainland. Sediments in the area are predominantly sand and muddy sand, although the deeper areas within the Fladen Ground consist of mud or sandy mud. Further off the edge of the continental shelf to the north of the region, the slope is characterised by areas of mixed and coarse sediments, while the floor of the Faroe-Shetland Channel is classified as mud (JNCC, 2017; DECC, 2016).

Under the European Nature Information System (EUNIS) habitat classification, three habitat types were determined across the North Cormorant survey area:

- 'Circalittoral Muddy Sand' (A5.26);
- 'Deep Circalittoral Coarse Sediment' (A5.15); and
- '*Capitella capitata*, *Thyasira* spp. in organically-enriched Offshore Circalittoral Mud and Sandy Mud' (A5.374).

In addition, one station 100 m northwest of the North Cormorant platform exhibited high levels of organic enrichment and chemical contamination. This station could not be assigned a EUNIS biotope due to the low species diversity and abundance of taxa and was instead assigned as an area of 'Organically Enriched Gravelly Muddy Sand' by Benthic Solutions (Benthic Solutions, 2019).

Table 3-1 provides the percentage of gravel and fines found in sediments around the North Cormorant platform during the most recent surveys (Benthic Solutions, 2019; Fugro, 2019), along with the type of sediments they have been classified into. The samples collected in the Benthic Solutions (2019) survey (between 90 and 590 m away from the North Cormorant platform) exhibited wider variability and represented five Folk (1954) classifications ranging from muddy sand to gravelly muddy sand, with most stations conforming to slightly gravelly muddy sand (40% of stations). The sediment type throughout the North Cormorant cuttings pile (directly below the platform) showed moderate variability and ranged from fine silt to fine sand. Coarser material was typically noted in the top core sections in comparison to their respective middle and bottom core sections. The cuttings pile sediment can be described as highly modified compared to the wider area covered by Benthic Solutions (2019).

Table 3-1 Seabed Characteristics for the North Cormorant Platform

Survey	Gravel (mean %)	Fines (mean %)	Sediment classification (Folk, 1954)
Benthic Solutions, 2019	6.3	31.5	Muddy to gravelly muddy gravelly sand
Fugro, 2019 (Cuttings pile)	5.17	52.5	Fine silt to fine sand

Total hydrocarbon (THC) concentrations measured in the cuttings pile by Fugro (2019) ranged from 748 μgg^{-1} (top of the pile) to 115,150 μgg^{-1} (bottom of the pile), with a mean of 57,100 μgg^{-1}. The THC levels exceeded the OSPAR cuttings pile ecological effects threshold (EET = 50 ppm; OSPAR, 2006) in all core sections. Deck log observations noted the sediment at the four stations closest to the North Cormorant platform to have a distinct diesel odour and consisted of 'black oily silty mud' indicative of drilling related contamination and anoxic conditions (Benthic Solutions, 2019).

A gradient of THC levels decreasing with distance from North Cormorant platform was evident, suggesting a point source of hydrocarbons most likely related to drilling discharges. An ellipsoidal distribution of THC was also observed around the North Cormorant platform. This pattern is common surrounding platforms with a typically higher concentration of hydrocarbons along the axis of the most persistent current (Davies *et al.*, 1984).

Of particular relevance to the offshore oil and gas industry are metals associated with drilling-related discharges. These can contain substantial amounts of barium sulphate (barites) as a weighting agent (NRC, 1983). Barium is therefore frequently used to detect the deposition of drilling fluids around offshore installations (Chow and Snyder, 1980; Gettleson and Laird, 1980; Tricine and Trefry, 1983; Muniz *et al.*, 2004). Solid barites are often discharged during the drilling process and also contain measurable concentrations of heavy metals as impurities, including cadmium, chromium, copper, lead, mercury, and zinc (NRC, 1983; McLeese *et al.*, 1987). Metal levels analysed in sediments around North Cormorant showed a pattern of higher levels at central stations, decreasing with distance from the platform (Benthic Solutions, 2019). Within the cuttings pile (Fugro, 2019) some measured metals, including cadmium, chromium, copper, mercury, lead, and zinc showed elevation above their respective OSPAR Effects Range Low (ERL) thresholds, above which a significant environmental impact might be expected.

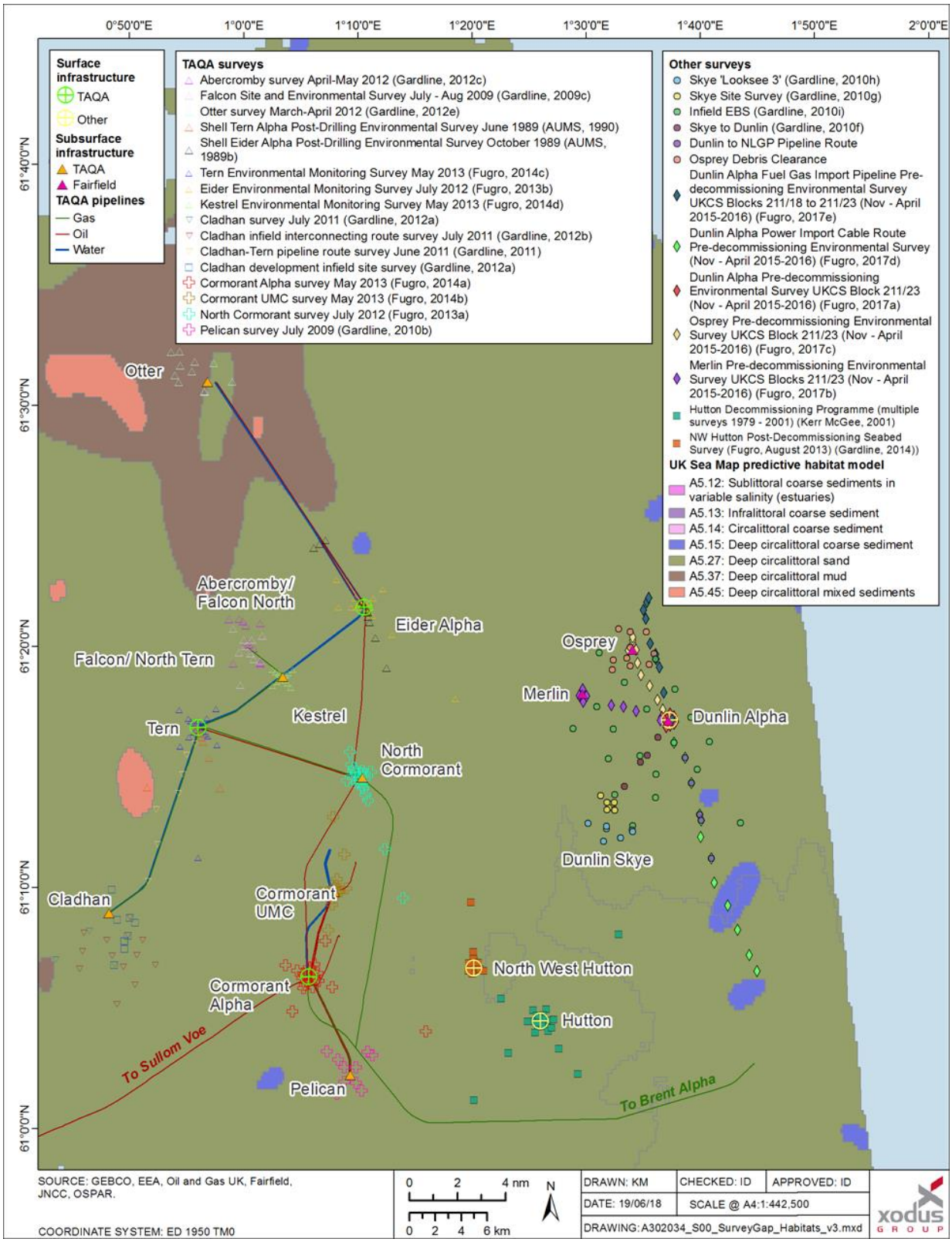

Figure 3-3 **Broad-Scale Predicted Habitat around the North Cormorant Platform (JNCC, 2017)**

3.2 Biological Environment

3.2.1 Plankton

Planktonic assemblages exist in large water bodies and are transported simultaneously with tides and currents as they flow around the North Sea. Plankton forms the basis of marine ecosystem food webs and therefore directly influences the movement and distribution of other marine species. There is a water column of approximately 160 m at the North Cormorant platform.

In both the northern and central areas of the North Sea, the phytoplankton community is dominated by dinoflagellates of the genus *Ceratium* and diatoms such as *Thalassiosira spp*. and *Chaetoceros spp*. In recent years the dinoflagellate *Alexandrium tamarense* and the diatom *Pseudo-nitzschia* (known to cause amnesic shellfish poisoning) has been observed in the area (DECC, 2016). Densities of phytoplankton fluctuate during the year, with sunlight intensity and nutrient availability driving its abundance and productivity together with water column stratification (Johns & Reid, 2001; DECC, 2016). In the 10-year period between 1997 and 2007, two main blooms are seen to occur in the NNS: one in May, and a second in August before levels decrease through the winter months when light and temperature are less abundant (SAHFOS, 2015).

Zooplankton species richness is greater in the northern and central areas of the North Sea, than in the south and displays greater seasonality. Zooplankton in this area is dominated by calanoid copepods, in particular *Calanus* and *Acartia spp*. and *Euphausiids* and decapod larvae are also important to the zooplankton community in this region (DECC, 2016).

Calanus finmarchicus has historically dominated the zooplankton of the North Sea and is used as an indicator of zooplankton abundance. Analysis of data provided by the Continuous Plankton Reader (CPR) surveys in the 10-year period between 1997 and 2007 shows a sharper spring increase in *C. finmarchicus* biomass in May in the NNS compared to more southerly areas. This peak in numbers is 70% greater than seen in the central North Sea and 88% greater than the southern North Sea over the same period (SAHFOS, 2015). The increase is likely a reflection of the increased availability of nutrients and food (including phytoplankton) in spring. Overall abundance of *C. finmarchicus* has declined dramatically over the last 60 years, which has been attributed to changes in seawater temperature and salinity (Beare *et al.*, 2002; FRS, 2004). *C. finmarchicus* has largely been replaced by boreal and temperate Atlantic and neritic (coastal water) species in particular, and a relative increase in the populations of *Calanus helgolandicus* has occurred (DECC, 2009; Edwards *et al.*, 2010; Baxter *et al.*, 2011).

3.2.2 Benthos

The biota living near, on or in the seabed is collectively termed benthos. The diversity and biomass of the benthos is dependent on several factors including substrata (i.e. sediment or rock), water depth, salinity, the local hydrodynamics and degree of organic enrichment (DECC, 2016). The species composition and diversity of the benthos or macrofauna found within sediments is commonly used as a biological indicator of sediment disturbance or contamination.

During the environmental survey around the North Cormorant platform, conducted by Benthic Solutions (2019), the macrobenthos was analysed from 20 grab samples at ten stations. A total of 15,638 individuals and 295 taxa were identified including juvenile and indeterminate specimens. The arthropods were represented by 63 species (2.7% of total individuals) and the molluscs by 75 species (8.8% of total individuals). In contrast, only 18 species of echinoderms were recorded, accounting for just 1.3% of the total individuals. Solitary epifauna was represented by two Ascidiacea and four Cnidarians (*Edwardsiidae*, *Actiniaria, Cerianthus lloydii, Caryophyllia* (*Caryophyllia*) *smithii*), where only one individual of *Edwardsiidae* and one *Cerianthus lloydii* individual in total was noted. All other groups (*Nemertea, Nematoda, Sipuncula, Turbellaria,*

Phoronida, Chaetognatha, etc.) were represented by just 10 species, but accounted for 41.3% of the total individuals (Benthic Solutions, 2019).

The macrofauna within the North Cormorant survey area was variable with different species dominating at the sediment close to the platform compared to the sediment sampled further afield. For example, the annelid species, *Glycera lapidum, Prionospio cirrifera, Spiophanes kroyeri* and *Spiophanes wigleyi* (polychaete worms) were found uniformly distributed throughout the survey area corresponding to the generally muddy sand/slightly gravelly muddy sand habitat. Polychaetes have frequently been found to account for ca. 50% of the species encountered in offshore sediments in the North Sea and the taxa identified across the North Cormorant survey area are broadly similar to those encountered previously in the NNS (Eleftheriou & Basford, 1989; Kunitzer *et al.*, 1992; Oil and Gas UK, 2015). In contrast, a high abundance of the taxa Nematoda, *Capitella*, *Nereimyra punctata*, *Cirratulus cirratus, Raricirrus beryli* and *Thyasira sarsii* was found in the areas closer to the North Cormorant platform (up to 122 m) where barium-rich drill cuttings have had an influence. This indicates that peak barium concentrations are suppressing the dominance of opportunistic species. Both species richness and abundance were affected by the influence of drilling related activity with stations close to the platform showing a reduced species diversity and increase in the abundance of opportunistic species (Benthic Solutions, 2019).

3.2.3 Potential sensitive habitats and species

A review of the ground-truthing data from the survey area surrounding the North Cormorant platform indicated the presence of several potentially sensitive habitats and species, including:

- ‘Submarine structures made by leaking gases’ - Annex I Habitat
- ‘Sea-pen and Burrowing megafauna communities’ – UK BAP habitat
- Ocean quahog *Arctica islandica* - OSPAR list of threatened and/or declining species and habitats (Region II - Greater North Sea)

These habitats are listed by one or more International Conventions, European Directives or UK Legislation (including devolved UK administrations).

‘Submarine structures made by leaking gases’ encompass hard substrates which support a unique community of organisms that are able to survive on the methane and hydrogen sulphide gasses associated with these ecosystems. There are two main types of submarine structures known to occur in the UK: bubbling reefs and submarine structures associated with pockmarks (JNCC, 2014). Pockmarks are generally connected to the release of methane, which reacts with the surrounding seawater forming carbonate blocks. The closest Special Area of Conservation (SAC) relating to ‘Submarine structures made by leaking gases’ is situated approximately 250 km south of the North Cormorant survey area, the ‘Braemar Pockmarks’. Depressions resembling unit pockmarks were recorded throughout the survey area on side scan sonar and bathymetry data (Benthic Solutions, 2019). The observed depressions were ground-truthed, revealing a high density of relic mussel shells and depressions filled with gravel and cobbles. Ground-truthing also revealed rock dumps adjacent to the pipeline infrastructure, anthropogenic debris (e.g. construction and fishing activities) and mattresses along pipelines and umbilicals (Benthic Solutions, 2019).

'Sea-pen and burrowing megafauna communities' are classified as a UK Habitat Feature of Conservation Importance (FOCI) and are also an OSPAR-listed habitat. OSPAR defines of 'Sea-pen and burrowing megafauna communities' as follows:

"Plains of fine mud, at water depths ranging from 15–200 m or more, which are heavily bioturbated by burrowing megafauna; burrows and mounds may form a prominent feature of the sediment surface with conspicuous populations of sea-pens, typically *Virgularia mirabilis* and *Pennatula phosphorea.* The burrowing crustaceans present may include *Nephrops norvegicus*, *Calocaris macandreae* or *Callianassa subterranea*. In the deeper fjordic lochs which are protected by an entrance sill, the tall sea-pen *Funiculina quadrangularis* may also be present. The burrowing activity of megafauna creates a complex habitat, providing deep oxygen penetration. This habitat occurs extensively in sheltered basins of fjords, sea lochs, voes and in deeper offshore waters such as the North Sea and Irish Sea basins and the Bay of Biscay" (OSPAR, 2010).

According to JNCC (2014) guidance, the key determinant for classification of 'Sea-pen and burrowing megafauna communities' is the presence of burrowing species or burrows at a SACFOR (Super abundant, Abundant, Common, Frequent, Occasional, Rare) density of at least 'frequent'. Benthic Solutions (2019) estimated the density of burrow openings at the seabed using representative video transects from each sampling station and found that the density of small and large burrows across the transects were recorded as 'occasional' on the SACFOR scale and therefore not considered to be a high enough density to be classified as a FOCI or as an OSPAR Habitat.

There were four recorded examples of the ocean quahog *Arctica islandica* (a type of clam). Three were found at a station approximately 500 m southwest of the platform and a further individual was found 250 m northeast (Benthic Solutions, 2019). This species is listed as a Priority Marine Feature (PMF) in Scottish waters (Tyler-Walters, 2016) and is on the OSPAR List of Threatened and/or Declining Species (OSPAR, 2008). However, there was no evidence of distinct *A. islandica* siphons at the seabed on any of the video footage or still photographs. The North Cormorant platform is located on the edge of a number of UKCS Blocks where this species has been recorded (Figure 3-4) and the distribution of *A. islandica* is relatively wide in the North Sea (OSPAR, 2009).

No other benthic habitat or species features of conservation interest have been noted within the scope of the most recent (Benthic Solutions, 2019) surveys within 500m of the North Cormorant platform. This includes those listed on the Annex I of the EC/EU Habitats Directive, the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, the OSPAR list of threatened and/or declining species, or the Scottish PMF list (IUCN, 2018).

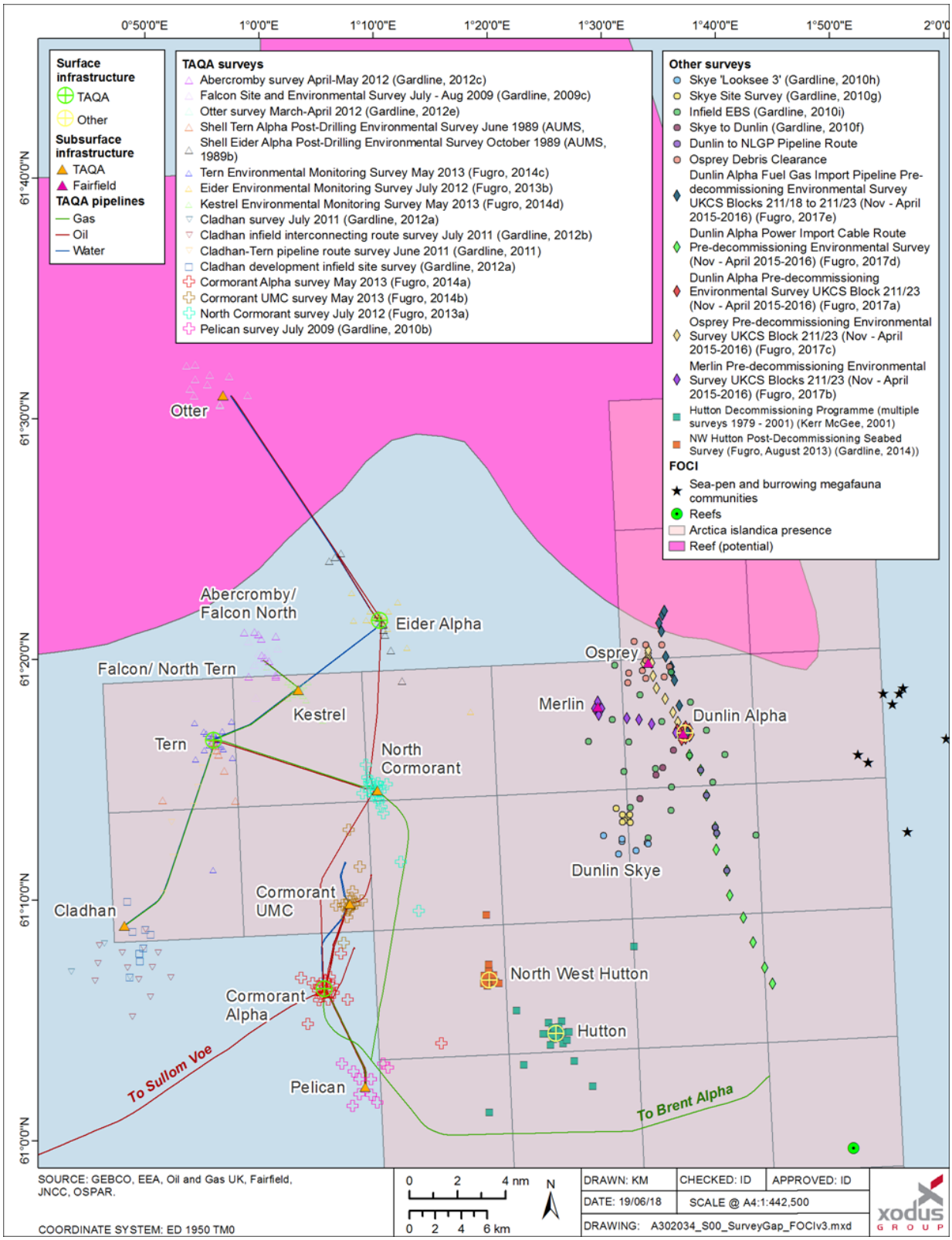

Figure 3-4 **Features of Conservation Importance in the Region of Interest**

3.2.4 Fish and Shellfish

A number of commercially important fish and shellfish species occur in the vicinity of the proposed decommissioning operations. Fish and shellfish populations may be vulnerable to impacts from offshore installations such as hydrocarbon pollution and exposure to aqueous effluents, especially during the egg and juvenile stages of their lifecycles (Bakke *et al.*, 2013).

The proposed decommissioning project for the North Cormorant platform is located in International Council for the Exploration of the Sea (ICES) rectangle 51F1, in an area of spawning and nursery grounds for several commercially important species. Information on spawning and nursery periods for these different species, including peak spawning times are detailed in Table 3-2.

Table 3-2 Fisheries Sensitivities within ICES Rectangle 51F1 (Coull *et al.*, 1998 and Ellis *et al.*, 2012)

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cod	S	S*	S*	S								
Haddock	N	S*N	S*N	S*N	N	N	N	N	N	N	N	N
Norway pout	SN	S*N	S*N	SN	N	N	N	N	N	N	N	N
Saithe	S*	S*	S	S								
Whiting	N	SN	SN	SN	SN	SN	N	N	N	N	N	N
Blue whiting	N	N	N	N	N	N	N	N	N	N	N	N
Hake	N	N	N	N	N	N	N	N	N	N	N	N
Herring	N	N	N	N	N	N	N	N	N	N	N	N
Ling	N	N	N	N	N	N	N	N	N	N	N	N
Mackerel	N	N	N	N	N	N	N	N	N	N	N	N
Spurdog	N	N	N	N	N	N	N	N	N	N	N	N

S = Spawning, N = Nursery, SN = Spawning and Nursery; * = peak spawning; Species = High nursery intensity as per Ellis *et al*, 2012; Species = High intensity spawning as per Ellis *et al* (2012); Species = High concentration spawning as per Coull *et al.*, 1998;

Spawning areas for most species are not rigidly fixed and fish may spawn either earlier or later from year to year. In addition, the mapped spawning areas represent the widest known distribution given current knowledge and should not be seen as rigid unchanging descriptions of presence or absence (Coull *et al*, 1998). Whilst most species spawn into the water column of moving water masses over extensive areas, benthic spawners (e.g. sandeel; *Ammodytidae sp*) have very specific habitat requirements, and therefore their spawning grounds are relatively limited and potentially vulnerable to seabed disturbance and change.

The North Cormorant platform is within an area of spawning ground for of cod (*Gadus morhua*); January – April [peak spawning February – March], haddock (*Melanogrammus aeglefinus*; February to May [peak spawning February – April]), Norway pout (*Trisopterus esmarkii;* January to April [peak spawning February – March]), saithe (*Pollachius virens;* January to April [peak spawning January – February]) and whiting (*Merlangius merlangus*; February to June) (Coull *et al.*, 1998; Ellis *et al.*, 2012). The North Cormorant platform is within a high intensity spawning ground for Cod (Ellis et al., 2012) and a high intensity spawning area for Norway pout has previously been reported approximately 30 km south by Coull *et al*. (1998) (Figure 3-5).

The North Cormorant Decommissioning area is also a potential nursery ground for haddock, Norway pout, whiting, blue whiting (*Micromesistius poutassou)*, European hake (*Merluccius merluccius)*, herring (*Clupea harengus)*, ling (*Molva molva*), mackerel (*Scomber scombrus)* and spurdog (*Squalus acanthias)*. Blue whiting is the only species with a high nursery intensity ground in the North Cormorant area while other species have a lower nursery intensity (Ellis *et al.*, 2012).

Fisheries sensitivity maps produced by Aires *et al.*, (2014) for Marine Scotland Science detail the likelihood of aggregations of fish species in the first year of their life (i.e. group 0 or juvenile fish) occurring around the UKCS, as shown on Figure 3-6 and Figure 3-7.

Aires *et al.,* (2014) provided modelled spatial representations of the predicted distribution of 0 age group fish (fish in the first year of their life) aggregations. These do not represent 'nursery grounds' as described in Coull *et al.*, (1998) and Ellis *et al.*, (2012), as nursery grounds can comprise a larger spread of ages and sizes. With this caveat in mind, the modelling indicates the presence, in medium densities, of juvenile fish (less than one years old) for two species within Block 211/21a. This includes blue whiting and European Hake. All other species were low.

Most fish are known to produce pelagic eggs with the exception of herring and sandeels, which are both benthic spawners. Herring are reported to spawn within Block 211/21a where the North Cormorant platform is located (Coull *et al*, 1998; Ellis *et al.*, 2012).

The following species listed above are also listed as Scottish PMF and are considered as of natural heritage importance: blue whiting, ling, mackerel, Norway pout, spurdog, herring, saithe, whiting and cod (SNH, 2016).

Herring, mackerel and hake are also on the IUCN Red List, listed as species of global status of 'least concern', as well as spurdog, listed with a global status of "vulnerable" and European status of "least concern". Norway pout and whiting are listed as species of 'least concern', both global and European status, and saithe and blue whiting are listed as species of 'least concern' (European status; IUCN, 2020). Cod and haddock are listed as a global status of 'vulnerable' global status (IUCN, 2020).

Cod, mackerel, ling, Norway pout, spurdog, herring, sole, whiting, blue whiting and hake are also on the Scottish Biodiversity List which identifies species of most importance for biodiversity conservation in Scotland (SNH, 2013a).

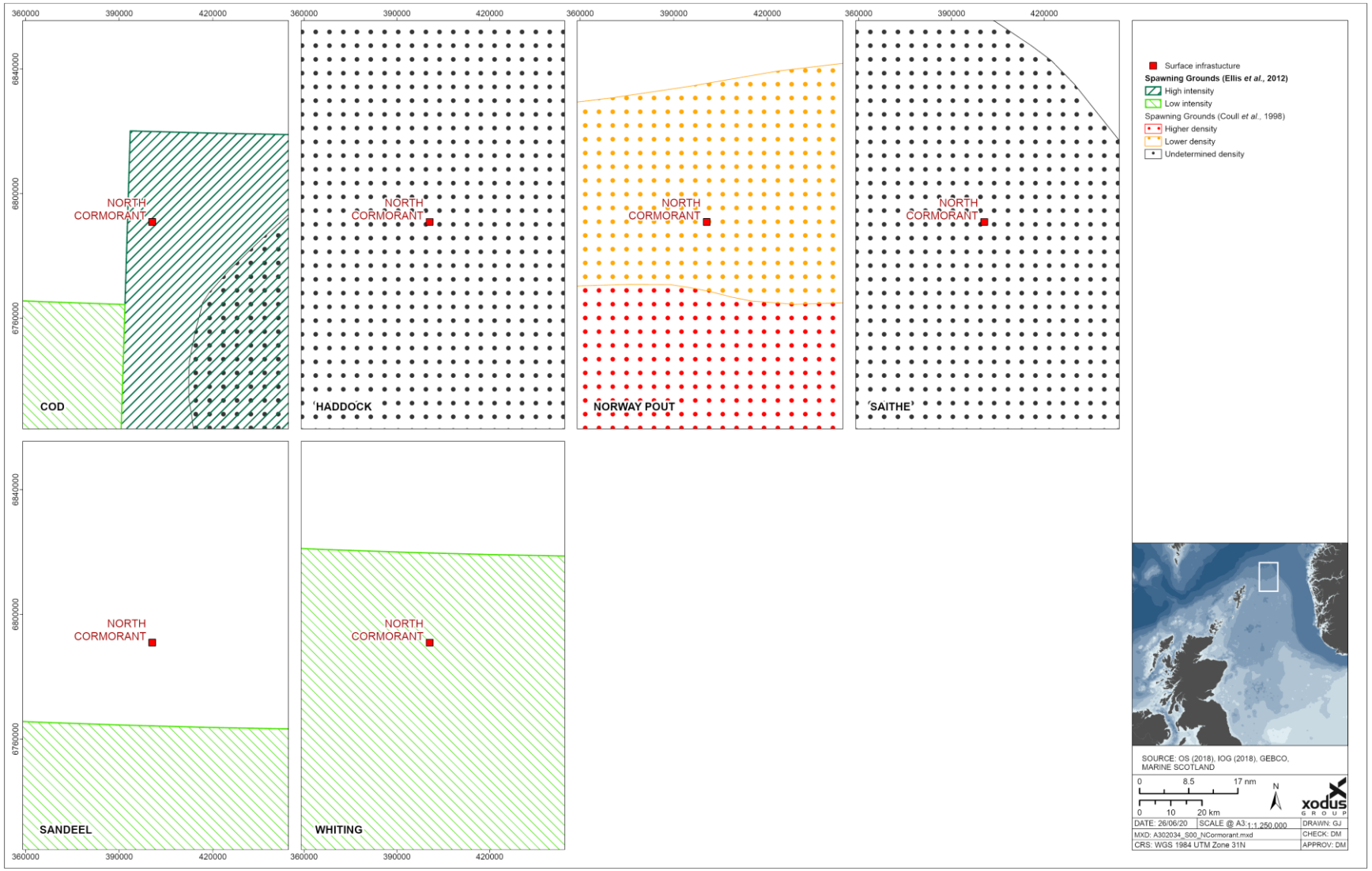

Figure 3-5 Potential Fish Spawning Grounds

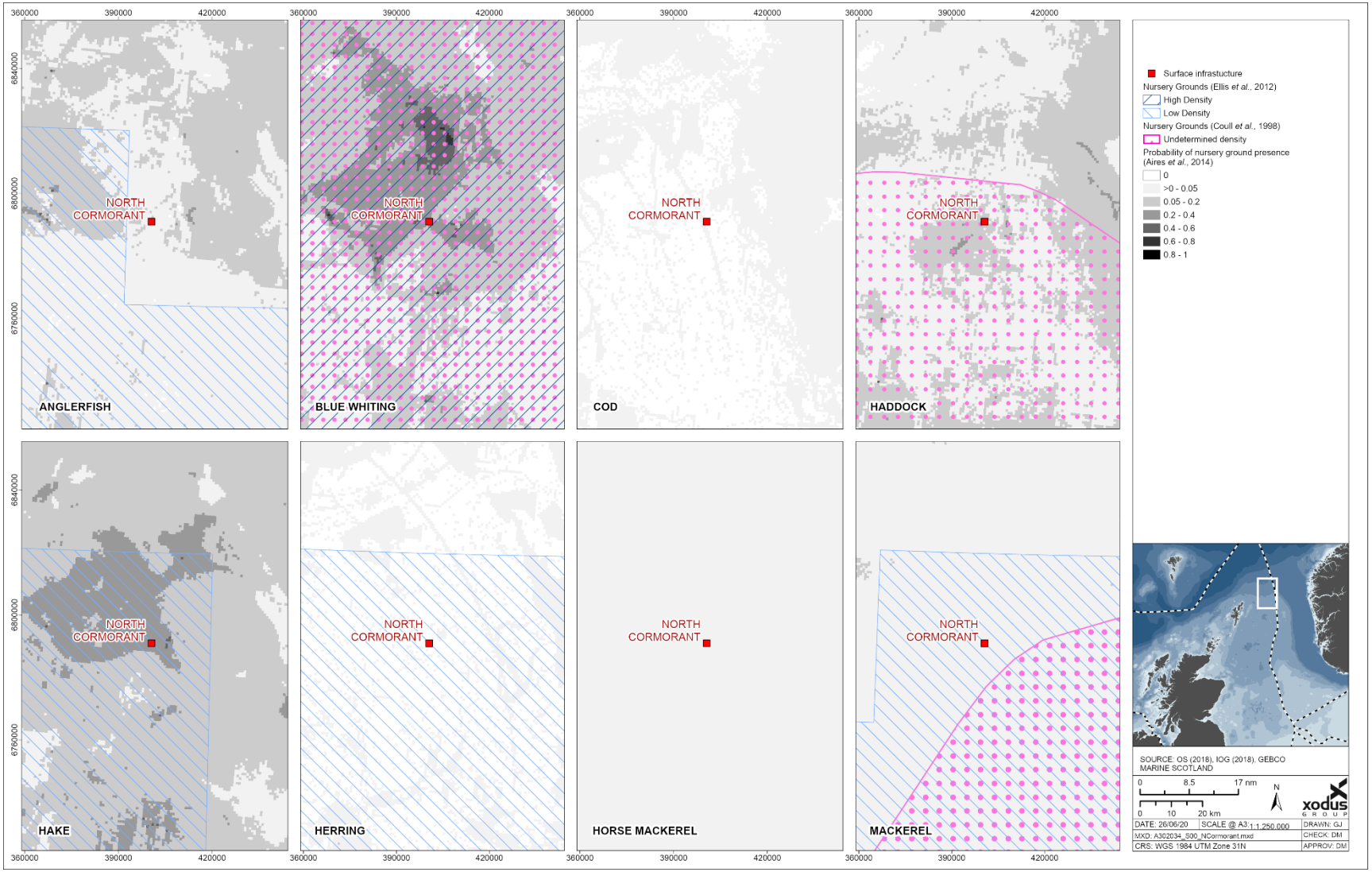

Figure 3-6 **Potential Fish Nursery Habitats adapted from Aires *et al.* (2014) (1 of 2)**

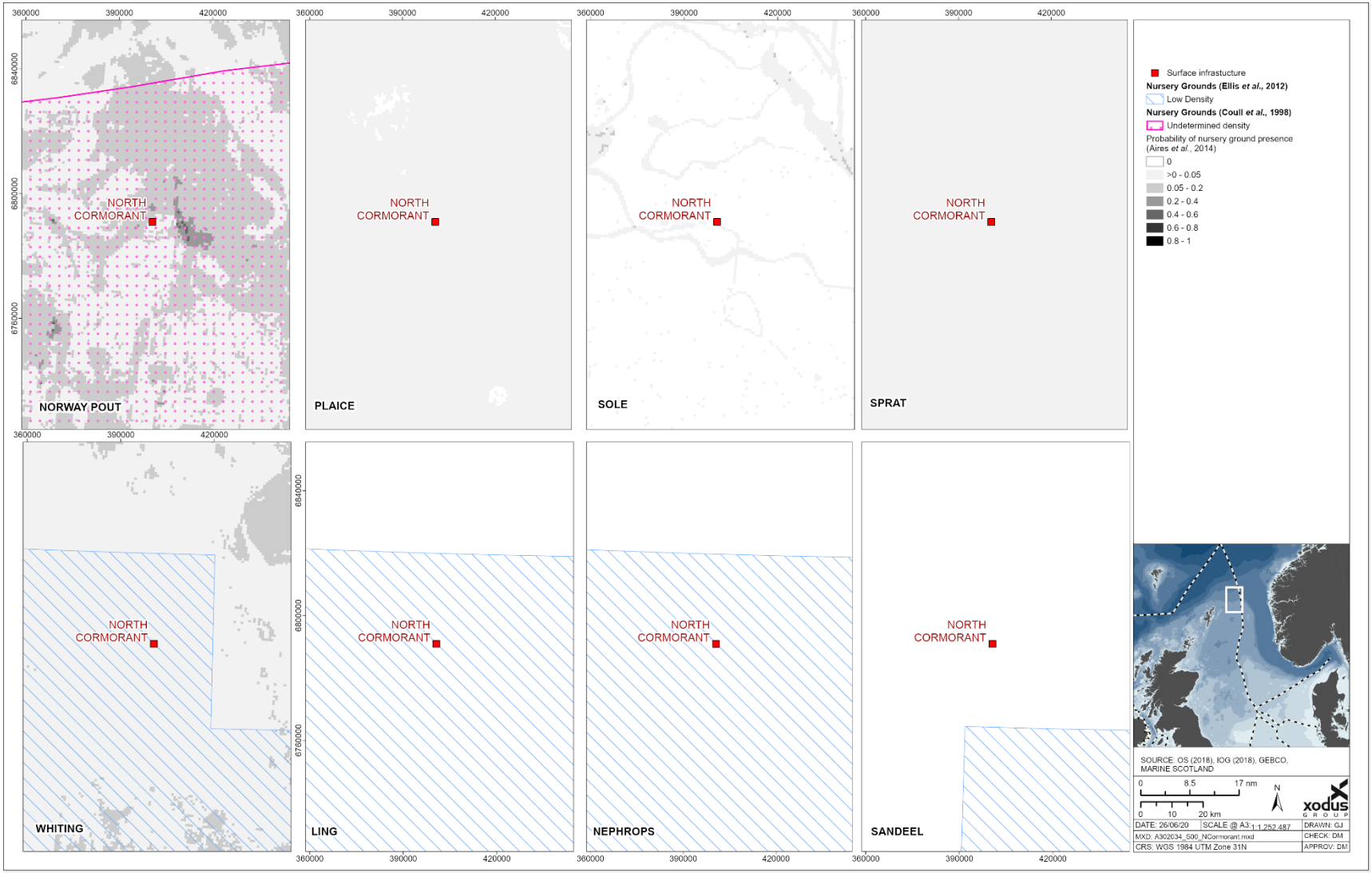

Figure 3-7 **Potential Fish Nursery Habitats adapted from Aires *et al.* (2014) (2 of 2)**

Intentionally blank page

3.2.5 Seabirds

Much of the North Sea and its surrounding coastline is an internationally important breeding and feeding habitat for seabirds. In the Central North Sea (CNS) and NNS, the most numerous species present are likely to be northern fulmar *Fulmarus glacialis*, black-legged kittiwake *Rissa tridactyla* and common guillemot *Uria aalge* (DECC, 2009; DECC, 2016). Seabirds are not normally affected by routine offshore oil and gas operations. In the unlikely event of an oil release, however, birds are vulnerable to oiling from surface pollution, which could cause direct toxicity through ingestion, and hypothermia as a result the birds' inability to waterproof their feathers. Birds are most vulnerable in the moulting season when they become flightless and spend a large amount of time on the water surface.

After the breeding season ends in June, large numbers of moulting auks (common guillemot, razorbill *Alca torda* and Atlantic puffin *Fratercula arctica*) disperse from their coastal colonies and into the offshore waters from July onwards. At this time these high numbers of birds are particularly vulnerable to oil pollution. In addition to auks, black-legged kittiwake, northern gannet *Morus bassanus*, and northern fulmar, are present in sizable numbers during the post breeding season.

Kober *et al.* (2010) have identified hotspots for a number of breeding seabirds in UK waters. The North Cormorant platform is located within or in the vicinity of a wider area of aggregation (or hotspots) for northern fulmar, northern gannet and Atlantic puffin during their breeding season. The offshore presence of these species during the breeding season is confirmed by the maximum foraging distances from colonies reported by Thaxter *et al.* (2012). The northern fulmar has been recorded up to 580 km from colonies, the northern gannet up to 590 km, and the Atlantic puffin up to 200 km (Thaxter *et al.*, 2012).

The Seabird Oil Sensitivity Index (SOSI) (Webb *et al.*, 2016) identifies sea areas where seabirds are likely to be most sensitive to oil pollution. It is an updated version of the Oil Vulnerability Index (JNCC, 1999) as it uses survey data collected between 1995 and 2015 and includes an improved method to calculate a single measure of seabird sensitivity to oil pollution.

Overall, seabird sensitivity to oil pollution in the region of the North Cormorant platform is considered low (score of 5) from January to April and June to December (Table 3-3). No data was available for May.

Table 3-3 Seabird Oil Sensitivity in Block 211/21 and Surrounding Vicinity (Webb *et al.*, 2016)

Block	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
210/20	3	5	5	5*	N	5*	5	5	5	5*	4*	4
211/16	5*	5	5	5*	N	5*	5	5	5	5*	4*	4
211/17	5*	5	5	5*	N	5*	5	5	5*	N	3*	3
210/25	5	5	5	5*	N	5*	5	5	5	5*	5*	5
211/21	**5**	**5**	**5**	**5***	**N**	**5***	**5**	**5**	**5**	**5***	**5***	**5**
211/22	5	5	5	5*	N	5*	5	5	4	4*	4*	4
210/30	5	5	5	5*	5*	5	5	5	5	5*	5*	5
211/26	5	5	5	5*	5*	5	5	5	5	5*	5*	5
211/27	5	5	5	5*	5*	5	5	5	4	4*	5*	5
Key	Extremely high		Very high		High		Medium		Low		No data	
* in light of coverage gaps, an indirect assessment of SOSI has been made												

3.2.6 Marine Mammals

3.2.6.1 Cetaceans

The central and NNS has a moderate to high diversity and density of cetaceans, with a general trend of increasing diversity and abundance with increasing latitude. Harbour porpoise *Phocoena phocoena* and white-beaked dolphin *Lagenorhynchus albirostris* are the most widespread and frequently encountered species, occurring regularly throughout most of the year. Minke whales *Balaenoptera acutorostrata* are regularly recorded as frequent seasonal visitors. Coastal waters of the Moray Firth and east coast of Scotland support an important population of bottlenose dolphins *Tursiops truncatus*, while killer whales *Orcinus orca* are sighted with increasing frequency towards the north of the area. Atlantic white-sided dolphin *Lagenorhynchus acutus*, Risso's dolphin *Grampus griseus* and long-finned pilot whale *Globicephala melas* can be considered occasional visitors, particularly in the north of the area (DECC, 2016).

Harbour porpoise, white-beaked dolphin, white-beaked dolphin and minke whale have been recorded in the vicinity of the North Cormorant platform (Reid *et al*, 2003). The harbour porpoise has been recorded at medium densities (approximately 1 – 10 individuals cited per hour in the months May and July). The minke whale was also recorded at medium densities in May and white-sided dolphins and white-beaked dolphins are both recorded at relatively medium densities in July (Reid *et al.*, 2003).

In 2016, the third series of Small Cetaceans in European Atlantic waters and the North Sea (SCANS-III) was conducted in European Atlantic waters. This involved a large-scale ship and aerial survey to study the distribution and abundance of cetaceans. Harbour porpoise, white-beaked dolphin, minke whale and white-sided dolphin were the most abundant species recorded in the survey block covering the North Cormorant Decommissioning area, with specific densities listed in Table 3-4 (Hammond *et al.*, 2017). This does not discount other species from occurring within the area, however, there is insufficient data for these species to provide abundance estimates (Hammond et al., 2017). Other species recorded within this survey block were also sighted including Risso's dolphin, fin whale and Gervais beaked whale, however, there was not sufficient data for these species to provide abundance estimates (Hammond *et al.*, 2017).

Table 3-4 Densities of Cetaceans in the North Cormorant platform Area (Hammond *et al.*, 2017)

Species	Density of cetaceans in the survey Block T (animals per km^2)
Harbour porpoise	0.402
White-beaked dolphin	0.037
Minke whale	0.032
White-sided dolphin	0.021

3.2.6.2 Seals

Two species of seal live and breed in the UK, namely the grey seals *Halichoerus grypus* and harbour seal *Phoca vitulina*, both of which are protected under Annex II of the EC Habitats Directive and are listed as Scottish PMFs (SNH, 2016; Jones *et al.*, 2015; DECC, 2016).

Approximately 38% of the world's grey seals breed in the UK with 88% of these breeding at colonies in Scotland with the main concentrations in the Outer Hebrides and in Orkney. Birth rates have grown since the 1960s, although according to data from the Special Committee on Seals (SCOS) population growth is levelling off (SCOS, 2014). In the case of harbour seals, approximately 30% of the world's population are found in the UK. Following significant population declines due to disease in 1988 and 2002, harbour seal numbers on the English east coast have been rising since

2009 (SCOS, 2014). Harbour seals are widespread around the west coast of Scotland and throughout the Hebrides and Northern Isles (SCOS, 2017).

Grey and harbour seals will feed both in inshore and offshore waters depending on the distribution of their prey, which changes both seasonally and yearly. Both species tend to be concentrated close to shore, particularly during the pupping and moulting season. Seal tracking studies from the Moray Firth have indicated that the foraging movements of harbour seals are generally restricted to within a 40–50 km range of their haul-out sites (SCOS, 2017). The movements of grey seals can involve larger distances than those of the harbour seal, and trips of several hundred kilometres from one haul-out to another have been recorded (SMRU, 2011).

Since the North Cormorant platform is located approximately 113 km offshore, grey and harbour seals may be infrequently encountered, however, activity in the area is likely to be low during the planned decommissioning activities. This is confirmed by the grey and harbour seal density maps published by the Sea Mammal Research Unit (SMRU), which are provided in the NMPI (2019). The maps report the presence of grey and harbour seals in UKCS Block 211/21a as between 0 - 1 per 25 km^2 (Figure 3-8).

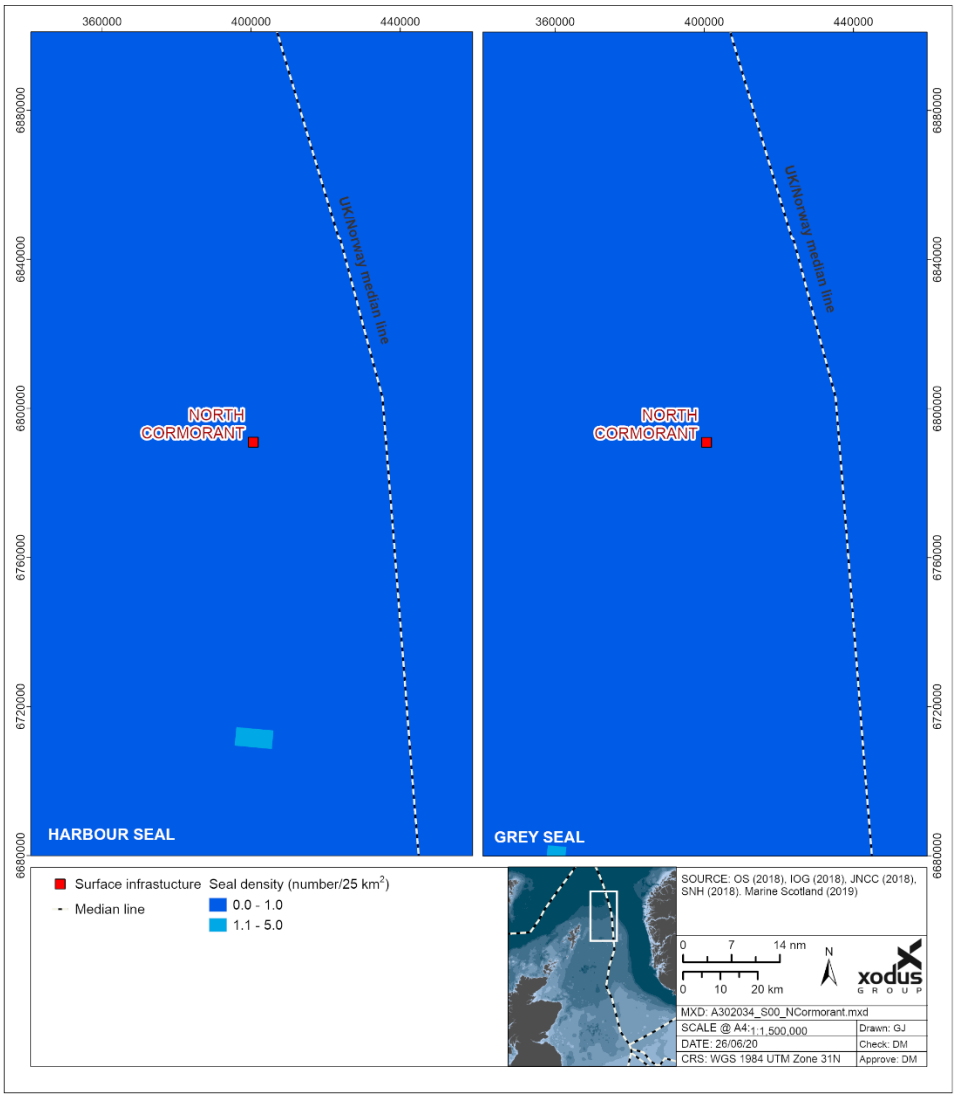

Figure 3-8 Seal Densities around the North Cormorant platform (per 25 km^2)

3.3 Conservation

3.3.1 Offshore Conservation

There are no Nature Conservation Marine Protected areas (NC MPAs), Special Protection areas (SPAs), SAC, or Demonstration and Research Marine Protected Areas (DR MPA) within 40 km of the North Cormorant platform (NMPI, 2019). The closest SAC is the Pobie Bank Reef, located approximately 77 km south west of the North Cormorant Decommissioning area (Figure 3-9). The closest SPA is the Hermaness, Saxa Vord and Valla Field, located in Unst, Shetland approximately 113 km to the southwest (NMPI, 2019).

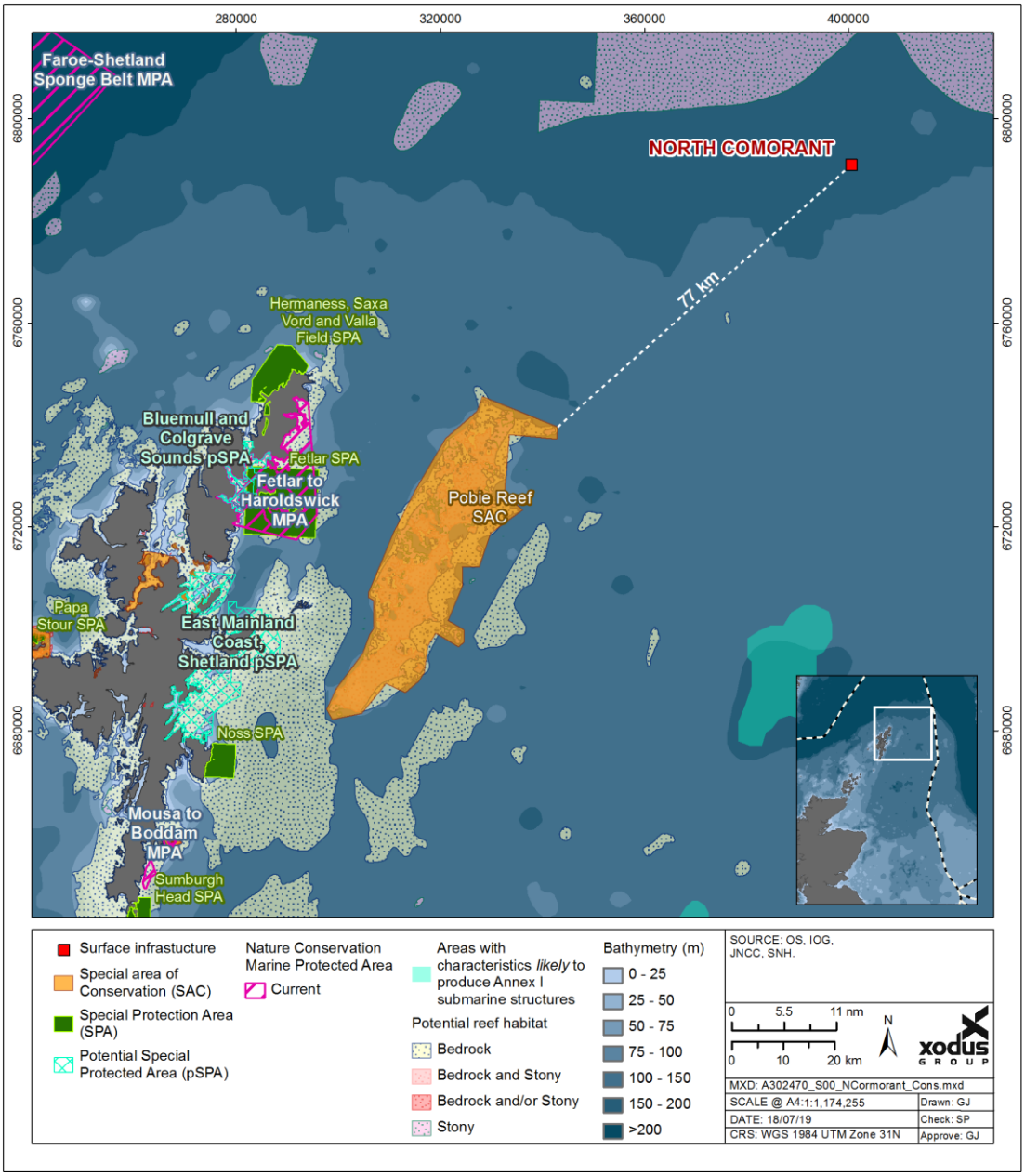

Figure 3-9 Location of the North Cormorant platform in relation to Nature Conservation Marine Protected Areas (NC MPAs), Special Protection areas (SPAs) Special Areas of Conservation (SAC), Demonstration and Research Marine Protected Areas (DR MPA) and Sites of Special Scientific Interest (SSSIs)

The seabed in UKCS Block 211/21a is within a wider area of 'subtidal sand and gravels' (NMPI, 2019), a seabed type designated as a PMF in Scottish waters (Tyler-Walters, 2016). 'Subtidal sands and gravels' also support internationally important commercial fisheries e.g. scallops, flatfish, sandeels, and are important nursery grounds for juvenile commercial fish species such as sandeels, flatfish, bass, skates, rays and sharks (SNH, 2016). However, the distribution of this feature is relatively wide in the North Sea (NMPI, 2019).

3.3.2 Protected Species

Four species listed under Annex II of the EC Habitats Directive are found in UK waters; harbour porpoise, minke whale, grey seal and harbour seal. Grey and harbour seals are unlikely to be observed near the North Cormorant project with any regularity as both species have very low densities as was previously described. The harbour porpoise and minke whale are the two Annex II species which could be present near the North Cormorant decommissioning project; the species are however likely, due to their mobile nature, to move away and not be adversely affected by the proposed North Cormorant platform decommissioning activities.

All species of cetacean recorded within the proposed operations area are listed as European Protected Species (EPSs). Other marine species listed as EPSs include turtles and sturgeon (*Acipenser sturio*), which are not likely to be present within this area of the North Sea.

A. islandica is listed as PMF in Scottish waters (Tyler-Walters, 2016) and is on the OSPAR List of Threatened and/or Declining Species (OSPAR, 2008). The presence of four individuals in close proximity to the North Cormorant platform is discussed in Section 3.2.3.

3.3.3 Onshore Conservation

The North Cormorant platform is located approximately 113 km from the northeast coast of Shetland. Due to this distance, no impacts to onshore conservation sites are expected from decommissioning activities in UKCS Block 211/21a.

3.3.4 National Marine Plan

The National Marine Plan (NMP) covers the management of both Scottish inshore waters (out to 12 nautical miles) and offshore waters (12 to 200 nautical miles). The aim of the NMP is to help ensure the sustainable development of the marine area through informing and guiding regulation, management, use and protection of the Marine Plan areas. The proposed operations as described in this permit have been assessed against the Marine Plan Objectives and policies, specifically GEN 1, 4, 5, 9, 12, 14 and 21 (Section 3.3.4.1 to Section 3.3.4.7) and OIL AND GAS 2, 3 and 6 (Section 3.3.4.8 to Section 3.3.4.10).

Assessment of compliance against relevant policies has already been achieved through the impact assessment in Section 5.0, in support of this EA Justification. The proposed operations do not contradict any of the marine plan objectives and policies. TAQA will ensure they comply with all the new policies that have been introduced; with particular attention being made to the following policies:

3.3.4.1 GEN 1 – General planning and principle

Development and use of the marine area should be consistent with the Marine Plan, ensuring activities are undertaken in a sustainable manner that protects and enhances Scotland’s natural and historic marine environment. TAQA will ensure that any potential impacts associated with the North Cormorant platform decommissioning operations will be kept to a minimum as discussed in Section 5.0.

3.3.4.2 GEN 4 – Co-existence

Where conflict over space or resource exists or arises, marine planning should encourage initiatives between sectors to resolve conflict and take account of agreements where this is applicable. TAQA will ensure that any potential impacts on other sea users associated with the proposed North Cormorant topsides decommissioning operations will be kept to a minimum.

3.3.4.3 GEN 5 - Climate change

Marine planners and decision makers should seek to facilitate a transition to a low carbon economy. They should consider ways to reduce emissions of carbon and other greenhouse gasses. TAQA will ensure that any potential impacts associated with North Cormorant topsides decommissioning operations will be kept to a minimum as discussed in Section 5.0

3.3.4.4 GEN 9 - Natural heritage

Development and use of the marine environment must:

- Comply with legal requirements for protected areas and protected species.
- Not result in significant impact on the national status of PMF.
- Protect and, where appropriate, enhance the health of the marine area.

TAQA will ensure that any potential impacts to protected species and sites associated with North Cormorant topsides decommissioning operations will be kept to a minimum, as discussed in Section 5.0

3.3.4.5 GEN 12 – Water quality and resource

Developments and activities should not result in a deterioration of the quality of waters to which the Water Framework Directive, Marine Strategy Framework Directive or other related Directives that apply. TAQA will ensure that any potential impacts to water quality associated with North Cormorant topsides decommissioning operations will be kept to a minimum, as discussed in Section 5.0

3.3.4.6 GEN 14 – Air quality

Development and use of the marine environment should not result in the deterioration of air quality and should not breach any statutory air quality limits. Some development and use may result in increased emissions to air, including particulate matter and gasses. Impacts on relevant statutory air quality limits must be taken into account and mitigation measures adopted, if necessary, to allow an activity to proceed within these limits. TAQA will ensure that any potential impacts to air quality with North Cormorant topsides decommissioning operations will be kept to a minimum, as discussed in Section 5.0

3.3.4.7 GEN 21 – Cumulative impacts

Cumulative impacts affecting the ecosystem of the marine plan area should be addressed in decision making and plan implementation. TAQA will ensure that any potential impacts to air and water quality and biological communities with North Cormorant topsides decommissioning operations will be kept to a minimum, as discussed in Section 5.0.

3.3.4.8 OIL AND GAS 2 – Decommissioning end-points

Where re-use of oil and gas infrastructure is not practicable, either as part of oil and gas activity or by other sectors such as carbon capture and storage, decommissioning must take place in line with standard practice, and as allowed by international obligations. Re-use or removal of

decommissioned assets from the seabed will be fully supported where practicable and adhering to relevant regulatory process. TAQA will ensure that any material returned to shore as a result of North Cormorant decommissioning activities adheres to the waste hierarchy (Figure 2-7) as discussed in Section 5.0.

3.3.4.9 OIL AND GAS 3 – Minimising environmental and socio-economic impacts

Supporting marine and coastal infrastructure for oil and gas developments, including for storage, should utilise the minimum space needed for activity and should take into account environmental and socio-economic constraints. TAQA will ensure that the onshore resources required for drilling derrick deconstruction activities will be minimised, as discussed in Section 5.0.

3.3.4.10 OIL AND GAS 6 – Risk reduction

Consenting and licensing authorities should be satisfied that adequate risk reduction measures are in place, and that operators should have sufficient emergency response and contingency strategies in place that are compatible with the National Contingency Plan and the Offshore Safety Directive. TAQA have the relevant risk reduction measures in place for the deconstruction of the drilling derrick, as discussed in Section 5.0.

3.4 Socio-Economic Environment

3.4.1 Commercial Fisheries

To provide the fullest picture of fisheries within the area, and the associated landings and effort trends, data from 2014 to 2018 are considered (see Table 3-5). The North Cormorant platform is located in ICES rectangle 51F1 which in recent years has been targeted primarily for demersal species in terms of both landed weights and value (Figure 3-10).

In 2018, 2017 and 2016, landings of demersal fish accounted for more than 99% of the total value. and 99% of the total landed weight. In these same years shellfish and pelagic species accounted for less than 1% of the value and 1% of landed weight. By contrast, in 2014 and 2015 there were significant pelagic species landings accounting for 63-73% of the live weight and 46-53% of the value. In 2018, the three most valuable species were saithe, cod and haddock. These species also had the largest contribution to the live weight landed in 2018.

In 2018, the live weight of demersal fish in ICES 51F1 was moderate compared to surrounding ICES blocks such as block 51F0 and 50F1, where demersal live weight reached 1,003 and 1,500 te respectively (Scottish Government, 2019).

To put the landings of 2018 into context, catches amounting to 552,564 te with a value of £751,777,445 were landed across the UK in 2018. Therefore, ICES rectangle 51F1 presents a relatively low contribution to the UK total, comprising 0.15% of te landed and providing a 0.18% contribution to the total value of the UK commercial fisheries in 2018.

Figure 3-11 shows fishing intensity (hours) in the NNS around North Cormorant based on vessel monitoring system (VMS) data (NMPi, 2019). Therefore, ICES rectangle 51F1 presents a relatively low contribution to the UK total, comprising 0.15% of tonnes landed and providing a 0.18% contribution to the total value of the UK commercial fisheries in 2018.

Table 3-6 presents the fishing effort in ICES rectangle 51F1 between 2014-2018 and Figure 3-13 presents fishing effort (days) (by UK vessels >10m length) (NMPi, 2019). Fishing effort in ICES Rectangle 51F1 is dominated by demersal (trawl) activities and is relatively low in comparison to areas to the south and east. Fishing effort amounted to 132 days in ICES rectangle 51F1 in 2018, as detailed in Table 3-6. This represents a substantial increase in effort compared to the four preceding years, particularly compared to the 62 days spent fishing in 2016. Effort for the 51F1 rectangle has been recorded as disclosive for all except the spring/summer months each year between 2014 and 2017, indicating very low levels of fishing effort. Fishing effort is generally highest between April and June. Trawls were the only gear type used in the ICES rectangle 51F1 over all the years, making up 100% of the effort in each consecutive year (Scottish Government, 2018).

Table 3-5 Live Weight and Value of Fish and Shellfish from ICES Rectangle 51F1 from 2014-2018 (Scottish Government, 2019)

Species type	2018		2017		2016		2015		2014	
	Live weight (te)	Value (£)	Live weight (te)	Value (£)	Live weight (te)	Value (£)	Live weight (te)	Value (£)	Live weight (te)	Value (£)
Demersal	846	1,381,095	545	824,054	482	709,207	525	724,269	753	948,798
Pelagic	1	637	ND	ND	<1	12	1,404	830,843	1,314	799,329
Shellfish	1	3,272	<1	1,711	<1	765	3	7,819	<1	220
Total	**848**	**1,385,004**	**545**	**825,765**	**482**	**709,984**	**2,235**	**1,562,931**	**2,067**	**1,748,347**

Note: Monthly weight and value of Fish and Shellfish in Scotland: ND = no data

Table 3-6 Number of Fishing Days per Month (all gear) in ICES Rectangle 51F1 from 2014-2018 (Scottish Government, 2019)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2014	D	D	13	21	26	14	D	D	D	D	D	D	100
2015	D	D	D	5	13	48	8	D	D	D		D	103
2016	D	D	D	D	14	D	20	D	D	D	D	D	62
2017		D	D	13	D	9	D	D	D	D	D	D	75
2018	D	10	D	27	14	D	7	17	19	19	D		132

Note: Monthly fishing effort by UK vessels landing into Scotland: Blank = no data, D = Disclosive data (indicating very low effort) [3], green = 0 – 100 days fished, yellow = 101 – 200, orange =201-300, red = ≥301

[3] The term 'disclosive' is used when fewer than five vessels have been recorded fishing in an area, meaning that detailed data cannot be shown in order to preserve data privacy. It therefore indicates very low levels of effort within the area.

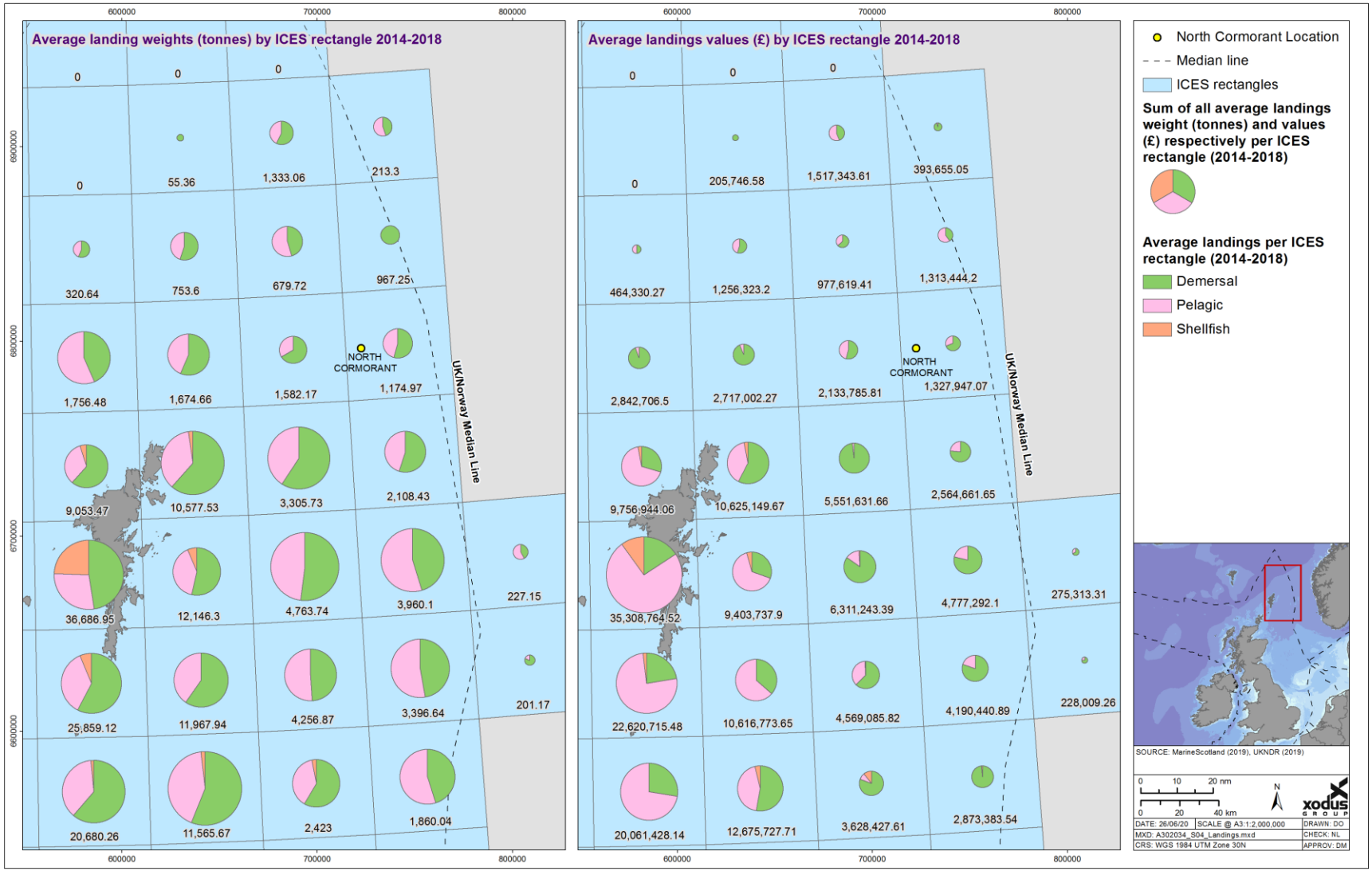

Figure 3-10 **Average landings (tonnes) and values (£) of demersal, pelagic and shellfish fisheries by ICES rectangle (2014-2018)**

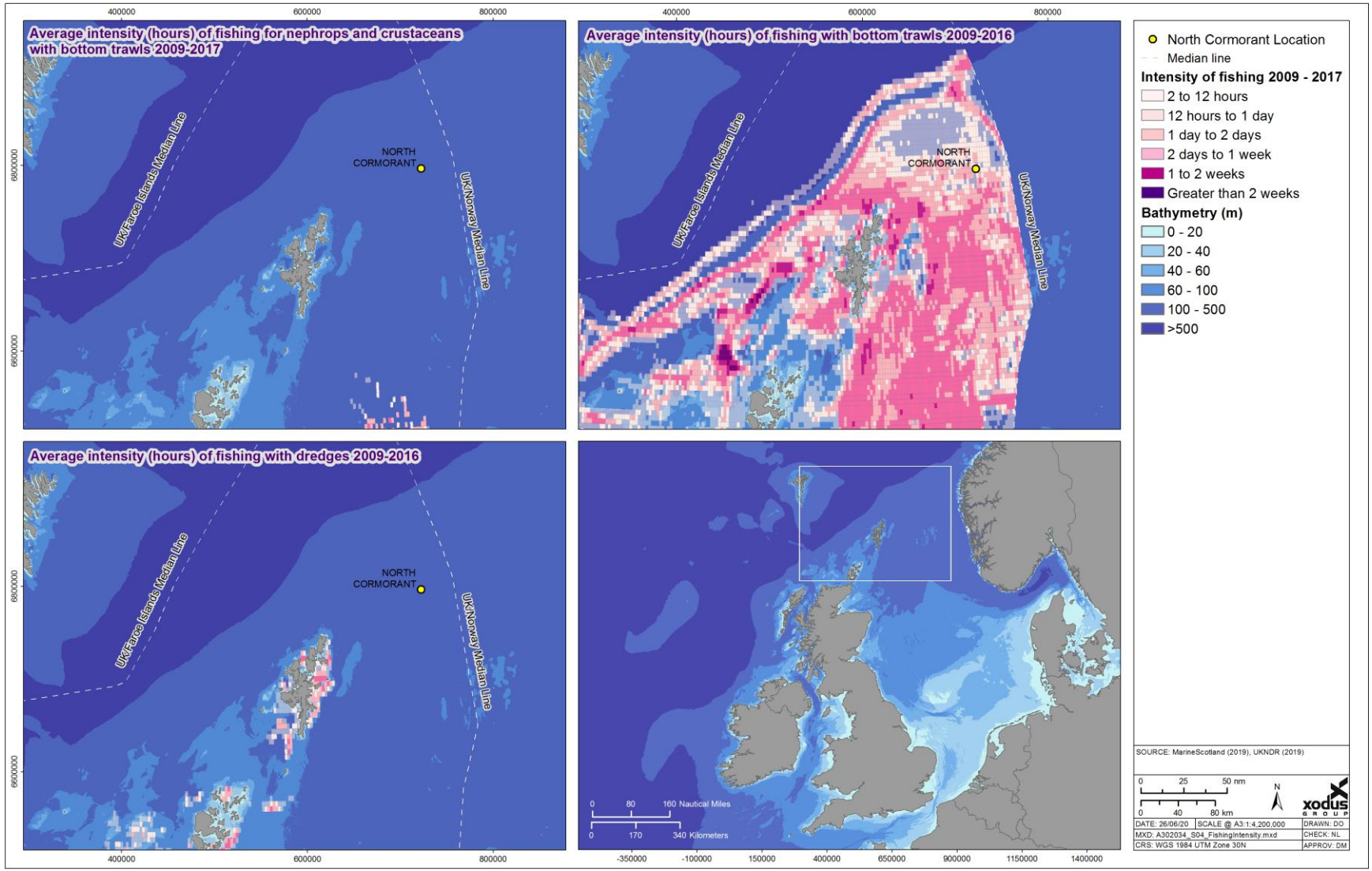

Figure 3-11 Fishing intensity (hours) in the region of the North Cormorant Development between 2009 – 2017 grouped by fishing method

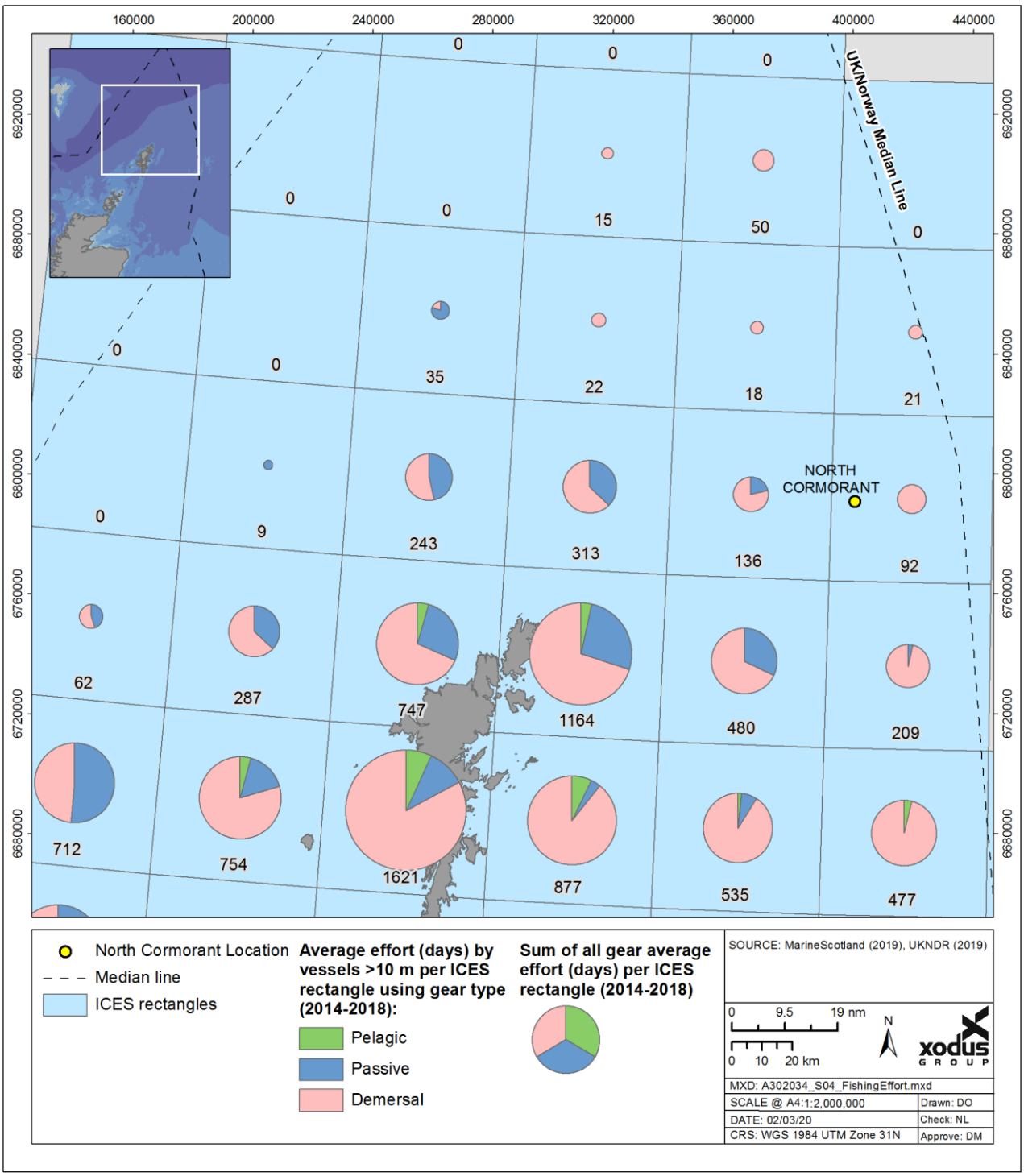

Figure 3-12 **Fishing effort (days) (by UK vessels >10m length) per ICES rectangle for demersal, passive and pelagic gears (2014 – 2018)**

3.4.2 Shipping

The North Sea contains some of the world's busiest shipping routes, with significant traffic generated by vessels trading between ports at either side of the North Sea and the Baltic. North Sea oil and gas fields generate moderate vessel traffic in the form of support vessels, principally operating from Peterhead, Aberdeen, Montrose and Dundee in the north and Great Yarmouth and Lowestoft in the south (DECC, 2016).

The level of shipping activity is considered very low in Block 211/21 (Oil and Gas Authority, 2016). The average weekly density of vessels (all combined) using automatic identification systems (AIS) data between 2012 and 2015 is < 5 transits in the UKCS block 211/21, which is low compared to other areas in the North Sea (NMPI, 2019). Satellite data based on the AIS dataset from 2015, plotted in Figure 3-13, show that between 200 – 300 vessels transit through Block 211/21 annually (MMO, 2017).

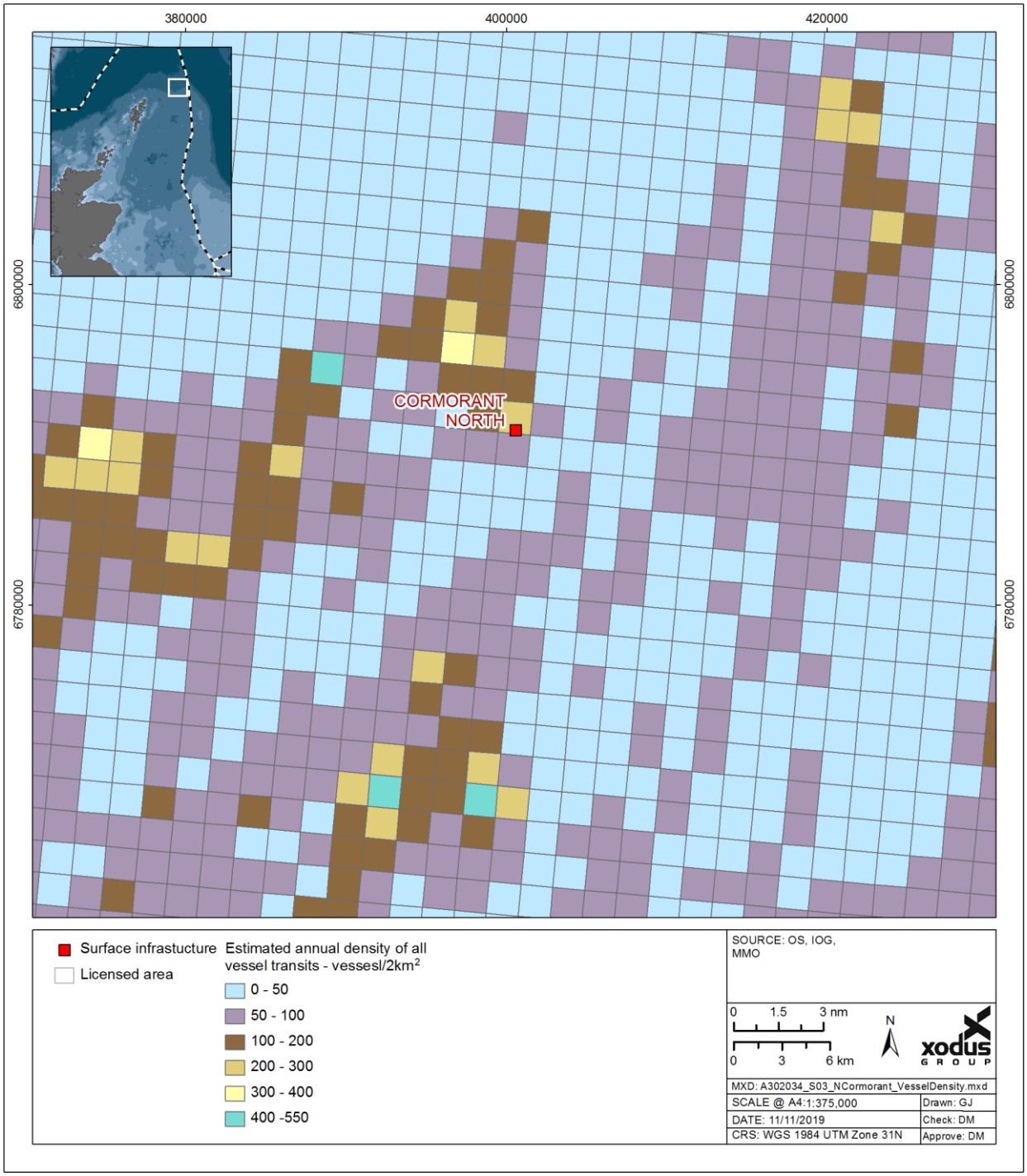

Figure 3-13 **Annual Density of Vessel Transits (number of transits per 2 km²) around North Cormorant Platform in 2015 (MMO, 2017)**

3.4.3 Oil and Gas Activity

There are a number of installations located within the vicinity of the North Cormorant platform, as shown in Figure 3-14. Table 3-7 provides the distances in the vicinity (<40 km) of the North Cormorant platform.

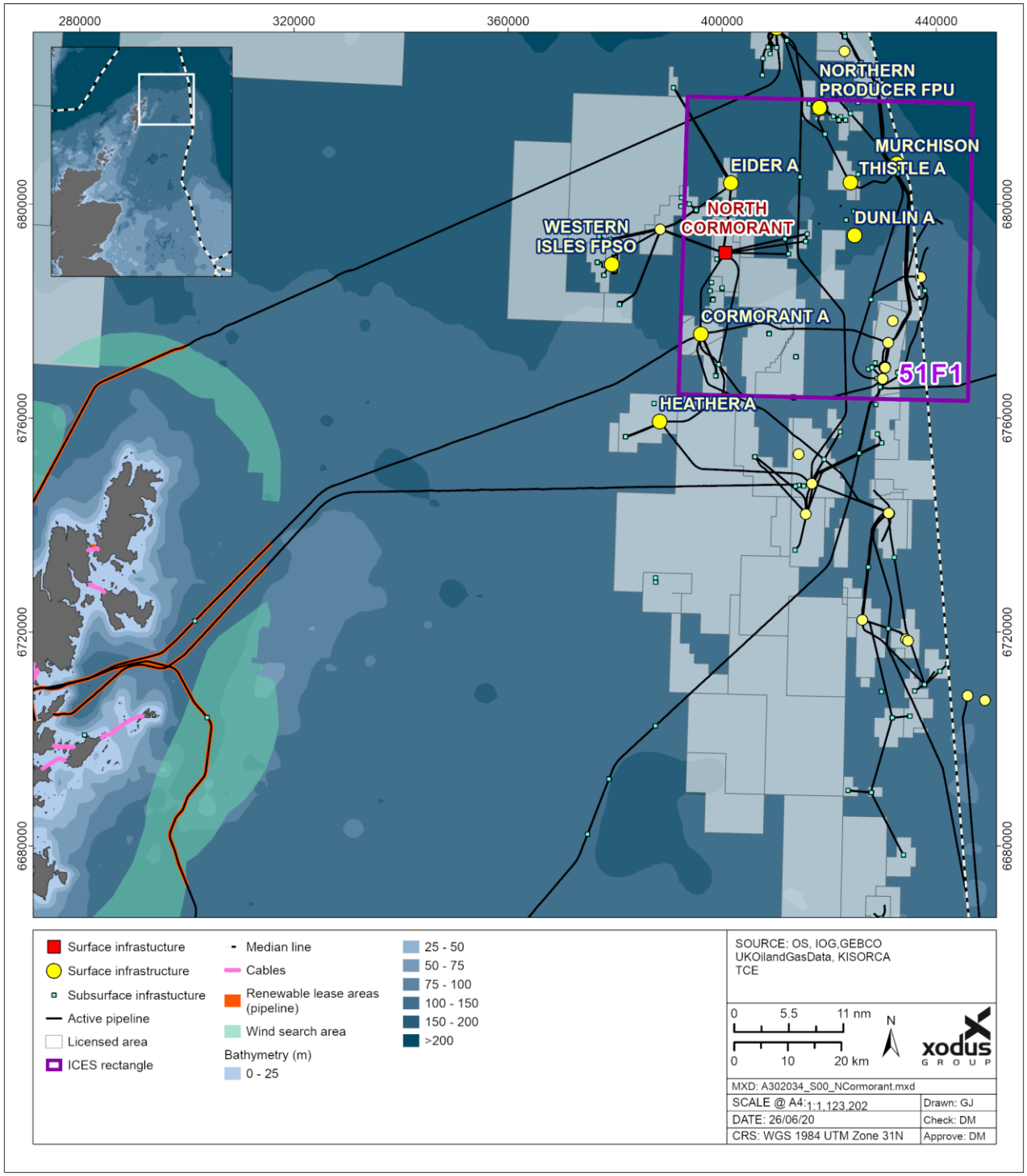

Figure 3-14 Other Users in the Vicinity of the North Cormorant Platform

Table 3-7 Installations located within 40 km of the North Cormorant Platform

Installation	Distance from North Cormorant (km)	Direction from North Cormorant	Status
Tern Alpha	13.0	west	Active
Eider Alpha	13.0	north	Active
Cormorant Alpha	16.0	south	Active
Western Isles FPSO	21.0	west	Active
Dunlin Alpha	24.0	east	CoP reached. Under preparation for decommissioning
Thistle Alpha	27.0	northeast	Active
Northern Producer FPU	32.0	northeast	Active

3.4.4 Military Activities

There are no charted Military Practice and Exercise Areas (PEXAs) the vicinity of the Project area (DECC, 2016).

3.4.5 Renewable Energy

There are no planned or operating renewable energy sites in close vicinity (<40 km) of the North Cormorant platform.

3.4.6 Telecommunication Cables

There are no telecommunication cables within or in the vicinity of Block 211/21a (NMPI, 2019).

3.4.7 Wrecks

There is one wreck site in Block 211/21, located 2 km to the south-southwest of the North Cormorant platform (NMPI, 2019). However, this wreck site is not protected or dangerous.

4.0 EA METHODOLOGY

The Impact assessment is designed to:

- Identify potential impacts to environmental and societal receptors from the proposed decommissioning activities;
- Evaluate the potential significance of any identified impacts in terms of the threat that they pose to these receptors; and
- Assign measures to manage the risks in line with industry best practice; and address concerns or issues raised by stakeholders through consolation.

The impact assessment was undertaken using the following approach:

- The potential environmental issues arising from topsides decommissioning activities were identified through a combination of the expert judgement of project engineers and marine environmental specialists in a screening workshop, and consultation with key stakeholders (Section 4.1). The potential environmental issues were grouped under the following key receptor risk groups:
    - Emissions to air;
    - Disturbance to the seabed;
    - Physical presence;
    - Discharges to sea;
    - Underwater noise;
    - Resource use;
    - Onshore activities;
    - Waste;
    - Employment; and
    - Unplanned events.
- Undertake initial screening based on a high-level consideration of these aspects against the evaluation criteria. Screening aspects in or out of further detailed assessment. Justification statements will be compiled detailing the rationale for screening out any aspects from further assessment (Section 5.1).
- For aspects which are considered potentially significant, evaluate significance of potential impacts against impact criteria definitions (Section 4.2.3 to section 4.2.5)
- For any potentially significant impact capture any potential mitigation and/or control measures to be used to further reduce any impact to ‘as low as reasonably practicable’ (ALARP).

4.1 Stakeholder Engagement

The consultation for the North Cormorant topside decommissioning has been largely based on sharing project expectations, approach and specific considerations with key stakeholders including OPRED, Scottish Fishermen’s Federation (SFF), Global Marine Systems Ltd (GMS), the National Federation of Fishermen’s Organisation (NFFO) and the Northern Irish Fish Producer’s Organisation (NIFPO). Current stakeholder responses are listed in Table 4-1.

Table 4-1 Stakeholder responses

Issues/concerns	Outline response and EA section where addressed
Scottish Fishermen's Federation	
28th January 2020: Email to provide high level summary of the scope and intent of the project	SFF thanked TAQA for the information provided. As the DP is focusing on topside removal work, they may provide comment at consultation.
Global Marine Systems Ltd	
28th January 2020: Email to provide high level summary of the scope and intent of the project	No comment received.
National Federation of Fishermen's Organisation	
28th January 2020: Email to provide high level summary of the scope and intent of the project	NFFO thanked TAQA for the information provided. However, as the infrastructure in question lays in Scottish Waters NFFO believe the Scottish Fisherman's Federation, who they work very closely with, are best placed to take the lead role in commenting.
Northern Irish Fish Producers Organisation	
28th January 2020: Email to provide high level summary of the scope and intent of the project	A specific location map was requested to gauge what, if any, impact there might be for NIFPO. NIFPO confirmed that the location of the proposed decommissioning programme is out with their geographical area of interest.

4.2 EA Methodology

4.2.1 Overview

The decision process related to defining whether or not a project is likely to significantly impact on the environment is the core principle of the environmental impact assessment process; the methods used for identifying and assessing potential impacts should be transparent and verifiable.

The method presented here has been developed by reference to the Institute of Ecology and Environmental Management (IEEM) guidelines for marine impact assessment (IEEM, 2010), the Marine Life Information Network (MarLIN) species and ecosystem sensitivities guidelines (Tyler-Walters *et al.*, 2004) and guidance provided by SNH in their handbook on environmental impact assessment (SNH, 2013b) and by The Institute of Environmental Management and Assessment (IEMA) in their guidelines for environmental impact assessment (IEMA, 2015, 2016).

Environmental impact assessment provides an assessment of the environmental and societal effects that may result from a project's impact on the receiving environment. The terms impact and effect have different definitions in environmental impact assessment and one drives the other. Impacts are defined as the changes resulting from an action, and effects are defined as the consequences of those impacts.

In general, impacts are specific, measurable changes in the receiving environment (volume, time and/or area); for example, were a number of marine mammals to be disturbed following exposure

to vessel noise emissions. Effects (the consequences of those impacts) consider the response of a receptor to an impact; for example, the effect of the marine mammal/noise impact example given above might be exclusion from an area caused by disturbance, leading to a population decline. The relationship between impacts and effects is not always so straightforward; for example, a secondary effect may result in both a direct and indirect impact on a single receptor. There may also be circumstances where a receptor is not sensitive to a particular impact and thus there will be no significant effects/consequences.

For each impact, the assessment identifies a receptor's sensitivity and vulnerability to that effect and implements a systematic approach to understand the level of impact. The process considers the following:

- Identification of receptor and impact (including duration, timing and nature of impact);
- Definition of sensitivity, vulnerability and value of receptor;
- Definition of magnitude and likelihood of impact; and
- Assessment of consequence of the impact on the receptor, considering the probability that it will occur, the spatial and temporal extent and the importance of the impact. If the assessment of consequence of impact is determined as moderate or major, it is considered a significant impact.

Once the consequence of a potential impact has been assessed it is possible to identify measures that can be taken to mitigate impacts through engineering decisions or execution of the project. This process also identifies aspects of the project that may require monitoring, such as a post-decommissioning survey at the completion of the works to inform inspection reports.

For some impacts, significance criteria are standard or numerically based. For others, for which no applicable limits, standards or guideline values exist, a more qualitative approach is required. This involves assessing significance using professional judgement.

Despite the assessment of impact significance being a subjective process, a defined methodology has been used to make the assessment as objective as possible and consistent across different topics. The assessment process is summarised below. The terms and criteria associated with the impact assessment process are described and defined; details on how these are combined to assess consequence and impact significance are then provided.

4.2.2 Baseline Characterisation and Receptor

In order to make an assessment of potential impacts on the environment it was necessary to firstly characterise the different aspects of the environment that could potentially be affected (the baseline environment). The baseline environment has been described in Section 1.0 and is based on desk studies combined with additional site-specific studies such as surveys and modelling where required. Information obtained through consultation with key stakeholders was also used to help characterise specific aspects of the environment in more detail.

The EA process requires identification of the potential receptors that could be affected by the North Cormorant topsides decommissioning (e.g. other users of the sea, water quality). High level receptors are identified within the impact assessments (Section 5.1).

4.2.3 Impact Definition

4.2.3.1 Impact magnitude

Determination of impact magnitude requires consideration of a range of key impact criteria including:

- Nature of impact, whether it be beneficial or adverse;
- Type of impact, be it direct or indirect;
- Size and scale of impact, i.e. the geographical area;
- Duration over which the impact is likely to occur e.g. days, weeks;
- Seasonality of impact, i.e. is the impact expected to occur all year or during specific times; and
- Frequency of impact, i.e. how often the impact is expected to occur.

Each of these variables are expanded upon in Table 4-2 – Table 4-6 to provide consistent definitions across all EA topics. In each impact assessment, these terms are used in the assessment summary table to summarise the impact and are enlarged upon as necessary in any supporting text. With respect to the nature of the impact (Table 4-1), it should be noted that all impacts discussed in this EA report are adverse unless explicitly stated otherwise.

Table 4-2 Nature of Impact

Nature of impact	Definition
Beneficial	Advantageous or positive effect to a receptor (i.e. an improvement).
Adverse	Detrimental or negative effect to a receptor.

Table 4-3 Type of Impact

Type of impact	Definition
Direct	Impacts that result from a direct interaction between the North Cormorant Topsides Decommissioning Project and the receptor. Impacts that are actually caused by the activities.
Indirect	Reasonably foreseeable impacts that are caused by the interactions of the North Cormorant Topsides Decommissioning Project, but which occur later in time than the original, or at a further distance. Indirect impacts include impacts that may be referred to as ‘secondary’, ‘related’ or ‘induced’.
Cumulative	Impacts that act together with other impacts (including those from any concurrent or planned future third-party activities) to affect the same receptors as the North Cormorant Topsides Decommissioning Project. Definition encompasses “in-combination” impacts.

Table 4-4 Duration of Impact

Duration	Definition
Short-term	Impacts that are predicted to last for a short duration (e.g. less than one year).
Temporary	Impacts that are predicted to last a limited period (e.g. a few years). For example, impacts that occur during the decommissioning activities and which do not extend beyond the main activity period for the works or which, due to the timescale for mitigation, reinstatement or natural recovery, continue for only a limited time beyond completion of the anticipated activity
Prolonged	Impacts that may, although not necessarily, commence during the main phase of the decommissioning activity and which continue through the monitoring and maintenance, but which will eventually cease.
Permanent	Impacts that are predicted to cause a permanent, irreversible change.

Table 4-5 Geographical Extent of Impact

ographical extent	Description
Local	Impacts that are limited to the area surrounding the North Cormorant Topsides Decommissioning Project footprint and associated working areas. Alternatively, where appropriate, impacts that are restricted to a single habitat or biotope or community.
Regional	Impacts that are experienced beyond the local area to the wider region, as determined by habitat/ecosystem extent.
National	Impacts that affect nationally important receptors or protected areas, or which have consequences at a national level. This extent may refer to either Scotland or the UK depending on the context.
Transboundary	Impacts that could be experienced by neighbouring national administrative areas.
International	Impacts that affect areas protected by international conventions, European and internationally designated areas or internationally important populations of key receptors (e.g. birds, marine mammals).

Table 4-6 Frequency of Impact

Frequency	Description
Continuous	Impacts that occur continuously or frequently.
Intermittent	Impacts that are occasional or occur only under a specific set of circumstances that occurs several times during the course of the North Cormorant Topsides Decommissioning Project. This definition also covers such impacts that occur on a planned or unplanned basis and those that may be described as ‘periodic’ impacts.

4.2.3.2 Impact magnitude criteria

Overall impact magnitude requires consideration of all impact parameters described above. Based on these parameters, magnitude can be assigned following the criteria outlined in Table 4-6. The resulting effect on the receptor is considered under vulnerability and is an evaluation based on scientific judgement.

Table 4-7 Impact Magnitude Criteria

Magnitude	Criteria
Major	Extent of change: Impact occurs over a large scale or spatial geographical extent and/or is long term or permanent in nature. Frequency/intensity of impact: high frequency (occurring repeatedly or continuously for a long period of time) and/or at high intensity.
Moderate	Extent of change: Impact occurs over a local to medium scale/spatial extent and/or has a prolonged duration. Frequency/intensity of impact: medium to high frequency (occurring repeatedly or continuously for a moderate length of time) and/or at moderate intensity or occurring occasionally/intermittently for short periods of time but at a moderate to high intensity.
Minor	Extent of change: Impact occurs on-site or is localised in scale/spatial extent and is of a temporary or short-term duration. Frequency/intensity of impact: low frequency (occurring occasionally/intermittently for short periods of time) and/or at low intensity.
Negligible	Extent of change: Impact is highly localised and very short term in nature (e.g. days/few weeks only).
Positive	An enhancement of some ecosystem or population parameter.
Notes: Magnitude of an impact is based on a variety of parameters. Definitions provided above are for guidance only and may not be appropriate for all impacts. For example, an impact may occur in a very localised area (minor to moderate) but at very high frequency/intensity for a long period of time (major). In such cases informed judgement is used to determine the most appropriate magnitude ranking and this is explained through the narrative of the assessment.	

4.2.3.3 Impact likelihood for unplanned and accidental events

The likelihood of an impact occurring for unplanned/accidental events is another factor that is considered in this impact assessment. This captures the probability that the impact will occur and also the probability that the receptor will be present and is based on knowledge of the receptor and experienced professional judgement. Consideration of likelihood is described in the impact characterisation text and used to provide context to the specific impact being assessed in topic specific chapters as required.

4.2.4 Receptor Definition

As part of the assessment of impact significance it is necessary to differentiate between receptor sensitivity, vulnerability and value. The sensitivity of a receptor is defined as 'the degree to which a receptor is affected by an impact' and is a generic assessment based on factual information whereas an assessment of vulnerability, which is defined as 'the degree to which a receptor can or cannot cope with an adverse impact' is based on professional judgement taking into account an number of factors, including the previously assigned receptor sensitivity and impact magnitude, as well as other factors such as known population status or condition, distribution and abundance.

4.2.4.1 Receptor sensitivity

These range from negligible to very high and definitions for assessing the sensitivity of a receptor are provided in Table 4-7.

Table 4-8 Sensitivity of Receptor

Receptor Sensitivity	Definition
Very high	Receptor with no capacity to accommodate a particular effect and no ability to recover or adapt.
High	Receptor with very low capacity to accommodate a particular effect with low ability to recover or adapt.
Medium	Receptor with low capacity to accommodate a particular effect with low ability to recover or adapt.
Low	Receptor has some tolerance to accommodate a particular effect or will be able to recover or adapt.
Negligible	Receptor is generally tolerant and can accommodate a particular effect without the need to recover or adapt.

4.2.4.2 Receptor vulnerability

Information on both receptor sensitivity and impact magnitude is required to be able to determine receptor vulnerability. These criteria, described in Table 4-7 and Table 4-8 are used to define receptor vulnerability as per Table 4-9.

Table 4-9 Vulnerability of Receptor

Receptor Sensitivity	Definition
Very high	The impact will have a permanent effect on the behaviour or condition on a receptor such that the character, composition or attributes of the baseline, receptor population or functioning of a system will be permanently changed.
High	The impact will have a prolonged or extensive temporary effect on the behaviour or condition on a receptor resulting in long term or prolonged alteration in the character, composition or attributes of the baseline, receptor population or functioning of a system.
Medium	The impact will have a short-term effect on the behaviour or condition on a receptor such that the character, composition, or attributes of the baseline, receptor population or functioning of a system will either be partially changed post development or experience extensive temporary change.
Low	Impact is not likely to affect long term function of system or status of population. There will be no noticeable long-term effects above the level of natural variation experience in the area.
Negligible	Changes to baseline conditions, receptor population of functioning of a system will be imperceptible.

It is important to note that the above approach to assessing sensitivity/vulnerability is not appropriate in all circumstances and in some instances professional judgement has been used in determining sensitivity. In some instances, it has also been necessary to take a precautionary approach where stakeholder concern exists with regard to a particular receptor. Where this is the case, this is detailed in the relevant impact assessment in Section 5.0.

4.2.4.3 Receptor value

The value or importance of a receptor is based on a pre-defined judgement based on legislative requirements, guidance or policy. Where these may be absent, it is necessary to make an informed judgement on receptor value based on perceived views of key stakeholders and specialists. Examples of receptor value definitions are provided in Table 4-10.

Table 4-10 Value of Receptor

Receptor Sensitivity	Definition
Very high	Receptor of international importance (e.g. United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Site). Receptor of very high importance or rarity, such as those designated under international legislation (e.g. EU Habitats Directive) or those that are internationally recognised as globally threatened (e.g. IUCN red list). Receptor has little flexibility or capability to utilise alternative area. Best known or only example and/or significant potential to contribute to knowledge and understanding and/or outreach.
High	Receptor of national importance (e.g. NCMPA, Marine Conservation Zone (MCZ)). Receptor of high importance or rarity, such as those which are designated under national legislation, and/or ecological receptors such as UK BAP priority species with nationally important populations in the study area, and species that are near-threatened or vulnerable on the IUCN red list. Receptor provides the majority of income from the North Cormorant installation area. Above average example and/or high potential to contribute to knowledge and understanding and/or outreach.
Medium	Receptor of regional importance. Receptor of moderate value or regional importance, and/or ecological receptors listed as of least concern on the IUCN red list but which form qualifying interests on internationally designated sites, or which are present in internationally important numbers. Any receptor which is active in the North Cormorant installation area and utilises it for up to half of its annual income/activities. Average example and/or moderate potential to contribute to knowledge and understanding and/or outreach.
Low	Receptor of local importance. Receptor of low local importance and/or ecological receptors such as species which contribute to a national site, are present in regionally. Any receptor which is active in the North Cormorant installation area and reliant upon it for some income/activities. Below average example and/or low potential to contribute to knowledge and understanding and/or outreach.
Negligible	Receptor of very low importance, no specific value or concern. Receptor of very low importance, such as those which are generally abundant around the UK with no specific value or conservation concern. Receptor of very low importance and activity generally abundant in other areas/ not typically present in the North Cormorant installation area. Poor example and/or little or no potential to contribute to knowledge and understanding and/or outreach.

4.2.5 Consequence and Significance of Potential Impact

Having determined impact magnitude and the sensitivity, vulnerability and value of the receptor, it is then necessary to evaluate impact significance. This involves:

- Determination of impact consequence based on a consideration of sensitivity, vulnerability and value of the receptor and impact magnitude;
- Assessment of impact significance based on assessment consequence;
- Mitigation; and
- Residual impacts.

4.2.5.1 Assessment of consequences and impact significance

The sensitivity, vulnerability and value of receptor are combined with magnitude (and likelihood, where appropriate) of impact using informed judgement to arrive at a consequence for each impact, as shown in Table 4-11. The significance of impact is derived directly from the assigned consequence ranking. The assessment of consequence considers mitigation measures that are embedded within the proposed activities.

Table 4-11 Assessment of Consequence

Assessment consequence	Description (consideration of receptor sensitivity and value and impact magnitude)	Impact significance
Major consequence	Impacts are likely to be highly noticeable and have long term effects, or permanently alter the character of the baseline and are likely to disrupt the function and status/value of the receptor population. They may have broader systemic consequences (e.g. to the wider ecosystem or industry). These impacts are a priority for mitigation in order to avoid or reduce the anticipated effects of the impact.	Significant
Moderate consequence	Impacts are likely to be noticeable and result in prolonged changes to the character of the baseline and may cause hardship to, or degradation of, the receptor population, although the overall function and value of the baseline/ receptor population is not disrupted. Such impacts are a priority for mitigation in order to avoid or reduce the anticipated effects of the impact.	Significant
Low consequence	Impacts are expected to comprise noticeable changes to baseline conditions, beyond natural variation, but are not expected to cause long term degradation, hardship, or impair the function and value of the receptor. However, such impacts may be of interest to stakeholders and/or represent a contentious issue during the decision-making process and should therefore be avoided or mitigated as far as reasonably practicable.	Not significant
Negligible	Impacts are expected to be either indistinguishable from the baseline or within the natural level of variation. These impacts do not require mitigation and are not anticipated to be a stakeholder concern and/or a potentially contentious issue in the decision-making process.	Not significant
Positive	Impacts are expected to have a positive benefit or enhancement. These impacts do not require mitigation and are not anticipated to be a stakeholder concern and/or a potentially contentious issue in the decision-making process.	Not significant

4.2.6 Cumulative Impact Assessment

While the scope of this impact assessment is restricted to the decommissioning of the North Cormorant topsides as outlined in Section 2.0, there will be other marine activities which have the potential to interact with the activities completed under the decommissioning work scope. The impact assessments presented in the following sections consider the potential for significant cumulative impacts to occur as a result of overlapping activities.

4.2.7 Transboundary Impact Assessment

For most potential impacts from decommissioning, the likelihood of transboundary impact is low. However, where impacts on mobile receptors are of concern, the likelihood of a transboundary impact is higher. The impact assessments presented in the following sections have identified the potential for transboundary impacts and the potential for transboundary impact is considered within the definition of significance.

4.2.8 Mitigation

Where potentially significant impacts (i.e. those ranked as being of moderate impact level or higher in Table 4-11) are identified, mitigation measures must be considered. The intention is that such measures should remove, reduce or manage the impacts to a point where the resulting residual significance is at an acceptable or insignificant level. Mitigation is also proposed in some instances to ensure impacts that are predicted to be not significant remain so.

5.0 IMPACT ASSESSMENT AND JUSTIFICATION

An impact assessment screening workshop was undertaken to discuss the proposed decommissioning activities and any potential impacts these may pose. This discussion identified eleven potential impact areas based on the proposed removal methods identified in Section 2.4. All eleven potential impacts were screened out of further assessment based on the low level of severity, or likelihood of significant impact occurring. The eleven potential impacts are tabulated in Section 5.1, together with justification statements for the screening decisions.

5.1 Assessment of Potential Impacts

Impact	Further assessment	Rationale
Emissions to air	No	Emissions during decommissioning activities, (largely comprising fuel combustion gases) will occur in the context of the cessation of production. As such, emissions from operations and vessels associated with operation of the North Cormorant topsides will cease. Reviewing historical European Union (EU) Emissions Trading Scheme data and comparison with the likely emissions from the proposed workscope suggests that emissions relating to decommissioning will be small relative to those during production. The majority of emissions for the North Cormorant topsides decommissioning can be attributed to vessel time or are associated with the recycling of material returned to shore (Appendix A). As the decommissioning activities proposed are of such short duration this aspect is not anticipated to result in significant impact. The estimated CO_2 emissions to be generated by the worst-case decommissioning option (Single Lift) is 17,018 te (Appendix A). Of this total, vessel emissions equate to 4,485 te, representing less than 0.06 % of the total UKCS vessel emissions in 2017 (7,800,000 te; BEIS, 2019). Considering the above, atmospheric emissions do not warrant further assessment.
Disturbance to the seabed	No	Currently it is envisaged that all vessels undertaking the decommissioning and removal works would be dynamically positioned vessels. As a result, there will be no anchoring associated with the decommissioning of the topsides. Should this change following the commercial tendering process and an anchor vessel be required, any potential seabed impact would be assessed and captured in the Consent to Locate application, Marine Licence application and supporting Environmental Impact Assessment (EIA) justification within the Portal Environmental Tracking System (PETS). On this basis, no further assessment needs to be undertaken.
Physical presence of vessels in relation to other sea users	No	The presence of a small number of vessels for topsides decommissioning activities will be short-term in the context of the life of the North Cormorant installation. Activity will occur using similar vessels to those currently deployed for oil and gas installation, operation and decommissioning activities. The decommissioning of the North Cormorant topsides is estimated to require up to seven vessels, with a maximum of four on site at any one time, depending on the selected method of removal.

Impact	Further assessment	Rationale
		If applicable, Notices to Mariners will be made in advance of activities occurring. This may not be a requirement as decommissioning/ installation activities will only take place within the existing 500 m safety exclusion zone. Stakeholders will have time to make any necessary alternative arrangements for the very limited period of operations. Considering the above, temporary presence of vessels does not need further assessment.
Physical presence of infrastructure decommissioned in situ in relation to other sea users	No	As topsides will be fully removed, there will be no mechanism for associated long-term impact through physical presence. Considering the above, no further assessment related to long term presence of infrastructure is justified.
Discharges to sea (short-term and long-term)	No	Discharges from vessels are typically well-controlled activities that are regulated through vessel and machinery design, management and operation procedures. In addition, the topsides will be Drained, Flushed, Purged and Vented (DFPV) using the TAQA DFPV philosophy prior to any decommissioning activities commencing. There would be no planned discharges from the topsides. Any residual remaining material will be in trace levels/volumes following the DFPV regime and therefore would not pose any significant risk. Oil spill modelling conducted for a release of hydrocarbons associated with vessel collision was conducted for the field's operational phase; this was based on a volume of 450 m^3 of diesel and indicated no significant impact due to the remote offshore Project location. Any hydrocarbon inventories on site during decommissioning will be of significantly smaller volume than those modelled. As the topsides will be fully removed, there will be no potential for releases in the longer term from the facilities. Considering the above, discharges to sea from the topsides should not be assessed further.
Underwater noise emissions	No	Cutting required to remove the topsides will take place above the waterline, and there will be no other noise-generating activities. Vessel presence will be limited in duration. The project is not located within an area protected for marine mammals. With industry-standard mitigation measures and JNCC guidance, EAs for offshore oil and gas decommissioning projects typically show no injury, or significant disturbance associated with these projects. On this basis, underwater noise assessment does not need assessed further.
Resource use	No	Generally, resource use from the proposed activities will require limited raw materials and be largely restricted to fuel use. Such use of resources is not typically an issue of concern in offshore oil and gas. The estimated worst-case (Single Lift option) total energy usage for the project is 197,027 GJ (Appendix A). Material will be returned to shore as a result of project activities, and expectation is to recycle at least 97% of this returned material. There may be instances where infrastructure returned to shore is contaminated and cannot be recycled, but the weight/volume of such material is not expected to result in substantial landfill use.

Impact	Further assessment	Rationale
		Considering the above, resource use does not warrant further assessment.
Onshore activities	No	The onshore waste management process is likely to have negligible consequences for the human population in terms of an increase in dust, noise, odour and reduced aesthetics. It should be noted that, through TAQA's Waste Management Strategy, only licenced contractors will be considered who can demonstrate they are capable of handling and processing the material to be brought ashore (e.g. permitted capacity to accept the relevant waste streams). This will form part of the commercial tendering process, including duty of care audits and due diligence on the successful contractor. Approval is determined through due-diligence assessment comprising site visits, review of permits and consideration of the facilities design and construction has been developed to minimise environmental impact. TAQA understands that dismantling sites will also require consents and approvals from onshore regulators such as the Environment Agency, who apply conditions relating to mitigation, management and who are responsible for the provision of permits for such work.
Waste	No	It is waste management, not generation, that is the issue across DPs, with capacity to handle waste within the UK often cited as a stakeholder concern. The limited waste to be brought to shore, which will be routine in nature, will be managed in line with TAQA's Waste Management Strategy as part of the project Active Waste Management Plan, using approved waste contractors. On this basis, no further assessment of waste is necessary.
Employment	No	TAQA will communicate regularly with all crew members throughout. TAQA will also be working closely with its contractor companies to retain and redeploy crew where possible. Following the above measures and continued communications further assessment is not warranted for this aspect.
Unplanned events	No	The topsides process system will have been through the DFPV process prior to the decommissioning activities described herein being carried out. Release of a live hydrocarbon and chemical inventory is therefore not a relevant impact mechanism. The lift vessel to be used for removing the topsides is likely to have the largest fuel inventory of the few vessels involved in the decommissioning activities. However, the inventory is likely to be less than the worst-case crude oil spill from loss of well containment modelled and assessed in the Cormorant North field oil pollution emergency plan (OPEP). In addition, the vessel's fuel inventory is likely to be split between a number of separate fuel tanks, significantly reducing the likelihood of an instantaneous release of a full inventory. Overall, therefore, the potential impact from fuel inventory release will be at worst equivalent to that already assessed and mitigated for the operational phase of North Cormorant. The current OPEP for the North Cormorant topsides considers a diesel release of approx. 850 m^3. For such a spill, no beaching is expected, and under normal weather conditions, the spill will disperse naturally within 9 hours

Impact	Further assessment	Rationale
		As the methodology for the removal to shore of the topsides has not been defined in detail, there exists the possibility that during transport of the topsides materials, elements may dislodge and drop from the transport vessel. Dropped object procedures are industry-standard and there is only a very remote probability of any interaction with any live infrastructure. Considering the above, the potential impacts from accidental chemical/ hydrocarbon releases during decommissioning activities do not warrant further assessment. Although the risk of oil spill is remote, an OPEP will be in place for the North Cormorant Decommissioning activities. Any spills from vessels in transit and outside the 500 m zone are covered by separate Shipboard Oil Pollution Emergency Plans (SOPEPs). Up to seven vessels will be deployed during decommissioning activities, including a heavy lift vessel, tug vessels (4), a barge vessel, a standby vessel and supply vessels (2).
Dropped Objects	No	Any dropped objects of significant size will be removed (i.e. those reported to OPRED via PON2 notifications). Any small non-significant objects will be marked and will be within the safety zone of the substructure. These dropped objects will be addressed during the debris clearance survey post decommissioning activities associated with the substructure decommissioning activities.

5.2 Aspects Taken Forward for Further Assessment

Based on the initial screening (Section 5.1), there are no aspects which warrant further assessment within the EA as any potential impact will be short in duration and of low impact severity, therefore pose no significant risk to the environmental or societal receptors assessed.

5.3 Proposed Mitigation and Control Measures

To ensure that impacts remain as described above, TAQA will follow routine environmental management activities, for example appropriate Project planning, contractor management, vessel audits, activity permitting and legal requirements to report discharges and emissions, such that the environmental and societal impact of the decommissioning activities will be minimised. The activities associated with the decommissioning of the North Cormorant topsides are not likely to result in significant impacts to the environment or other sea users either offshore or onshore, for example shipping traffic, fishing or seabed communities, if appropriate mitigation and control measures are effectively applied. A summary of the proposed control and mitigation measures is shown in Table 5-1.

Table 5-1 Proposed Mitigation and Control Measures

General and Existing
• Lessons learnt from previous decommissioning scopes will be reviewed and implemented as appropriate; • Vessels will be managed in accordance with TAQA's existing marine procedures; • The vessels' work programme will be optimised to minimise vessel use; • The 500 m safety exclusion zone will remain in operation during the decommissioning activities reducing risk of non-project related vessels entering into the area where topsides decommissioning activities are taking place; • All topsides will be subject to a drain, flush, purge and vent philosophy that will be assessed and permitted under existing operational permits prior to decommissioning, to ensure minimal residual contaminants are present in the infrastructure before removal operations commence; • The OPEP is one of the controls included in a comprehensive management and operational control plan developed to minimise the likelihood of large hydrocarbon releases and to mitigate their impacts should they occur; • All vessels undertaking decommissioning activities will have an approved SOPEP; • Existing processes will be used for contractor management to assure and manage environmental and social impacts and risks; • TAQA's management of change process will be followed should changes of scope be required; • Careful planning, selection of equipment, subsequent management and implementation of activities; • A debris survey will be undertaken once decommissioning activities for the field as a whole are fully completed. Any debris identified as resulting from oil and gas activities will be recovered from the seabed where possible; and • Similarly, overtrawl assessments conducted as assurance of a safe seabed for other sea users will be undertaken once decommissioning activities for the Cormorant North field as a whole have been completed.
Large-scale Releases to Sea
• Risk of a full inventory loss from a vessel is very low given that the majority of vessels have compartmentalised or distributed fuel tanks, making full containment loss highly unlikely and the distance from shore would prevent any significant volume of diesel reaching any shoreline; and • Any release will be managed under an approved OPEP, in which the risks associated with North Cormorant topside removal have been appropriately assessed and planned for.
Waste Management
• All contractors will be audited as part of a stringent commercial tendering process to ensure they can demonstrate that they are capable of handling the materials expected to be present on the North Cormorant topsides; • TAQA is targeting at least 97% of the material brought back onshore will be recycled and will actively engage with the supply chain and other operators/ industries to explore opportunities to maximise this recovery of the other 3%; • All waste will be managed in compliance with relevant waste legislation by a licenced waste management contractor; and • TAQA will develop and maintain an AWMP to help identify and track all wastes generated.

6.0 CONCLUSIONS

Although the three options for topsides removal differ in their durations, type of vessels and detail of activities undertaken, the worst-case aspects from each method were considered and assessed in line with a tried and tested EA Methodology and the results detailed in Section 5.0.

Following detailed review of the Project activities, the environmental sensitivities of the Project area, industry experience with decommissioning activities and taking stakeholder concerns into account, it was determined that none of the issues commonly associated with offshore oil and gas activities required detailed assessment. The proposed North Cormorant topsides removal will involve surface activities only with a limited number of vessels mostly within the North Cormorant 500 m safety zone. It will not involve any interaction with the seabed, significant discharges to sea or underwater noise generation.

The North Cormorant installation is located 113 km north east of Shetland in the northern North Sea, remote from coastal sensitivities and from any designated sites. Therefore, no significant impact to any protected sites is expected.

Finally, this EA has considered the objectives and marine planning policies of the National Marine Plan across the range of policy topics including biodiversity, natural heritage, cumulative impacts and the oil and gas sector. TAQA considers that the proposed decommissioning activities are in alignment with such objectives and policies.

Based on the findings of this EA including the identification and subsequent application of appropriate mitigation measures, and Project management according to TAQA's Health, Safety, Security and Environment Policy and EMS, it is considered that the proposed North Cormorant topside decommissioning activities do not pose any significant threat of impact to environmental or societal receptors within the UKCS.

7.0 REFERENCES

Aires, C., Gonzlez-Irusta, J. M. & Watret, R. (2014). Scottish Marine and Freshwater Science Report, Vol 5 No 10, Updating Fisheries Sensitivity Maps in British Waters.

Baxter, J.M., Boyd, I.L., Cox, M., Donald, A.E., Malcolm, S.J., Miles, H., Miller, B., & Moffat, C.F. (Editors) (2011). Scotland's Marine Atlas: Information for the national marine plan. Marine Scotland, Edinburgh. pp. 191. Available online at: http://www.scotland.gov.uk/Publications/2011/03/16182005/0.

Beare, D., Batten, S., Edwards, M. & Reid, D., (2002). Prevalence of boreal Atlantic, temperate Atlantic and neritic zooplankton in the North Sea between 1958 and 1998 in relation to temperature, salinity, stratification intensity and Atlantic inflow. , Journal of Sea Research, 48, p 29 – 49.

BEIS (2019). UK Greenhouse Gas Emissions, Final Figures. Statistical Release: National Statistics. Online at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/776085/2017_Final_emissions_statistics_-_report.pdf

BEIS (2017). A review of the NAEI Shipping Emissions Methodology. Report for the Department of Business, Energy and Industrial Strategy, Ricardo Energy and Environment. PO number 1109088. Issue number 5. Date: 12/12/2007

Benthic Solutions (2019). North Cormorant – Combined Environmental Baseline and Habitat Assessment Survey Report (November 2018).

CNRI (2013). Environmental Statement of the Murchison Facilities. MURDECOM-BMT-EN-REP-00198. May 2013.

CNRI (2017). Ninian Northern Platform Decommissioning Programme. P0005-CNR-PM-REP-00004. February 2017.

Coull, K., Johnstone, R. & Rogers, S. (1998). Fisheries Sensitivity Maps in British Waters, Published and distributed by UKOOA Ltd. Available online at https://www.cefas.co.uk/media/52612/sensi_maps.pdf

Davies, J.M. & Addy, J.M. & Blackman, R.A. & Blanchard, J.R. & Ferbrache, J.E. & Moore, D.C. & Somerville, H.J. & Whitehead, A., Wilkinson, T. (1984). Environmental effects of the use of oil-based drilling muds in the North Sea. Marine Pollution Bulletin. 15. 363-370.

D3 Consulting Ltd (2019) North Cormorant Materials Inventory. Reference No: 77IFS-155036-L99-0003-000.

Decom North Sea (2017). Environmental Appraisal Guidelines. Online at http://decomnorthsea.com/about-dns/projects-update/environmental-appraisal-guidelines [Accessed 04/07/2019].

Decom North Sea (2018). Managing Offshore Decommissioning Waste. First Edition, November 2018.

DECC (Department of Energy Climate Change) (2009). UK Offshore energy Strategy and strategic environmental assessment Appendix 3h Other Users and Material Assets (infrastructure, other natural resources) Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/194348/OES_A3h_Other_Users.pdf.

DECC (Department of Energy Climate Change) (2016). UK Offshore Energy Strategic Environmental Assessment 3 (OESEA3). Available at:

https://www.gov.uk/government/consultations/uk-offshore-energy-strategic-environmental-assessment-3-oesea3 [Accessed 04/07/2019].

DTI (Department of Trade and Industry) (2001). Report to the Department of Trade and Industry. Strategic Environmental Assessment of the Mature Areas of the Offshore North Sea SEA 2. Consultation Document.

Edwards, M., Beaugrand, G., Halaouet, P., Licandro, P., McQuatters-Gollop, A. & Wootton, M. (2010). Ecological Status Report (2010): results from the CPR survey 2009/2010. SAHFOS Technical Report 8 1-8, Plymouth UK.

Eleftheriou, A. and Basford, D.J. (1989). The macrobenthic infauna of the offshore northern

Ellis, J. R., Milligan, S. P., Readdy, L., Taylor, N., & Brown, M. J. (2012). Spawning and nursery grounds of selected fish species in UK waters. Sci. Ser. Tech. Rep., Cefas Lowestoft, 147, 56.

Folk, R.L. (1954). The distinction between grain size and mineral composition in sedimentary rock nomenclature. The Journal of Geology, 62, 344-359.

FRS (Fisheries Research Services) (2004). Zooplankton and climate change – the Calanus story. Available online at http://www.vliz.be/docs/Zeecijfers/zooplankton_and_climate_change.pdf

Fugro (2019). North Cormorant Cuttings Pile UKCS Block 211/21 (January 2019). Report from Fugro EMU Ltd to TAQA Bratani Ltd. Report no 172361 – R -004(03).

Hammond, P.S., Lacey, C., Gilles, A., Viquerat, S., Börjesson, P., Herr, H., Macleod, K., Ridoux, V., Santos, M., Scheidat, M. and Teilmann, J. (2017). Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. Wageningen Marine Research.

IEEM (2010). Guidelines for Ecological Impact Assessment in Britain and Ireland, marine and Coastal. August 2010. Final Version 5.

IEMA (2015). Environmental impact assessment Guide to Shaping Quality Development.

IEMA (2016). Environmental impact assessment Guide to Delivering Quality Development.

IUCN (International Union for Conservation of Nature) (2020). IUCN Red List of Threatened Species. Available at: https://www.iucnredlist.org/ [Accessed 20/02/2020].

JNCC (Joint Nature Conservation Committee) (1999). Seabird vulnerability data in UK waters, block specific vulnerability. Joint Nature Conservancy Committee.

JNCC (2014). Annex I Submarine structures made by leaking gases. Available online at http://archive.jncc.gov.uk/default.aspx?page=1453

JNCC (2015). Sea-pen and burrowing megafauna communities. Available online at http://archive.jncc.gov.uk/page-6028. [Accessed 04/07/2019].

JNCC (2017). UKSeaMap 2016. A broad-scale seabed habitat map for the UK. Available at: http://jncc.defra.gov.uk/ukseamap [Accessed 04/07/2019].

Johns, D.G. & Reid, P.C. (2001). An Overview of Plankton Ecology in the North Sea. Technical Report TR_005 produced for Strategic Environmental Assessment-SEA2.

Kober, K., Webb, A., Win, I., Lewis, M., O'Brien, S., Wilson, L. J., & Reid, J. B. (2010). An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs. JNCC report, 431.

Künitzer, A., Basford, D., Craeymeersch, J.A., Dewarumez, J.M., Dörjes, J., Duineveld, C.A., Elftheriou, A., Heip, C., Herman, P., Kingston, P., Niermann, U., Rachor, E., Rumohr, H. and de

Wilde, P.A.J. (1992). The Benthic Infauna of the North Sea: Species Distribution and Assemblages. ICES Journal of Marine Science, 49, 127 – 143.

Marathon Oil U.K. LLC (2017). Brae Alpha, Brae Bravo, Central Brae, West Brae and Sedgwick – Combined Decommissioning Programmes. Document reference number: 9000-MIP-99-PM-RP-00003-000,102. June 2017.

McBreen, F., Askew, N., Cameron, A., Connor, D., Ellwood, H. and Carter, A. (2011). UK SeaMap 2010. Predictive mapping of seabed habitats in UK waters. JNCC Report No. 446. Available online at http://jncc.defra.gov.uk/PDF/jncc446_web.pdf

MMO, (2017). Vessel Density Grid 2015. Available at: https://data.gov.uk/dataset/b7ae1346-7885-4e2d-aedf-c08a37d829ee/vessel-density-grid-2015 [Accessed 07/11/2018].

NMPI (2019). National Marine Plan Interactive. Available at: http://www.gov.scot/Topics/marine/seamanagement/NMPIhome [Accessed 20/02/2020].

Oil and Gas Authority (2016). Information of levels of shipping activity. 29th Offshore Licensing Round information and resources. Available online at https://www.ogauthority.co.uk/licensing-consents/licensing-rounds/offshore-licensing-rounds/#tabs [Accessed 04/07/2019].

Oil and Gas UK (2015). UK Benthos. Database of offshore benthic environmental surveys in the North Sea. Version 5.02. January 2015

OPRED (2018). Guidance Notes - Decommissioning of Offshore Oil and Gas Installations and Pipelines.

OSPAR (2006). Harmonised reporting format to compile environmental monitoring data and information related to offshore oil and gas activities. OSPAR 2006-07, OIC 06/7/1-E.

OSPAR (2008). Case Reports for the OSPAR List of threatened and/or declining species and habitats. OSPAR Commission. Available online at http://qsr2010.ospar.org/media/assessments/p00358_case_reports_species_and_habitats_2008.pdf [Accessed 04/07/2019].

OSPAR (2009). Background for ocean quahog *Arctica islandica*. OSPAR Publication No. 407/2009.

OSPAR (2010). Background Document for Seapen and Burrowing megafauna communities. Available online at https://qsr2010.ospar.org/media/assessments/Species/P00481_Seapen_and_burrowing_megafauna.pdf.

Reid, J., Evans, P. & Northridge, S. (2003). An atlas of cetacean distribution on the northwest European Continental Shelf, Joint Nature Conservation Committee: Peterborough.

SAHFOS (2015). Sir Alister Hardy Foundation for Ocean Science. CPR Data: Standard Areas. Available at: https://www.cprsurvey.org/1409 [Accessed 04/07/2019].

SCOS (2017). Scientific advice on matters related to the management of seal populations: 2017. Available at: http://www.smru.st-andrews.ac.uk/files/2018/01/SCOS-2017.pdf [Accessed 06/11/2018].

SCOS (2014). Scientific advice on matters related to the management of seal populations 2013. Available online at http://www.smru.st-and.ac.uk/documents/1803.pdf [Accessed 18-09-2018].

Scottish Government (2019). Scottish Sea Fisheries Statistics, 2018. Scottish Government. Available online at http://www.gov.scot/Topics/marine/marine-environment/species/fish [Accessed 28/10/2019]

Shell U.K. Limited (2017). Brent Topsides Decommissioning Technical Document. Document Reference: BDE-F-TOP-HE-0709-00001. February 2017.

SMRU (2011). Utilisation of space by grey and harbour seals in the Pentland Firth and Orkney waters, Scottish Natural Heritage Commissioned Report No. 441.

SNH (2013a). Scottish Biodiversity List. Scottish Natural Heritage. Available at: https://www2.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL [Accessed 02/11/2018].

SNH (2013b). A handbook on environmental impact assessment Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland. Online at http://www.snh.gov.uk/docs/A1198363.pdf [Accessed 17/02/2017].

SNH (2016). Priority Marine Features in Scotland's seas, available online at http://www.snh.gov.uk/docs/A1327320.pdf

TAQA (2018a). Method Statement North Cormorant Topsides Removal. EID-01246-DEC-ST-MET-0001-ALS

TAQA (2020). North Cormorant Decommissioning Programme Topsides

TAQA (2019). North Cormorant Topsides Removal Report. 77-ACON0520-S-RE-0001-000

Tyler-Walters, H., James, B., Carruthers, M. (eds.), Wilding, C., Durkin, O., Lacey, C., Philpott, E., Adams, L., Chaniotis, P.D., Wilkes, P.T.V., Seeley, R., Neilly, M., Dargie, J. & Crawford-Avis, O.T., (2016). Descriptions of Scottish Priority Marine Features (PMFs). Scottish Natural Heritage Commissioned Report No. 406. Available online at https://www.nature.scot/snh-commissioned-report-406-descriptions-scottish-priority-marine-features-pmfs [Accessed 04/07/2019].

Tyler-Walters, H., Lear, D. and Allen J.H. (2004). Identifying offshore biotope complexes and their sensitivities. Report to Centre for Environmental, Fisheries, and Aquaculture Sciences from the Marine Life Information Network (MarLIN). Plymouth: Marine Biological Association of the UK. [Sub contract reference A1148]. Online at http://www.marlin.ac.uk/assets/pdf/Cefas_Rpt_revised.pdf [Accessed 04/07/2019].

UKOOA (2001). An analysis of UK offshore oil and gas environmental surveys 1975-95.

Webb, A., Elgie, M., Irwin, C., Pollock, C. & Barton, C. (2016). Sensitivity of offshore seabird concentrations to oil pollution around the United Kingdom: Report to Oil & Gas UK. Document No HP00061701. Available online at http://jncc.defra.gov.uk/page-7373 [Accessed 30/10/2019].

Wolf, J. Yates, N., Brereton, A., Buckland, H., De Dominicis, M., Gallego, A. & O'Hara Murray, R. (2016). The Scottish Shelf Model. Part 1: Shelf-Wide Domain. Scottish Marine and Freshwater Science Vol 7 No 3, 151pp. Available online at http://data.marine.gov.scot/sites/default/files//SMFS%20Vol%207%20No%203.pdf.

Xodus (2018). Survey Gap Analysis for TAQA Northern North Sea Assets. Document number A-302034-S00-TECH-001.

8.0 APPENDIX A: ENERGY AND EMISSIONS

Table 8-1 Energy and emissions by project activity for Single Lift removal of topsides

Planned activity	Operations energy (GJ)	Operations CO_2 (Te)
Onshore transportation of materials	17	1
Onshore deconstruction	18,604	ND
Onshore recycling of materials	117,968	12,531
Offshore transport (See table 8.2)	60,439	4,485
Total	**197,027**	**17,018**

Table 8-2 Offshore transport energy and emissions for Single Lift removal of topsides

Vessel type	Total Duration (days)				Operations energy (GJ)	Operations CO_2 (Te)
	Mob/ Demob	Transit	Working	Wait on Weather		
Single Lift Vessel	2	4	4	2	60,008	4,455
Cargo Barge	2	8	20	6		
Standby vessel	2	8	40	5		
Tugs (4)	8	16	16	8		
Helicopters	<1				431	30
Total offshore transport					**60,439**	**4,485**

9.0 APPENDIX B: TAQA HSSE POLICY

TAQA Europe Health, Safety, Security and Environment Policy

The health, safety and security of our employees, contractors and the public is our highest priority; it is more important than any operational priority.

We must also:

- Ensure that our assets are operated safely
- Assure the integrity of our assets
- Respect, protect and understand the natural environment

HSSE = Health, Personal Safety, Major Accident Prevention, Security and Environment

We strongly believe that excellent business performance requires excellent HSSE performance – we recognise this as a core value.

Employees and contractors are required to focus on the four areas below:

Leadership

- Everyone within TAQA understands their accountabilities for the management of HSSE
- The structure and resources necessary to achieve and measure HSSE accountabilities are provided
- Requirements of applicable legislation and standards are identified, understood and complied with
- Personnel have the required competencies and are fit for work
- Our workforce is aligned, involved and empowered in the identification and management of HSSE hazards and the achievement of our HSSE goals
- Key stakeholder groups are identified and a good working relationship is maintained with them (understanding and addressing their issues and concerns)
- Everyone within TAQA demonstrates commitment and accountability to implement this policy and to work in accordance with the TAQA Management System Elements and Expectations

Operational Risk Identification and Assessment

- Risks are identified, assessed and appropriately managed
- Information required to support safe operation is identified, accurate, available and up to date

Operational Risk Management

- The standards, procedures and operating manuals required to support project, maintenance and operational activities are identified, developed, understood and consistently applied
- Process and operational status monitoring and handover requirements are defined, understood and carried out
- Operational interfaces with third parties are identified, assessed and appropriately managed

Document No: TUK-01-A-001 Issue Date: September 2020

TAQA Europe Health, Safety, Security and Environment Policy

- Risks arising from any form of change are systematically identified, assessed and managed
- A systematic process is in place to verify the safe condition of plant and equipment and to ensure that personnel are appropriately prepared (before start-up or return to normal operations)
- We are appropriately prepared for all necessary actions which may be required for the protection of the public, personnel (including contractors), the environment, plant equipment and reputation in the event of an incident
- We aim to prevent pollution and protect the environment from the impact of our operations

Review and Improvement

- We routinely monitor our activities through internal/external audits and produce key performance indicators – we review these indicators and intervene as necessary
- Compliance with our expectations is routinely reviewed and audited to determine whether this policy remains appropriate and is being implemented effectively
- The management system is routinely reviewed for continual improvement and to enhance HSSE performance
- All incidents, near misses and opportunities for improvement are consistently reported and investigated, and that identified actions and learnings are implemented on a timely basis

We all have a personal responsibility to work safely and protect the environment. We are all safety leaders, irrespective of our role or location. Everyone is empowered to challenge and stop work if they are in any doubt regarding a job they are involved in or observing.

Donald Taylor, Managing Director

John Hogg, HSSEQ Director

René Zwanepol, NL Country Manager

Sandy Hutchison, Legal, Commercial and Business Services Director

Calum Riddell, Operations Director

Iain Lewis, Europe CFO / Europe Decommissioning Director

Gary Hunt, Human Resources Manager

Gary Tootill, Technical Director – Subsurface / Wells

David Wilson, Technical Director – Projects, Engineering and Assurance

Document No: TUK-01-A-001 Issue Date: September 2020