CNR International

BANFF & KYLE DECOMMISSIONING PROJECT

CNR Project Number:	P0009
CNR Project Description:	Banff & Kyle Decommissioning Project
Contractor:	

Document Number:			
P0009-CNR-EN-REP-00015	B1		113
Contract-Originator-Discipline-Document Class-5-numeric sequence code	Rev	Sheet	Total Sheets
System:	**Tag Numbers:**		

Title:

REPORT - BANFF AND KYLE DECOMMISSIONING PROGRAMME: ENVIRONMENTAL APPRAISAL - BANFF AND KYLE EA

REVISION	REVISION STATUS	DATE	ORIGINATOR	DISC. CHECK	DISC. APPROVAL	CNR APPROVAL
B1	ISSUED FOR INFORMATION	24/5/2021	KL	PR	PR	SB

REVISION RECORD

Current revisions are identified on the relevant page(s) by a vertical line in the right-hand margin, adjacent to where the revision was made. All previous revision identification has been removed.

Rev	Date	Revision Details
B1	24/5/2021	Issued for Information

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TERMS AND ABBREVIATIONS

Abbreviation	Text in full
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
BAT	Best Available Technology
BEIS	Business, Energy and Industrial Strategy
CA	Comparative Assessment
CATS	Central Area Transmission Systems
CNRI	Canadian Natural Resources International
CNS	Central North Sea
CO_2	Carbon dioxide
CoP	Cessation of Production
CPUE	Catch per Unit Effort
cm	Centimetre
°C	Degree(s) Celsius
CSV	Construction Support Vessel
DECC	Department of Energy and Climate Change
DoB	Depth of Burial
DP	Decommissioning Programme
DSV	Dive Support Vessel
DUTU	Dynamic Umbilical Termination Unit
E	East
EA	Environmental Appraisal
EHC	Electrohydraulic Control
EIA	Environmental Impact Assessment
EMS	Environmental Management System
ENVID	Environmental Impact Identification
EPS	European Protected Species
EU	European Union
EUNIS	European Nature Information System
FAO	Food and Agriculture Organisation
FPSO	Floating, Production Storage and Offloading vessel
FSO	Floating Storage and Offloading vessel
GJ	Gigajoule
HSE	Health, Safety and Environment
ICES	International Council for the Exploration of the Seas

in	Inch
JNCC	Joint Nature Conservation Committee
kg	Kilogrammes
km	Kilometre
km^2	Square kilometre
KP	Kilometre Point
KPI	Key Performance Indicator
m	Metre
MARPOL	Marine Pollution
MCDA	Multi Criteria Decision Analysis
MCZ	Marine Conservation Zone
µg/g	Micrograms per gram
mm	Millimetre
MMO	Marine Management Organisation
MPA	Marine Protected Area
MPE	(Norwegian) Ministry of Petroleum and Energy
N/A	Not Applicable
NCMPA	Nature Conservation Marine Protected Area
NE	Northeast
nm	Nautical mile
NMP	National Marine Plan
NNS	Northern North Sea
NORM	Naturally Occurring Radioactive Material
NW	Northwest
OD	Outer Diameter
OGA	Oil & Gas Authority
OGUK	Oil & Gas UK
OPRED	Offshore Petroleum Regulator for Environment & Decommissioning
OPEP	Oil Pollution Emergency Plan
OSPAR	Oslo Paris Convention – Convention for the Protection of the Marine Environment of the North East Atlantic
PAH	Polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PL	Pipeline
PLEM	Pipeline End Manifold
PMF	Priority Marine Features
ppm	parts per million

PWA	Pipeline Works Agreement
ROV	Remotely Operated Vehicle
SAC	Special Area of Conservation
SACFOR	Super abundant, Abundant, Common, Frequent, Occasional, Rare
SAL	Submerged Anchor Loading
SAM	Subsea Accumulator Module
SCOS	Special Commission on Seals
SDU	Subsea Distribution Unit
SEPA	Scottish Environmental Protection Agency
SFF	Scottish Fishermen's Federation
SHE	Safety, Health, Environment
SMRU	Sea Mammal Research Unit
SNH	Scottish National Heritage
SOPEP	Shipboard Oil Pollution Emergency Plans
SOSI	Seabird Oil Sensitivity Index
SPA	Special Protection Areas
SSIV	Sub-Surface Isolation Valve
SSS	Side Scan Sonar
STL	Subsea Turret Loading
SW	Southwest
Te	Tonne
TFSW	Trans Frontier Shipment of Waste
THC	Total Hydrocarbon Concentration
TOOPEP	Temporary Operation Oil Pollution Emergency Plan
TPFP	Teekay Petrojarl Floating Production UK Limited
TUTU	Topside Umbilical Termination Unit
UKBAP	United Kingdom Biodiversity Plan
UKCS	United Kingdom Continental Shelf
UKOOA	United Kingdom Offshore Operators Association
VMS	Vessel Monitoring System
WHPS	Wellhead Protection Structures

EXECUTIVE SUMMARY

Introduction and Background

In accordance with the Petroleum Act 1998, Canadian Natural Resources International (UK) Limited (CNRI), on behalf of Teekay Petrojarl Floating Production UK Limited (TPFP) and the Banff and Kyle JV Partners, are applying to the Department for Business, Energy and Industrial Strategy (BEIS) to obtain approval for the decommissioning of the Banff and Kyle subsea infrastructure and pipelines. In June 2020, CNRI began the process to permanently cease production from these Fields.

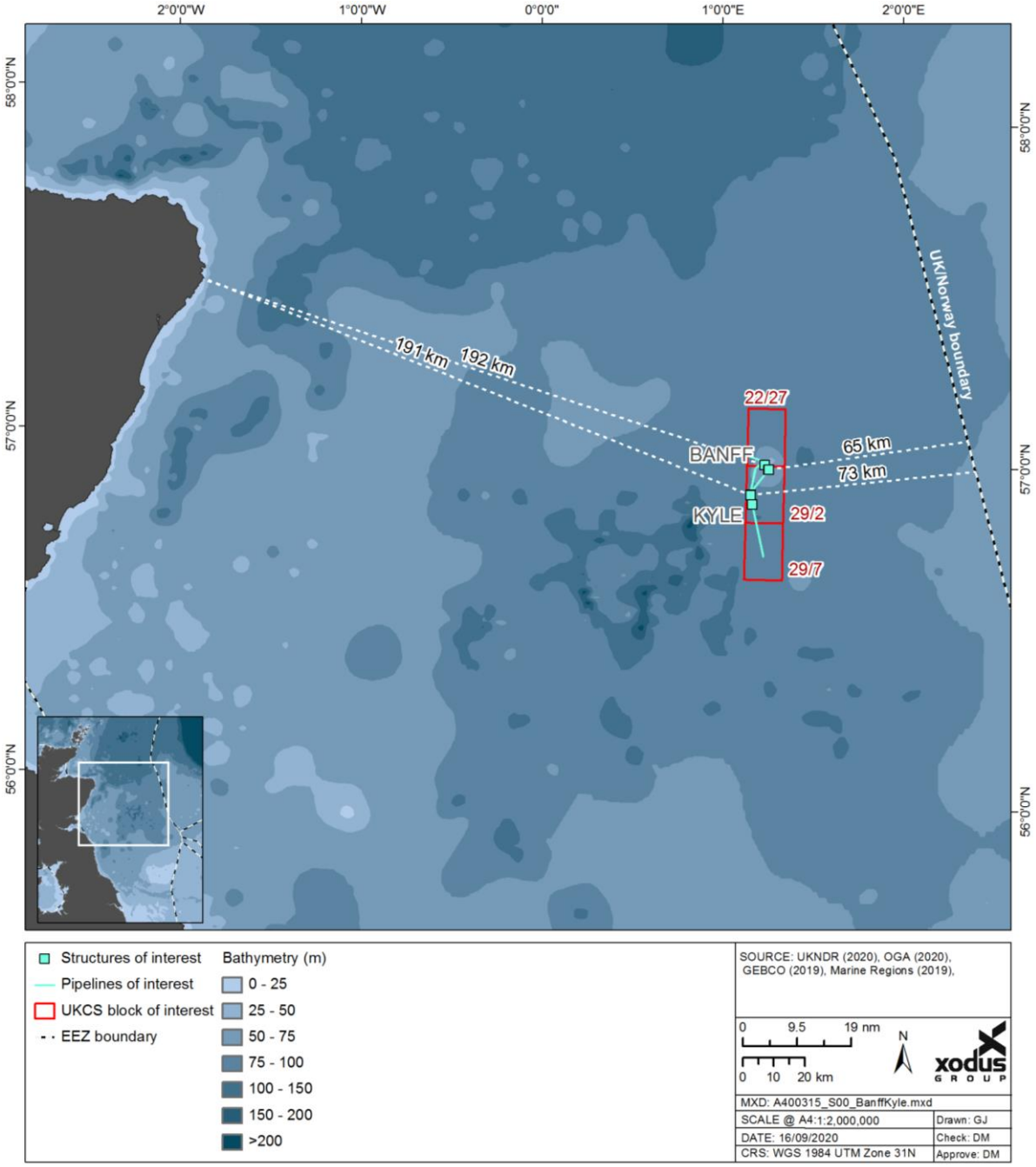


Figure 1-1 Location of the Banff and Kyle Fields

Both Fields produced via the leased Petrojarl Banff Floating Production Storage and Offloading vessel (FPSO) and the Apollo Spirit Floating Storage and Offloading vessel (FSO). In Q4 of 2019 CNRI, TPFP and Altera Infrastructure (formerly a part of TPFP) created a combined project team to safely execute the release of the FPSO and FSO. The FPSO, FSO and associated risers were subject to a separate combined Decommissioning Programme (DP/163/19) as part of the decommissioning strategy and are independent of the remaining infrastructure to be decommissioned. FPSO float off occurred in August 2020. The remaining activities of the Banff and Kyle decommissioning strategy include the decommissioning of the Banff and Kyle subsea installations and pipelines and are covered by this EA, in support of the associated DP.

The Banff Field is located in Blocks 29/2a and 22/27a in the UK Sector of the Central North Sea (CNS) due east of Aberdeen and 191 km from the nearest point of land. The Kyle Field is located in Blocks 29/2c and 29/2h in the UK Sector of the CNS also due east of Aberdeen, 192 km from the Scottish mainland, in approximately 90 m water depth (see Figure 1-1).

There is one drill centre in the Banff area and two drill centres supporting the Kyle Fields (North Kyle and South Kyle). North and South Kyle drill centres are approximately 3 km apart and are linked by an 8" production pipeline and an Electrohydraulic Control (EHC) umbilical. A 4" gas lift pipeline connects the Kyle North Drill Centre to the Banff Drill Centre which was historically tied back to the FPSO. A gas export pipeline also connected the Banff infrastructure to the Central Area Transmission System (CATS) export pipeline. A disconnected pipeline and umbilical also linked the Curlew Field (~2 km south of Kyle) to South Kyle and as such is also part of the decommissioning scope; this pipeline and umbilical are located partly within Block 29/7 (see Figure 1-1). The schematic in Figure 1-2 shows the current layout of the Banff and Kyle Fields.

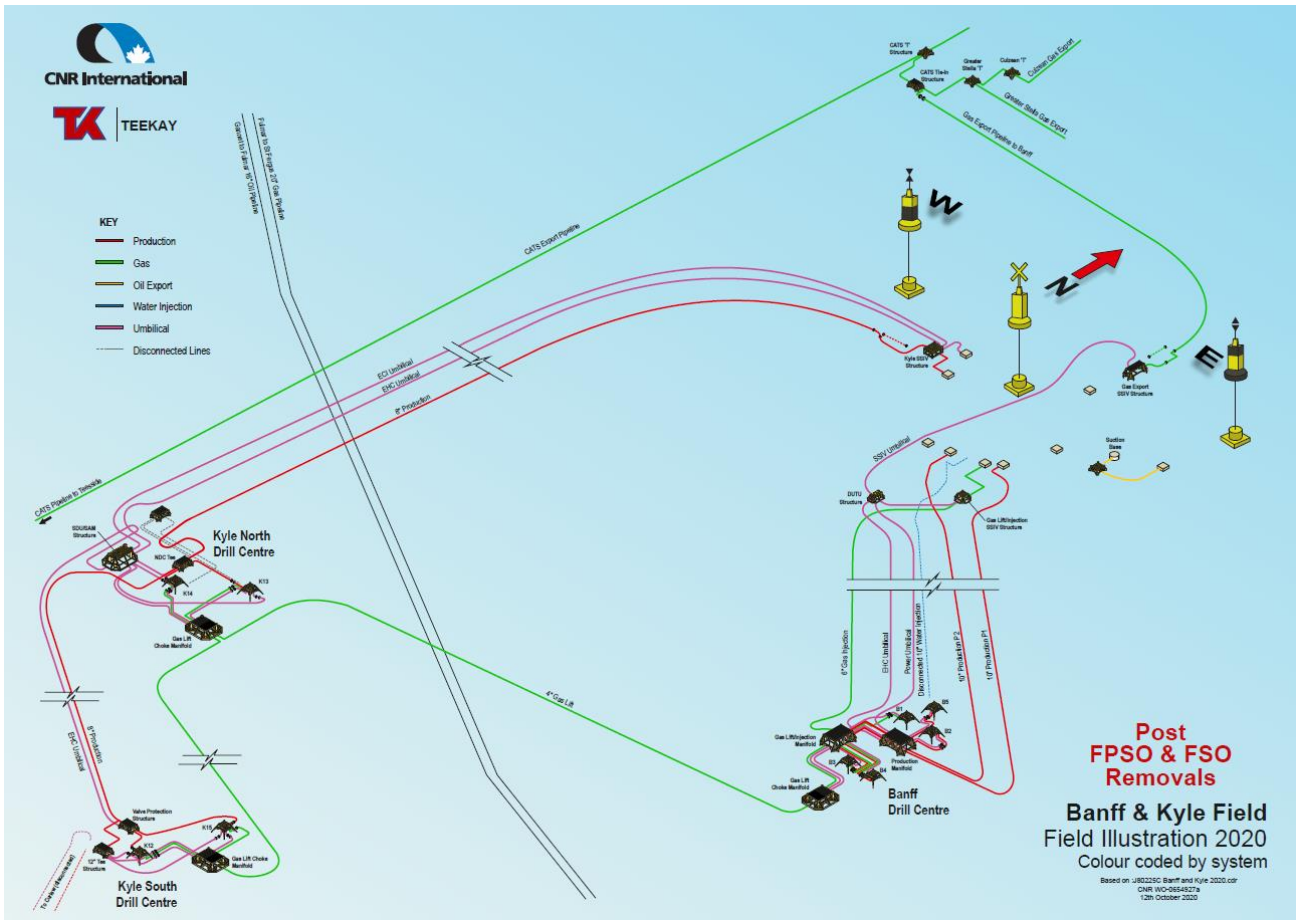


Figure 1-2 Banff and Kyle Field illustration

Regulatory context

The Petroleum Act 1998 (as amended by the Energy Act 2008) governs the decommissioning of offshore oil and gas infrastructure, including pipelines, on the United Kingdom Continental Shelf (UKCS). The Petroleum 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 a DP from the Offshore Petroleum Regulator for Environment & Decommissioning (OPRED), part of BEIS, before initiating decommissioning work. The DP should outline in detail the infrastructure being decommissioned and the method by which the decommissioning will take place (CNRI, 2021). The primary guidance for offshore decommissioning was updated and published by BEIS in 2018 (and updated in 2020), details the need for an Environmental Appraisal (EA) and a Comparative Assessment (CA) to be submitted in support of the DP. For the EA, the Guidance describes a proportionate process that culminates in a streamlined EA Report which focuses on screening out of non-significant impacts and presents a detailed assessment of potentially significant impacts. The CA is a detailed process that involves a weighted assessment of various decommissioning options against key criteria identified by the Guidance.

The Scottish National Marine Plan (NMP) has been adopted by the Scottish Government to help ensure sustainable development of the marine area. 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". CNRI present this EA in alignment with the aims of the Plan.

Decommissioning Overview

The decommissioning strategy for the Banff and Kyle Fields has been split into two DPs, which cover the following:

1. The release and float-off of the Petrojarl Banff FPSO and Apollo Spirit FSO (DP/163/19; CNRI 2020);

2. The decommissioning subsea infrastructure and pipeline structures within the Banff and Kyle fields (associated with this EA), and covers:

- all subsea installations (including trees and wellhead structures);
- eight Subsea Turret Loading (STL) piles;
- spools, jumpers and SSIVs;
- drill cuttings;
- stabilisation materials;
- pipelines, flexible flowlines and umbilicals; and
- remediation associated with decommissioning of the above.

This Environmental Appraisal (EA) report covers the environmental impacts of the decommissioning activities anticipated for the different item groups listed above. The Comparative Assessment (CA) presents the emerging decommissioning options for the pipelines and flowlines and for the eight pile structures. The EA only considers the impacts of these emerging options.

Proposed Schedule

The precise timing of the decommissioning activities is not yet confirmed and will be subject to market availability of cost-effective removal services and contractual agreements. The potential activity window for the Banff and Kyle subsea decommissioning activity is between 2022 and 2026.

Options for Decommissioning

All of the Banff and Kyle Field subsea infrastructure was assessed for decommissioning against the Guidance Notes: Decommissioning of Offshore Oil and Gas Installations and Pipelines (BEIS, 2018). The recommended Comparative Assessment (CA) process was undertaken following this Guidance. In accordance with normal practice for the Scoping phase of the CA, equipment was organised into groups of items with similar characteristics, facilitating greater efficiency in processing the latter phases of the CA. The guidance identifies items which must be fully removed and some categories of pipelines which may be left decommissioned *in situ* subject to CA. Once the equipment groups designated for full removal were identified the remaining groups were assessed further.

The CA groups which were considered for Decommissioning are outlined in Table 1-1 and further details are provided in the accompanying Banff and Kyle Field CA Report. Table 1-1 also indicates whether the infrastructure was scoped in or out of CA. Where only one option was identified for decommissioning the group was scoped out of CA. The emerging options are in bold and are covered in greater detail in this EA. Only Groups 1, 2, 4 and 8 were carried through the CA process as all other groups were identified for full removal.

Table 1-1 CA Groups Assessed, Scoping Decision and Emerging Options

CA Group No.	Subsea Infrastructure Description	Scoping Decision	Decommissioning Options Considered (emerging option in bold)
1	Rigid Pipelines, Trenched and Buried	Scoped in	Option 2a: Cut and Lift with De-Burial **Option 4a: Rock Placement over Ends / Exposures** Option 4c: Remove Exposures Option 5: Remove Ends and Remediate Snag Hazards
2	Flexibles / Umbilicals Trenched and Buried	Scoped in	Option 2b: Reverse Reel without De-Burial **Option 4a: Rock Placement over Ends / Exposures** Option 5: Remove Ends and Remediate Snag Hazards
3	Flexibles / Umbilicals, Surface Laid	Scoped out	**Full Removal**
4	Rigid Pipelines, Trenched and Rock Covered	Scoped in	Option 2a: Cut and Lift with De-Burial **Option 4a: Rock Placement over Ends / Exposures** Option 5: Remove Ends and Remediate Snag Hazards
5	Spools and Jumpers	Scoped out	**Full Removal**
6	Subsea Installations (Structures)	Scoped out	**Full Removal**
7	Protection / Stabilisation	Scoped out	**Full Removal**
8	STL piles	Scoped in	Option 2c: Reverse Installation with De-Burial Option 3a: Rock Cover Exposed Piles and Chains **Option 5: Leave *in situ* – Remove Piles to Below the Seabed**

Environmental and Societal Sensitivities

The key environmental and societal sensitivities in the Banff and Kyle area are summarised in Table 1-2.

Table 1-2 Environmental and Societal Sensitivities in the Banff and Kyle Area

Conservation Interests
No adult ocean quahog (>1 cm) were recovered within samples or observed during survey footage of the Banff and Kyle Fields (Fugro, 2020a, 2020b). The habitat *'Seapens and burrowing megafauna'* was present within both the Banff and Kyle Field survey areas. According to the SACFOR classification, seapen presence ranged from 'rare' to 'common'. Faunal burrows between 3-15 cm ranged from either 'frequent' to 'abundant' at the four sites where they were present (Fugro, 2020a). Both 'Burrowed mud' and *'Seapens and burrowing megafauna in circalittoral fine mud'* are also considered PMFs. No Annex I protected features were observed in the area.
Conservation Sites
The Banff Field infrastructure is partly located within the East of Gannet and Montrose Fields NCMPA. The site is ~10 km due north of the Kyle Fields. The site is designated for the protection of ocean quahog aggregations and deep-sea muds. The next closest protected sites are located >50 km from the Banff and Kyle Fields (Scanner Pockmark SAC, Fulmar MCZ).
Conservation Species
Harbour porpoise, short beaked common dolphin, white-beaked dolphin, Atlantic white-sided dolphin and minke whale are known to be visitors to the waters surrounding the project area (Reid *et al*., 2003; Hammond *et al*., 2017). All of these species are both European Protected Species (EPS) and are covered by the UK Biodiversity Action Plan (BAP). Both grey and harbour seal densities are very low (0-1 individuals per 25 km^2) across the Banff and Kyle area due to its distance from shore (Russell *et al*., 2017). Both seal species are Annex II species.
Benthic Environment
The Banff Field is located partly within A5.27 '*Deep circalittoral sand'*, and also within an area of A5.37 '*Deep* circalittoral mud'. The Kyle Field is almost exclusively located within A5.37 'Deep circalittoral mud'. Directly to the south of the Banff Field is a small patch of A5.15 'Deep circalittoral coarse sediment' (EMODnet, 2019). Side-scan sonar data revealed regions of seabed which had higher sonar reflectivity corresponded with regions of A5.44 'Circalittoral mixed sediment' in the Banff Field (Fugro, 2020a). Benthic fauna composition was similar between the Banff and Kyle Fields. The dominant taxa observed within both the sandy and mixed substrate at the Banff Field, were seapens, hermit crabs and anemones (Fugro, 2020a). Sea urchins were additionally amongst the dominant species within the Kyle Field (Fugro, 2020b). Bioturbation was evident across both survey areas (Fugro 2020a, 2020b). The 'Seapens and burrowing megafauna in circalittoral fine mud' habitat, as described above, was present at both the Banff and Kyle Fields. Though no cuttings piles are evident in the project area, sediment contamination levels indicate the presence of historic piles (Fugro, 2020c).
Fish
The project area is located within the high intensity spawning grounds of mackerel and Norway pout as well as the spawning grounds of cod, lemon sole and sandeel. Additionally, the following species use the area as nursery grounds: anglerfish, blue whiting, cod, European hake, haddock, herring, ling, mackerel, Norway pout, plaice, sandeel, spurdog and whiting (Coull *et al*., 1998; Ellis *et al*., 2012). Aires *et al*. (2014) provides modelled spatial representations of the predicted distribution of 0 age group fish. The modelling indicates the presence of juvenile fish (less than one year old) for multiple species: anglerfish,

blue whiting, European hake, haddock, herring, mackerel, horse mackerel, Norway pout, plaice, sprat, and whiting. Across the project area, the probability of juvenile fish aggregations occurring is low (<0.15).

Seabirds

According to the density maps provided in Kober *et al.* (2010), the following species could be found within the project area: northern fulmar, Manx shearwater, European storm-petrel, northern gannet, Arctic skua, great skua, black-legged kittiwake, great black-backed gull, common gull, lesser black-backed gull, herring gull, Arctic tern, common guillemot, razorbill, little auk, Atlantic puffin and pomarine skua. Seabird Oil Sensitivity Index (SOSI) identifies areas at sea where seabirds are likely to be most sensitive to surface pollution (Webb *et al.*, 2016). Seabird vulnerability in Blocks 22/27, 29/2 and 29/7 is low throughout the year with no data for November. Block 29/11 experiences a Very High SOSI value in the months of September and October (Webb *et al.*, 2016). The risk of an oil spill from the proposed operations in the project area is considered remote and therefore the overall risk to birds is considered negligible.

Commercial Fisheries

The Banff and Kyle infrastructure lies in International Council for the Exploration of the Seas (ICES) Rectangles 42F1 and 43F1 (Scottish Government, 2020). The waters comprising the Banff and Kyle are fished for a variety of species by both UK and foreign vessels. ICES rectangle 42F1 has predominantly been targeted for shellfish in recent years, whilst the adjacent ICES rectangle 43F1 experiences a much greater amount of demersal fishing. For the last five fishing years (2015-2019 inclusive), the total landings value was greater in ICES rectangle 42F1 than 43F1 by £2,383,217, and the live weight of those landings were greater by approximately 694 Te. This observation reflects the dramatically larger tonnage of shellfish species caught in ICES rectangle 42F1, comprising >50% of the total landings live weight in 2019. The total annual landings for ICES rectangles 42F1 and 43F1 were ≤1% of the total landings within the UKCS for each of the five most recent fishing years (Scottish Government, 2020).

In 2019 fishing effort in ICES rectangle 42F1 was highest in January, March and November, accounting for 51% of the total number of days fished, however overall effort was relatively low for 42F1 (Scottish Government, 2020). Comparatively, fishing effort in ICES rectangle 43F1 was much lower. In total there were 28 days of fishing effort in 2019 in 43F1 which is deemed to be very low (Scottish Government, 2020). Both in 2018 and consistently in previous years, fishing effort has been greater in rectangle 42F1 compared to 43F1. Trawls were the most utilised gear in rectangle 42F1 and 43F1. In total, trawls contributed 99% of the total fishing effort in rectangle 42F1. In rectangle 43F1 approximately 86% of total fishing effort was from trawls with the remainder being attributed to seine nets (Scottish Government, 2020).

Other Sea Users

The Banff and Kyle infrastructure is located in a mature area of the CNS with extensive oil and gas development. There are five oil and gas surface structures within 40 km of the project area. The Banff and Kyle infrastructure is located in areas of either low or very low shipping intensity (OGA, 2016).

There are no designated areas for military activities occur in the vicinity of the Banff and Kyle infrastructure (NMPi, 2020). There are no dangerous wrecks and no active cables in the vicinity of Banff and Kyle (NMPi, 2020). The North Sea Link electricity interconnector between Norway and the UK is currently under construction. It will pass approximately 2 km from the Kyle Field (NMPi, 2020). The cable will be operational by 2021 (North Sea Link, 2020) and therefore should not coincide with the proposed decommissioning.

Impact Assessment

This EA Report has been prepared in line with the OPRED Decommissioning Guidelines and with Decom North Sea's EA Guidelines for Offshore Oil and Gas Decommissioning. The environmental impact assessment has been informed by several different processes, including the identification of potential environmental issues through project engineer and marine environmental specialist review in an Environmental Identification (ENVID) screening workshop and consultation with key stakeholders. The ENVID workshop discussed the proposed decommissioning activities and any potential impacts these may pose. The impacts assessed were as follows:

- Emissions to air;
- **Disturbance to the seabed;**
- Physical presence of vessels in relation to other sea users;
- **Physical presence of infrastructure decommissioned *in situ* in relation to other sea users;**
- Discharges to sea;
- Underwater noise associated with general decommissioning activities;
- Resource use;
- Onshore activities;
- Waste; and
- Unplanned events

Of the ten potential impacts, only impacts associated with 'Disturbance to seabed' and 'Physical presence of infrastructure decommissioned in situ in relation to other sea users' were screened in for further assessment based on the potential severity and / or likelihood of their respective environmental impact.

Further reasoning for why the remaining eight impacts were scoped out, and mitigation measures that will be applied against each aspect, are presented within the main body of the EA. The intention is that such measures should remove, reduce or manage the impacts to a point where the resulting residual significance is reduced to 'as low as reasonably practicable' (ALARP). The potential impacts considered are as follows:

Disturbance to seabed was investigated further as a potential impact due to the nature of the proposed activities and proximity to the sensitive seabed habitats of the East of Montrose and Gannet Nature Conservation Marine Protection Area (NCMPA). Of key importance is the recovery of habitats and benthos following temporary disturbance and the area of seabed expected to be affected by permanent disturbance.

The following measures have been or will be taken in order to reduce as far as possible potential impacts on the environment from the various decommissioning activities:

- All activities which may lead to seabed disturbance will be planned, managed and implemented in such a way that disturbance is minimised;
- Careful planning, selection of equipment, and management and implementation of activities;
- A debris survey will be undertaken at the completion of the decommissioning activities. Any debris identified as resulting from oil and gas activities will be recovered from the seabed where possible;
- Rock armour will be placed by a fall pipe vessel equipped with an underwater camera on the fall pipe. This will ensure accurate placement of the rock armour and reducing unnecessary spreading of the rock armour footprint and ensuring that minimum safe quantity or rock is used; and,
- Clear seabed verification will ensure there is no residual risk to other sea users. Non-intrusive verification techniques will be considered in the first instance, but if deemed necessary, seabed clearance may require conventional overtrawl survey methods, in agreement with OPRED and fishing bodies.

Physical presence of infrastructure decommissioned *in situ* in relation to other sea users was investigated as a potential impact on commercial fisheries. Of key importance was understanding the utilisation of the Banff and Kyle Fields for commercial fishing purposes and the risk this infrastructure decommissioned *in situ* presented as a snagging hazard.

The following measures have been or will be taken in order to reduce as far as possible potential impacts on the environment from the various decommissioning activities:

- The Banff and Kyle Fields' subsea infrastructure is currently shown on Admiralty Charts, the FishSafe system and the OGA Infrastructure data systems (OGA Open Data). Once decommissioning activities are complete, updated information (i.e. which infrastructure remains in situ and which has been removed) will be made available to allow the Admiralty Charts and the FishSafe system to be updated;
- Any exposures / cut flowline ends will undergo rock placement to ensure they are overtrawlable to active fishing gears;
- Any objects dropped during decommissioning activities will be removed from the seabed where appropriate;
- Clear seabed verification will ensure there is no residual risk to other sea users. Non-intrusive verification techniques will be considered in the first instance, but if deemed necessary, seabed clearance may require conventional overtrawl survey methods. Where there is evidence of residual snagging hazards (e.g. any spans, berms, dropped objects, etc.), then intervention in the form of overtrawling to re-level the seabed or the addition of rock placement will be discussed with OPRED, and implemented as appropriate; and
- CNRI recognise their commitment to monitor any infrastructure decommissioned *in situ* and therefore intend to set up arrangements to undertake post-decommissioning monitoring. The frequency of the monitoring that will be required will be agreed with OPRED and future monitoring will be determined through a risk-based approach based on the findings from each subsequent survey. During the period over which monitoring is required, the status of the infrastructure decommissioned *in situ* would be reviewed and any necessary remedial action undertaken to ensure it does not pose a risk to other sea users.

Conclusion

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

Having reviewed the project activities and taken into consideration: the remote offshore location of the Banff and Kyle Fields; that the activities will have a small area of impact; that the benthos are likely to have a degree of natural resilience to sediment suspension; the availability of similar habitat within the context of the wider North Sea, as well as the undertaking of mitigation measures to limit this impact, there is not expected to be a significant impact on the seabed environment or any European or nationally designated protected sites in proximity to the activities.

The Banff and Kyle Fields are generally not heavily fished and what little trawling activity there is in the area, is mostly concentrated along pipelines without identified exposures. Pipelines which do presently have exposures along their lengths will be appropriately remediated during decommissioning thereby no snagging risk should remain to fisheries. Overall, there is not expected to be an impact on commercial fisheries from infrastructure decommissioned *in situ*.

1 INTRODUCTION

1.1 Background

In accordance with the Petroleum Act 1998, Canadian Natural Resources International (UK) Limited (CNRI), on behalf of Teekay Petrojarl Floating Production UK Limited (TPFP) and the Banff and Kyle JV Partners, are applying to the Department for Business, Energy and Industrial Strategy (BEIS) to obtain approval for the decommissioning of the Banff and Kyle subsea infrastructure and pipelines. In June 2020, CNRI began the process to permanently cease production from these fields.

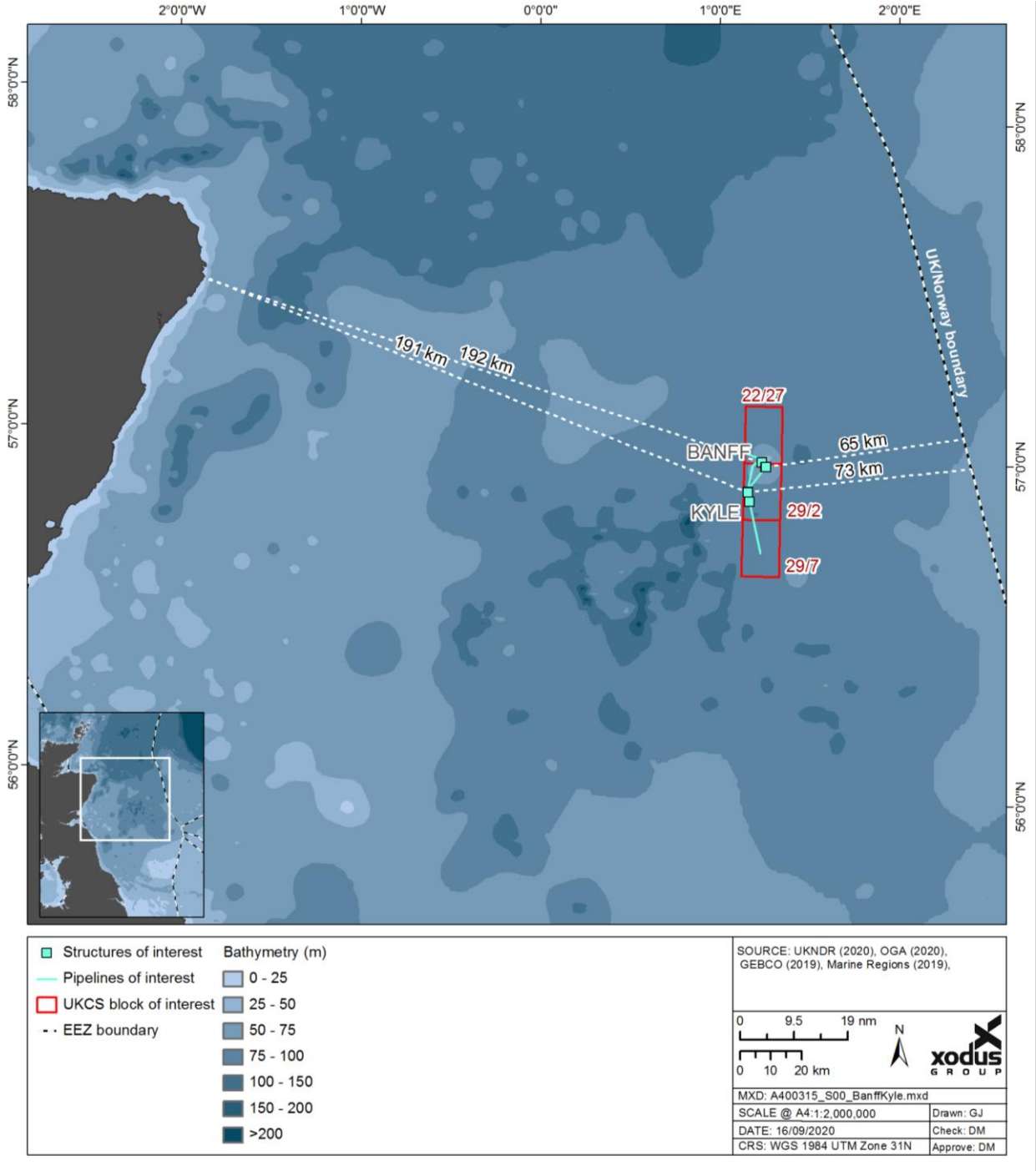


Figure 1-1 Location of the Banff and Kyle Fields

The Banff Field infrastructure is located in Blocks 29/2a and 22/27a in the UK Sector of the Central North Sea (CNS) due east of Aberdeen,191 km from the nearest point of land and in water of a depth of approximately 95 m. The Kyle Field infrastructure is located in Block 29/2c and 29/2h in the UK Sector of the Central North Sea some also due east of Aberdeen, and 192 km from land, in approximately 90 m water depth (Figure 1-1).

There is one drill centre in the Banff area and there are two drill centres in the Kyle areas (North Kyle and South Kyle). North and South Kyle are approximately 3 km apart and are linked by an 8" production pipeline and an EHC umbilical. A 4" gas lift pipeline connects the Kyle North Drill Centre to the Banff Drill Centre which historically tied back to the FPSO. A gas export pipeline also connected the Banff infrastructure to the Central Area Transmission System (CATS) export pipeline. A disconnected pipeline and umbilical also linked the Curlew Field (~2 km south of the Kyle Field) to South Kyle and as such is also part of the scope of this DP. The disconnected pipeline and umbilical are located within Block 29/7 (see Figure 1-1). The schematic in Figure 1-2 shows the layout of the Banff and Kyle Fields. Prior to float-off, produced gas was exported from the Petrojarl Banff Floating Production Storage and Offloading vessel (FPSO) via the CATS pipeline to the CATS Terminal in Seal Sands, Teesmouth. Their former location is indicated by the two cardinal buoys and single special marker, as shown in Figure 1-2.

The Banff Field came online in 1996. CNRI International (UK) Limited (hereafter, "CNRI") brought the Kyle Field online in 2000, and initial production was through the Curlew FPSO. CNRI took over operatorship of the Banff Field in 2003 and the following year production from the Kyle Field K14 well was tied back to Banff infrastructure. In 2005 the remaining Kyle Field wells were tied back to Banff. Both Fields produced via the leased Petrojarl Banff FPSO and the Apollo Spirit Floating Storage and Offloading vessel (FSO). In Q4 of 2019, with a natural decline in production and a drop in commodity price CNRI, TPFP and Altera Infrastructure (formerly a part of TPFP) created a combined project team to safely execute the release of the FPSO and FSO. The FPSO, FSO and associated risers were subject to a separate combined Decommissioning Programme (DP/163/19) as part of the decommissioning strategy and are independent of the remaining infrastructure to be decommissioned. Cessation of Production (CoP) approval was granted in March 2020. CoP took place in June 2020 and FPSO and FSO float off occurred in August 2020.

1.2 Regulatory Context

The Petroleum Act 1998 (as amended by the Energy Act 2008) governs the decommissioning of offshore oil and gas infrastructure, including pipelines, on the United Kingdom Continental Shelf (UKCS). The responsibility for ensuring compliance with the Petroleum Act 1998 rests with Department of Business, Energy and Industrial Strategy (BEIS) and is managed through its regulatory body the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED). OPRED is the Competent Authority on decommissioning in the UK for OSPAR purposes and relevant legislation. The Petroleum 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 a DP from OPRED, part of BEIS, before initiating decommissioning work. The DP should outline in detail the infrastructure being decommissioned and the method by which the decommissioning will take place (CNRI, 2021).

Formal Environmental Impact Assessment (EIA) to support a DP is not explicitly required under existing UK legislation. However, the primary guidance for offshore decommissioning that was updated and published by BEIS in 2018 (and updated in 2020), detailed the need for an EA to be submitted in support of the DP. This guidance describes a proportionate EA process that culminates in a streamlined EA Report which focuses on screening out of non-significant impacts and presents a detailed assessment of potentially significant impacts.

In terms of activities in the CNS, the Scottish National Marine Plan has been adopted by the Scottish Government to help ensure sustainable development of the marine area. 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 7), CNRI have considered the broader aims of the Plans and have made a statement on alignment with the aims.

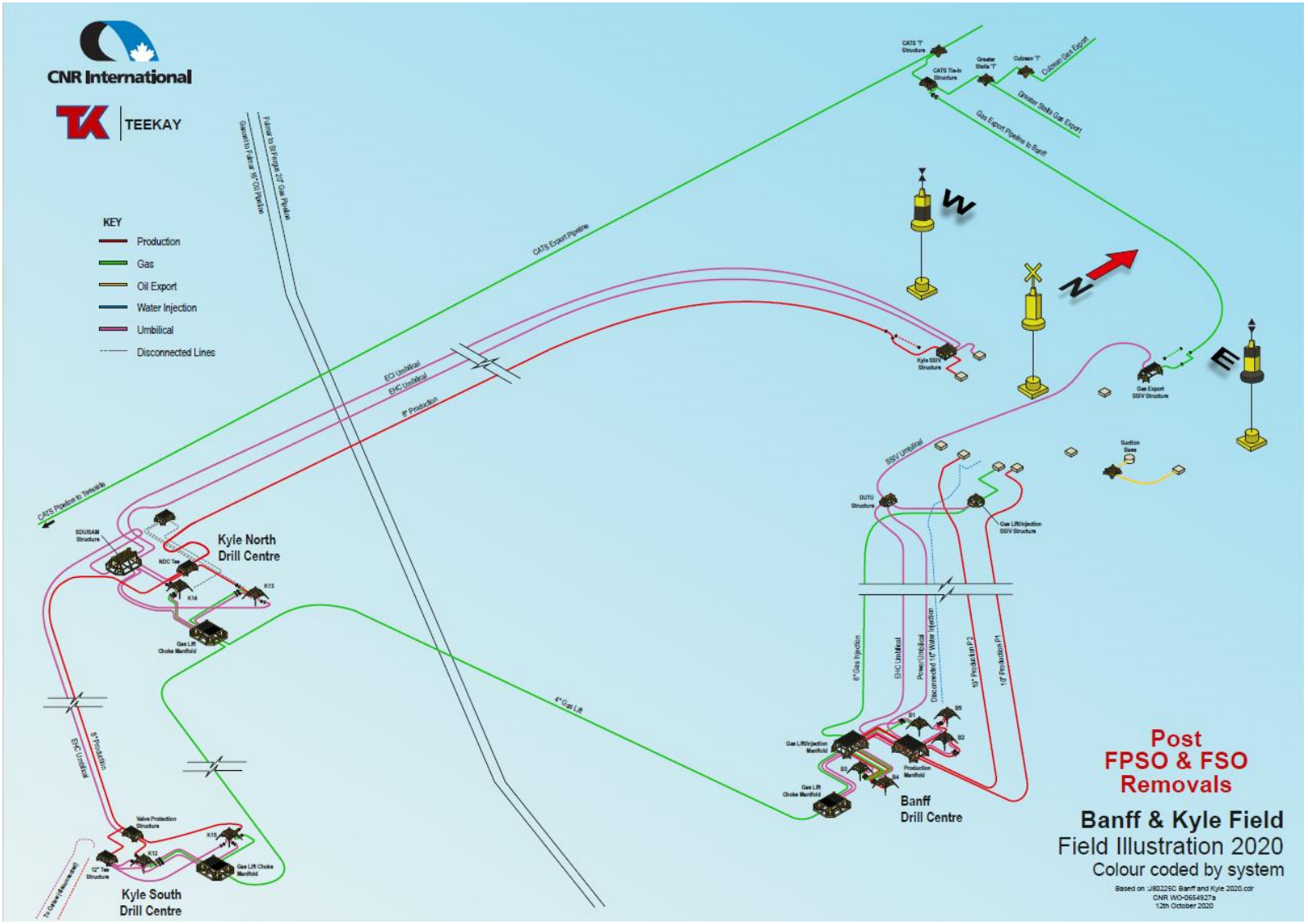


Figure 1-2 Banff and Kyle Field illustration

1.3 Scope and Structure

1.3.1 Scope of the Environmental Appraisal

The decommissioning strategy for the Banff and Kyle Fields has been split into two DPs, which cover:

1. The release and float-off of the Petrojarl Banff FPSO and Apollo Spirit FSO (DP/163/19; CNRI, 2020);

2. The decommissioning subsea infrastructure and pipeline structures within the Banff and Kyle fields (associated with this EA), and covers:

- all subsea installations (including trees and wellhead structures);
- Subsea Turret Loading (STL) piles;
- spools, jumpers and SSIVs;
- eight subsea pile structures;
- drill cuttings;
- stabilisation materials;
- pipelines, flexible flowlines and umbilicals; and
- remediation associated with decommissioning of the above.

This Environmental Appraisal (EA) report covers the environmental impacts of the decommissioning activities anticipated for the different item groups listed above. The Comparative Assessment (CA) presents the emerging decommissioning options for the pipelines and flowlines and for the eight pile structures. The EA only considers the impacts of these emerging options.

This EA does not cover well decommissioning that will be undertaken prior to the commencement of the decommissioning activities. Flushing and cleaning operations have already occurred within the Fields; these activities are additionally not within scope of the EA and have been covered by the appropriate permits. The Xmas trees and wellhead structures are included as part of the subsea infrastructure for consideration in the respective DPs for these fields; however, these installations will be removed as part of well decommissioning operations within the well abandonment campaign and will be covered by that permitting regime. Assessment of impacts from onshore energy use and atmospheric emissions for well decommissioning activities will be included in license applications for appropriate onshore disposal facilities. As the assessment of the removal of these subsea installations will be captured within the relevant permits, they are considered outwith the scope of this EA. This activity will be carried out as part of the preparatory work preceding decommissioning, under existing field operational permits. Further detail about the infrastructure to be decommissioned is provided in Section 2.

1.3.2 Structure of the Environmental Appraisal

This EA report describes the potential environmental impacts of the proposed activities associated with the Banff and Kyle decommissioning and to demonstrate the extent to which these can be mitigated and controlled to an acceptable level. This is achieved in the following Sections:

- The process by which the selected decommissioning strategy has been established (Section 2);
- A description of the proposed decommissioning activities (Section 2);
- A summary of the baseline sensitivities and receptors relevant to the assessment area that support this EA (Section 3);
- The methodology used to carry out the impact assessment (Section 4);
- A review of the potential impacts from the proposed decommissioning activities and justification for the assessments that support this EA (Section 5);
- Assessment of key issues (Section 6); and
- Conclusions (Section 7).

2 PROJECT SCOPE

2.1 Decision Making Context

BEIS (2018 and 2020) Guidance states that subsea installations (e.g. drilling templates, wellheads and their protective structures, production manifolds and risers) must, where practicable, be completely removed for reuse, recycling or final disposal on land. The Guidance states that any piles used to secure such installations in place should be severed below the natural seabed level at such a depth to ensure that any remains are unlikely to become uncovered. operators should aim to achieve a cut depth of 3m below the natural seabed level, however consideration will be given to the prevailing seabed conditions and currents and this should be detailed in the decommissioning programme and discussed with the relevant decommissioning team. The Guidance also states that mattresses and grout bags installed to protect pipelines should be removed for disposal onshore if their condition allows. If the condition of the mattresses or grout bags is such that they cannot be removed safely or efficiently, any proposal to leave them in place must be discussed with the Regulator.

With regards to pipelines (including flowlines and umbilicals), these should be considered on a case-by-case basis. The guidance provides general advice regarding removal for two categories of pipelines:

- For small diameter pipelines (including flexible flowlines and umbilicals) which are neither trenched nor buried, the guidance states that they should normally be entirely removed; and
- For pipelines covered with rock protection, the guidance states that these are expected to remain in place unless there are special circumstances warranting removal.

The Guidance also highlights instances where pipelines could be decommissioned *in situ*. For example, pipelines that are adequately buried or trenched or which are expected to self-bury could be considered as candidates for in situ decommissioning. Where an Operator is considering decommissioning pipelines *in situ*, the decision-making process must be informed by CA of the feasible decommissioning options. The CA takes account of safety, environmental, technical, societal and economic factors to arrive at a preferred decommissioning solution.

The following sections outline the decision making and CA process and detail the resultant emerging options for the decommissioning of all of the infrastructure and pipelines within the Banff and Kyle Fields.

2.2 Alternatives to Decommissioning

Options to re-use the Banff and Kyle Field infrastructure *in situ* for future hydrocarbon developments have been considered, but to date none have yielded a viable commercial opportunity. Reasons for this include the absence of remaining hydrocarbon reserves in the vicinity of the infrastructure, and the limited remaining design life and unsuitable material composition of the Banff and Kyle Field infrastructure. It is considered unlikely that any opportunity to re-use the Field infrastructure will be feasible and, as such, there is no reason to delay decommissioning of the infrastructure in a way that is safe and environmentally and socioeconomically acceptable.

2.3 Comparative Assessment

All of the Banff and Kyle Field subsea infrastructure was assessed for decommissioning against the Guidance Notes: Decommissioning of Offshore Oil and Gas Installations and Pipelines (BEIS, 2018). The recommended CA process was applied. In accordance with normal practice for the Scoping phase of the CA, equipment was organised into groups of items with similar characteristics, facilitating greater efficiency in processing the latter phases of the CA. The guidance identifies certain equipment which must be fully removed and some categories of pipelines which may be left decommissioned *in situ* subject to CA. Once the equipment groups designated for full removal were identified the remaining groups were assessed further.

All possible decommissioning options for the remaining groups were coarsely screened against the primary criteria as specified within the BEIS (2018) Guidance: Safety; Environment; Technical; Societal; and Economic. The options were scored against each criterion either green, amber or red, pertaining to attractive, acceptable or unattractive respectively. This process eliminated the least favourable options from each equipment group in preparation for detailed evaluation of the remaining options. Those remaining options were then investigated

in detail to develop quantitative and qualitative data for each option pertaining to the primary criteria and sub-criteria (e.g. safety data; environmental impact data; technical considerations; societal impacts; and costs). Once this data had been prepared in the form of published studies, a detailed evaluation was conducted to determine the final recommended decommissioning option for each item of equipment. This was facilitated by comparing the data for each sub-criterion across the options using a Multi Criteria Decision Analysis (MCDA) tool which employs pairwise comparisons of quantitative and qualitative data to produce a relative score for each sub-criterion that can be summed to produce an overall relative score for each option, enabling identification of the emerging recommendation for the group.

The CA groups which were considered for decommissioning are outlined in Table 2-1 and further details are provided in the accompanying Banff and Kyle CA Report. All of the infrastructure groups considered prior to scoping are included in Table 2-1, which also indicates whether the infrastructure was scoped in or out of CA. Where only one option was identified for decommissioning the group was scoped out of CA. The selected options are in bold and are covered in greater detail in Section 2.5 of this EA. Only Groups 1, 2, 4 and 8 were carried through the CA process as all other groups were identified for full removal.

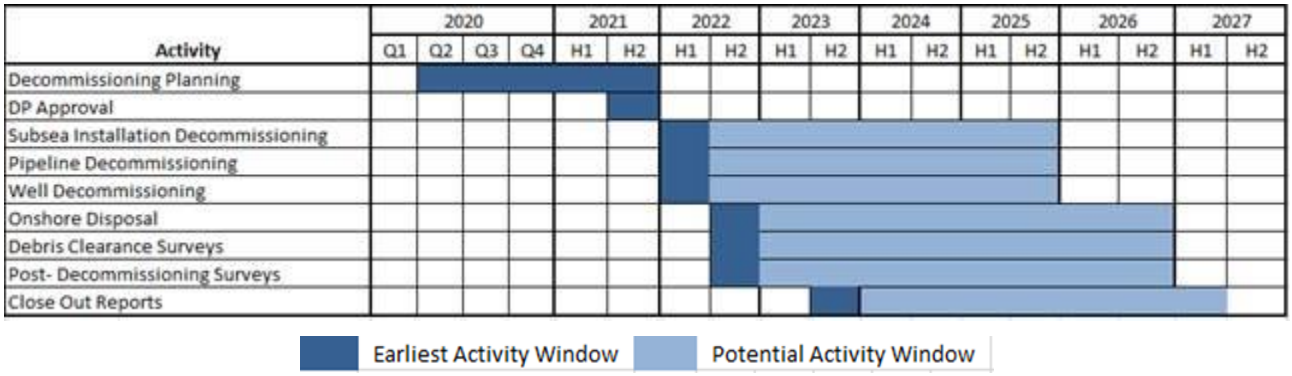
Table 2-1 CA Decommissioning Options Considered

CA Group No.	Subsea Infrastructure Description	Scoping Decision	Decommissioning Options Considered (selected option in bold)
1	Rigid Pipelines, Trenched and Buried	Scoped in	Option 2a: Cut and Lift with De-Burial **Option 4a: Rock Placement over Ends / Exposures** Option 4c: Remove Exposures Option 5: Remove Ends and Remediate Snag Hazards
2	Flexibles / Umbilicals Trenched and Buried	Scoped in	Option 2b: Reverse Reel without De-Burial **Option 4a: Rock Placement over Ends / Exposures** Option 5: Remove Ends and Remediate Snag Hazards
3	Flexibles / Umbilicals, Surface Laid	Scoped out	**Full Removal**
4	Rigid Pipelines, Trenched and Rock Covered	Scoped in	Option 2a: Cut and Lift with De-Burial **Option 4a: Rock Placement over Ends / Exposures** Option 5: Remove Ends and Remediate Snag Hazards
5	Spools and Jumpers	Scoped out	**Full Removal**
6	Subsea Installations (Structures)	Scoped out	**Full Removal**
7	Protection (Mattresses and Grout Bags)	Scoped out	**Full Removal**
8	STL piles	Scoped in	Option 2c: Reverse Installation with De-Burial Option 3a: Rock Cover Exposed Piles and Chains **Option 5: Leave *in situ* – Remove Piles to Below the Seabed**

2.4 Proposed Schedule

The precise timing of the decommissioning activities is not yet confirmed and will be subject to market availability of cost-effective removal services and contractual agreements. As shown in Table 2 2, the potential activity window for the Banff and Kyle subsea decommissioning activity is between 2022 and 2026.

Figure 2-1 Proposed Schedule of Banff and Kyle Decommissioning Activities



2.5 Decommissioning Activities

2.5.1 Groups 1, 2 and 4

The pipelines within the Banff and Kyle Fields have already been cut and cleaned and have been left open-ended filled with seawater. As per the emerging CA options for Group 1, Group 2 and Group 4 (as defined in Table 2-1 above), these groups will be decommissioned *in situ* with rock placement over areas of exposure and at exposed ends. Rock will be placed along the transition zones wherein the pipelines start as surface laid before entering a trench. The transition zones are approximately 50 m long within the Banff Field and 20 m long in the Kyle Field. The length of rock will therefore be along a 50 m section of pipeline transition at Banff and 20 m at Kyle. Rock will be placed out to a width of ~10 m which results in a maximum anticipated area of 200 m^2 to 500 m^2 covered by rock at each pipeline end. A rock placement vessel will carry out the remediation activities.

In addition, any areas of exposure will also be remediated using rock as appropriate. There are 23 exposures (totalling a length of 345 m) across the Group 1 pipelines. The Group 2 and Group 4 pipelines are all stably buried. Table 2-2 presents a description of the pipelines considered within each group. A full inventory of items to be decommissioned as part of the DP is available in Appendix A.

Table 2-2 Group 1, 2 and 4 Pipelines in the Banff and Kyle Fields

Group	PL number	Description	Length (m)
1	PL1546	Trenched & Buried, P2 10" Banff Oil Production	1,546
	PL1547	Trenched & Buried, P1 10" Banff Oil Production	1,546
	PL1548	Trenched & Buried, 10" Water Injection (Disconnected)	1,715
	PL2388	Trenched & Buried, 4" Gas Lift Pipeline	3,289
	PL1550	Trenched & Buried, 12" Banff Oil Export	1,248
	PL1798	12" Curlew Production Pipeline, Trenched TBC	17,383

Group	PL number	Description	Length (m)
	PL1660	Trenched & Rock Covered, Kyle 8" Production Pipeline	12,023
	PL1797	8" Production Pipeline, Trenched & Buried	3,291
2	PL2052	Trenched & Buried TBC, 6" Banff Gas Lift / Injection	1800
	PL1552 1 & 2, PL1553, PL1554.1 –7	Trenched & Buried, Banff Chemical Injection System, Controls and Chemical Umbilical	1,990
	PLU3117	Trenched & Buried, Kyle ECI Umbilical (Electrical / Chemical)	12, 292
	PL1800	Curlew Control Umbilical	17,550
	PL1799.1 – 8	Trenched & Buried, Main Kyle Umbilical	3,607
	PL1661.1 –22	Trenched & Rock Covered, EHC Umbilical	11,926
4	PL2387	Trenched & Rock Covered, 4" Gas Lift Pipeline	10,252
	PL1549	Trenched & Rock Covered, 6" Banff Gas Export	6,268

2.5.2 Group 3

This group contains two umbilicals which are both surface laid into shallow trenches. These umbilicals will be fully removed using a winch on a Construction Support Vessel (CSV) and will be cut on deck where required. The details of the umbilicals are provided in Table 2-3. A full project inventory is available in Appendix A.

Table 2-3 Group 3 Pipelines in the Banff and Kyle Field

Group	PL number	Description	External Diameter (mm)	Length (m)
3	PLU4522	Power Umbilical	83	1,600
	PLU3106	Banff gas export SSIV umbilical	83	536

2.5.3 Structures

Table 2-4 outlines all the infrastructure within the Banff and Kyle Fields which is to be fully removed during decommissioning. For full infrastructure details and dimensions see Appendix A.5. Prior to recovery, a Dive Support Vessel (DSV) may be required to prepare some of the structures for rigging and cutting connections. The subsea structures will be recovered by CSV before being returned to shore.

Well structures (including nine Xmas Trees and five abandoned guide bases) are presented here as part of the Banff and Kyle subsea inventory, however, as they are associated with the Banff and Kyle wells, their removal and the associated impact is out of scope of the EA and will be addressed via permitting prior to well decommissioning.

Table 2-4 Infrastructure Details for the Banff and Kyle Decommissioning

Infrastructure		Description		Proposed Strategy
Pipelines[1]	SSIV Structures	Banff Gas Lift SSIV Structure	8.7 m x 8.3 m x 3.4 m	Full removal
		Banff Gas Export SSIV Structure	10 m x 5.5 m x 3.9 m	
		Kyle Subsea Isolation Valve (SSIV) Structure	6 m x 7.5 m x 3.2 m	
Pipeline Structures	Wet Splice	Banff to Kyle North Umbilical Wet Splice	3 m x 1.2 m x 0.8 m	Full removal
		Kyle North to Kyle South Umbilical Wet Splice	2.6 m x 1.2 m x 0.6 m	
Subsea Structures	Kyle North	Subsea Distribution Unit (SDU) Structure	9 m x 8 m x 1.9 m	Full removal
		Gas Lift / Choke Manifold	13 m x 11 m x 3.7 m	
		North Drill Centre Valve Structure	10 m x 8 m x 2.4 m	
		Kyle Production Riser Base	8 m x 8 m x 3.2 m	
		Kyle Umbilical Riser Base	8 m x 8 m x 3.2 m	
		Disconnected SDU / Subsea Accumulator Module (SAM) Structure	7.6 m x 6.8 m x 1.8 m	
		Umbilical Tee c/w Protective Cover	6.2 m x 3 m x 1.3 m	
		Abandoned Guide Base	2.8 m x 2.8 m x 3 m	
		Xmas Tree with Guide Base Well K14	5.3 m x 5.3 m x 5.2 m	
		Xmas Tree with Guide Base Well K13	5.3 m x 5.3 m x 5.2 m	
		Abandoned Umbilical Tee Connector	6.2 m x 4.3 m x 1.3 m	
	Kyle South	12" Tee Structure	11.8 m x 8.8 m x 2.2 m	
		Gas Lift / Choke Manifold	13 m x 11 m x 3.7 m	
		South Drill Centre Valve Structure	10 m x 8 m x 2.4 m	
		Curlew Umbilical DUTU	3 m x 1.3 m x 1.2 m	
		Xmas Tree with Guide Base Well K12	5.3 m x 5.3 m x 5.2 m	
		Xmas Tree with Guide Base Well K15	5.3 m x 5.3 m x 5.2 m	
	Banff	Banff Gas Lift / Injection Manifold	18 m x 14 m x 4.8 m	
		Banff Production Manifold	18 m x 16 m x 5.2 m	
		Gas Lift / Choke Manifold	13 m x 11 m x 3.7 m	
		Banff Dynamic Umbilical Termination Unit (DUTU) Structure	7.5 m x 5.5 m x 2.9 m	
		P1 Production Riser Base	8.7 m x 4.5 m x 4.3 m	
		P2 Production Riser Base	8.7 m x 4.5 m x 4.3 m	
		Gas Lift / Injection Riser Base	8.65 m x 4.5 m x 4.3 m	
		Oil Export Tether Base	7 m x 7 m x 2.9 m	
		Oil Export STL Tether Base	4 m x 3 m x 1.4 m	

[1] Where pipelines remaining *in situ* have a direct link to infrastructure (and it is not feasible to remove a spool or jumper), they will be cut at minimal length to enable the removal of this infrastructure. The environmental impact of this activity is accounted for here within the footprint of the associated infrastructure.

Infrastructure		Description		Proposed Strategy
		Banff Suction Base (SAL Anchor Base)	9 m x 9 m x 16.7	
		Pipeline End Manifold (PLEM) Tee	3.1 m x 3 m x 1.7 m	
		Banff Umbilical Tether Base	7 m x 7 m x 2.9 m	
		Gas Export Tether Base	7 m x 7 m x 2.9 m	
		Banff Umbilical Tether Base Anode Skid A	2.5 m x 1.5 m x 0.5 m	
		Banff Umbilical Tether Base Anode Skid B	2.5 m x 1.5 m x 0.5 m	
		Gas Export Tether Base Anode Skid A	2.5 m x 1.5 m x 0.5 m	
		Gas Export Tether Base Anode Skid B	2.5 m x 1.5 m x 0.5 m	
		Gas Export SSIV Anode Skid	2.1 m x 1.5 m x 0.5 m	
		Riser Base Structure Anode Skid A	2.5 m x 1.5 m x 0.5 m	
		Riser Base Structure Anode Skid B	2.5 m x 1.5 m x 0.5 m	
		PLEM Tee Anode Skid	0.75 m x 0.5 m x 0.2 m	
		Abandoned Guide Base	9.4 m x 9.4 m x 3.1 m	
		Abandoned Guide Base	2.8 m x 2.8 m x 3 m	
		Abandoned Guide Base	3 m x 3 m x 3.4 m	
		Abandoned Guide Base	3 m x 3 m x 3.4 m	
		Xmas Tree with Guide Base Well B1	5.3 m x 5.3 m x 5.2 m	
		Xmas Tree with Guide Base Well B2	5.3 m x 5.3 m x 5.2 m	
		Xmas Tree with Guide Base Well B3	5.3 m x 5.3 m x 5.2 m	
		Xmas Tree with Guide Base Well B4	5.3 m x 5.3 m x 5.2 m	
		Xmas Tree with Guide Base Well B5	5.3 m x 5.3 m x 5.2 m	

2.5.4 Group 8

Group 8 is comprised of eight STL piles which remain as part of the historic location of the Apollo Spirit FSO. All eight are located in the north of the Banff Field. Amongst the eight piles, there are three different sizes. The pile dimensions are presented in Table 2-5 below and further details are available in Appendix A.6. The CA outcome determined removal with prior de-burial to be the best method. The remediation will involve internal dredging of the top of the pile in order to insert a cutting tool which will cut and recover the top of the pile, such that the remaining section of pile does not protrude above the seabed or pose a risk of doing so over time, based on seabed movement.

The piles will be recovered by winch to a CSV before being returned to shore. Once the pile structure has been removed, the area will be remediated as appropriate and under discussion with OPRED. The most likely scenario is that the dredged sediment will be backfilled into the remaining holes, however, rock placement within this footprint is assessed in this EA as a worst-case scenario.

Table 2-5 Group 8 Structures in the Banff Field

Group	Structure	Number	Dimensions (m)
8	STL pile	4	30 x 1.83
		3	24 x 1.83
		1	28 x 1.83

2.5.5 Spools, Jumpers and Other Pipeline Sections

Spools and jumpers and some surface laid sections of pipelines were considered in the CA process but early on, and in line with Regulatory guidance (BEIS, 2018), were determined for full removal. The spools, jumpers and pipeline sections will be prepared for recovery by cutting connections and they will be recovered by winch to a CSV before being returned to shore. A full inventory of these pipeline components is included in Appendix A.7.

2.5.6 Further Remediation

In addition to the remediation which will occur in association with the pipelines and potential remediation at the STL pile dredging location, there are some depressions remaining in the Banff Field which are remnants of the presence of the Petrojarl Banff FPSO. There are ten trenches which are associated with the former location of the FPSO mooring lines where they interacted with the seabed at the touchdown points. These touchdown trenches are at their deepest closest to the former location of the FPSO and have very steep (almost vertical) sides. Additionally, there are a corresponding ten depressions associated with the former FPSO anchor locations. The dimensions of these touchdown trenches and depressions are presented in Table 2-6 and Table 2-7 respectively. In both tables, the width and depth given are the maximum approximate values observed.

Table 2-6 FPSO Mooring Line Trenches

Mooring Line	Trench Start Position		Trench End Position		Length (m)	Width (m)	Depth (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)			
1	396428	6319122	396452	6319186	68	4	4
2	396440	6319087	396479	6319155	78	4	4
3	396510	6318956	396647	6318948	137	>8	8
4	396509	6318918	396678	6318872	175	>8	7
5	396385	6318841	396410	6318659	184	>8	9
6	396370	6318811	396378	6318641	170	>8	9
7	396233	6318881	396132	6318811	123	>8	7
8	396245	6318909	396111	6318853	173	>8	8
9	396275	6319043	396139	6319155	176	>8	8
10	396269	6319078	396182	6319189	141	>8	6

Table 2-7 FPSO Anchor Depressions

Mooring Line	Depression Start Position		Depression End Position		Length (m)	Width (m)[2]	Depth (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)			
1	397215	6321121	397232	6321146	30	10	1
2	397550	6320950	397567	6320973	29	10	2
3	398691	6318798	398711	6318795	20	10	2
4	398624	6318391	398640	6318392	25	10	2
5	396719	6316711	396736	6316633	80	10	4
6	396393	6316635	396389	6316595	40	10	1
7	394363	6317715	394343	6317698	26	10	2
8	394188	6318078	394118	6318045	77	10	2
9	394570	6320470	394496	6320430	91	10	2
10	394891	6320722	394869	6320762	46	10	2

The trenches and depressions are shown in the context of the wider Banff Field in Figure 2-2. The anchor depressions associated with mooring lines 1, 2, 3, 4, 9 and 10 are all located within the NCMPA. The mooring trenches associated with mooring lines 1, 2 and 3 are all located fully or partly within the NCMPA. CNRI are conducting a study of these features to determine the most appropriate method of targeted remediation and will monitor the depressions in the interim to assess change over time. The results of the study will be relayed to OPRED and a discussion will be initiated to determine the most appropriate course of action. The method of remediation is therefore yet to be determined, with the worst-case assumption involving the placement of rock to fill the dimensions of the trenches. It is possible that rock infill would not be all the way up to seabed level; this would allow for some natural backfilling by sediment to cover the rock over time. Any future remediation activities relating to the mooring trenches and anchor depressions in the Banff Field will also be covered by the applicable permitting once confirmed with OPRED.

Estimated tonnages of rock are provided in Table 2-8 which are likely to be required to remediate each of the FPSO mooring line trenches and anchor depressions (should remediation using rock be the chosen method). All estimates include a 10% contingency to account for inaccuracies within the dimensions of the scar dimensional estimates. An area of rock placement has also been calculated in Table 2-8 using the dimensions of the trenches and depressions, as presented in Table 2-6 and Table 2-7 above.

[2] The width of the scars is uncertain from the ROV footage but is unlikely to significantly exceed the width of the anchors themselves. A typical estimate of between 8 m – 10 m width is considered sufficient. In the interest of presenting a worst-case scenario, the upper end of this assumption (i.e. 10 m) has been presented here. This width is also used in the calculation of areas in Table 2-8.

Table 2-8 Rock Placement Infill and Area Estimates

Mooring Line	Rock Placement Estimate (Te)		Rock Placement Estimate (m^2)	
	Mooring Line Trenches	Anchor Depressions	Mooring Line Trenches	Anchor Depressions
1	987	218	272	300
2	1133	421	312	290
3	7957	290	1096	200
4	8894	363	1400	250
5	12023	2323	1472	800
6	11108	290	1360	400
7	6251	378	984	260
8	10048	1118	1384	770
9	10222	1321	1408	910
10	6142	668	1128	460
Subtotal	**74763**	**7391**	**10816**	**4640**
Total	**82154**		**15456**	

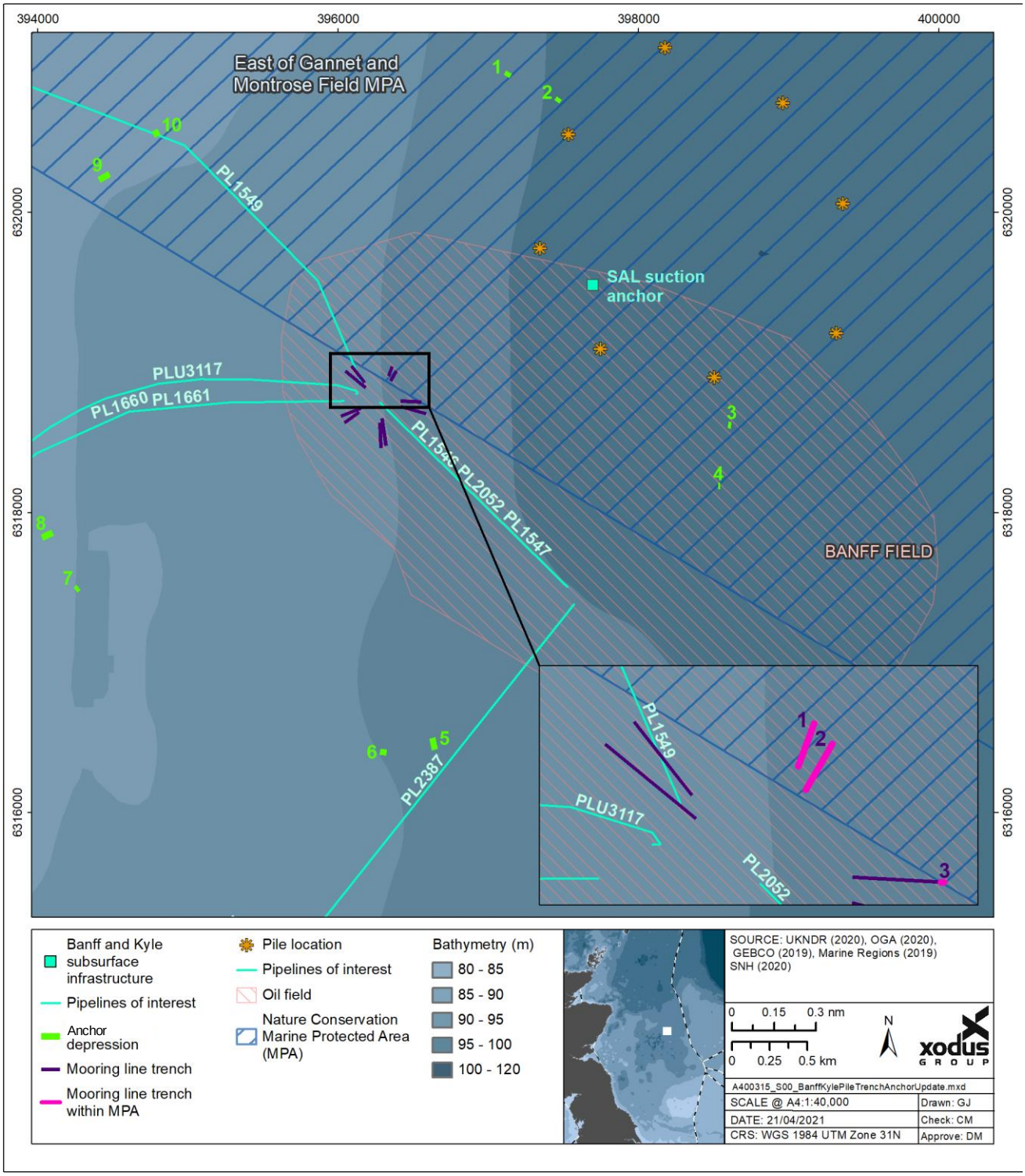


Figure 2-2 **Mooring trenches associated with the former location of the Petrojarl Banff FPSO**

2.5.7 Protection (Mattresses and Grout Bags)

All subsea protection and stabilisation infrastructure (i.e. concrete mattresses and grout bags) will be fully recovered, unless associated with third party crossings / infrastructure. There are an estimated 1,550 mattresses in the Banff and Kyle Fields, split across two different sizes; Table 2-9 provides a summary of concrete mattresses associated with the Banff and Kyle Fields. Of these, the majority (1,440) are associated with the pipelines within the Fields. The remaining 110 are associated with the subsea installations.

The number of grout bags within the Banff and Kyle Fields is also shown in Table 2-9. The number of grout bags presented is an estimate. Standard grout bag dimensions have been assumed.

Prior to their retrieval mattresses will be stacked to allow for more efficient removal. A CSV will be used to retrieve the stabilisation materials and return them to shore. Grout bags will be removed using an Orange Peel Grab.

While the intention is to fully remove all protection / stabilisation materials, with the exception of any mattresses associated with crossings, should stabilisation features not have sufficient integrity to allow for full removal CNRI shall engage with the regulator regarding alternative options.

Table 2-9 Protection Features within the Banff and Kyle Fields

Stabilisation Feature	Dimensions (m)	Total Number
Concrete Mattresses	6 x 3 x 0.15	1,340
Concrete Mattresses	6 x 3 x 0.3	210
Grout Bags (25 kg bags)	0.6 x 0.3	15,500

2.6 Summary of Material Inventory

The sections below summarise the inventory of materials associated with the subsea infrastructure to be decommissioned. Comprehensive information about the materials present within the Banff and Kyle Fields are provided.

Table 2-10 and Figure 2-3 summarise the total weight of each component's materials for the Banff and Kyle Field subsea installations.

Table 2-10 Material Inventory Associated with the Banff and Kyle Installations

Items	Description	Weight (tonnes)
Metals	Steel (all grades)	2,944.44
	Non- Ferrous (Copper, Aluminium)	9.01
Concrete	Aggregates (mattresses and grout bags)	774.25
Plastic	Rubbers, polymers	0
Hazardous	Residual Fluids (hydrocarbons, chemicals)	Trace
	NORM scale	To be determined
Other	Glass filament, Silica	0
Total for the Banff and Kyle Fields		**3,727.7**

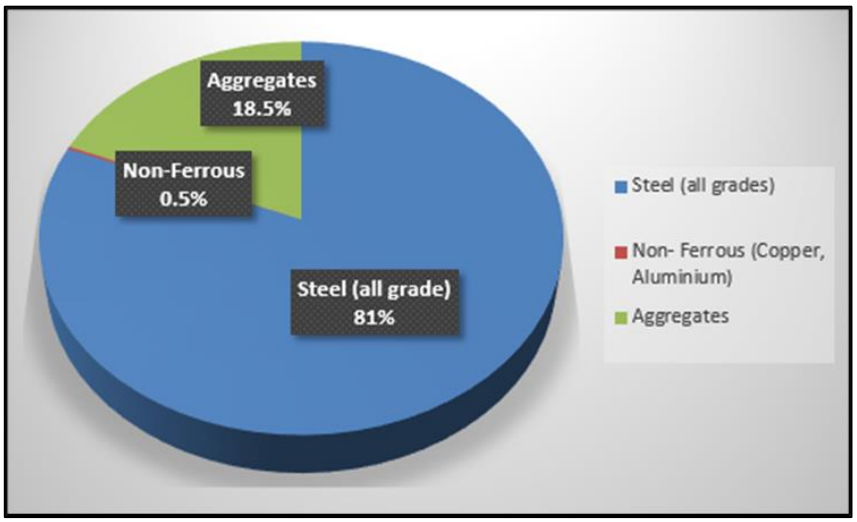


Figure 2-3 Pie chart of the estimated inventory of subsea installations (including associated stabilisation materials)

Table 2-11 and Figure 2-4 summarise the total weight of each component's materials for the Banff and Kyle Field pipelines.

Table 2-11 Material Inventory Associated with the Banff and Kyle Pipelines

Items	Description	Weight (tonnes)
Metals	Steel (all grades)	3,604.13
	Non- Ferrous (Copper, Aluminium)	370.37
Concrete	Aggregates (mattresses and grout bags)	10,496.25
Plastic	Rubbers, polymers	15.43
Hazardous	Residual Fluids (hydrocarbons, chemicals)	Trace
	NORM scale	To be determined
Other	Glass filament, Silica	Trace
Total for Banff and Kyle Field		**14,486.18**

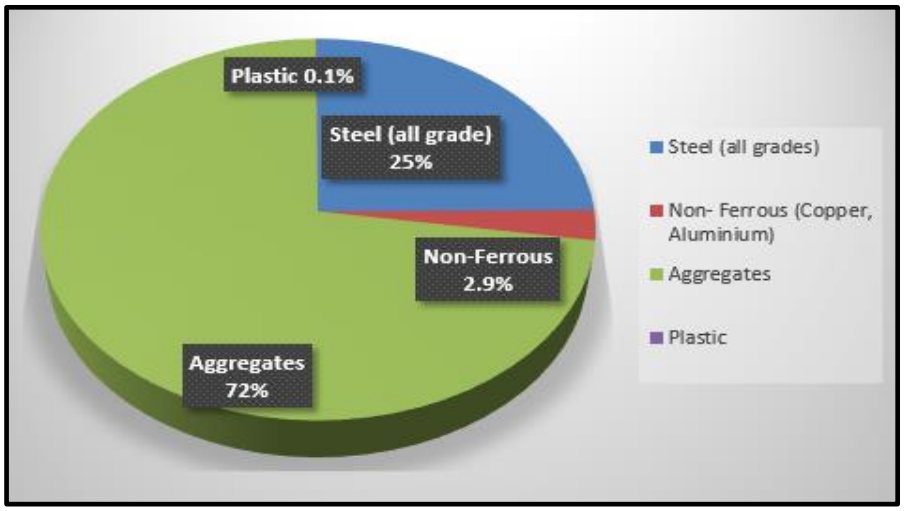


Figure 2-4 Pie chart of the estimated inventory of pipelines (including associated stabilisation materials)

2.7 Post-Decommissioning Activities

2.7.1 Clear Seabed Verification

Following the decommissioning of the Banff and Kyle Field infrastructure, it will be necessary to identify any potential snagging hazards associated with any changes to the seabed and remediate these. A clear seabed will be validated by an independent verification survey of all of the installation sites and pipeline corridors. The aim of these clean seabed verification actions is to ensure the seabed is left in a safe condition for future fishing effort, in line with the current Decommissioning Guidance (BEIS, 2018).

The survey methods will be discussed and finalised with OPRED prior to survey commencement to ensure the survey meets the requirements for clear seabed verification. Non-intrusive verification techniques will be considered in the first instance. These may include techniques which do not make contact with the seabed, such as Side Scan Sonar (SSS) and Remotely Operated Vehicle (ROV) surveys.

Where these are deemed inconclusive by the Scottish Fishermen's Federation (SFF), or where there is evidence of snagging hazards requiring intervention (e.g. any spans, berms, dropped objects, etc.), targeted overtrawling may be undertaken to ensure no residual risk of snagging remains post-decommissioning. Should overtrawling be required, it will be conducted by fishing vessel(s) using trawl gear that is appropriate for the area. Post-decommissioning surveys shall be conducted, and any debris identified shall be recovered and recycled / disposed of accordingly.

2.8 Waste Management

Waste will be dealt with in accordance with the Waste Framework Directive. The re-use of any infrastructure, spools and jumpers – or parts thereof, is first in the order of preferred decommissioning options. Options for re-use of an infrastructure, spools and jumpers – or parts thereof are currently under investigation. Waste generated during decommissioning will be segregated by type and periodically transported to shore in an auditable manner through licensed waste contractors.

Article 4 of the EU Waste Framework Directive (Directive 2008/98/EC) sets out the five steps to manage waste ranked according to environmental impact (also knowns as the waste hierarchy). In line with the waste hierarchy, the re-use of an installation (or parts thereof) is first in the order of preferred decommissioning options. CNRI will follow the principles of the waste hierarchy (Figure 2-5) in order to minimise waste production resulting from any removal of subsea infrastructure, spools and jumpers (including stabilisation materials).

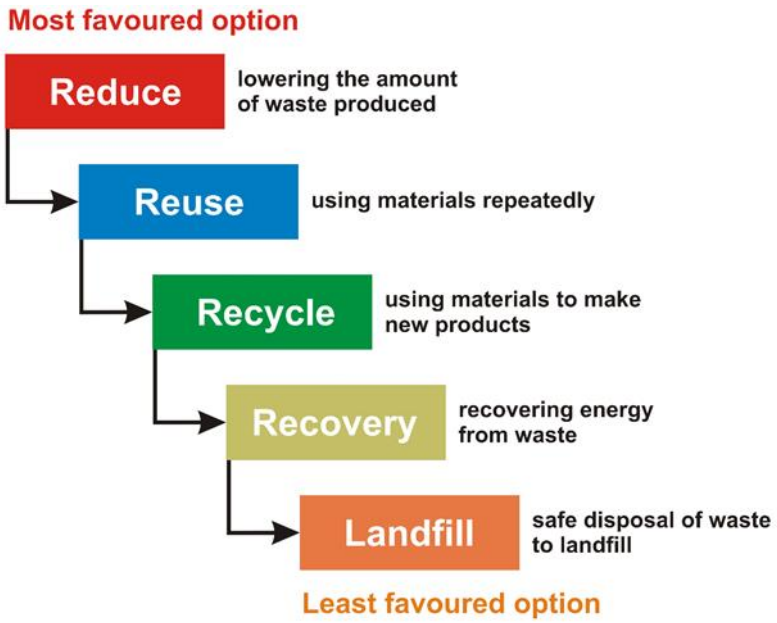


Figure 2-5 Waste hierarchy

Recovered infrastructure will be returned to shore and transferred to a suitably licenced decommissioning facility and it is expected that the recovered infrastructure will be cleaned before largely recycled.

Appropriately licensed waste management facilities will be identified through a selection process that will ensure that the chosen facilities demonstrate a proven record of waste stream management throughout the deconstruction process, the ability to deliver innovative reuse/ recycling options, and ensure the aims of the waste hierarchy are achieved.

Geographic locations of potential disposal yard may require the consideration of Trans Frontier Shipment of Waste (TFSW), including hazardous materials. Early engagement with the relevant waste regulatory authorities will ensure that any issues with TFSW are addressed before the shipment of any waste.

CNRI will engage with other companies and industries to identify potential reuse opportunities. Both companies recognise that such opportunities are best achieved through the tendering and selection of a waste management contractor with expert knowledge and experience in this area.

2.9 Environmental Management Approach

CNRI each have established and independently verified Environmental Management Systems (EMS) both of which operate in accordance with the requirements of ISO14001:2015. The scopes of the CNRI's EMS' are defined to include all activities, onshore and offshore, in relation to the exploration for and production of hydrocarbons in defined license areas of the UK sector of the North Sea. This scope encompasses the proposed Banff and Kyle Filed decommissioning. Both EMS' meets the requirements of OSPAR Recommendation 2003/5 which promotes the use and implementation of the Environmental Management System (EMS) by the offshore industry. The EMS is an integral part of both CNRI's Safety, Health and Environmental Management Systems which describes the means of compliance with SHE legislation and industry standards, and manages SHE risks in their respective businesses. Relevant to the EA, and to all of CNRI's activities, is the commitment to managing all environmental impacts associated with their 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. Signed copies of CNRI's Health and Safety Policy and Environmental Management Policy are presented in Appendix B.

3 ENVIRONMENTAL AND SOCIETAL BASELINE

3.1 Background

Information is provided here on the environmental baseline characteristics around the Banff and Kyle Fields to help inform an assessment of the features that may be affected by the proposed decommissioning operations or may have a bearing on the nature and extent of relevant impacts. The potential interactions between project activities and environmental receptors are detailed and assessed in Section 6. As the activities associated with the DP will form a presence over several years, environmental features and any relevant changes in their characteristics and sensitivities are described across the entire year.

The project scope (Section 2) and initial screening (Section 5) suggests that the majority of potentially significant environmental impacts would be felt within close proximity to the proposed development location. Therefore, environmental sensitivities are described on a local scale, with broader scale data only used where appropriate to certain ecological characteristics, such as broad scale habitat classification. Certain activities or events could potentially have more spatially extensive environmental impacts. In these instances, those environmental sensitivities that may be affected are described on a greater spatial scale.

In this regard, Section 3.3 provides an overview of all the environmental and societal sensitivities in the area. Details have been provided on the receptors most likely to be impacted by the proposed activities in the sections below. This baseline characterisation describes the current conditions of the receiving environment comprising the Banff and Kyle Fields and is considered sufficient to enable effective evaluation of the potential environmental interactions from proposed decommissioning activities.

3.2 Summary of Environmental Surveys

Pre-decommissioning surveys for habitat assessment and environmental baseline data collection were conducted in the Banff and Kyle Fields in 2020 (Fugro, 2020a, 2020b, 2020c). These surveys gathered seabed samples and imagery to acquire an understanding of the range of seabed habitats and communities present, including the potential presence of any species or habitats of conservation concern prior to the commencement of decommissioning activities. An outline of these surveys is provided in the proceeding sections.

3.2.1 Banff Habitat Assessment Report (2020)

Twelve stations were sampled within the Banff Field during this survey. The stations were arranged in a cruciform manner centred around the Banff manifold. The stations were aligned with the predominant tidal current direction. Photographic data was collected along 20 m transects positioned at each sampling station. The sediment samples were taken at depths ranging from 89 to 96 m (Fugro, 2020a). This survey aimed to assess the possible presence of marine Annex I habitats in the Banff Field, as well as PMFs, OSPAR threatened and / or declining species and habitats, and Priority Species and Habitats (UKBAP).

3.2.2 Kyle Habitat Assessment Report (2020)

Twenty-four stations were sampled across the Kyle survey area. Twelve sites were arranged in a cruciform pattern around both the Kyle North and Kyle South drill centres. A total of three survey transects were undertaken; one at Kyle North and a further two at Kyle South. The maximum sample depth at Kyle North was 96 m, at Kyle South the maximum depth was 92 m (Fugro, 2020b). This survey, as above, aimed to assess the possible presence of protected marine habitats within the Kyle Field.

3.2.3 Environmental Pre-Decommissioning Report: Banff and Kyle (2020)

The Banff and Kyle Habitat Assessment Reports were conducted as part of, and contributed to, the overall Environmental Pre-Decommissioning Report (Fugro, 2020c) therefore the survey strategy reflects that which is described in Sections 3.2.1 and 3.2.2 above. In addition to benthic faunal identification, this survey investigated the sediment chemical findings across the Fields and provides information regarding the presence of any historical drill cuttings.

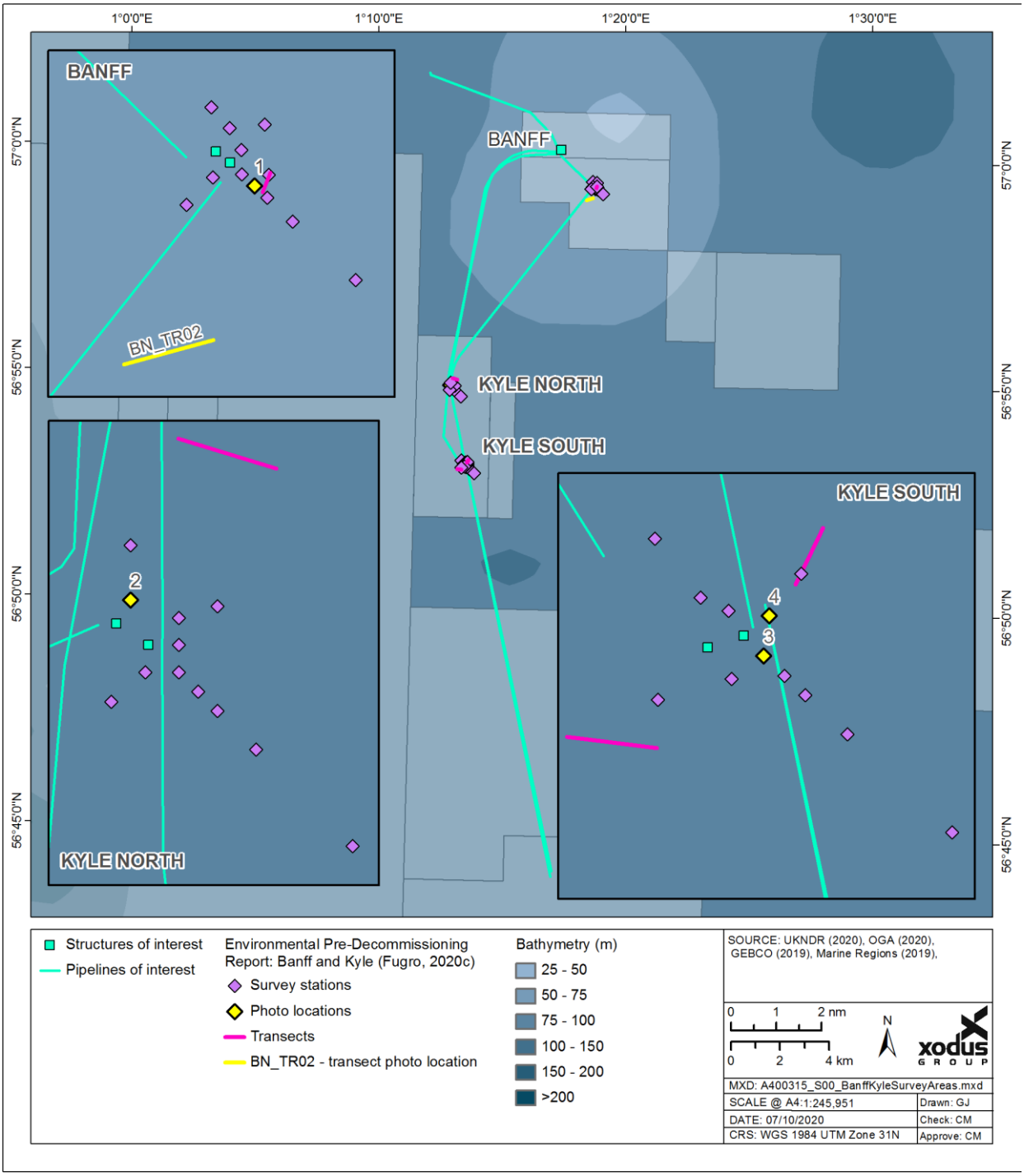


Figure 3-1 **Survey coverage within the Banff and Kyle Fields**

3.3 Baseline Summary

The baseline environmental and societal receptors within the project area are summarised in Table 3-1. For most receptors, the information provided in the table is considered sufficient to inform the environmental assessment of potential impacts within this EA. Receptors identified during the Environmental Identification (ENVID; the process of which is described in Section 4) and consultation meetings as of specific interest to stakeholders included the seabed and benthic environment, conservation sites and species, and commercial fisheries. These sensitive receptors are discussed in more detail in the subsequent sections (within Section 3.4).

Table 3-1 Summary of Environmental and Societal Receptors

Environmental Receptor	Description
Conservation Interests (will be addressed in greater depth in Section 3.4.1)	
OSPAR (2008) List of Threatened and / or Declining Species and Habitats	
Ocean quahog	No adult ocean quahog (*A. islandica*, >1 cm) were recovered within either of the Banff or Kyle surveyed areas. Furthermore, the presence of ocean quahog siphons was not observed in any of the survey footage (Fugro, 2020a, 2020b). However, the species and its associated habitat is one of the reasons for the designation of the East of Gannet and Montrose Fields NCMPA, within which the Banff Field is partially located.
Seapens and burrowing megafauna communities	This habitat was present within both the Banff and Kyle Field survey areas. According to the SACFOR classification, the seapen *P. phosphorea* ranged from 'occasional' to 'common' during the Banff survey. *V. mirabilis* was 'frequent' at one station and 'absent' at all others. Faunal burrows between 3-15 cm were either 'frequent' or 'common' at the four sites where they were present (Fugro, 2020a). Faunal burrows sized 3-15 cm were considered either 'common' or 'frequent' at all Kyle North sites. At Kyle South the SACFOR classification of faunal burrows was 'common' at all but one site which was considered 'abundant'. Burrows >15 cm were 'absent' at all stations and 'frequent' along both visual transects (Fugro, 2020b). Both 'Burrowed mud' and 'Seapens and burrowing megafauna in circalittoral fine mud' are also considered PMFs.
Other conservation interests	
Annex I habitats	No Annex I Habitats were identified in any of the site-specific surveys.
Conservation Sites (will be addressed in greater depth in Section 3.4.2)	
SAC	The nearest SAC is the Scanner Pockmark SAC (~140 km north of Banff and ~151 km from Kyle). It is designated for the presence of Annex I feature 'Submarine structures made by leaking gases'.
NCMPA	The Banff Field is partly located within the East of Gannet and Montrose Fields NCMPA. The site is ~10 km due north of the Kyle Field. The site is designated for the protection of ocean quahog aggregations and deep-sea muds.
MCZ	The Fulmar MCZ is located ~50 km southeast of the Kyle Field (and ~60 km from the Banff Field). The site is designated for Subtidal mixed sediments, Subtidal sand, Subtidal mud and ocean quahog aggregations.
Conservation Species (will be addressed in greater depth in Section 3.4)	
Coastal and Offshore Annex II species most likely to be present in the project area	
Pinnipeds – grey and harbour seals	About 38% of the world population of grey seal *Halichoerus grypus* occur in the UK, with 88% of the UK population breeding in Scotland. Most of the grey seal population will be on land from October to December during the breeding season, and in February and March during the annual moult, therefore densities at sea are likely to be lower at these times of the year (DECC, 2016). The density of grey seals within the Banff and Kyle fields is 0-1 individuals per 25km^2 (Russell *et al.*, 2017). Harbour seals *Phoca vitulina* are also concentrated in Scotland, where 79% of the UK population live and / or breed (Jones *et al.*, 2013). Harbour seals generally haul out on

Environmental Receptor	Description
	tidally exposed areas of rock, sandbanks or mud. Pupping season is between June and July, and the moult occurs in August and September, therefore from June to September harbour seals are on shore more often than at other times of the year (DECC, 2016). The predicted density of harbour seals within the Project area is very low, 0-1 animal per 25km^2 (Russell *et al*., 2017).
European Protected Species (EPS) most likely to be present in the project area	
Harbour porpoise	Harbour porpoise (*Phocoena phocoena*) are amongst the most frequently observed cetacean species in the North Sea, seen throughout the year (Reid *et al*., 2003). They have been spotted at the Project location in the months of May, July, August, September. The predicted density of harbour porpoises in the vicinity of the Project area is moderate-high compared to the rest of the UK waters, with an estimate of around 0.59 animals per km^2 (Hammond *et al.*, 2017). They are also listed as a UK Biodiversity Action Plan (BAP) species.
Atlantic white-sided dolphin	Atlantic white-sided dolphins (*Lagenorhynchus acutus*) live mainly in cool waters (7-12°C), particularly seaward or along the edges of the continental shelf in depths of 100-500 m (Reid *et al*., 2003). However, the species can also be numerous in much deeper, oceanic waters. They are found in deep waters around the north of Scotland throughout the year but enter the North Sea mainly in the summer (Reid *et al*., 2003; Hammond *et al*., 2017). Within the Project area, white-sided dolphins have been observed in July. Their density is estimated to be 0.01 animals per km^2, which is high in comparison with other areas of the UK (Hammond *et al*., 2017). They are also listed as a UK BAP species.
Short-beaked common dolphin	Short-beaked common dolphins (*Delphinus delphis*) favour deep water habitats out of all the common dolphin species found globally. In north-west European waters they are usually observed in groups of six to ten, though large schools (>100) have been observed frequently. They have been observed in the Project vicinity in August (Reid *et al*., 2003). They are so infrequently observed in the region of the Project that estimates of their abundance have not been made. They are also listed as a UK BAP species.
Minke whale	Minke whales (*Balaenoptera acutorostrata*) occur in water depths of 200 m or less throughout the northern North Sea and CNS. They are usually sighted in pairs or in solitude; however, groups of up to 15 individuals can be sighted feeding. It appears that animals return to the same seasonal feeding grounds (Reid *et al*., 2003). They have been observed in May and July in the Project area. Their density is predicted to be 0.04 animals/km^2 which is the highest across all areas surveyed (Hammond *et al*., 2017). They are also listed as a UK BAP species.
White-beaked dolphin	White-beaked dolphins (*Lagenorhynchus albirostris*) are found mostly in continental shelf waters with depths between 50 m and 100 m, and rarely out to the 200 m isobath (Reid *et al*., 2003). White-beaked dolphins are usually found in groups of around 10 individuals, although large groups of up to 500 animals have been seen. They may be found in the Project area throughout much of the year with peaks in summer; they have been observed in February, July, August, September, October, and November. The species are roughly estimated to have a density of 0.24 animals/km^2 near the Project area (Hammond *et al*., 2017). They are also listed as a UK BAP species.
Benthic Environment (will be addressed in greater depth in Section 3.4.1)	
Seabed composition	The Banff Field is located partly within A5.27 'Deep circalittoral sand', and also within an area of A5.37 'Deep circalittoral mud'. The Kyle Field is almost exclusively located within A5.37 'Deep circalittoral mud'. Directly to the south of the Banff Field is a small patch of A5.15 'Deep circalittoral coarse sediment' (EMODnet, 2019). Side-scan sonar (SSS) data revealed regions of seabed which had higher sonar reflectivity corresponded with regions of A5.44 'Circalittoral mixed sediment' in the Banff Field (Fugro, 2020a).

Environmental Receptor	Description
	Though no cuttings piles are evident in the project area, sediment contamination levels indicate the presence of historic piles. Drilling fluid inputs were evident at some of the locations within the Banff and Kyle Fields (Fugro, 2020c).
Benthic fauna	Benthic fauna was much the same between the Banff and Kyle Fields. The dominant taxa observed within both the sandy and mixed substrate at the Banff Field, were sea pens (*Pennatula phosphorea*), hermit crabs (Paguridae) and anemones (Actiniaria including *Hormathiidae* and *Epizoanthus papillosus*) (Fugro, 2020a). Sea urchins (*Gracilechinus acutus*) were additionally amongst the dominant species within the Kyle Field (Fugro, 2020b). Bioturbation was evident across both survey areas (Fugro 2020a, 2020b).
Fish – spawning and nursery grounds	
Spawning grounds	The project area is located within the high intensity spawning grounds of mackerel (*Scomber scombrus*) and Norway pout (*Trisopterus esmarkii*) as well as the spawning grounds of cod (*Gadus morhua*), lemon sole (*Microstomus kitt*) and sandeel (*Ammodytidae sp.*) (Coull *et al.*, 1998; Ellis *et al.*, 2012).
Nursery grounds	The following species have nursery grounds in the vicinity of the project area: anglerfish (*Lophius piscatorius*), blue whiting (*Micromesistius poutassou*), cod, European hake (*Merluccinus merluccinus*), haddock (*Melanogrammus aeglefinus*), herring (*Clupea harengus*), ling (*Molva molva*), mackerel, Norway pout, plaice (*Pleuronectes platessa*), sandeel, spurdog (*Squalus acanthias*) and whiting (*Merlangius merlangus*) (Coull *et al*., 1998; Ellis *et al*., 2012). Fisheries sensitivity maps indicate that the probability of significant aggregations of juveniles of these species in the project area is low (Ellis *et al.*, 2012).
Probability of juvenile fish aggregations	Aires *et al.* (2014) provides modelled spatial representations of the predicted distribution of 0 age group fish. The modelling indicates the presence of juvenile fish (less than one year old) for multiple species: anglerfish, blue whiting, European hake, haddock, herring, mackerel, horse mackerel (*Trachurus trachurus)*, Norway pout, plaice, sprat (*Sprattus sprattus*), and whiting. Across the project area, the probability of juvenile fish aggregations occurring is low for all species (<0.15).
Seabirds	
According to the density maps provided in Kober *et al.* (2010), the following species could be found within the project area: northern fulmar (*Fulmarus glacialis)*, Manx shearwater (*Puffinus puffinus)*, European storm-petrel (*Hydrobates pelagicus),* northern gannet (*Morus bassanus)*, Arctic skua (*Stercorarius parasiticus)*, great skua (*Stercorarius skua)*, black-legged kittiwake (*Rissa tridactyla)*, great black-backed gull (*Larus marinus)*, common gull (*Larus canus)*, lesser blackbacked gull (*Larus fuscus)*, herring gull (*Larus argentatus)*, Arctic tern (*Sterna paradisaea)*, common guillemot (*Uria aalge)*, razorbill (*Alca torda)*, little auk (*Alle alle)*, Atlantic puffin (*Fratercula arctica)* and pomarine skua *(Stercorarius pomarinus)*. Seabird Oil Sensitivity Index (SOSI) identifies areas at sea where seabirds are likely to be most sensitive to surface pollution (Webb *et al.*, 2016). Seabird vulnerability in Blocks 22/27, 29/2 and 29/7 is low throughout the year with no data for November. Block 29/11 experiences a Very High SOSI value in the months of September and October (Webb *et al.*, 2016). The risk of an oil spill from the proposed operations in the project area is considered remote and therefore the overall risk to birds is considered negligible.	

Environmental Receptor	Description

Seabird Oil Sensitivity Index

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
22/21	5	5*	5	5*	5*	5	5	5	5	5*	N	5*
22/22	5	5	5	5*	5*	5	5	5	5	5*	N	5*
22/23	5	5	5	5*	5*	5	5	5	5	5*	N	5*
22/26	5	5*	5	5*	5*	5	5	5	5	5*	N	5*
22/27	5	5*	5	5*	5*	5	5	5	5	5*	N	5*
22/28	5	5	5	5*	5*	5	5	5	5	5*	N	5*
29/1	5	5	5	5*	5*	5	5	5	5	5*	N	5*
29/2	5	5	5	5*	5*	5	5	5	5	5*	N	5*
29/3	5	5	5	5*	5*	5	5	5	5	5*	N	5*
29/6	5	5	5	5*	5*	5	5	5	5	5*	N	5*
29/7	5	5	5	5*	5*	5	5	5	5	5*	N	5*
29/8	5	5	5	5*	5*	5	5	5	5	5*	N	5*
29/11	5	5	5	5*	5*	5	5	5	2	2*	N	5*
29/12	5	5	5	5*	5*	5	5	5	5	5*	N	5*
29/13	5	5	5	5*	5*	5	5	5	5	5*	N	5*

Key	1 = Extremely high	2 = Very High	3 = High	4 = Medium	5 = Low	N = No data
	*in light of coverage gaps, an indirect assessment of SOSI has been made					

Commercial Fisheries (will be addressed in greater depth in Section 3.4.3)

The Banff and Kyle Fields lie in International Council for the Exploration of the Seas (ICES) Rectangles 42F1 and 43F1 (Scottish Government, 2020).

The waters comprising the Banff and Kyle are fished for a variety of species by both UK and foreign vessels. ICES rectangle 42F1 has predominantly been targeted for shellfish in recent years, whilst the adjacent ICES rectangle 43F1 experiences a much greater amount of demersal fishing. Shellfish species caught in ICES rectangle 42F1 comprised >50% of the total landings live weight in 2019 and constituted over five times the average live weight of shellfish landings in 43F1 (between 2015 and 2019; Scottish Government, 2020). The total annual landings for the Banff and Kyle Area (ICES rectangles 42F1 and 43F1) were ≤1% of the total landings within the UKCS for each of the five most recent fishing years (Scottish Government, 2020).

In 2019 fishing effort in ICES rectangle 42F1 was highest for January, March and November (45, 42 and 42 days respectively), together accounting for 51% of the total number of days fished. Overall effort was low for 42F1 (Scottish Government, 2020). Comparatively, fishing effort in ICES rectangle 43F1 is much lower. In 2019, effort was highest in January (only 6 days), accounting for 21% of the total number of days fished, with the other disclosive months contributing for the remaining fishing effort (Scottish Government, 2020).

Trawls were the most utilised gear in rectangle 42F1 and 43F1. In total, trawls contributed 99% of the total fishing effort in rectangle 42F1. In rectangle 43F1 approximately 86% of total fishing effort was from trawls with the remainder being attributed to seine nets (Scottish Government, 2020).

<table>
<tr><th colspan="2">Other Sea Users</th></tr>
<tr><td>Shipping</td><td>The Banff and Kyle Fields are in areas of low or very low shipping intensity (OGA 2016).</td></tr>
<tr><td>Oil and gas</td><td>The Banff and Kyle Fields are in a mature area of the CNS with extensive oil and gas development. Adjacent oil and gas surface infrastructure within 40 km are as follows
<table>
<tr><th>Installation name</th><th>Installation type</th><th>Operator</th><th>Distance</th></tr>
<tr><td>Gannet A</td><td>Platform</td><td>Shell UK</td><td>27 km NW</td></tr>
<tr><td>Triton</td><td>FPSO</td><td>Dana Petroleum</td><td>26 km W</td></tr>
<tr><td>Elgin</td><td>Platform</td><td>Total</td><td>32 km E</td></tr>
<tr><td>Franklin</td><td>Platform</td><td>Total</td><td>30 km E</td></tr>
<tr><td>Shearwater</td><td>Platform</td><td>Shell UK</td><td>39 km E</td></tr>
</table></td></tr>
<tr><td>Telecommu-nication</td><td>There are no active cables in the vicinity of Banff and Kyle. However, the North Sea Link electricity interconnector between Norway and the UK is currently under construction. The planned cable passes ~2 km from the Kyle Field and will cross the disused Kyle South to Curlew production pipeline. The cable will be operational by 2021 (North Sea Link, 2020).</td></tr>
<tr><td>Military activities</td><td>There are no designated areas for military activities in the vicinity of Project area. There are no known military restrictions on Blocks 22/27, 29/2 and 29/7 (NMPi, 2020).</td></tr>
<tr><td>Renewables</td><td>The closest renewables site is ~54 km from the Kyle Field (NMPi, 2020).</td></tr>
<tr><td>Wrecks</td><td>There are two unknown wrecks approximately 3.5 km NW and 6.7 km due west of the Banff Field respectively. The (possible) wreck of the Ternacia motor trawler is located ~3.7 km due south of the Banff Field. Another unknown wreck is located <1 km from the Curlew Field. Neither of these wrecks are listed as dangerous (NMPi, 2020).</td></tr>
</table>

3.4 Sensitive Receptors

3.4.1 Seabed

3.4.1.1 *Habitats and Benthos*

Much of the seabed of the CNS is categorised as EUNIS habitat type A5.27 'Deep circalittoral sand'. The Banff field is located partly within A5.27 'Deep circalittoral sand', and also within an area of A5.37 'Deep circalittoral mud'. Directly to the south of the Banff field is a small patch of A5.15 'Deep circalittoral coarse sediment' (EMODnet, 2019). Survey data confirmed the main sediment type in the Banff field to be EUNIS broad habitat A5 'Sublittoral sediment'. This habitat produces low sonar reflectivity when subjected to side scan sonar (SSS). Regions of seabed which had higher sonar reflectivity were determined to be habitat type A5.44 'Circalittoral mixed sediment' (Fugro, 2020a).

In contrast, the Kyle field is almost exclusively located within A5.37 'Deep circalittoral mud' (EMODnet, 2019). Survey data categorised it as EUNIS broad habitat A5 'Sublittoral sediment' and determined that the sediment type was homogenous between both the North and South Kyle locations (Fugro, 2020b). Figure 3-2 presents images taken during surveys which show the seabed type. Each image is numbered and corresponds to a location marked on Figure 3-1.

The dominant taxa observed during video surveys within both the sandy and mixed substrate at the Banff field, were sea pens (*P. phosphorea*), hermit crabs (Paguridae) and anemones (Actiniaria including *Hormathiidae* and *Epizoanthus papillosus*). Other fauna included sea urchins (Echinoidea including *Gracilechinus acutus*), nudibranchs (Nudibranchia), starfish (Asteroidea including *Asterias rubens* and *Astropecten irregularis*), brittlestars (Ophiuroidea), crabs (Brachyura), soft coral (*Alcyonium digitatum*), sea cucumber (*Psolus spp.*), sea snail (Naticidae), sea pens (*V. mirabilis*), worms (Polychaeta), sponges (Porifera), squat lobster

(Galatheoidea), anemones (Ceriantharia) and faunal turf (Hydrozoa / Bryozoa) (Fugro, 2020a). Some evidence of calcareous tube worms (Serpulidae) was additionally observed in the Banff Field.

The observed benthos associated with the Kyle field was very similar however, sea urchins (*Gracilechinus acutus*) were considered amongst the dominant species within the field (Fugro, 2020b). Bioturbation, which includes faunal tracks, burrows and mounds, was evident across both Fields (as visible in Figure 3-2; Fugro 2020a, 2020b). While these burrows did not indicate the presence of Norway lobster (*Nephrops norvegicus*), they do indicate the possible presence of OSPAR listed threatened and / or declining habitat 'Sea pen and burrowing megafauna communities'.

According to JNCC (2014a) guidance, the key determinant for classification of 'Sea pen and burrowing megafauna communities' is the presence of burrowing species or burrows at a minimum SACFOR density of 'frequent'. According to the SACFOR classification, the presence of *P. phosphorea* ranged from 'occasional' to 'common' across the sites sampled during the Banff survey. *V. mirabilis* was 'frequent' at one station and 'absent' at all others. Faunal burrows between 3-15 cm in size were 'absent' at nine of 13 stations. At the remaining stations they were recorded as either 'frequent' or 'common' (Fugro, 2020a). Sea pens (mostly *P. phosphorea*) are clearly visible in the images in Figure 3-2, as are the faunal burrows indicative of the OSPAR habitat.

Faunal burrows sized 3-15 cm were recorded at all stations and transects within the Kyle North site. Using the SACFOR classification this was considered either 'common' or 'frequent'. Faunal burrows sized 3-15 cm were recorded at all stations and transects within the Kyle South site. The SACFOR classification of faunal burrows here was 'common' at all but one site which was considered 'abundant'. Faunal burrows >15 cm were 'absent' at all stations and 'frequent' along the visual transects within the Kyle South site (Fugro, 2020b).

231 benthic taxa were counted at Banff and 230 at both Kyle North and South. The dominant taxa which were identified in the survey samples were common to this region of the North Sea. Just over 40% of the taxa counted in the Banff and Kyle Fields were annelids each time (Fugro, 2020c). The polychaetes *Paramphinome jeffreysii* and *Galathowenia oculata* were the most abundant taxa across all areas surveyed. Other dominant taxa included the annelid polychaetes *Ampharete falcata*, *Pholoe assimilis*, *Spiophanes bombyx*, *S. kroyeri*, *Pseudopolydora* A, *Galathowenia fragilis*, the bivalve molluscs *Axinulus croulinensis* and *Adontorhina similis* and the lophophore *Phoronis*. Ocean quahog are another OSPAR listed threatened and / or declining species. Samples taken during the surveys of both the Banff and Kyle Fields did not contain any adult specimens (>1 cm). Video footage taken during both surveys also did not identify any siphons of the species (Fugro, 2020a, 2020b). While no adult *A. islandica* were found, juveniles were found in all but one of the macrofaunal samples ranging between 1 and 22 juveniles per 0.1 m^2. These dominant taxa are common to this region of the North Sea (Fugro, 2020c). Based on these findings, it is unlikely that ocean quahog exist in aggregations within the Fields.

Fish observed in survey footage of both Fields included flatfish (Pleuronectiformes including *Glyptocephalus cynoglossus*), Norway pout (*Trisopterus esmarkii*), gadoid fish (Gadidae), cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), gurnard (Triglidae), and hagfish (*Myxine glutinosa*; Fugro, 2020c). Norway pout is listed as a Scottish Priority Marine Feature (PMF).

Figure 3-2 Survey images from the Banff and Kyle Fields

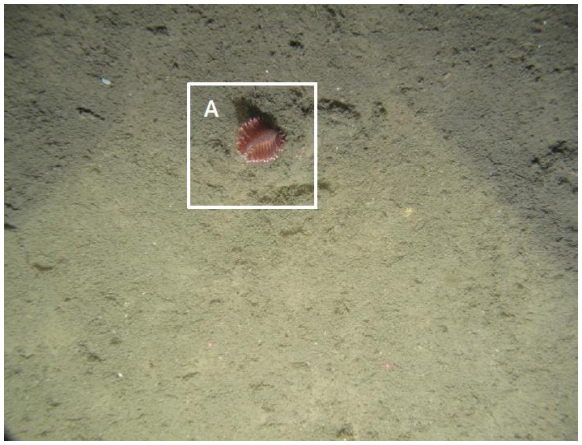


Photo 1

Sediment type:

Muddy sand / sandy mud with shell fragments

Fauna:

A. Sea pen (*P. phosphorea*)

Photo 2

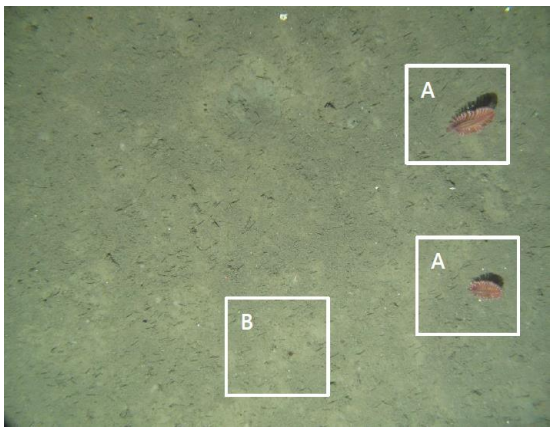
Sediment type:

Muddy sand / sandy mud with shell fragments

Fauna:

A. Sea pen (*P. phosphorea*)

B. Anemone (Ceriantharia)



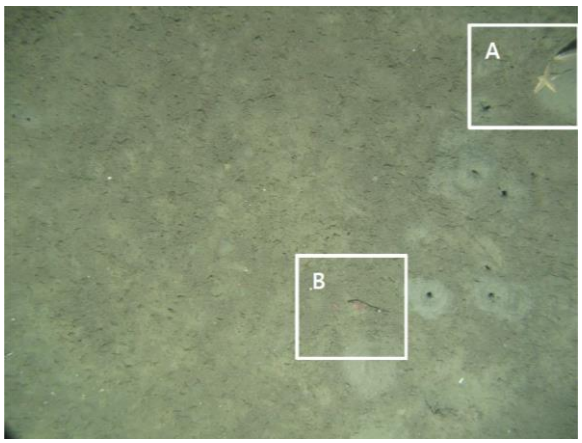


Photo 3

Sediment type:

Muddy sand / sandy mud with shell fragments

Fauna:

A. Sea pen (*Virgularia mirabilis*) and starfish (*Astropecten irregularis*)

B. Dragonet (*Callionymus* spp.)

Faunal burrows

Photo 4

Sediment type:

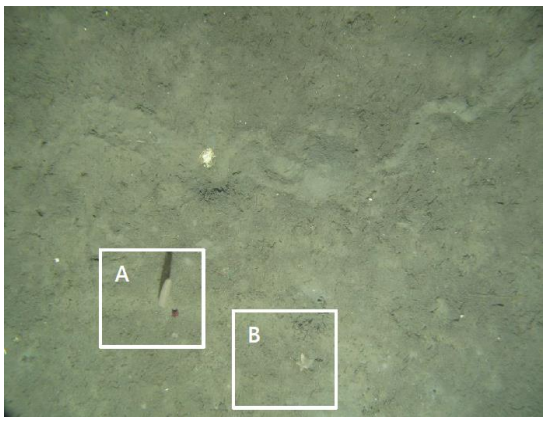
Muddy sand / sandy mud with shell fragments

Fauna:

A. Sea pen (*Pennulata phosphorea* and *Virgularia mirabilis*)

B. Starfish (*Astropecten irregularis*)

Faunal tracks



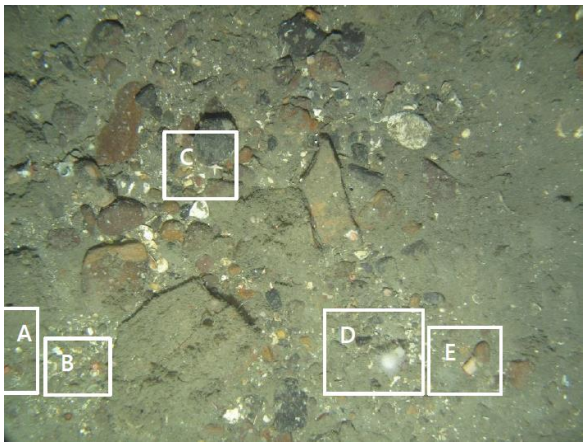


Photo from Transect BN_TR02

Sediment type:

Muddy sand / sandy mud with gravel and cobbles

Fauna:

A. Squat lobster (Galatheoidea)

B. Sea cucumber (*Psolus* spp.)

C. Starfish (Asteroidea)

D. Soft coral (*Alcyoniumdigitatum*)

E. Anemone (Hormathiidae)

Faunal turf (Hydrozoa / Bryozoa)

3.4.1.2 *Physical Composition*

Within the Banff Field, sand was the dominant sediment fraction, contributing on average 84.59% to samples. Fines content ranged from 9.92% to 22.53%, with a mean of 14.90%. Gravel content ranged from 0.00% to 4.48%, with a mean of 0.51% (Fugro, 2020c). Sand content at Kyle North had a mean of 88.33% across samples. Fines content ranged from 9.06% to 13.57% at station, with a mean of 11.59%. Gravel content was very low within all samples (<1.00%). At Kyle South sand content had a mean of 84.31%. Fines content ranged from 11.55% to 21.01%, with a mean of 15.51%. The gravel content of samples was always <1.00% (Fugro, 2020c). At most stations sampled within both the Banff and Kyle Fields, the fines content was consistent with the CNS mean background fines concentration (17.38%), only occasionally exceeding the norm (Fugro, 2020c). Based on the content of fines, sand and gravel the sediment within both fields was predominantly classed as muddy sand.

3.4.1.3 *Chemical Composition*

Sediments across both the Banff and Kyle Fields had a low organic carbon content. Total hydrocarbon content (THC) values at Kyle North and Kyle South were generally comparable to, or below the average background concentration typical of the CNS. THC levels at Banff had a mean of 22.5 µg/g and were generally higher than the levels recorded at Kyle North and Kyle South. THC at Banff exceeded the OSPAR 50 parts per million (ppm) ecological effects threshold at one sampled station (109 ppm was recorded). The highest THC levels recorded at Banff correlated with stations where oil-based mud inputs were detected (presented in Figure 3-3, taken from Fugro, 2020c). This THC distribution indicates the presence of historic cuttings piles. It is not possible to determine the spread of this THC distribution to a higher resolution; however it is possible that this is an anomaly linked to the predominant south-easterly currents and associated movement of sediment (and hydrocarbons) away from the site of the Banff drill-centre. Polycyclic aromatic hydrocarbon (PAH), polychlorinated biphenyl (PCB) and bioavailable metals were all found in concentrations equivalent to, or below, what is typical of the CNS. Barium levels did indicate some dispersion of drilling muds around the Banff, Kyle North and South drill centres, however, where chemical parameters were elevated, there was limited evidence to suggest this had a negative impact on the macrofaunal community (Fugro, 2020c).

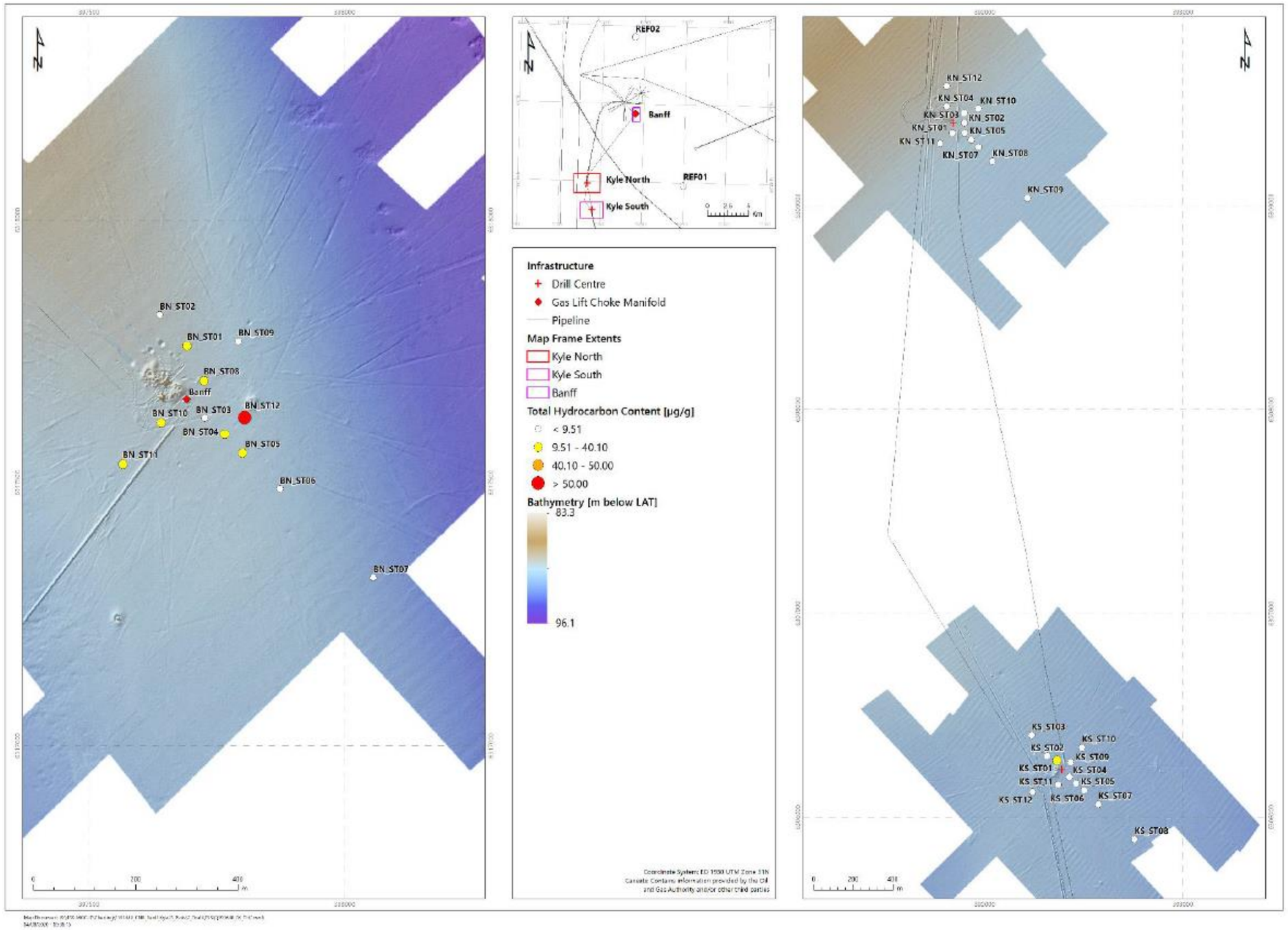


Figure 3-3 **Spatial distribution of THC at Banff and Kyle (from Fugro, 2020c)**

3.4.2 Conservation Sites

3.4.2.1 *Offshore Conservation*

The Banff Field is partly located within the East of Gannet and Montrose Fields NCMPA. The NCMPA is located within a shallow sediment plain where the seabed is dominated by sands and gravels, the preferred habitat for ocean quahog. Both the species and their supporting habitat are one of the reasons for the area's designation. The clam species are usually found beneath the surface of sandy sediments and filter food from the water. As they can live for over 400 years, they are amongst the longest living creatures on Earth (JNCC, 2017). The aggregations are mostly located along the eastern extent of the site (JNCC, 2014b). None were identified during the Banff and Kyle surveys (see Section 3.4.1).

The area is also designated for the presence of offshore deep-sea muds. The NCMPA hosts one of the few examples of coherent Atlantic-influenced offshore deep-sea mud habitat. The deep-sea muds occur in a 2–7 km wide band, which is approximately 100 m deep, and runs from the south-east to the north-west along the southern border of the NCMPA (JNCC, 2017).

The Conservation Objectives for the East of Gannet and Montrose Fields NCMPA are for the features to remain in favourable condition or, if they are not in such a condition, to be brought into it (JNCC, 2018a). All other offshore protected sites are located >100 km from the Banff and Kyle Fields. Figure 3-4 shows the location of the Banff and Kyle Fields in relation to the conservation areas in the region.

3.4.2.2 *Onshore Conservation*

The Buchan Ness to Collieston Coast SPA is the nearest onshore conservation site to the Banff and Kyle fields. The site is designated for breeding seabird assemblages, including the following species: fulmar, guillemot, herring gull, kittiwake, and shag (SNH, 2017). However, as it is located ~191 km from the Banff field and ~189 km from the Kyle field, the decommissioning activities are unlikely to have an impact on this site.

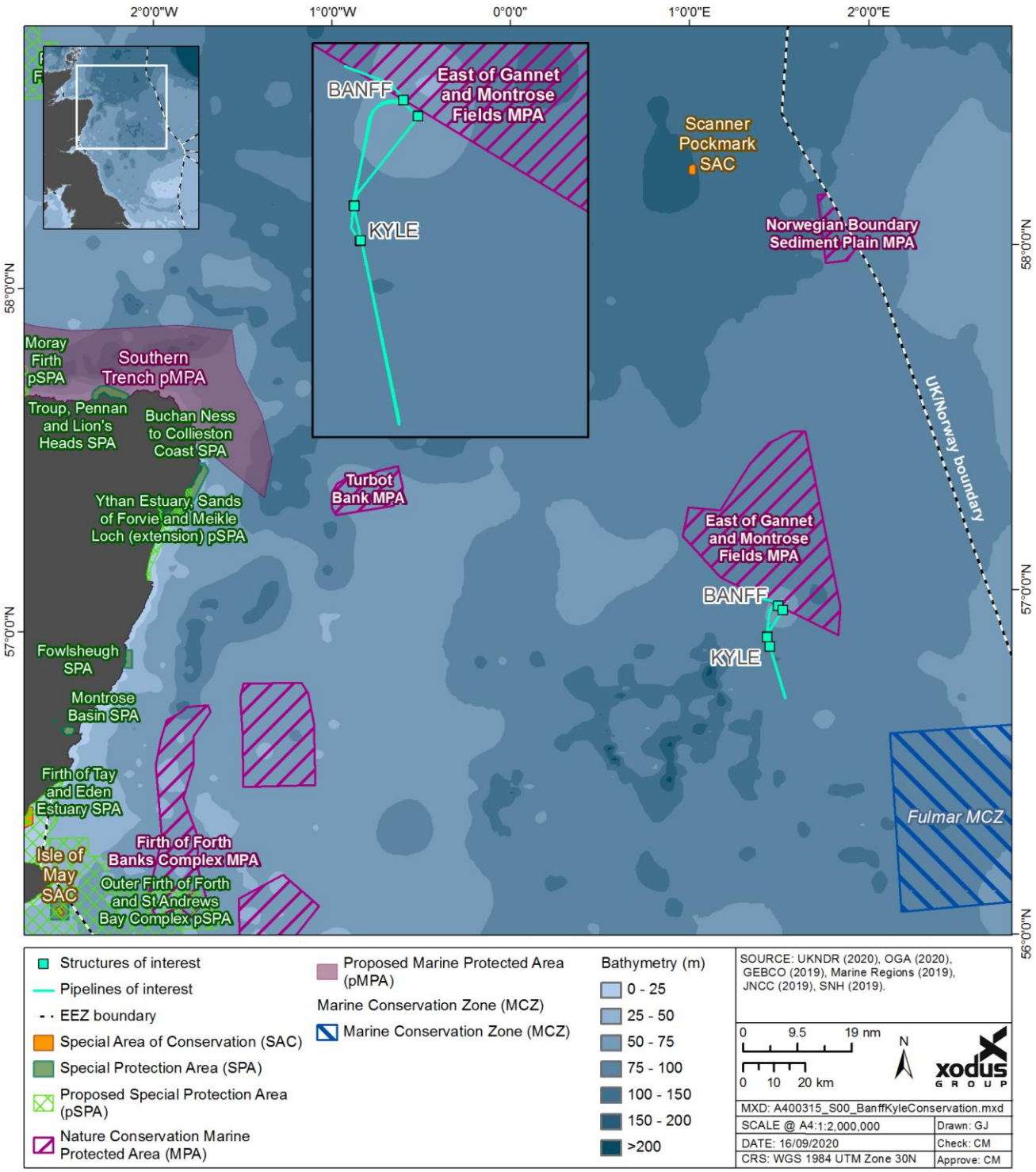


Figure 3-4 **Conservation sites in the vicinity of the Banff and Kyle Fields**

3.4.3 Other Users: Commercial Fisheries

This section describes the type of fishing vessels occurring in the area, the weight and value of fish landed and the fishing effort in the study area over the period 2015 to 2019 in context with the rest of the UKCS. The study area considered to be relevant for the decommissioning activities is shown in relation to the ICES rectangles, 42F1 and 43F1 (Table 3-2 and Table 3-3).

According to fishing data from the Scottish Government (2020), the waters surrounding the Banff and Kyle infrastructure are fished for a variety of species by both UK and foreign vessels. ICES rectangle 42F1 has predominantly been targeted for shellfish in recent years, whilst the adjacent ICES rectangle 43F1 is mostly targeted for demersal fishing (Table 3-2). For the period 2015-2019 inclusive, the total landings value was greater in ICES rectangle 42F1 than 43F1 by £2,383,217, and the live weight of those landings were greater by approximately 694 Te (Table 3-2).

This observation reflects the dramatically larger tonnage of shellfish species caught in ICES rectangle 42F1, comprising >50% of the total landings live weight in 2019, and constituting over five times the average live weight of shellfish landings in 43F1 (between 2015 and 2019; Table 3-2). The total annual landings for the Banff and Kyle Area (ICES rectangles 42F1 and 43F1) were ≤1% of the total landings within the UKCS for each of the five most recent fishing years (Scottish Government, 2020).

Total fishing effort in ICES rectangle 42F1 amounted to 251 days in 2019 (Table 3-4). In 2019 fishing effort in ICES rectangle 42F1 was highest for January, March and November (45, 42 and 42 days respectively), together accounting for 51% of the total number of days fished. Only the summer months of May, June and August had fishing effort recorded as disclosive. Overall, this effort can be considered low. In the years preceding 2018, fishing effort had traditionally been higher during the summer months (Scottish Government, 2020).

Comparatively, fishing effort in ICES rectangle 43F1 is much lower. In 2019, effort was highest in January (only 6 days), accounting for 21% of the total number of days fished, with the other disclosive months contributing for the remaining fishing effort. In total there were 28 days of fishing effort in 2019 in 43F1 which is very low (Table 3-4). Both in 2018 and consistently in past years fishing effort has been greater in rectangle 42F1 compared to 43F1. The catch per unit effort (CPUE) is a measure of the weight of catches versus per number of effort days (an indirect measure of fish availability). For ICES rectangle 42F1, CPUE was 1.1 Te/day, and for rectangle 43F1 CPUE was higher at 1.5 Te/day. The combined CPUE for both rectangles was 2.5 Te/day, which is just over half the CPUE for the UKCS across the same period (4.1 Te/day; Scottish Government, 2020).

Trawls were the most utilised gear in rectangle 42F1 and 43F1. In total, trawls contributed 99% of the total fishing effort in rectangle 42F1. In rectangle 43F1 approximately 86% of total fishing effort was from trawls with the remainder being attributed to seine nets (Scottish Government, 2020).

Table 3-2 Live Weight and Value of Fish and Shellfish from ICES Rectangles 42F1 and 43F1 Between 2015-2019 (Scottish Government, 2020)[3]

ICES Rectangle	Species Type	2019		2018		2017		2016		2015	
		Live Weight (Tonnes)	Value (£)	Live Weight (Tonnes)	Value (£)	Live Weight (Tonnes)	Value (£)	Live Weight (Tonnes)	Value (£)	Live Weight (Tonnes)	Value (£)
42F1	Demersal	100	121,311	53	75,049	67	112,475	153	202,601	66	70,311
	Pelagic	0	349	63	25,388	1	1,301	215	104,582	<1	362
	Shellfish	242	842,305	115	484,335	140	602,528	236	1,080,620	83	321,002
	Total	**343**	**963,966**	**195**	**570,013**	**209**	**716,511**	**604**	**1,387,803**	**150**	**391,674**
43F1	Demersal	134	149,129	34	41,431	140	181,436	106	136,761	57	64,849
	Pelagic	0	90	<1	90	80	33,760	1	967	<1	369
	Shellfish	4	18,736	4	18,828	93	401,357	127	528,622	10	42,065
	Total	**140**	**167,865**	**47**	**77,901**	**318**	**627,351**	**234**	**666,349**	**68**	**107,284**
Total for Both Rectangles		**483**	**1,131,831**	**242**	**647,914**	**527**	**1,343,862**	**838**	**2,054,152**	**218**	**498,958**
UK Landings Total		**493,076**	**767,721,935**	**555,565**	**764,993,805**	**565,639**	**724,854,083**	**564,677**	**729,378,313**	**547,423**	**574,430,209**

[3] All values are rounded to the nearest whole number. For the purposes of identifying within the UK, disclosive data has not been included to limit the effects of zero-inflation on the results.

Table 3-3 Annual Fishing Effort by UK Vessels and Landings by All Vessels landing in the UK for the Banff and Kyle Area and Across the UKCS (2015 – 2019) (Scottish Government, 2020)[4]

Year	Within ICES rectangle 42F1			Within ICES rectangle 43F1			Average across the UKCS		
	Fishing effort (days)	Landings value (£)	Live Weight (te)	Fishing effort (days)	Landings value (£)	Live Weight (te)	Fishing effort (days)	Landings value (£)	Live Weight (te)
2015	195	391,674	150	55	107,284	68	700	3,001,940	2,841
2016	512	1,387,803	604	272	666,349	234	693	3,599,692	2,785
2017	222	716,511	209	170	627,351	318	638	3,553,440	2,809
2018	210	570,013	195	24	77,901	47	620	3,768,936	2,779
2019	251	963,966	343	28	167,865	140	641	3,800,604	2,441
Annual Average	**278**	**805,993**	**300**	**110**	**329,350**	**161**	**658**	**3,544,922**	**2,731**

[4] All values are rounded to the nearest whole number. For purposes of identifying averages across the UK, disclosive data has not been included to limit the effects of zero-inflation on the results.

Table 3-4 Number of Fishing Days per Month (All Gear) for Vessels Landing into Scotland in ICES Rectangles 42F1 and 43F1 Between 2015-2019 (Scottish Government, 2020)[5]

ICES Rectangle	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
42F1	2019	45	9	42	24	D	D	23	D	18	23	42	17	251
	2018	99	11	D	D	D	D	D	42	D	D	D	31	221
	2017	51	D	D	D	D	43	34	73	D	D	D	D	223
	2016	D	D	101	16	94	10	14	51	102	8	18	99	518
	2015	D	-	D	D	14	20	-	-	39	37	57	D	195
43F1	2019	6	D	D	-	D	D	D	D	-	D	D	-	28
	2018	8	D	-	-	D	D	-	D	-	D	-	D	25
	2017	29	-	-	D	D	9	D	116	D	D	D	D	171
	2016	D	D	20	D	59	-	D	D	149	14	-	13	272
	2015	-	D	-	D	D	D	-	D	D	11	5	D	55

Vessel automatic identification system (AIS) tracks can indicate what types of fishing activity occur in a region. Long straight lines of vessel movement suggest vessels are in transit with many vessels leaving from Peterhead, on the north east coast of Scotland, to reach fishing grounds around the North Sea. According to 2017 AIS data, to the west of the Kyle Field and to the northwest of Banff there appears to be evidence of fishing activity, based on the tight localised AIS patterns; these pockets could be targeted by demersal fishing methods, for instance *Nephrops* trawling, as the AIS lines show intensive back and forth movement in the same place (Figure 3-5). AIS data from years preceding 2017 showed a higher incidence of fishing vessels in the vicinity of the Banff and Kyle Fields coming from / departing to Norwegian waters, as well as Peterhead.

Trawling intensity across pipelines is generally low; between 0 – 5 trawl passes across the Banff / Kyle Field pipelines per year on average (between 2007 – 2015). The pipeline which experiences the most trawling activity overhead is the disused PL1798 which connects Kyle South to the Curlew Field (Figure 3-6). When considered in conjunction with the vessel monitoring system (VMS) hotspot areas in Figure 3-7, there are patches of increased *Nephrops* fishing intensity at either side of the aforementioned pipeline. The increased number of passes across the PL1798 could indicate the movement of vessels between those two areas of *Nephrops* fishery. To the south west of the disused PL1798 is an area of increased (pelagic) herring fishing intensity. The visible prevalence of the *Nephrops* and herring fisheries is apparent when looking at the species breakdown of catch in ICES rectangles 42F1 and 43F1 (as discussed above and presented in Table 3-2).

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

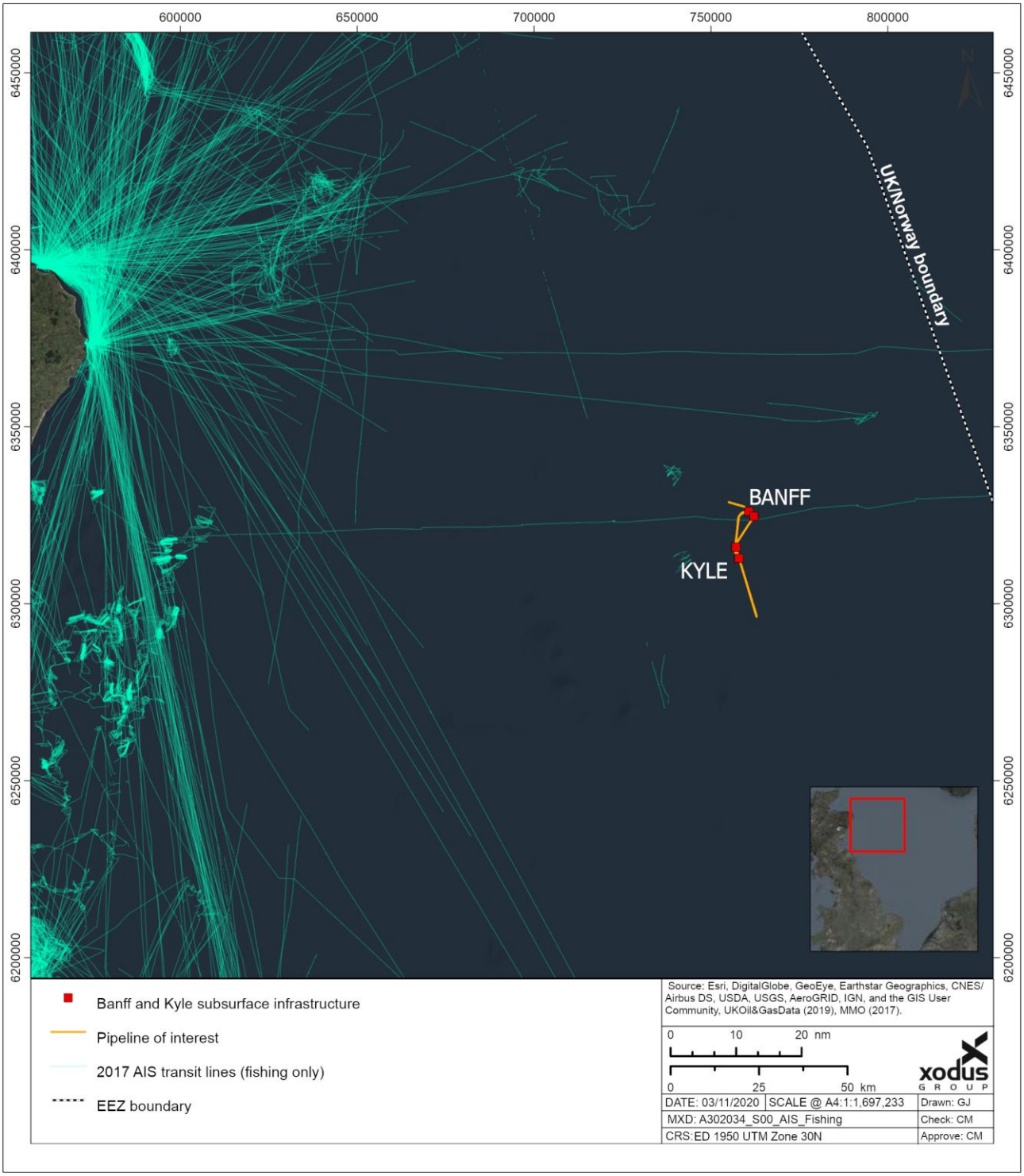


Figure 3-5 **AIS data for commercial fishing vessels during the year (MMO, 2017)**

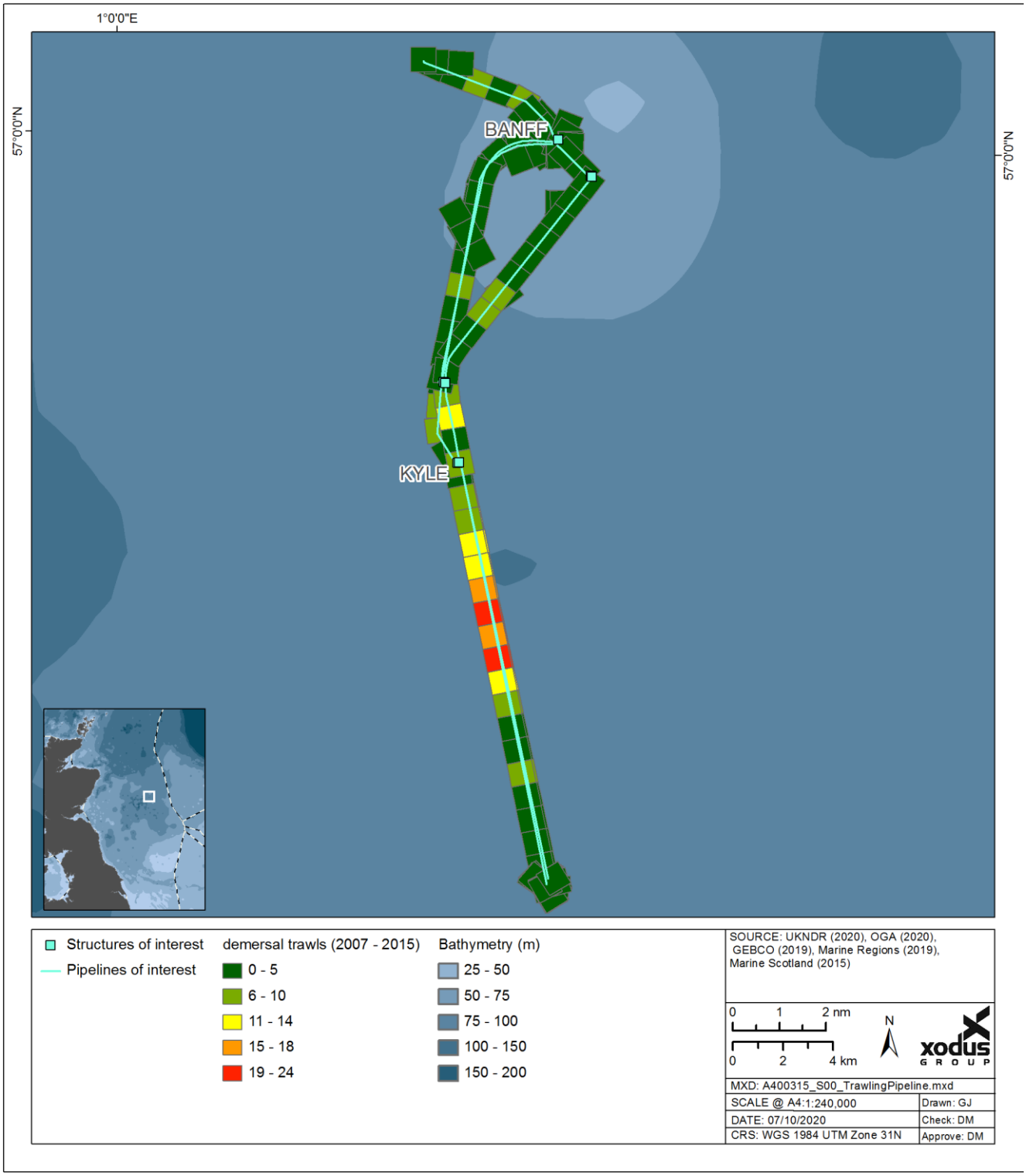


Figure 3-6 **Trawling intensity associated with the pipelines to be decommissioned**

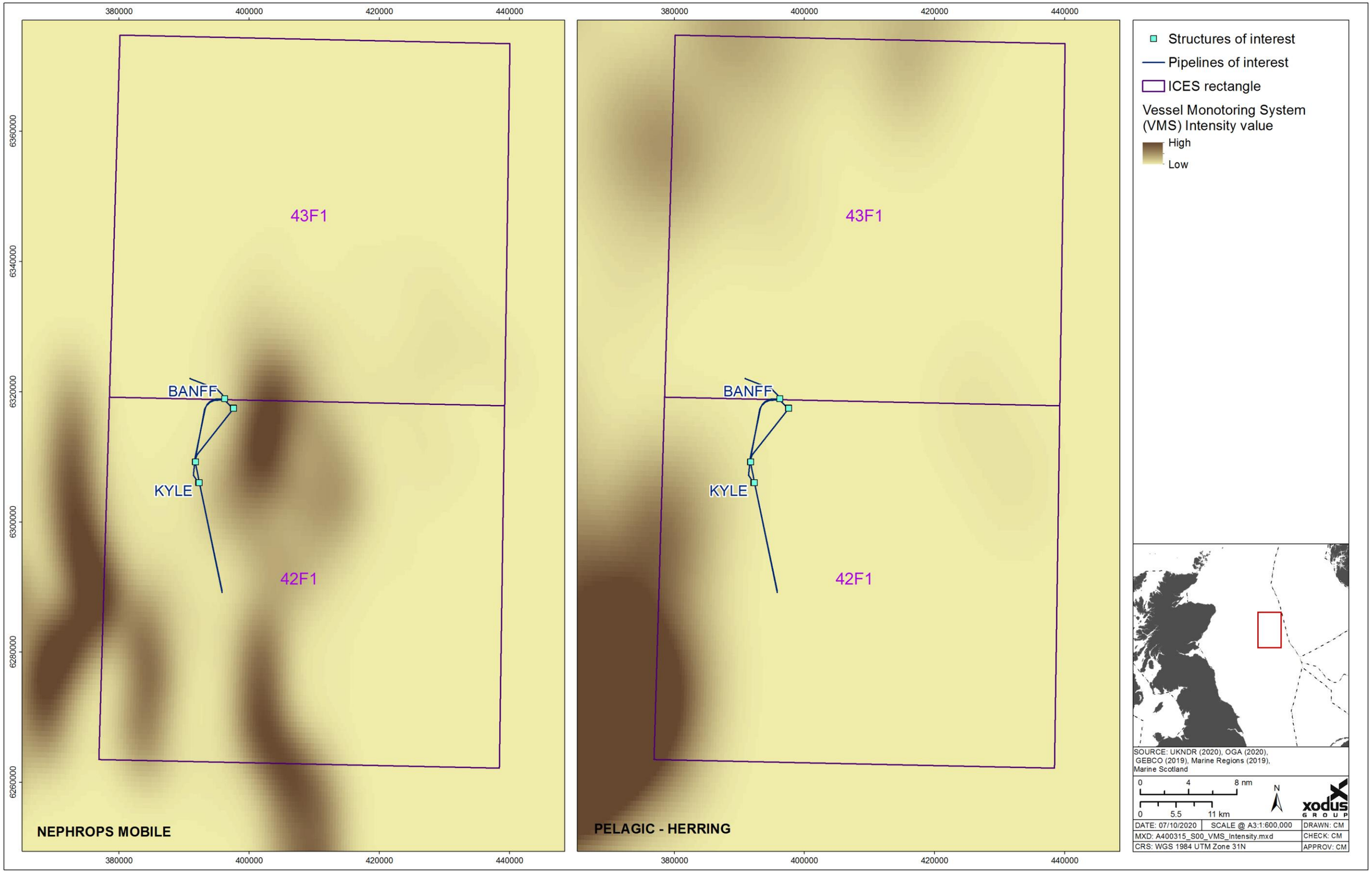


Figure 3-7 VMS intensity for *Nephrops* (mobile gear) and herring (pelagic) fisheries in ICES Rectangles 43F1 and 42F1

3.5 National Marine Plan

The National Marine Plan (NMP) covers the management of both Scottish inshore waters (≤ 12 nm) and offshore waters (12 – 200 nm). The NMP aims to ensure sustainable development of the marine environment by guiding regulation, management, use and protection of Marine Plan areas. The proposed decommissioning activities have been assessed against relevant NMP Objectives: GEN 1, 4, 5, 9, 12, 14 & 21; Oil & Gas 1, 2, 3, 5 & 6.

The proposed operations do not contradict any of the marine plan objectives and policies. CNRI will ensure compliance with all the policies; with particular attention being made to those listed above. The following Sections describe the aims of each policy and how CNRI commitments will achieve them.

3.5.1 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. CNRI will ensure that any potential impacts associated with the Banff and Kyle decommissioning operations will be kept to a minimum.

3.5.2 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. CNRI will ensure that any potential impacts on other sea users associated with the proposed Banff and Kyle decommissioning operations will be kept to a minimum.

3.5.3 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. CNRI will ensure that any potential impacts associated with the Banff and Kyle decommissioning operations will be kept to a minimum.

3.5.4 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.

CNRI will ensure that any potential impacts to protected species and sites associated with Banff and Kyle decommissioning activities will be kept to a minimum.

3.5.5 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. CNRI will ensure that any potential impacts to water quality associated with the Banff and Kyle decommissioning operations will be kept to a minimum.

3.5.6 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 gases. 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. CNRI will ensure that any potential impacts to air quality with Banff and Kyle decommissioning operations will be kept to a minimum.

3.5.7 GEN 21 – Cumulative impacts

Cumulative impacts affecting the ecosystem of the marine plan area should be addressed in decision making and plan implementation. CNRI will ensure that any potential impacts to air and water quality and biological communities associated with the decommissioning operations within the Banff and Kyle Fields will be kept to a minimum.

3.5.8 Oil & Gas 1

The Scottish Government will work with DECC, the new Oil and Gas Authority and the industry to maximise and prolong oil and gas exploration and production whilst ensuring that the level of environmental risks associated with these activities are regulated. Activity should be carried out using the principles of Best Available Technology (BAT) and Best Environmental Practice. Consideration will be given to key environmental risks including the impacts of noise, oil and chemical contamination and habitat change.

3.5.9 Oil and Gas 2

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.

3.5.10 Oil and Gas 3

Marine and coastal infrastructure for oil and gas developments and storage should: utilise the minimum space needed for each activity and take into account environmental and socio-economic constraints.

3.5.11 Oil and Gas 5

Consenting and licensing authorities should have regard to the potential risks, both now and under future climates, to oil and gas operations in Scottish waters, and be satisfied that installations are appropriately sited and designed to take account of current and future conditions.

3.5.12 Oil and Gas 6

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.

4 METHODOLOGY

4.1 Overview

This EA 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 consultation.

4.2 Approach

Potential risks associated with the proposed decommissioning operations were assessed during an ENVironmental Identification (ENVID) workshop attended by project engineers and marine environmental specialists.

To enable focus during assessment, the potential environmental issues were considered under the following aspect groups:

- Emissions to air;
- Disturbance to the seabed;
- Physical presence of vessels in relation to other sea users;
- Physical presence of infrastructure decommissioned *in situ* in relation to other sea users;
- Discharges to sea;
- Underwater noise associated with general decommissioning activities;
- Resource use;
- Onshore activities;
- Waste; and
- Unplanned events.

These aspects were screened in and out of further assessment using two measures, the likelihood of an event occurring and the consequence of this occurrence. This was done using categories defined within CNRI's method of impact assessment.

The likelihood that an event would occur (Table 4-1) and the consequence of an unplanned event occurring (Table 4-2) were assessed using the definitions specified in the CNRI Management of Aspects and Impacts Procedure (CNRI, 2018). The consequence of an impact occurring as a result of planned events was assessed using the definitions specified in the UKOOA Offshore Environmental Statement Guidelines (1999).

The sensitivity of environmental and societal receptors was also considered in the ENVID workshop, taking into account any sensitive receptors identified (Section 3.4) and the results of the most recent (Fugro, 2020a, 2020b and 2020c) environmental surveys.

4.3 Stakeholder Engagement

The ENVID workshop was undertaken prior to stakeholder consultation, however, the impact assessment process also captured any long-standing stakeholder views on UKCS decommissioning activities. Stakeholder concerns from all associated phases of the Banff and Kyle decommissioning were accounted for in this ENVID (available in Appendix C). A scoping report has been circulated to stakeholders with no feedback to date.

4.4 Impact Assessment Methodology

The following tables outline the approach used to carry out the impact assessment in Section 6.

Table 4-1 Definition of Likelihood of Occurrence (CNRI, 2018)

Likelihood	Definition for planned and unplanned events
Very Unlikely	> A freak combination of factors would be required for an incident to result. > An incident has occurred within the UKCS in the past. > No direct or associated impact on emissions will result from process / equipment failure or malfunction.
Unlikely	> A rare or combination of factors would be required for an incident to result. > An incident has occurred on a CNRI platform in the past. > Unlikely that failure or malfunction of a process / equipment will have an impact on emissions.
Possible	> Could happen if a number of additional factors are present, but otherwise unlikely to occur. > An incident has occurred within the named platform's lifetime. > Possible that failure or malfunction of process/equipment will impact on emissions.
Likely	> Not certain, but incident could occur with only one normally-occurring additional factor. > An incident has occurred within the past year on the named platform. > Likely that failure or malfunction of process / equipment will impact on emissions.
Very Likely	> Almost inevitable that an incident will occur under the circumstances. > An incident has happened several times on the platform within the last year or the impact on the environment is part of a continuous operation. Certain that failure or malfunction of process / equipment will impact on emissions.

Table 4-2 Definition of Consequence of Occurrence (CNRI, 2018 and UKOOA, 1999)

Severity	Definition (CNRI, 2018) for an unplanned event	Definition (UKOOA, 1999) for a planned event
None	-	> No interaction and hence no change expected.
Beneficial	-	> Likely to cause some enhancement to the ecosystem or activity within the existing structure. > May help local population.
Negligible	> No loss to the external environment. > No regulatory exposure.	> Change which is unlikely to be noticed or measurable against background activities. > Negligible effects in terms of health or standard of living.
Slight	> Potential loss to the external environment from a system or process does not exceed 1 tonne.	> Change which is within the scope of existing variability but can be monitored and / or noticed. > May affect behaviour, but not a nuisance to users or public.
Moderate	> Potential loss to the external environment from a system or process is between 1 and 25 tonnes. > There is a breach of consent and / or legislative conditions which is unlikely to result in prosecution from Regulators.	> Change in the ecosystem or activity in a localised area for a short time (<2 years), with good recovery potential. Similar scale of effect to existing variability but may have cumulative implications. > Potential effect on health, but unlikely. > May cause nuisance to some users.

Severity	Definition (CNRI, 2018) for an unplanned event	Definition (UKOOA, 1999) for a planned event
High	> Potential loss to the external environment from a system or process is between 25 and 100 tonnes. > There is a breach of consent and / or legislative conditions with potential for prosecution from Regulators.	> Change in the ecosystem or activity over a wide area leading to medium term (<2 year) damage, but with a likelihood of recovery within 10 years. > Possible effect on human health. > Financial loss to users or public
Very High	> Potential loss to the external environment from a system or process greater than 100 tonnes. > There is a breach of consent and / or legislative conditions with a strong likelihood of prosecution from Regulators.	> Change in the ecosystem leading to long-term (>10 years) damage and poor potential for recover to a normal state. > Likely to affect human health. > Long-term loss or change to users or public finance.

Table 4-3 Risk Potential Matrix Summary

Likelihood of Occurrence	Severity				
	Negligible	Slight	Moderate	High	Very High
Very Unlikely	1	2	3	4	5
Unlikely	2	4	6	8	10
Possible	3	6	9	12	15
Likely	4	8	12	16	20
Very Likely	5	10	15	20	25

Table 4-4 Definition of Environmental Risk

Score	Level of Significance	Environmental Risk Definition
1-6	Low	Risk Acceptable: review annually and continue with current management controls
8-12	Moderate	Risk should be reduced: Identify opportunities for improvement through objectives and targets
15-25	High	Risk unacceptable: Immediate action required to reduce risk to an acceptable level

During the ENVID, aspect groups (i.e. underwater noise, seabed disturbance etc…) were scoped in or out of further assessment based on the level of significance assigned using Table 4-3 and Table 4-4. Any aspect of a moderate significance (or higher) was scoped in to further assessment. Any known stakeholder concerns (Section 4.3) and any location-specific environmental and / or societal sensitivities (including cumulative and transboundary impacts) (Section 3) were also considered when applying a level of significance at this stage. The full results of the ENVID are presented in Appendix C.

5 IMPACT ASSESSMENT SCREENING AND JUSTIFICATION

The screening of potential environmental impacts from the decommissioning of the Banff and Kyle Fields for further assessment is provided in Table 5-1 , which also includes a rationale for the screening outcomes and any proposed mitigation associated with each aspect group. The potential impacts on any of the sensitive receptors (described in Section 3.4) are outlined. Further mitigation and measures that will be applied in each instance against each aspect are also presented. The intention is that such measures should remove, reduce or manage the impacts to a point where the resulting residual significance is reduced to 'as low as reasonably practicable' (ALARP).

Table 5-1 Environmental Impact Screening Summary for the Banff / Kyle Decommissioning

Aspect group	Rationale	Mitigation and control measures	Further assessment?
Emissions to air	Emissions during decommissioning activities, (largely comprising fuel combustion gases) will occur following CoP. Emissions generated by infrastructure, equipment and vessels associated with operation of the assets will be replaced by those from vessel use as well as the recycling of decommissioned materials. Reviewing historical EU Emissions Trading Scheme data and comparison with the likely emissions from the proposed workscope suggests that emissions relating to decommissioning will be minor relative to those generated during production. The estimated CO_2 emissions to be generated by the selected decommissioning options are 10,654 Te, this equates to 0.08% of the total UKCS emissions in 2018 (13,200,000 Te; OGUK, 2019). These emissions have been calculated assuming approximately 200 days of vessel emissions across the duration of the project. This vessel time is split across four types of vessels which will participate in a variety of activities including: flowline removal, rock placement and a post-decommissioning monitoring. The total emissions estimate also includes any emissions associated with the infrastructure being removed and remaining *in situ*. See Appendix D for a summary of the emissions associated with the project. Review of available decommissioning EAs shows conclusively that atmospheric emissions in highly dispersive offshore environments do not present significant impacts and are extremely small in the context of UKCS and global emissions. Most submissions also note that emissions from short-term decommissioning activities are small compared to those previously arising from the asset over its operational life. Furthermore, in	• Vessel management. • Minimal vessel use/ movement. • Vessel sharing where possible. • Engine maintenance.	No

Aspect group	Rationale	Mitigation and control measures	Further assessment?
	line with the OGA's (2021) expectations, in particular Expectation 11, CNRI are dedicated to the reduction of greenhouse gas emissions from all decommissioning operations, as far as is reasonable for each project. CNRI are committed to working with the supply chain, collating emission / energy savings initiatives across the business and reviewing emissions sources, as part of meeting these emissions reduction expectations. Considering the above, atmospheric emissions do not warrant further assessment.		
Disturbance to the seabed	There is potential for decommissioning activities to generate disturbance to the seabed; these include activities associated with decommissioning of pipelines in situ with remediation, the removal of substructures and the surface laid pipeline, and the post-decommissioning remediation of anchor depressions. Seabed impacts may range in duration from short-term impacts, such as temporary sediment suspension or smothering, to permanent impacts, such as the introduction of new substrate or any consequential habitat or community level changes which may transpire. Additionally, seabed disturbance from the removal of infrastructure has the potential to modify the habitat in a way which might impact upon other sea users which utilise the seabed. The seabed typical of the Banff and Kyle Fields may lend itself to the formation of clay berms in areas of occasionally muddy benthic habitat (described in Section 3.4.1). Clay berms may pose a potential snagging hazard to commercial fishing gears which make contact with the seabed. However, the single umbilical surface laid in a trench is not buried and will be winched up for removal, thus eliminating the potential for the generation of clay berms. As pipelines from Groups 1, 2 and 4 will be decommissioned *in situ*, there is an associated potential impact of long-term discharges from degrading infrastructure on the receiving environment. Discharges are expected to occur in very small quantities and over a long period of time and will be highly localised as the pipelines will not degrade equally along their length.	• Mitigation to be discussed in Section 6.1.6	Yes, see Section 6.1

Aspect group	Rationale	Mitigation and control measures	Further assessment?
	Some of the proposed activities will overlap with the East of Gannet and Montrose Fields NCMPA. The STL piles in Group 8 are all located within the site, as is one single SAL pile base. The PL1549 is almost entirely located within the NCMPA. Therefore, any remediation of the ends will occur within the designated site. The potential impacts to the site are addressed within Section 6.1.5. CNRI have elected to undertake a study of the mooring depressions which remains in the Banff Field as a result of the historic location of the Banff Petrojarl FPSO (Table 2-6). This will require remediation however, owing to the slight overlap with the NCMPA, the study will determine the best course of action to address this, owing to the potentially sensitive seabed in the area. CNRI are committed to leaving a clear, safe seabed in the wake of the decommissioning activities. The clear seabed will be validated by an independent verification survey over the installation sites and pipeline corridors. Non-intrusive verification techniques will be considered in the first instance, but where these are deemed inconclusive by the SFF, seabed clearance is likely to require conventional overtrawl survey methods. The methods used will be discussed and finalised with OPRED. Impacts to the seabed from project activities have been assessed further in Section 6.1, whilst impacts to commercial fisheries generated by seabed disturbance are assessed in Section 6.2.		
Physical presence of vessels in relation to other sea users	The presence of a small number of vessels for decommissioning activities will be short-term in the context of the life of the Banff and Kyle Fields. Activity will occur using similar vessels to those currently deployed for oil and gas installation, operation and decommissioning activities. Furthermore, all decommissioning works will be carried out within the 500 m zones. The proposed decommissioning of the Banff and Kyle Fields are estimated to require three different vessel types. These would not all be on location at the same time. Vessel activities are expected to over approximately 200 days.	• Minimal vessel use/ movement. • Cardinal buoy presence • Notification to Mariners • Opening up of 500m safety exclusion zones following seabed-clearance.	No

Aspect group	Rationale	Mitigation and control measures	Further assessment?
	Other sea users will be notified in advance of planned activities through the appropriate mechanisms, meaning those stakeholders will have time to make any necessary alternative arrangements during the finite period of operations. Furthermore, the Banff and Kyle area only experiences very low to low shipping levels therefore the decommissioning activities should not affect shipping and navigation in the region. Assessment of the impact of the decommissioning on this receptor is therefore not required.		
Physical presence of infrastructure decommissioned *in situ* in relation to other sea users	The physical presence of infrastructure decommissioned *in situ* has limited potential of impacting other sea users and is limited to potential snagging risks to commercial fisheries. The single surface-laid umbilical will be fully removed. Remaining structures will be fully removed, and the seabed will be subsequently surveyed and remediated as required. The infrastructure to be decommissioned *in situ* are the trenched and buried rigid and flexible flowlines and the trenched and rock-covered rigid pipelines. Pipeline ends will have mattress cover reinstated and therefore do not pose an additional snagging risk to other users of the sea. The burial status of these flowlines is such that they are not expected to pose any risk of interaction with other sea users (see Appendix E for exposure details). Future monitoring work will monitor the Depth of Burial (DoB) of this pipeline and ensure that snagging risks do not arise. The frequency of this monitoring work and any subsequent maintenance regime will be established after consultation with OPRED. CNRI are committed to leaving a clear, safe seabed. The clear seabed will be validated by an independent verification survey over the installation sites and pipeline corridors. Non-intrusive verification techniques will be considered in the first instance, but where these are deemed inconclusive, seabed clearance is likely to require conventional overtrawl survey methods. The methods used will be discussed and finalised with OPRED.	• Mitigation to be discussed in Section 6.2.4	Yes, see Section 6.2

Aspect group	Rationale	Mitigation and control measures	Further assessment?
	To address any Stakeholder concerns and to provide more detail with regards to the proposed mitigation measures, assessment of potential snagging risks associated with the decommissioning of infrastructure *in situ*, as well as the condition of the seabed following the decommissioning of infrastructure via full removal, is provided in Section 6.2.		
Discharges to sea	All subsea infrastructure in the Banff and Kyle Fields has been drained and flushed at CoP. This is a pre-decommissioning activity which has been permitted as appropriate, and therefore, falls outside the scope of this EA. Vessel discharges are managed through existing legislation and compliance controls. Post-flushing and / or water jetting, residual liquids present during the decommissioning of pipelines and subsea infrastructure will be treated before being discharged to sea, such that the discharge will comprise treated water. Any residual remaining material will be in trace levels / volumes following the flushing regime and will not pose any significant risk to water quality. All residual solids will be shipped to shore for disposal. Considering the above, impacts to water quality do not require further assessment.	• MARPOL compliance. • Bilge management procedures. • Vessel audit procedures. • Contractor management procedures.	No
Underwater noise associated with general decommissioning activities	Vessel presence will be limited in scale (i.e. the size and number of vessels) and duration, therefore, does not constitute a significant or prolonged increase in noise emissions across the project area. All other noise generating activities associated with the decommissioning of the Banff and Kyle Fields are considered negligible in the context of ambient noise levels and are likely to be masked by project-related vessel activities. Geophysical surveys undertaken for post-decommissioned infrastructure left *in situ* will be assessed in future, through the process of permit application. Multibeam echosounder survey equipment is likely to be used for imaging and identification of pipeline exposures. The JNCC (2017)	• Vessel management. • Minimal vessel use/ movement. • Vessel sharing where possible. • Cutting activities will be minimised and carried out in isolation where possible.	No

Aspect group	Rationale	Mitigation and control measures	Further assessment?
	Guidelines will be employed for mitigation of noise impacts to marine mammals for future survey work involving seismic survey equipment. None of the activities associated with the decommissioning of the Banff and Kyle Fields are considered to generate significant noise levels which may cause injury or significant disturbance to marine species or other users. Furthermore, the project is not located within a marine mammal protection area and EAs for offshore oil and gas decommissioning projects generally show no potential injury or significant disturbance associated with the non-survey decommissioning activities covered within the project scope. On this basis, underwater noise generated by general decommissioning activities does not require further assessment.		
Resource use	Generally, resource use from the proposed activities will require limited raw materials and be largely restricted to fuel use. Any opportunities for increasing fuel efficiency and reducing use of resources will be identified and implemented by CNRI where possible. The estimated total energy usage for the project is 140,972 GJ. This number accounts for all operations, material recycling, and the resource loss associated with decommissioning items *in situ*. This is considered very low, compared to the resources generated during the production phase of the project. A summary of energy use associated with the project is available in Appendix D. Considering the above, resource use does not warrant further assessment.	• Adherence to the Waste Hierarchy • Vessel management. • Minimal vessel use/ movement. • Vessel sharing where possible. • Engine maintenance.	No
Waste	The recycling and disposal of wastes are covered by CNRI's Waste Management Strategy, which is compliant with relevant regulations relating to the handling of waste offshore, transfer of controlled, hazardous (special) waste, and TFSW (Trans-Frontier Shipment of Waste). The Waste Management Strategy is guided by each company's respective HSE Policy and commitments to best practice in waste management. This includes the mapping and documenting of waste management	• Overall 'Duty of Care' • Waste Management Strategy • Active waste tracking (cradle to grave)	No

Aspect group	Rationale	Mitigation and control measures	Further assessment?
	arrangements for ongoing monitoring of waste procedures and performance review against target Key Performance Indicators (KPIs). Wastes will be treated using the principles of the waste hierarchy, focusing on the reuse and recycling of wastes where possible. Raw materials will be returned to shore with the expectation to recycle the majority of the returned material. There may be instances where infrastructure returned to shore is contaminated (e.g. by Naturally Occurring Radioactive Material (NORM), hazardous, and / or special wastes) and cannot be recycled. In these instances, the materials will require disposal. However, the weight and/or volume of such material is not expected to result in substantial landfill use. It should be noted that, only licenced contractors which can demonstrate they are capable of handling and processing the material to be brought ashore will be considered for onshore activities and this will form an integral part of the commercial tendering process. On this basis, no further assessment of waste is necessary.	• Adherence to the Waste Hierarchy • Transfrontier Shipment of Waste (if applicable) • Permitting for hazardous wastes • Communication with relevant Regulator(s) - e.g. SEPA established • EEMs tracking • Close-out reporting • Contractor management	
Unplanned events	Unplanned events may include an unplanned instantaneous diesel release from the largest vessel. This is expected to be a CSV type vessel, with a maximum fuel capacity of approximately 2,000 m^3. The fuel inventory of the CSV vessel is likely to be split between a number of separate fuel tanks, significantly reducing the likelihood of an instantaneous release of the full inventory. Any spills from vessels in transit or participating in decommissioning activities are covered by separate Shipboard Oil Pollution Emergency Plans (SOPEPs). CNRI will support response of any vessel-based loss of fuel containment through the vessel owner's SOPEP. In line with the mitigation measures in place and the very low likelihood of occurrence, a vessel collision scenario does not require further assessment. In addition to the mitigation measures outlined in the individual vessel SOPEPs, CNRI maintains manned bridges, navigational aids and	• OPEP and TOOPEP in place for operations • Navaids (Cardinal Buoys) in place • 500m zones operational until seabed clearance certified • SOPEP on all vessels • Spill response procedures • Bunkering procedures in place (if necessary)	No

Aspect group	Rationale	Mitigation and control measures	Further assessment?
	monitoring of safety zones (e.g. with Cardinal Buoys with 'smart' location-sensitive technology). Only project vessels will be present when activity is taking place within 500 m safety exclusion zone(s). Other vessels will not be present within the 500 m zone at any time prior to well decommissioning, therefore the likelihood of fishing vessels overtrawling in the vicinity of the wellheads is negligible, making a well blowout scenario highly unlikely. In line with the mitigation measures in place and the very low likelihood of occurrence, the well blowout scenario does not require further assessment. As the methodology for the post-removal subsea installation and flowline return to shore has not been defined in detail, there exists the remote possibility that during transport of those materials, elements may dislodge and drop from the transport vessel. Therefore, the likelihood of accidental loss of pipeline materials to the seabed during lift operations is very low. Moreover, all subsea installations are considered sound and no issues regarding their integrity have been identified, therefore methods of removal are not anticipated to generate issues which result in material losses to sea. Dropped object procedures are industry-standard and will be employed. All unplanned losses in the marine environment will be attempted to be remediated, and notifications to other mariners will be sent out. The post-decommissioning Clear Seabed Verification Survey will aid in the identification of in-field dropped objects. In line with the mitigation measures in place, unplanned loss of materials to the sea do not require further assessment.	• Contractor management and communication • Lifting operations management of risk • Dropped object recovery and debris clearance surveys • PON2 submission	

6 IMPACT ASSESSMENT

The following aspect groups have been identified as requiring further assessment against potential impacts from the proposed decommissioning activities:

- **Disturbance to the seabed**; and
- **Physical Presence** of infrastructure decommissioned *in situ* in relation to other sea users.

Potential sources of impacts associated with these aspect groups and the consequences for any sensitive receptors and / or Stakeholders are detailed in Section 6.1 and 6.2.

6.1 Disturbance to the Seabed

6.1.1 Approach

The two seabed impact pathways associated with the proposed activities are direct and indirect disturbance.

Direct disturbance is considered to be the physical disturbance of seabed sediments and habitats. Direct disturbance has the potential to cause temporary or permanent changes to the marine environment, depending upon the nature of the associated activity. Permanent impacts are generally considered to represent a worst-case where required. Activities which contribute to the direct disturbance impact pathway include the removal of infrastructure and remediation of snagging hazards, either from re-burial or placement of material (rock armour) on the seabed. The total area of seabed expected to be impacted by direct physical disturbance has been calculated by adding together the individual areas of physical disturbance estimated for each activity. Dimensions used to calculate the disturbance area for each activity are available in Appendix A.

The second impact mechanism, indirect disturbance, is that which occurs outside of the direct disturbance footprint. It may be caused by the suspension and re-settlement of natural seabed sediments and cuttings pile materials disturbed during activities. This secondary impact pathway is considered temporary in all instances. The scale of indirect disturbance due to re-suspension and re-settlement of natural sediment has been estimated based on the expected area of direct disturbance from any activity. The estimated indirect disturbance area is assumed to be double the direct disturbance area for all installations and activities taking place.

6.1.2 Sources of Potential Impacts

The following activities have been identified as potential sources of direct or indirect seabed disturbance:

- Subsea infrastructure decommissioning:
  - Full removal of subsea structures (Section 6.1.2.1)
  - Removal of the STL piles and remediation (Section 6.1.2.2)
  - Full removal of spools, jumpers and SSIVs (Section 6.1.2.3)
  - Full removal of protection materials (Section 6.1.2.3)
- Decommissioning of rigid and flexible flowlines:
  - Decommissioning *in situ* of trenched and buried / rock covered rigid and flexible flowlines, including remediation associated with ends and exposures (Section 6.1.2.5)
  - Full removal of two surface laid umbilicals (Section 6.1.2.6)
- Remediation of former FPSO mooring locations (Section 6.1.2.7); and
- Clear seabed verification (Section 6.1.2.7).

6.1.2.1 *Structures*

All subsea structures within the Banff and Kyle Fields are to be fully removed (as described in Section 2.5.3). Any wellhead structures remaining will be assessed as part of the well decommissioning campaign under separate permits.

To calculate the area of direct disturbance the dimensions of the structures have been used. To account for the potential extended impact due to removal methods, the footprint of the base has been doubled. This methodology has been used in the interest of being conservative and calculating a worst-case possible impact.

An estimate has been made of the possible indirect disturbance due to re-suspension and settlement of sediment. Most re-suspended sediment will settle within the initial disturbance area, but it has been assumed that some will land beyond that area. As a conservative estimate, the area of indirect disturbance has been assumed to be double the area of direct disturbance. This temporary disturbance will be temporary and will only last as long as activities are occurring.

The direct and indirect disturbance areas associated with these proposed operations are summarised in Table 6-1. A full inventory of infrastructure dimensions is available in Appendix A.

A single SAL Anchor Base associated with the Banff Field is located within the East of Gannet and Montrose Fields NCMPA. The area of impact associated with the removal of this single item is presented separately below.

Table 6-1 Seabed Disturbance Associated with the Decommissioning of Structures

Activity	Quantity and dimensions	Expected duration of disturbance	Direct disturbance area (km^2)	Indirect disturbance area (km^2)
Removal of subsea structures in the Banff Field	21 structures of varying dimensions (not including the SAL Anchor Base below)	Temporary	0.0021	0.0042
Removal of Banff Field SAL Anchor Base within the NCMPA	Single SAL Anchor Base of dimensions 9 m x 9 m x 16.7 m	Temporary	0.00016	0.00032
Removal of subsea structures in the Kyle Field	14 structures of varying dimensions	Temporary	0.0017	0.0034
Total			**0.0038**	**0.0076**
Total within the East of Gannet and Montrose Fields NCMPA			**0.00016**	**0.00032**

The area of direct impact within the East of Gannet and Montrose Fields NCMPA attributed to the removal of the SAL anchor base is 0.00016 km^2 which equates to <0.00009% of the site (1,839 km^2).

6.1.2.2 STL Piles

As determined by the CA, Group 8 (consisting of eight STL piles) will be removed below the seabed, requiring dredging. A full breakdown of the STL pile dimensions is available in Appendix A.6. The seabed impact footprint of the piles was calculated using the pile dimensions and adding a buffer of 4 m to ensure sufficient access for cutting. Once the pile sections have been removed, the area will be remediated as appropriate and under discussion with OPRED, with rock placement within this footprint assessed here as a worst-case scenario as this would represent a permanent and direct disturbance. As before, the indirect disturbance is twice the direct disturbance and the indirect impacts are temporary in nature.

The direct and indirect disturbance areas associated with the removal of the STL piles is presented in Table 6-2 below. All eight STL piles are located within the East of Gannet and Montrose Fields NCMPA, therefore the area of impact associated with their removal is exclusively within the site.

Table 6-2 Seabed Disturbance Associated with the Decommissioning of the STL Piles

Activity	Quantity and dimensions	Expected duration of disturbance	Direct disturbance area (km^2)	Indirect disturbance area (km^2)
Full removal of the STL piles	8 piles of varying dimensions	Permanent	0.00043	0.00085
		Total	**0.00043**	**0.00085**

The area of direct impact within the East of Gannet and Montrose Fields NCMPA attributed to the removal of the eight STL piles is 0.00043 km^2 which equates to <0.00002% of the site.

6.1.2.3 Spools, Jumpers, Other Pipeline Sections and SSIVs

As described in Section 2.5.5, all jumpers, spools, other pipeline sections and SSIV structures will be removed.

The area of seabed disturbed by recovery of each individual flowline to the surface has been estimated by multiplying the length of each individual line section which will be removed, by a 1 m buffer width. The addition of a buffer aims to account for any disturbance associated with the physical removal process of the spools and jumpers, and the method by which this activity is undertaken. The areas disturbed by recovery of each individual line have then been summed to give an overall area of disturbance affected.

To calculate the area of impact associated with the removal of the SSIVs, the footprint of the structure has been doubled (as for the structures in Section 6.1.2.1) to account for additional disturbance generated by the structure removal.

Indirect disturbance has been assumed to be twice that of the direct area. This accounts for the resuspension of sediment generated due to the direct disturbance, most of which will settle within the direct footprint. However, in light of the muddy sediment composition, the resettlement of sediment is likely to be minimal.

The direct and indirect disturbance areas associated with these proposed operations are summarised in Table 6-3. A full inventory of infrastructure dimensions is available in Appendix A. All disturbance will be temporary and will only last as long as activities are occurring.

Table 6-3 Seabed Disturbance Associated with the Decommissioning of Spools, Jumpers, Other Pipeline Sections and SSIVs

Activity	Quantity and dimensions	Expected duration of disturbance	Direct disturbance area (km^2)	Indirect disturbance area (km^2)
Removal of the SSIVs in the Banff and Kyle Fields	3 SSIVs of varying dimensions	Temporary	0.00034	0.00069
Removal of spools, jumpers and other pipeline sections in the Banff and Kyle Fields	55 items of varying dimensions	Temporary	0.12	0.23
		Total	**0.12**	**0.23**

6.1.2.4 Protection (Mattresses and Grout Bags)

Concrete mattresses and grout bags have previously been deployed across the Banff and Kyle Fields to stabilise and protect the seabed infrastructure. As noted in Section 2.5.7, the intention is that all concrete mattresses and grout bags will be recovered; this will cause temporary direct and indirect disturbance. Any protection / stabilisation associated with third party crossing and infrastructure will be left undisturbed and decommissioned *in situ*. There are an estimated 1,550 concrete mattresses across the Banff and Kyle Fields which will be removed. This total allows for an additional mattress contingency should it transpire during the decommissioning activities that there are more mattresses than previously accounted for. The dimensions of the concrete mattresses were used to determine the area of cover.

In the case of grout bags, there are an estimated 15,500 in the Banff and Kyle Fields. This estimate is likely to be conservative. Grout bags are used in conjunction with different subsurface installations to provide protection or stability. As such, they are usually stacked or piled on top of one another or on top of other installations / mattresses. The exact location and layout of the bags is unknown. Although unlikely, the worst-case scenario has been defined as all 15,500 bags spread in a single layer on the seabed. A standard grout bag size has been used to estimate the area cover by grout bags in the Banff and Kyle Fields. Full inventory details, including the dimensions of stabilisation materials, are available in Appendix A.

The direct and indirect seabed disturbance areas associated with the stabilisation materials are summarised in Table 6-4. As previously, the indirect impact has been assumed to be double the direct impact area.

Table 6-4 Seabed Disturbance Associated with the Decommissioning of Protection Materials

Activity	Quantity and dimensions	Expected duration of disturbance	Direct disturbance area (km^2)	Indirect disturbance area (km^2)
Removal of existing concrete mattresses	Estimated 1,550 concrete mattresses of varying dimensions	Temporary	0.028	0.056
Removal of grout bags	Estimated 15,500 grout bags of dimensions 0.6 x 0.3 m	Temporary	0.0028	0.0056
		Total	**0.031**	**0.061**

6.1.2.5 Pipelines Decommissioned *in situ*

Pipelines from CA Groups 1, 2 and 4 will all be decommissioned *in situ* and have their ends and exposures remediated. As remediation is the only anticipated impact associated with the decommissioning of these groups, the area of impact only relates to the direct and indirect impact due to the placement of rock. As described in Section 2.5.1, the pipelines will have variable rock placement cover at the ends dictated by the length of the transition zones (50 m at Banff and 20 m at Kyle). The area of rock placed per end will equate to either 200 or 500 m^2 (using an assumed width of 10 m to account for a 1:3 overtrawlable slope).

Of the eight pipelines in Group 1, five have exposures identified along them, with total length of 345 m. The remediation activities associated with the decommissioning of the pipelines *in situ* are considered a permanent disturbance and represent a worst-case scenario. As before, as a conservative estimate, the indirect disturbance is twice that of the direct area, however this type of impact is considered temporary. The permanent direct and temporary indirect disturbance areas associated with these proposed operations are summarised in Table 6-5. A full inventory of infrastructure dimensions is available in Appendix A.

Table 6-5 Area of Seabed Impact Associated with the Remediation of CA Groups 1, 2 and 4

Activity	Quantity and dimensions	Expected duration of disturbance	Permanent direct disturbance area (km^2)	Temporary indirect disturbance area (km^2)
Group 1 remediation of ends	16 ends (across eight pipelines), 50 m^2 per cut end	Permanent	0.0062	0.012
Group 1 remediation of exposures	345 m of exposures (23 exposures across five pipelines)	Permanent	0.0035	0.0069
Group 2 remediation of ends	12 ends (across six pipelines), 50 m^2 per cut end	Permanent	0.0049	0.0098
Group 4 remediation of ends	4 ends (across two pipelines), 50 m^2 per cut end	Permanent	0.0014	0.0028
		Total (permanent)	**0.016**	**n/a**
		Total (temporary)	**n/a**	**0.032**

The area of impact associated with the lengths of Group 1, Group 2 and Group 4 being decommissioned *in situ* has been calculated below. This has been calculated using the exact dimensions of the pipelines. There is no disturbance associated with this area, this is currently the area that the Banff and Kyle Field pipelines occupy and will continue to do so once they are decommissioned *in situ*.

Table 6-6 Area of Seabed Impact Associated with the Decommissioning *in situ* of CA Groups 1, 2 and 4

Activity	Quantity and dimensions	Remaining pipeline infrastructure area (km^2)
Group 1 decommissioned *in situ*	8 pipelines of varying dimensions	0.010
Group 2 decommissioned *in situ*	7 pipelines of varying dimensions	0.0090
Group 4 decommissioned *in situ*	2 pipelines of varying dimensions	0.0020
	Total	**0.020**

A single pipeline (PL1549) is located almost entirely within the East of Gannet and Montrose Fields NCMPA (Figure 6-1). The area associated with the decommissioning of this pipeline *in situ* has also been calculated separately within the context of the NCMPA in Table 6-7 (please note, this area has also been incorporated into the overall Group 4 area remaining *in situ* in Table 6-6 above). There are no exposures along the PL1549 but both ends will be covered in rock. Figure 6-1 shows the pipeline within the context of the NCMPA. Although it appears that the ends of the pipeline are not within the site, to allow for a worst-case scenario, the calculations assume the entire length of the P1549 to be within the NCMPA, including the ends. The area of rock associated with the remediation of the pipeline ends has been accounted for separately, as presented in Table 6-7.

Table 6-7 Area of Seabed Associated with the Legacy Impact of Decommissioning the PL1549 *in situ*

Pipeline	Dimensions	Remaining pipeline infrastructure area within East of Gannet and Montrose Fields NCMPA (km^2)	Area of rock remediation within East of Gannet and Montrose Fields NCMPA (km^2)	Area of temporary indirect impact within the East of Gannet and Montrose Fields NCMPA (km^2)
PL1549	6,268 m long, 168.3 mm OD 2 ends, 50 m^2 per cut end	0.00095	0.0001	0.0002
	Total	**0.00095**	**0.0001**	**0.0002**

The area of direct impact within the East of Gannet and Montrose Fields NCMPA attributed to the remediation of the PL1549 ends is 0.0001 km^2 which equates to <0.00001% of the site.

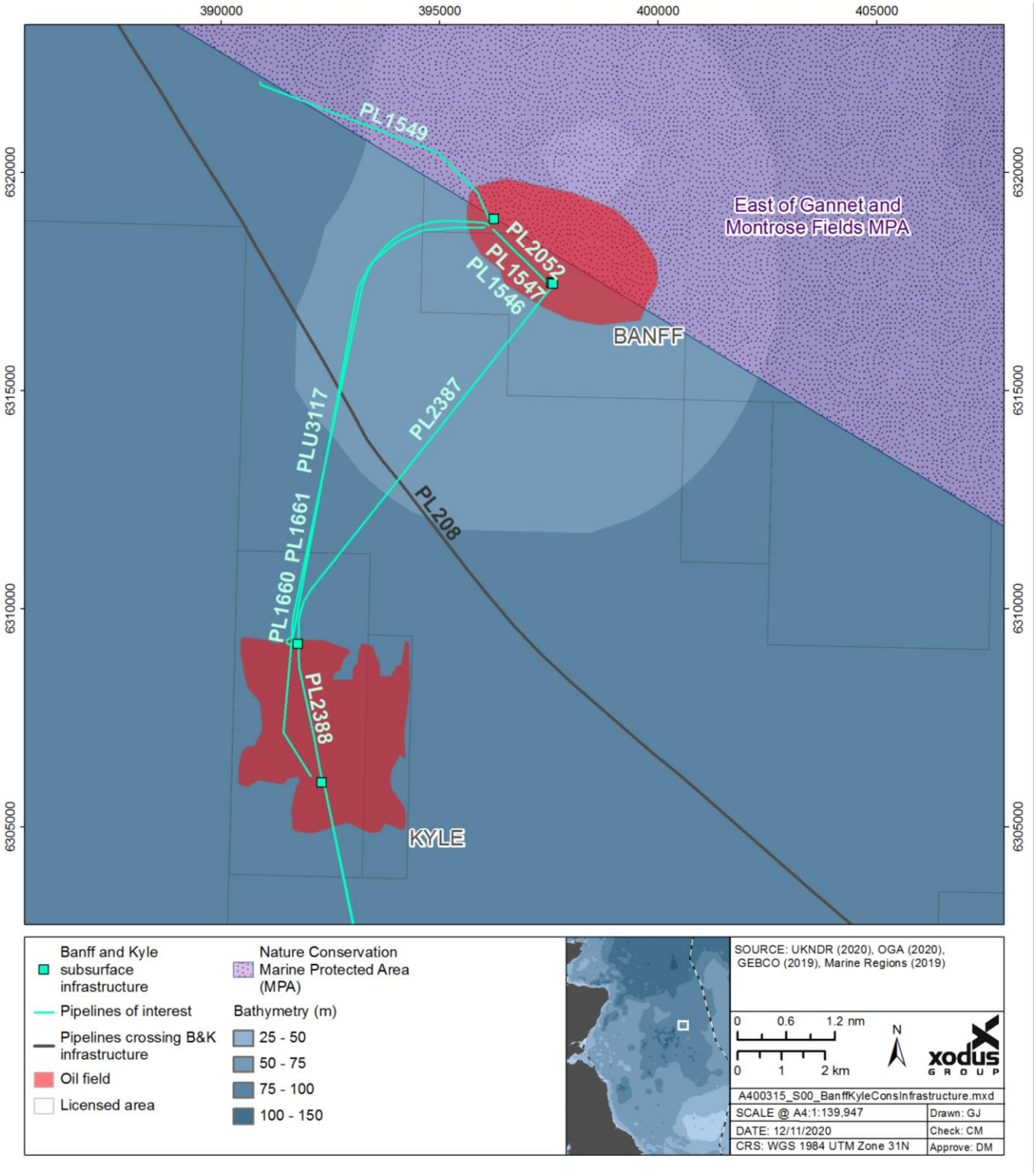


Figure 6-1 **Pipelines within the Banff and Kyle Fields**

6.1.2.6 *Pipelines to be Fully Removed*

The two umbilicals from CA Group 3 will be fully removed by being winched onto a CSV. The area of impact associated with this removal has been calculated by multiplying the length of the umbilical by a corridor width (10 m) of assumed impact which may be generated as a result of the removal procedure used to decommission the umbilical.

As before, an estimate has been made of the possible indirect disturbance due to re-suspension and settlement of sediment. The area of indirect disturbance is considered to be double the area of direct disturbance.

The direct and indirect disturbance areas associated with these proposed operations are summarised in Table 6-8. A full inventory of infrastructure dimensions is available in Appendix A.

Table 6-8 Area of Seabed Associated with the Decommissioning of CA Group 3

Activity	Quantity and dimensions	Expected duration of disturbance	Direct disturbance area (km^2)	Indirect disturbance area (km^2)
PLU4522	1,600 m long, 83 mm OD, width buffer of 10 m to account for removal	Temporary	0.016	0.032
PLU3106	536 m long, 76.2 mm OD, width buffer of 10 m to account for removal	Temporary	0.0054	0.011
		Total	**0.021**	**0.043**

6.1.2.7 *FPSO Mooring Remediation*

As explained in Section 2.5.5, targeted remediation is anticipated to be required for the mooring trenches and anchor depressions left by the FPSO mooring lines. However, due to the type of sediment, and with the intention of having as minimal an impact as possible, the method of remediation has yet to be determined. CNRI have committed to leaving a safe and unobstructed seabed and intend to commission a study to determine the appropriate method of remediation for the depressions. Based on the results of the discussion, CNRI will engage with the regulator to determine this method of remediation. As and when appropriate, these activities will be permitted and / or covered by a Marine Licence.

However, in the interest of presenting a worst-case scenario with regards to the extent of impact on the seabed, the mooring trench and anchor depression dimensions have been used to calculate an area of impact. These dimensions are in Table 2-6 and Table 2-7. The estimated tonnage of rock required for this activity, and the possible area of rock cover is provided in Table 2-8. While the study has yet to determine the appropriate method of remediation, the worst-case instance would involve rock placement within the trenches; a permanent impact. As before, the indirect area is twice the direct area. The area associated with the placement of rock to remediate the mooring trenches is shown in Table 6-9 below. The total area in Table 2-8 has been used in the table below.

Figure 2-2 shows the mooring trenches and anchor depressions which overlap with, or are located within, the East of Gannet and Montrose Fields NCMPA. The area of rock associated with any sections of trench/anchor depressions which overlap with the NCMPA is calculated separately below.

Table 6-9 Area of Impact Associated with FPSO Mooring Remediation

Activity	Quantity and dimensions	Expected duration of disturbance	Direct disturbance area (km^2)	Indirect disturbance area (km^2)
Remediation of the mooring trenches outside of the NCMPA	Remediation of mooring trenches 4, 5, 6, 7, 8, 9, 10 and 131.94 m of the trench associated with mooring line 3	Permanent	0.010	0.020
Remediation of the mooring trenches within the NCMPA	Remediation of mooring trenches associated with mooring lines 1 and 2 and 5.06 m of the trench associated with mooring line 3	Permanent	0.00062	0.0013
Remediation of the anchor depressions outside of the NCMPA	Remediation of anchor depressions 5, 6, 7 and 8	Permanent	0.0022	0.0045
Remediation of the anchor depressions within the NCMPA	Remediation of anchor depressions 1, 2, 3, 4, 9 and 10	Permanent	0.0024	0.0048
		Total	**0.012**	**0.025**
Total within the East of Gannet and Montrose Fields NCMPA			**0.0030**	**0.0061**

The area of direct impact within the East of Gannet and Montrose Fields NCMPA attributed to the remediation of the FPSO mooring trenches and anchor scour is 0.0061 km^2 which equates to 0.0003% of the site.

6.1.2.8 *Clear Seabed Verification*

As explained in Section 2.7.1, a clear seabed verification survey is required following all decommissioning projects to ensure there is no residual risk to other sea users, particularly those who make contact with the seabed, such as trawl fisheries.

Non-intrusive seabed clearance verification techniques will be considered in the first instance, but where these are deemed inconclusive, seabed clearance may require conventional overtrawl survey methods. Where there is evidence of residual snagging hazards (e.g. any berms, dropped objects, etc.), then intervention in the form of overtrawling to re-level the seabed will be implemented.

Although an important activity for limiting the potential for safety hazards, the use of overtrawling often constitutes the greatest potential temporary impact to the benthic environment from decommissioning activities. Therefore, post-decommissioning, CNRI will seek to engage with OPRED to determine the most effective course of action with regard to clear seabed verification.

6.1.2.9 *Summary of Disturbance to the Seabed*

The seabed disturbance from the decommissioning activities calculated throughout this Section is summarised in Table 6-10. This illustrates a worst-case scenario for seabed disturbance, in which the majority of the seabed impact is associated with the removal of spools, jumpers and SSIVs.

Table 6-10 Total Potential Seabed Disturbance from the Decommissioning Activities

Activity	Temporary direct disturbance area (km^2)	Temporary indirect disturbance area (km^2)	Permanent direct disturbance area (km^2)	Temporary direct disturbance area within the NCMPA (km^2)	Temporary indirect disturbance area within the NCMPA (km^2)	Permanent direct disturbance area within the NCMPA (km^2)
Removal of structures	0.0038	0.0076	-	0.0016	0.0032	-
Removal of eight STL piles	-	-	-		0.00085	0.00043
Removal of spools, jumpers and SSIVs	0.12	0.23	-	-	-	-
Removal of protection (mattresses and grout bags)	0.031	0.061	-	-	-	-
Remediation of Group 1, 2, and 4 pipelines decommissioned *in situ*	-	0.032	0.016	-	0.002	0.001
Full removal of Group 3 umbilicals	0.021	0.043	-	-	-	-
Remediation of FPSO mooring trenches and anchor depressions	-	0.025	0.012	-	0.0061	0.0030
Total	**0.18**	**0.40**	**0.028**	**0.0016**	**0.012**	**0.0044**

6.1.3 Effects on Sensitive Receptors

6.1.3.1 *Direct Disturbance*

Decommissioning activities are expected to lead to two types of direct physical disturbance. The first is temporary disturbance, which will result from the removal of pipelines and infrastructure from the seabed, and the placement of protective material. The sediment will be disturbed by the action of retrieving equipment from the seabed and rock placement, but once decommissioning is complete, the affected areas will be free of anthropogenic material. However, in the case of rock placement, temporary disturbance will only apply to the wider area impacted by suspended sediments, not the area covered by rock. Temporary disturbance should allow recovery in line with natural processes such as sediment re-suspension and deposition, movement of animals into the disturbed area from the surrounding habitat, and recruitment of new individuals from the plankton.

The second type of direct disturbance will be permanent disturbance caused by the deposition of additional rock armour on the seabed to protect infrastructure decommissioned *in situ*. This type of disturbance will effectively change the seabed type in the affected areas from the naturally occurring sand and mud (as described in Section 3.4.1) to a hard substrate. These materials will be permanently left on the seabed and ultimately will become fully buried by the deposition of new natural sediment. While the seabed will eventually recover and the substrate will return to pre-disturbance conditions, the time frame over which this occurs is so long-term that the disturbance is considered permanent. The temporary and permanent seabed effects associated with direct disturbance are discussed in the subsections below.

6.1.3.1.1 Temporary Direct Disturbance

As noted in Table 6-10, approximately 0.18 km^2 of seabed would be affected by temporary direct disturbance. The scale of the disturbance is minimal when compared to other forms of disturbance that occur in the area, such as commercial trawling. A commercial trawler with a 12 m wide beam trawl trawling at its slowest rate of approximately 4.7 km/h would cover an area of roughly 0.06 km^2 per hour so would therefore take approximately 3 hours to cover the anticipated direct disturbance area (FAO, 2019). As stated in Section 3.4.3, fishing effort in ICES rectangles 42F1 and 43F1, within which the Banff and Kyle Fields are located, is generally low. Effort in ICES Rectangle 42F1 was higher than in 43F1 and amounted to 251 days in 2019 (6,024 hours). Despite fishing activity being relatively low, in this context, the extremely limited scale of the disturbance associated with the decommissioning activities is clear.

Decommissioning disturbance will cause mortality, due to injuries arising from the crushing of benthic and epibenthic fauna which are sedentary or unable to move quickly. Mobile fauna will likely also be disturbed. The sediment structure, including the burrows of any animals present, will be affected. Past surveys of the Banff and Kyle Fields have identified the most common taxa living on the surface of the seabed as: sea pens (*P. phosphorea*); hermit crabs (Paguridae); anemones (Actiniaria including *Hormathiidae* and *Epizoanthus papillosus*), and sea urchins (*Gracilechinus acutus*; Fugro, 2020a). The polychaetes *Paramphinome jeffreysii* and *Galathowenia oculata* were the most abundant taxa in terms of species identified within grab samples (Fugro, 2020a, 2020b, 2020c).

The primary feature of conservation concern in the Banff and Kyle Fields are seapens and their associated EUNIS habitat, 'Seapens and burrowing megafauna in circalittoral fine mud' (which falls within the broader OSPAR threatened or declining habitat 'Seapen and burrowing megafauna communities'). Burrows were mostly 'common' throughout the area but were considered 'abundant' at one site in the Kyle Field (see Section 3.4.1 for a full description of the seabed habitats and benthos). Seapens have some resistance to being disturbed and generally can reinsert themselves into the sediment if removed, as long as they remained undamaged. However, damaged individuals show poor recovery, and therefore resilience is considered low, giving an overall sensitivity of medium (Hill, Tyler-Walters and Garrard, 2020). As such, temporary disturbance is expected to cause some mortality to any seapens that are physically damaged during operations, but this is expected to be extremely localised and not have any effect on the viability of the local population. Replacement of damaged individuals would be expected to occur either from plankton or from "adult" seapens moving in from the surrounding area. Where there has been a disturbance but the seapens remain undamaged, recovery may be rapid (<2 years; Hill, Tyler-Walters and Garrard, 2020). The nature of the activities is such that the removal of subsea structures should only have a highly localised impact on the seabed, there will be no placement of items thus the crushing of benthos is unlikely. Given this, recovery of seapens, and their corresponding habitat, would be swift.

The Banff infrastructure partially overlaps the East of Gannet and Montrose Fields NCMPA. The site is designated for deep-sea muds and ocean quahog (see Table 3-1). However, no adult ocean quahog (*A. islandica*, >1 cm) were recovered within either of the Banff or Kyle surveyed areas. Furthermore, the presence of ocean quahog siphons was not observed in any of the survey footage (Fugro, 2020a, 2020b). The Banff Field is located partly within an area of A5.37 'Deep circalittoral mud' and the Kyle Field is almost exclusively located within A5.37 'Deep circalittoral mud'. The JNCC Advice on Operations within the NCMPA categorises deep-sea muds as 'sensitive' to decommissioning activities such as abrasion and disturbance of the substrate, water clarity and siltation (JNCC, 2018b). The seabed disturbance in relation to this protected site which may overlap with the activities is detailed in the Section 6.1.5 below.

EUNIS habitat types A5.27 'Deep circalittoral sand', A5.27 'Deep circalittoral sand', and A5.37 'Deep circalittoral mud' are representative of the Banff and Kyle Fields (EMODnet, 2019). In particular, habitat A5.27 'Deep circalittoral sand', the predominant seabed type, is one of the most prevalent seabed habitats in the North Sea, covering an approximate area of 150,506 km^2 throughout UK waters (NMPi, 2020). As such, temporary disturbance of a small area of seabed (<0.0001% of the total habitat) is expected to have a negligible effect in the context of the regional environment.

Though no cuttings piles are evident in the project area, sediment contamination levels indicate the presence of historic piles. The historic drill cuttings piles within the Banff and Kyle Fields are thought to cover an area of 4,886 m^2 and 4,271 m^2 respectively. Drilling fluid inputs were evident at some of the locations within the Banff and Kyle Fields (Fugro, 2020c). The distribution of THC at sample locations within the Banff and Kyle

Fields is shown in Figure 3-3 (from Fugro, 2020c). At all but one site in the Banff Field the level of THC was below the OSPAR threshold of 'ecological effect' (Fugro, 2020c). However, this being the case at only one site, the likelihood of the decommissioning activities disturbing this is unlikely. Particularly given the very small area of overall effect and the highly localised activities which will be occurring to remove the subsea infrastructure. Based on the location of the structures which will be removed within the scope of this EA, it is unlikely that the activities will be occurring in proximity to the areas where the THC concentration is highest (Figure 3-3).

6.1.3.1.2 Permanent Direct Disturbance

Permanent direct disturbance will occur due to placing further hard substrate on the seabed in perpetuity. Approximately 0.028 km^2 of seabed will be subject to permanent direct disturbance due to the introduction of rock.

The immediate effect of the introduction of new hard substrate will be mortality and injury of benthic and epibenthic fauna that cannot move away from the activities, as well as disturbance of motile fauna. Following the introduction of the material, the ongoing effect will be the change of an area of softer habitat to a hard substrate, and a related change in the types of organisms that can use the habitat. Organisms such as sea pens and burrowing bivalves, anemones and crustaceans will no longer be able to use the area affected, while new habitat will be created for other groups such as encrusting sponges and other species of anemone.

The "Seapens and burrowing megafauna in circalittoral fine mud' habitat has no resistance to physical loss or change of substrate – where the soft sediment is no longer available, the community ceases to exist. As mentioned previously, seapens themselves show poor recovery when physically damaged (Hill, Tyler-Walters and Garrard, 2020). While the habitat could be affected by the remediation activities, this represents a highly localised impact. Furthermore, the prevalence of the habitat in the surrounding Banff and Kyle area would ultimately enable recovery of seapens.

There will be a maximum of 0.0044 km^2 of permanent disturbance associated with rock placement inside the East of Gannet and Montrose Fields NCMPA. This area is associated with the remediation of the PL1549 ends, remediation of the STL pile locations (once they are removed) and the, as yet unconfirmed, worst-case rock remediation of the FPSO mooring trenches and anchor depressions that overlap the NCMPA. Further discussion of impacts within the NCMPA can be found in Section 6.1.5.

As mentioned in Section 6.1.2.7, CNRI are committed to undertaking a study which aims to identify the appropriate method of remediation for any seabed depressions. This is due to the potentially sensitive nature of the seabed. Therefore, it is possible that rock will not be the chosen remediation method for these features and so the area of impact calculated is likely to be a considerable over-estimate. Once the survey is complete, the results will be relayed to OPRED and a discussion will be opened regarding the appropriate method of remediation for the mooring trenches.

While the introduction of hard substrate clearly results in a change in the habitat type and associated fauna present, the scale of the impact is negligible considering the very large extent of sandy seabed available in the CNS. Recovery of the affected areas is expected to take many years but will eventually occur as the deposited rock material is gradually buried by natural sediment deposition (however the time period is such that this is still considered a permanent disturbance). Therefore, the community is expected to recover and revert to pre-disturbance composition with time.

6.1.3.2 *Indirect Disturbance*

Indirect disturbance (being twice the area of direct disturbance) is projected to have an area of impact of 0.40 km^2. The temporary indirect disturbance area of increased sediment in the water column is expected dissipate rapidly as generally it is the coarser, upper layers of sediment that would be disturbed. Considering that the fines content of the samples taken throughout the Banff and Kyle Fields was always <25% and given the small area of impact, the overall level of re-suspended sediment will be low. However, increased suspended sediment may reduce feeding efficiency of filter feeders due to clogging of feeding structures. However, though not well studied, the bioturbation associated with burrows will generate sediment resuspension, thus implying that species typical of the 'Sea pen and burrowing megafauna communities' habitat may have some natural tolerance to sedimentation (Hill, Tyler-Walters and Garrard, 2020). Experimental evidence suggests that seapens, the main filter feeder of concern in the Banff and Kyle Fields,

are not sensitive to increased suspended sediment. Both species observed in the area (*P. phosphorea* and *V. mirabilis*) are tolerant to heavy smothering and siltation. *V. mirabilis* in particular are capable of retracting into their burrows thereby cleaning themselves of excess sediment by the production of mucous within the burrow (Hill, Tyler-Walters and Garrard, 2020). As such, effects due to increased suspended sediment are not expected to impact the benthos of the Banff and Kyle Fields.

6.1.3.3 *Impact of Pipelines Decommissioned* in situ

The decommissioning of items *in situ* has associated legacy impacts. This arises from the gradual breakdown of materials left *in situ*. In this instance, 15 pipelines will undergo long-term structural degradation caused by corrosion, leading to the eventual collapse of the pipelines under their own weight and that of overlying pipeline coating material, scale and sediment. During this process, degradation products derived from the exterior and interior of the pipe will breakdown and potentially become bioavailable to benthic fauna in the immediate vicinity.

The primary degradation products will originate from the following pipeline components:

- Pipeline scale;
- Steel;
- Sacrificial anodes; and
- Plastic coating.

As the Banff and Kyle Field pipelines have already been purged and flushed prior, the pipeline contents is limited to treated seawater and so is not discussed further herein.

Heavy Metals

Metals with a relatively high density or a high relative atomic weight are referred to as heavy metals. It is expected that these metals will be released into the sediments and water column during the breakdown of the components of the pipeline scale, steel and sacrificial anodes.

The toxicity of a given metal varies between marine organisms for several reasons, including their ability to take up, store, remove or detoxify these metals (Kennish, 1997). Concentrations of the metals are not expected to exceed acute toxicity levels at any time owing to the decommissioning. However, chronic toxicity levels may be reached for short periods within the interstitial spaces of the sediments or in close proximity to the pipelines. At these levels, heavy metals act as enzyme inhibitors, adversely affect cell membranes, and can damage reproductive and nervous systems. Changes in feeding behaviour, digestive efficiency and respiratory metabolism can also occur. Growth inhibition may also occur in crustaceans, molluscs, echinoderms, hydroids, protozoans and algae (Kennish, 1997). It is expected that any toxic impacts will be short lived and localised with minimal potential to impact populations of marine species. The potential for uptake and concentration of metals would also be limited to the local fauna and due to the slow release of these chemicals not likely to result in a significant transfer of metals into the food chain.

The slow release of the metals associated with the pipeline steel and steel associated with the concrete coating and mattress protection is expected to have a negligible impact on the local environment. It is anticipated that failure of the pipelines due to through-wall degradation would only begin to occur after many decades (of the order of 60 to 100 years) (HSE, 1997).

Along buried pipeline corridors there may be accumulations of heavy metals in the sediments. Where present, the finer fraction of these sediments (silts and clays) are likely to form bonds with these metals, making them less bioavailable to marine organisms. The sandy (coarser fraction) of the sediments surrounding the pipelines are less likely to retain metals (MPE, 1999). The seabed within the Banff and Kyle Fields is largely composed of muddy sand and is therefore likely to retain any metals, prolonging their release to the surrounding seawater.

The pipelines to be decommissioned *in situ* cover 0.019 km^2 within the context of the wider CNS. Degradation is unlikely to occur at a constant rate and across the entire length of the pipeline. Therefore, due to the highly localised nature of any degradation products and the low concentrations of contaminants being released over an elongated period it is highly unlikely that these products will be detectable above current background conditions.

Plastics

There are plastic components within the composition of the pipelines within the Banff and Kyle Fields. However, as no micro-organisms have evolved to utilise chemically resistant polymer chains as a carbon source, these plastics can be expected to persist in the environment for centuries (OGUK, 2013). As the rate of biodegradability in the marine environment is also low, it can be assumed that the environmental effect of leaving these plastics in place is insignificant (MPE, 1999).

Due to the highly localised nature of any degradation products and the low concentrations of contaminants being released over an elongated period it is highly unlikely that these products will be detectable above current background conditions in the area.

6.1.4 Cumulative and Transboundary Impacts

The decommissioning activities outlined within DP 2 will not act cumulatively with the removal of the FPSO and FSO, covered by DP 1. No impact to the seabed occurred as a result of the DP 1 activities therefore there is no opportunity for cumulative impacts within the overall Banff and Kyle decommissioning strategy.

The decommissioning activities taking place within the Banff and Kyle Fields will not be occurring in close proximity to any other third-party oil and gas installations; the closest installation is the Gannet A platform (operated by Shell UK) which is located 27 km NW from the proposed activities. At present, there are no active cables within the vicinity of Banff and Kyle. However, the North Sea Link electricity cable is currently under construction and passes within 2 km of the Kyle Field. The cable is currently under construction and should be operational by 2021 (North Sea Link, 2020). Cable installation activities will not coincide with the proposed Banff and Kyle decommissioning (schedule available in Section 2.4). Thus, cumulative impacts on the seabed cause by construction and decommissioning activities are considered negligible.

The Banff and Kyle Fields are located 65 km and 73 km respectively from the UK / Norway median line. Given this distance, and the area of indirect temporary disturbance being 0.17 km^2, there is no potential for sediment to travel beyond the immediate vicinity of the decommissioning area and into neighbouring territorial waters. The potential for seabed transboundary impacts is therefore highly unlikely.

6.1.5 Potential Impacts to Protected Sites

The Banff Field is partially located in the East of Gannet and Montrose Fields NCMPA. The site is designated for deep-sea muds and ocean quahog. A number of decommissioning activities have the potential to affect the site directly, as follows:

- Remediation of the PL1549: The PL1549 is almost entirely located in the NCMPA and is already covered by rock protection. The pipeline does not have any exposures; therefore, the only remediation required will be along the pipeline ends (500 m^2 per end). This will be a permanent source of impact.
- Remediation of the FPSO mooring trenches and anchor depressions: As shown in Figure 2-2, targeted remediation will be required within the NCMPA to address some of the mooring trenches (associated with mooring lines 1, 2 and 3) and anchor depressions (associated with mooring lines 1, 2, 3, 4, 9 and 10) which remain as a legacy from the former location of the FPSO. While a worst-case assumption of rock placement has been considered throughout the EA, the final method of remediation will be fully investigated in the proposed seabed study and any actions to undertake remediation will be discussed with OPRED and covered by the appropriate permits.
- Removal of eight STL piles in the Banff Field and the remediation of their former location: This area will relate directly to the structure footprints and any surrounding excavation required to allow for cutting and removal. Once removed, the area will be remediated, with a worst-case scenario of rock remediation resulting in a permanent impact to the seabed.
- Removal of a single Banff SAL Anchor Base: The removal of the single structure will only generate a temporary direct and indirect impact.

As quantified in Section 6.1.2.7, an estimated 0.003 km^2 of rock will be required within the NCMPA to remediate the mooring trenches and anchor depressions within the site, and those which partly overlap the site's

boundary. These unconfirmed remediation activities constitute the biggest impact to the site. A further 0.001 km^2 of rock will be used to remediate the ends of the PL1549, and an estimated 0.00043 km^2 of rock will be used to cover the former STL pile locations. All this activity will result in a total area of permanent impact of 0.0044 km^2 (Table 6-10). As stated previously, this is likely to be an overestimate because the seabed study has yet to determine the appropriate course of action to remediate the mooring trenches. Additionally, as can be seen in Figure 6-1, the ends of the PL1549 may be outside the boundary of the NCMPA thus in reality, a much lesser area of the site may be affected by these decommissioning activities.

The East of Gannet and Montrose Fields NCMPA site covers an area of 1,839 km^2 (JNCC, 2017). Activities which will generate a permanent impact on the site, and consequently a loss of habitat, will affect an area equating to 0.0002% of the site. Activities relating to the removal of the single SAL Anchor Base will create a maximum area of temporary direct disturbance equating to <0.00009% of the site. Consequently, only a very small area will be subject to disturbance due to the proposed activities. In the case of temporary disturbance, the area affected is likely to recover once the activities cease. It is also possible that with regard to remediation of the FPSO mooring trenches and anchor depressions, rock infill would not be all the way up to seabed level; this would allow for some natural backfilling by sediment to cover the rock over time. This would enable some degree of seabed recovery. However, the final method of remediation has not been determined and any future activities relating to the mooring trenches and anchor depressions in the Banff Field will be covered by the applicable permitting once confirmed with OPRED.

Based on the estimated locations of aggregations of ocean quahog and deep-sea muds, the decommissioning activities are only at risk of impacting the deep-sea mud habitat (NMPi, 2020). The JNCC Advice on Operations within the NCMPA categorises deep-sea muds as 'sensitive' to decommissioning activities such as abrasion and disturbance of the substrate, water clarity and siltation (JNCC, 2018b).

However, as described in Section 3.4.1, the environmental surveys carried out across the Banff Field defined the sediment as still having a substantial sand component (on average 84.59%; Fugro, 2020a). While the survey coverage within the Banff Field was centred on the Banff manifold (Figure 3-1) and did not extend as far from this location as the FPSO mooring trenches and anchor scour, it is possible that the trenches and depressions are in areas of localised sand sediment. Consequently, it is possible that the Banff Field may not intrude into an area of deep-sea muds as recognised within the NCMPA. As such, the protected deep-sea mud habitat may not be affected by the proposed decommissioning activities. Conversely, the depth of some of the trenches (as reported in Table 2-6) are such that it is possible the substrate has a substantial mud component as only a stiff clay could support such seabed features.

Overall, the impact on the NCMPA, including temporary and permanent direct impacts, will affect 0.0003% of the site, which is not likely to impact the functionality of the habitat. The Conservation Objectives of the site aim to maintain favourable conditions within the site or bring them into this favourable condition. It is not anticipated that the impact of the proposed decommissioning activities would inhibit the ability of the site's condition to be improved or reduce the condition of the site overall. As described above, the area of impact is likely an overestimate and surveys of the area did not observe any habitats for which the site is designated. Therefore, the most sensitive habitats of the NCMPA may be minimally affected by the decommissioning of the Banff and Kyle Fields.

With respect to cumulative impacts on the NCMPA, at time of writing CNRI are not aware of any similar projects occurring nearby within the same timeline or otherwise. There are a number of other oil and gas developments in the NCMPA: the East of Gannet and Montrose Fields; the Gannet Fields; and the Arwkright, Wood, Madoes, Montrose and Teal Fields. However, none of these have submitted DPs therefore it is assumed that there are no significant planned activities due to take place in the nearby future within the site. Thus, opportunities for cumulative impacts are eliminated.

6.1.6 Mitigation Measures

The following measures will be adopted to ensure that seabed disturbance and its impacts are minimised to a level that is as low as reasonably practicable:

- All activities which may lead to seabed disturbance will be planned, managed and implemented in such a way that disturbance is minimised;

- Careful planning, selection of equipment, and management and implementation of activities;
- A debris survey will be undertaken at the completion of the decommissioning activities. Any debris identified as resulting from oil and gas activities will be recovered from the seabed where possible;
- Rock armour will be placed by a fall pipe vessel equipped with an underwater camera on the fall pipe. This will ensure accurate placement of the rock armour and reducing unnecessary spreading of the rock armour footprint and ensuring that minimum safe quantity or rock is used; and,
- Clear seabed verification will ensure there is no residual risk to other sea users. Non-intrusive verification techniques will be considered in the first instance, but if deemed necessary, seabed clearance may require conventional overtrawl survey methods, in agreement with OPRED and fishing bodies.

6.1.7 Residual Impact

Decommissioning activities within the Banff and Kyle Fields will result in temporary direct and indirect disturbance to the seabed. Temporary direct disturbance has the potential to impact approximately 0.18 km^2 of seabed. Temporary indirect disturbance has the potential to impact approximately 0.4 km^2. There will be a 0.028 km^2 area of permanent disturbance as a result of rock placement. These are considered highly conservative estimations of the likely impact of the proposed decommissioning activities, as the buffers added to the structures are likely to overestimate the range of impact generated by various removal methods.

Surveys have identified the OSPAR threatened or declining habitat 'Seapen and burrowing megafauna communities' within the Banff and Kyle Fields (Fugro, 2020a, 2020b). The general benthos and the species associated with the OSPAR habitat specifically are likely to have some natural resilience to increased sedimentation, if not to abrasion associated with direct disturbance. Considering the nature of the removal of the subsea structures from the seabed, the opportunity for crushing or physical damage to seapens is minimal. Furthermore, taking into account the mitigation measures described above (Section 6.1.6), this should ensure that the area of impact will be as small as practicably possible. Given the very small area of direct and indirect impact predicted to be generated by the proposed decommissioning, the activities are not likely to negatively affect the seabed and benthos.

The EUNIS habitat complex A5.27 'Deep circalittoral sand' covers approximately 150,506 km^2 of the North Sea (NMPi, 2020), as such, the small area of disturbance modelled for the proposed decommissioning (including both temporary and permanent direct impacts) may impact only a very small proportion (0.0001%) of this habitat. Therefore, given the widespread nature of this substrate, the decommissioning will not affect a significant proportion of this seabed. Impacts will mostly be temporary in duration and the bioturbation observed in the surveys (Fugro, 2020a, 2020b and 2020c) suggests that sediment disturbance is naturally occurring in the area to some degree.

The East of Gannet and Montrose Fields NCMPA is designated for deep-sea muds and ocean quahog aggregations. While ocean quahog are not found in the vicinity of the Banff and Kyle Fields, the activities may overlap with the deep-sea mud habitat (though survey evidence does not indicate the presence of deep-sea mud at any of the sample locations; Fugro, 2020). Overall, the proposed decommissioning activities are expected to have both a permanent and temporary impact on the site, covering an area of 0.0044 km^2 and 0.0016 km^2 respectively. The area of rock placement equates to 0.0003% of the NCMPA. Considering the highly localised temporary nature of the activities and the mitigation measures outlined above, the habitat, though sensitive, is not likely to be affected significantly by the decommissioning.

Based on the anticipated localised and temporary nature of the disturbance, the proposed decommissioning of the Banff and Kyle Fields will have a negligible impact on seabed receptors.

6.2 Physical Presence of Infrastructure Decommissioned *in situ* in Relation to Other Sea Users

6.2.1 Sources of Potential Impacts

The decommissioning of the Banff and Kyle Fields has the potential to impact on other users of the offshore environment. In relation to the decommissioning of the Banff and Kyle Fields, the physical presence of subsea infrastructure decommissioned *in situ* poses a potential snagging risk for commercial fisheries.

6.2.1.1 *Physical presence of subsea infrastructure decommissioned* in situ *posing a potential snagging risk*

The long-term presence of subsea infrastructure decommissioned *in situ* has the potential to interfere with other sea users. In particular, exposures or free-spans associated with infrastructure decommissioned *in situ* which may arise during initial decommissioning and long-term degradation, may present a snagging risk to some fisheries. In addition to the physical presence of the pipelines / umbilicals decommissioned *in situ*, seabed depressions, local rock placement, mattresses and grout bags also increase the potential for interaction with fishing gear. Demersal fishing gears which interact with the seabed are vulnerable to snagging. Snagging may lead to the loss or damage of catch or fishing gear and may result in vessel destabilisation in extreme circumstances. Generally, interactions between oil and gas infrastructure and fishing gear are most prevalent in the muddy Northern North Sea (NNS) where the proportion of demersal fishing is relatively high (Rouse, Hayes and Wilding, 2018), as opposed to the CNS where the Banff and Kyle Fields are located.

6.2.2 Effects on Sensitive Receptors

Annual fishing effort in the Banff and Kyle area (ICES rectangles 42F1 and 43F1) is variable. In rectangle 42F1 effort is consistently higher; in 2019 there were 251 days of effort compared to 28 days in rectangle 43F1 (Table 3-3 and Table 3-4). The targeted species type also differs between rectangles; in 43F1 demersal catch contributes the most whereas in 42F1 shellfish dominate. Demersal catch includes trawl gears which interact with the seabed and increase snag risk. Shellfish fisheries are associated with a more passive gear effort, limiting contact with the seabed and any potential snag risks.

On review of demersal trawling activity in the North Sea, Rouse et al. (2017) found that a low percentage (0.93%) of demersal trawling trips specifically targeted oil and gas pipelines compared with surrounding areas. The disused pipeline from Kyle South to the Curlew Field (PL1798 and associated umbilical PL1800) experiences some increased fishing compared to other Banff and Kyle Field pipelines (Figure 6-2), but the number of trawl passes is still relatively low (19-24 trawl passes on average between 2007 and 2015; Figure 6-2). This corresponds to VMS data which highlights two areas of *Nephrops* activity on either side of the pipeline (Figure 3-7) between which trawl vessels could be moving. In the middle of the disused pipeline (where it experiences higher trawling intensity), no exposures were observed despite this ongoing activity (Appendix E).

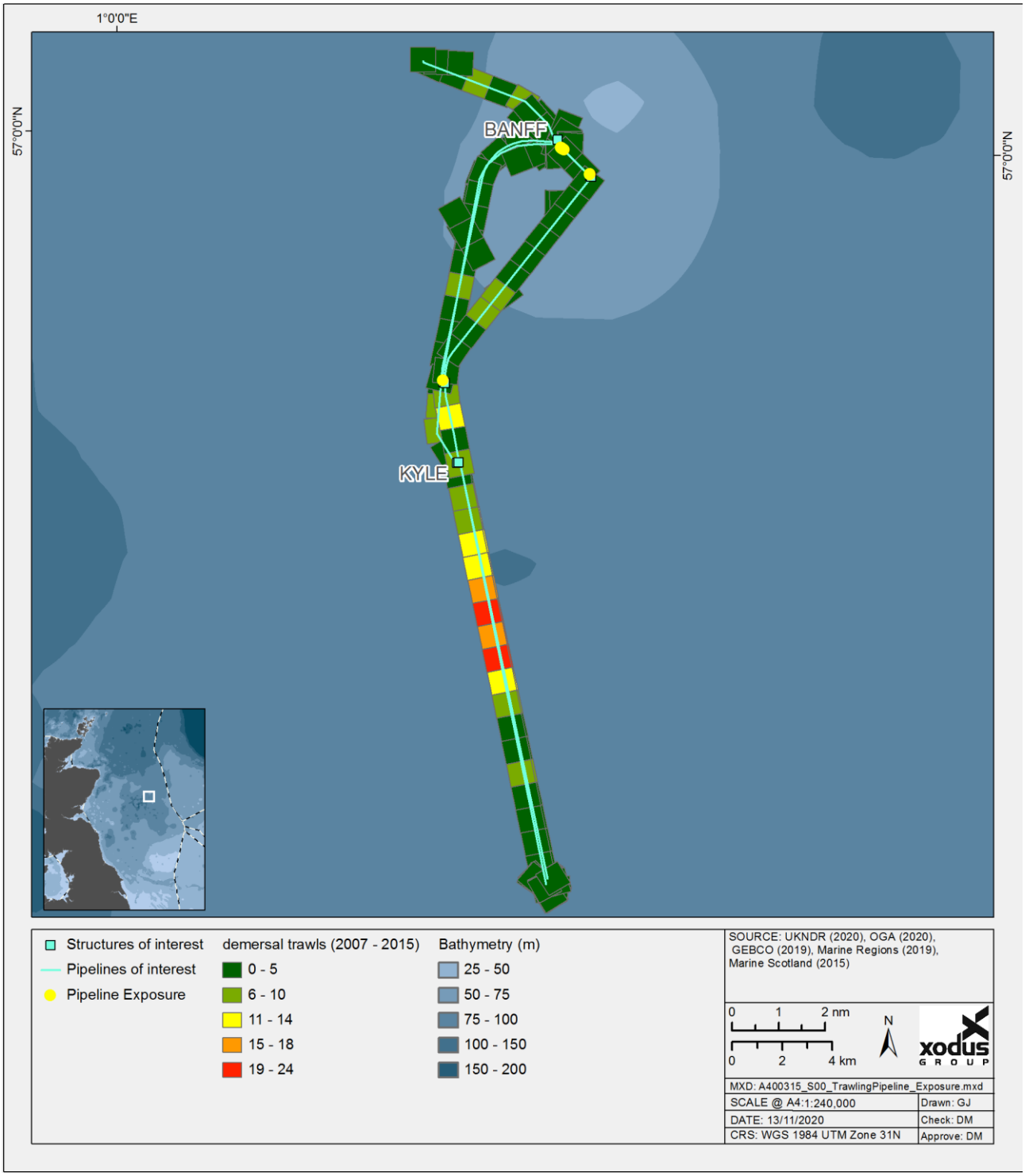


Figure 6-2 Trawling across the Banff and Kyle pipelines in relation to areas of exposure

The other pipelines within the Banff and Kyle Fields experience significantly less fishing, possibly due to the Fields' proximity to the East of Gannet and Montrose Fields NCMPA, though fishing is not prohibited within the area. More likely the sandier sediment within the Banff Field is less productive for commercial fisheries which, with the focus in ICES rectangle 42F1 being shellfish, find the habitat around the Kyle Field more profitable. The VMS fisheries data highlights fishing hotspots none of which come close to the Banff and Kyle Field pipelines (Figure 3-7).

There are no FishSafe reportable spans within the Banff and Kyle Fields. There are 23 exposures along five pipelines within the Banff and Kyle Fields totalling a length of 345 m. These exposures are located in clusters towards the ends of the infield pipelines (shown in yellow on Figure 6-2) and coincide with areas of low trawling intensity. All of these exposures will be remediated as appropriate using rock placement. Due to the water depth and nature of the environment within the Fields it is unlikely that any exposures will move or continue to grow as in a more mobile dynamic environment. Any potential changes in burial status of either pipeline resulting in legacy impacts to commercial fisheries due to its degradation over time will be managed through continued monitoring and communication with relevant users of the sea, as detailed in Section 6.2.4 below.

Overall, the region experiences low fishing activity and effort. In the areas along the discussed Kyle South to Curlew pipeline where trawling intensity is slightly higher, the pipeline is stably buried to a suitable depth. There are some exposures which will be remediated however they coincide with an area little used by commercial fisheries. Overtrawlable rock remediation over these exposures will ensure any snag risk is reduced. Therefore, the decommissioning activities will only reduce the potential for snagging events to occur along a section of pipeline within an area which attracts little commercial activity regardless. Therefore, snagging risks associated with the decommissioning of the pipelines *in situ* is minimal.

6.2.3 Cumulative and Transboundary Impacts

The Banff and Kyle Fields are located approximately 65 km and 73 km from the UK / Norway border respectively. The most recent AIS vessel track data does not show much fishing vessel movement between the UKCS and Norway. As such, the Fields are not likely to experience particularly high levels of fishing by foreign vessels, though it may be marginally higher when compared to other nearshore regions of the UKCS. Activity by fishing fleets of several non-UK nationalities may be recorded throughout the waters surrounding the Banff and Kyle Fields; the most common of which are likely to be Norwegian, Danish and French vessels which predominantly target blue whiting and mackerel (MMO, 2020).

In the wake of the decommissioning activities pipeline exposures will be remediated and the seabed will be left in a safe overtrawlable condition, so no impacts to any UK and / or foreign fishing fleets are expected to result from the proposed activities.

There are no other similar activities known to be occurring in the nearby area within the same timeframe (for a schedule of activities see Section 2.4), therefore there are not likely to be any snagging-related cumulative impacts on commercial fisheries resulting from activities coinciding with the decommissioning. This includes activities covered by DP 1 – none of the other proposed activities discussed or permitted outwith this EA will generate potential snag risk.

6.2.4 Mitigation Measures

A number of mitigation measures will be employed to reduce the impact on other sea users:

- The Banff and Kyle Fields' subsea infrastructure is currently shown on Admiralty Charts, the FishSafe system and the OGA Infrastructure data systems (OGA Open Data). Once decommissioning activities are complete, updated information (i.e. which infrastructure remains in situ and which has been removed) will be made available to allow the Admiralty Charts and the FishSafe system to be updated;
- Any exposures / cut flowline ends will undergo rock placement to ensure they are overtrawlable to active fishing gears;
- Any objects dropped during decommissioning activities will be removed from the seabed where appropriate;
- CNRI will monitor the seabed to assess any seabed depressions which may present a snag risk within the Banff Field and are currently undertaking studies to determine the most appropriate method of remediation. The survey results will be used in discussion with OPRED prior to the commencement of any intervention;
- Clear seabed verification will ensure there is no residual risk to other sea users. Non-intrusive verification techniques will be considered in the first instance, but if deemed necessary, seabed clearance may require conventional overtrawl survey methods. Where there is evidence of residual snagging hazards (e.g. any

spans, berms, dropped objects, etc.), then intervention in the form of overtrawling to re-level the seabed or the addition of rock placement will be discussed with OPRED, and implemented as appropriate; and

> CNRI recognise their commitment to monitor any infrastructure decommissioned *in situ* and therefore intend to set up arrangements to undertake post-decommissioning monitoring. The frequency of the monitoring that will be required will be agreed with OPRED and future monitoring will be determined through a risk-based approach established from the findings from each subsequent survey. During the period over which monitoring is required, the burial status of the infrastructure decommissioned *in situ* would be reviewed and any necessary remedial action undertaken to ensure it does not pose a risk to other sea users.

6.2.5 Residual Impact

The decommissioning of pipelines *in situ* should not pose an increased risk of snagging. All pipelines in the Banff and Kyle Fields are considered suitably buried. The disused pipelines from Kyle South to Curlew has two exposures along it at either end. These will be remediated as appropriate during the decommissioning. These exposures coincide with areas where fishing effort and intensity are low. Therefore, in areas where snagging has the greatest potential to occur there is little chance of interaction with fishing gear. The mooring line trenches associated with the former location of the FPSO and any other seabed depressions will also be remediated to mitigate against snag risk. While the method of remediation has not yet been determined, the planned study will advise the appropriate method of remediation thereby ensuring the seabed is left safe and unobstructed.

In the wider regional context, the waters in which the Banff and Kyle Fields and associated pipelines are located experience overall low fishing effort, based on available fishing data. Foreign fleets are unlikely to depend on the area significantly.

When accounting for the mitigation measures which will be implemented, and the fact that exposures will be remediated appropriately during decommissioning, the potential for future snagging events is completely reduced. Overall, the decommissioning of pipelines *in situ* is not anticipated to negatively impact commercial fisheries.

7 CONCLUSIONS

Following detailed review of the proposed decommissioning activities, the environmental sensitivities characteristic of the Banff and Kyle area, industry experience with decommissioning activities, and consideration of stakeholder concerns, it was determined that potential project-related impacts to the seabed, and commercial fisheries required further consideration

The Banff and Kyle infrastructure is located over 190 km offshore in the CNS, remote from coastal sensitivities and overlapping slightly with the East of Gannet and Montrose Fields NCMPA, which is designated for the protection of ocean quahog aggregations and deep-sea muds.

Decommissioning activities within the Banff and Kyle Fields will result in temporary direct and indirect disturbance to the seabed (Section 6.1). Temporary direct disturbance has the potential to impact approximately 0.18 km^2 of seabed. Temporary indirect disturbance has the potential to impact approximately 0.4 km^2 of seabed. Rock remediation activities will impact an area of approximately 0.028 km^2. The activities within the NCMPA which relate to rock placement will affect and area of 0.0044 km^2. These activities have the potential to cause minor discernible change to the baseline of existing benthic receptors within and outside of the NCMPA. A further 0.012 km^2 will be affected by temporary disturbance. However, considering the highly localised temporary nature of the activities and the mitigation measures outlined, the habitat, though sensitive, is not likely to be affected significantly by the decommissioning. Overall, only a fraction of the NCMPA will be affected (0.0003%). The Conservation Objectives of the site intend to maintain the site in a favourable condition, or otherwise improve it. As the area of impact within the site will be so minor, there is no foreseeable opportunity for the activities to impact the condition of the site as a whole. Based on the anticipated localised and temporary nature of the disturbance, the proposed decommissioning of the Banff and Kyle Fields will have a **negligible** impact on seabed receptors.

Activities with the potential to impact upon commercial fisheries were limited to the possible legacy impacts from the decommissioning of pipelines and associated protection materials *in situ* (Section 6.2). Such impacts are restricted to commercial fisheries which make active contact with the seabed, such as those which operate bottom trawl or dredging gears. All pipelines in the Banff and Kyle Fields are considered suitably buried and all exposures or seabed depressions will be remediated. Recent trawling data indicates that areas of pipeline exposure (and where remediation efforts will be focussed) do not coincide with high-intensity trawling routes. In the wider regional context, the waters in which the Banff and Kyle Fields and associated pipelines are located experience overall low fishing effort, based on available fishing data. Foreign fleets are unlikely to depend on the area. Based on these observations, coupled with mitigation measures which include focussed overtrawl surveys (if required) and monitoring for exposures, impacts to commercial fisheries from snagging risk from the decommissioning of the Banff and Kyle infrastructure are deemed **negligible**.

Finally, this EA has considered the objectives and marine planning policies of the NMP across the range of policy topics including biodiversity, natural heritage, cumulative impacts and the oil and gas sector. CNRI consider that the proposed decommissioning activities are in alignment with these 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 CNRI HSE Policies and Environmental Management Systems (EMS), it is considered that the proposed Banff and Kyle decommissioning activities do not pose any threat of significant impact to environmental or societal receptors within the UKCS or internationally.

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APPENDIX A ITEM INVENTORY

Appendix A.1 Group 1 Pipelines

Pipeline ID	Description	OD (inches)	Length (km)
PL1546	10" Banff Oil Production Pipeline (P2), Manifold to Riser Base	10	1.546
PL1547	10" Banff Oil Production Pipeline (PI), Manifold to Riser Base	10	1.546
PL1548	10" Banff Water Injection Pipeline, Riser Base to Manifold	10	1715
PL1550	12" Banff Oil Export Pipeline, Tie-in Spool to 12" Flow line	12	1 248
PL1660	8" Kyle Oil Production Pipeline, North Kyle DC to Riser Base	8	12.023
PL1797	8" Kyle Oil Production Pipeline, Kyle North Well to Kyle North Flow line	8	3.370
PL1798	Tie-in Flange	12	17.383
PL2388	12" Curlew Production Pipeline, Kyle South 12" Tee Structure to	4	3.289

Appendix A.2 Group 2 Pipelines

Pipeline ID	Description	OD (inches)	Length (km)
PL2052	6" Banff Gas Lift / Injection Flow line, Gas Lift / Injection Riser base to Gas Lift / Injection Manifold	6	1.800
PL1552 1 & 2	Umbilical (Hydraulic / Chemical), FPSO TUTU to Banff Manifold	4.75	1.990
PL1553, PL1554.1-7	Umbilical (Hydraulic / Chemical), DUTA to Banff Manifold	4.85	1.625
PC 1661.1-22	Kyle Umbilical (Electrical / Hydraulic / Chemical), DUTA to Well K14	5.4	1.926
PL3117	Kyle Umbilical (Electrical / Chemical), Kyle SSIV to North Kyle SAM	12.292	12.292
PL1799.1-8	Main Kyle Umbilical, Kyle North SAM to Kyle South SDU	5.4	3.607

Appendix A.3 Group 3 Flexible Flowline

Pipeline ID	Description	OD (inches)	Length (km)
PLU4522	Pow er Umbilical	3	1.6
PLU3106	Banff gas export SSIV umbilical	3	0.536

Appendix A.4 Group 4 Pipelines

Pipeline ID	Description	OD (inches)	Length (km)
PL1549	6" Banff Gas Export Pipeline, API Transition Spool to CATS Tie-in	6	6.268
PL2387	4" Kyle Gas Lift Pipeline, Banff Gas Lift / Injection Manifold to Kyle North Gas Lift / Choke Manifold	4	10.252

Appendix A.5 Structures

Description	Location	Length (m)	Width (m)	Height (m)
Banff Gas Lift / Injection Manifold	Banff	18	14	4.775
Banff Production Manifold		18	16	5.178
Gas Lift / Choke Manifold		13	11	3.65
Banff Dynamic Umbilical Termination Unit (DUTU) Structure		7.5	5.5	2.937
P1 Production Riser Base		8.65	4.5	4.3
P2 Production Riser Base		8.65	4.5	4.3
Gas Lift / Injection Riser Base		8.7	4.5	4.3
Oil Export Tether Base		7	7	2.9
Oil Export STL Tether Base		4	3	1.4
Suction Base (SAL Anchor Base)		9	9	16.7
Pipeline End Manifold (PLEM) Tee		3.1	3	1.7
Banff Umbilical Tether Base		7	7	2.9
Gas Export SSIV Structure		10	5.5	3.9
Gas Export Tether Base		6	6	3.2
Banff Umbilical Tether Base Anode Skid A		1.9	1.5	0.7
Banff Umbilical Tether Base Anode Skid B		1.9	1.5	0.7
Gas Export Tether Base Anode Skid A		1.9	1.5	0.7
Gas Export Tether Base Anode Skid B		1.9	1.5	0.7
Gas Export SSIV Anode Skid		1.9	1.5	0.7
Oil Export Riser Base Structure Anode Skid A		1.9	1.5	0.7
Oil Export Riser Base Structure Anode Skid B		1.9	1.5	0.7
PLEM Tee Anode Skid		0.75	0.5	0.2
Abandoned Guide Base		9.4	9.4	3.1
Abandoned Guide Base		2.8	2.8	3
Abandoned Guide Base		3	3	3.4
Abandoned Guide Base		3	3	3.4
Xmas Tree with Guide Base Well B1		5.3	5.3	5.2
Xmas Tree with Guide Base Well B2		5.3	5.3	5.2
Xmas Tree with Guide Base Well B3		5.3	5.3	5.2
Xmas Tree with Guide Base Well B4		5.3	5.3	5.2
Xmas Tree with Guide Base Well B5		5.3	5.3	5.2
SDU / SAM Structure	Kyle North	9	8	1.9
Gas Lift / Choke Manifold		13	11	3.7
North Drill Centre Valve Structure		10	8	2.4
Kyle SSIV Structure		6	7.5	3.2
Kyle Production Riser Base		8	8	3.2
Kyle Umbilical Riser Base		8	8	3.2
Disconnected Structure (Old SDU / SAM Structure)		7.6	6.8	1.8
Umbilical Tee c/w Protective Cover		6.2	3	1.3
Abandoned Guide Base		2.8	2.8	3
Xmas Tree with Guide Base Well K14		5.3	5.3	5.2
Xmas Tree with Guide Base Well K13		5.3	5.3	5.2

Abandoned Umbilical Tee Connector		6.2	4.3	1.3
Banff to Kyle North Umbilical Wet Splice		3	1.2	0.8
Kyle North to Kyle South Umbilical Wet Splice		2.6	1.2	0.6
12" Tee Structure	Kyle South	11.8	8.7	2.2
Gas Lift / Choke Manifold		13	11	3.65
South Drill Centre Valve Structure (8" Tee Structure)		10	8	2.4
Curlew Umbilical DUTU		3	1.3	1.2
Xmas Tree with Guide Base Well K12		5.3	5.3	5.2
Xmas Tree with Guide Base Well K15		5.3	5.3	5.2

Appendix A.6 Group 8 STL Piles

Subsea installations	Number	Size (m)	Weight (Te)	Comments / Status
STL Mooring Piles	4 (Type C)	30 m x 1.83 m	102 Te	Anchor pile has approximately 8 m of chain in 60% burial, exposed at the pile with no trench visible
		30 m x 1.83 m	102 Te	Anchor pile has chain bundle approximately 10 m from pile position. Chain to pile and pile all in full burial.
		30 m x 1.83 m	102 Te	Anchor pile has small chain bundle approximately 8 m from the pile suspected position. Chain to pile and pile all in full burial.
		30 m x 1.83 m	102 Te	ML4 Anchor pile has approximately 4 m of chain in 50% burial 4 m from the estimated pile position. The chain to pile all in full burial.
	3 (Type B)	24 m x 1.83 m	80 Te	ML5 Anchor pile is visible approximately 30 cm above seabed- 9 m from the pile there is half a link of chain exposed- all other chain in burial.
		24 m x 1.83 m	80 Te	Anchor pile is not visible nor is the chain- all in full burial.
		24 m x 1.83 m	80 Te	Anchor pile is protruding approximately 30 cm above seabed- all chain in full burial.
	1 (Type A)	28 m x 1.83 m	93 Te	ML8 anchor pile is exposed protruding approximately 20 cm above the seabed- there is approximately 4 m of chain in 20% burial next to the pile.

Appendix A.7 Spools, Jumpers and SSIVs

Field	Description	Pipeline No. (as per PWA)	Dia. (in)	Length (km)
Banff	Banff Production P2	PL1546	10" / 8"	1.759
Banff	Oil Production flexible Jumper	PL1546(J) B5	8"	0.020
Banff	Banff Production P1	PL1547	10"	1.740
Banff	Banff Gas Lift / Injection	PL1548	8"	0.001
Banff	Banff Water Injection	PL1548	10"	1.687

Field	Description	Pipeline No. (as per PWA)	Dia. (in)	Length (km)
Banff	Banff Gas Export	PL1549	6”	6.578
Banff	Banff Gas Export (redundant section)	PL1549A	6”	0.150
Banff	Banff Oil Export	PL1550	12”	1.920
Banff	Banff Oil Export, SAL (redundant section)	PL1550A	12”	0.324
Kyle	Kyle Production	PL1660	8”	12.023
Kyle	Kyle Production (redundant section)	PL1660A	8”	0.400
Kyle	Kyle EHC Umbilical	PL1661.1-.22	5.4”	12.033
Kyle	Kyle K13 Production	PL1797	8”	3.370
Kyle	Kyle K12 Production (Curlew pipeline)	PL1798	12”	16.975
Kyle	Kyle K12 Production	PL1798A	12”/8”	0.115
Kyle	Kyle South EHC umbilical	PL1799.1-.19	5.4”	3.548
Kyle	Kyle K13 Umbilical (redundant)	PL1799A	3.85”	0.143
Kyle	Kyle K12 umbilical	PL1800A	4”	0.030
Kyle	Kyle K14 Production	PL1887	11”	0.050
Kyle	Kyle K15 Production	PL1952(J)	10.75”	0.056
Kyle	Kyle K15 umbilical	PL1953(J)	11”	0.075
Banff	Banff Gas Lift / Injection	PL2052	6”	1.842
Banff	Banff Gas Lift / Injection	PL2052JB1	2”	0.039
Banff	Banff Gas Lift / Injection	PL2052JB3	2”	0.039
Banff	Banff Gas Lift / Injection	PL2052JB4	2”	0.039
Banff	Banff Production	PL2053	6”	0.039
Banff	Banff Production	PL2054	6”	0.029
Banff	Banff Production	PL2055	10”	0.029
Banff	Banff Production	PL2056	10”	0.036
Kyle	Kyle North chemical umbilical	PL2189	1.4”	0.045
Kyle	Kyle North Gas Lift	PL2387	4”	10.252
Kyle	Kyle North gas lift K13	PL2387JK13	2”	0.060
Kyle	Kyle North gas lift K14a	PL2387JK14a	2”	0.058
Kyle	Kyle South Gas Lift	PL2388	4”	3.289
Kyle	Kyle South gas lift K12z	PL2388JK12z	2”	0.051
Kyle	Kyle South gas lift K15	PL2388JK15	2”	0.040
Banff	Banff B1 control umbilical	PL4987	2”	0.039
Banff	Banff Chemical Injection umbilical	PLU1552	4.75”	1.750
Banff	Banff Chemical Injection umbilical	PLU1553	4.75”	1.625
Banff	Banff Chemical Injection umbilical	PLU1554.1-.7	4.75”	1.625
Kyle	Kyle K14 umbilical (redundant)	PLU1888	11”	0.045
Kyle	Kyle K13 umbilical	PLU2188	11”	0.154
Kyle	Kyle North K13 control umbilical	PLU2389	11”	0.083
Kyle	Kyle North K14a control umbilical	PLU2390	11”	0.083
Kyle	Kyle North control umbilical	PLU2391	11”	0.127
Kyle	Kyle South K15 control umbilical	PLU2392	11”	0.054
Kyle	Kyle South control umbilical	PLU2393	11”	0.095
Kyle	Kyle South K12z control umbilical	PLU2394	11”	0.086
Kyle	Kyle North control umbilical	PLU2520	6”	0.150
Banff	Banff Control Umbilical	PLU4522	3"	1.651

Field	Description	Pipeline No. (as per PWA)	Dia. (in)	Length (km)
Kyle	Kyle South umbilical (Curlew)	PL1800	5.5"	17.300
Kyle	Kyle umbilical	PLU3117	4"	12.292
Banff	Banff Oil Export (redundant section)	PL5073	12"	0.07

Appendix A.8 Pipeline Structures

Description	Location	Length (m)	Width (m)	Height (m)
Banff Gas Lift SSIV Structure	Banff	10	5.5	3.9
Banff Gas Export SSIV Structure	Banff	8.7	8.3	3.4
Kyle Subsea Isolation Valve (SSIV) Structure	Kyle South	6	7.5	3.2
Banff to Kyle North Umbilical Wet Splice	Kyle North	3	1.2	0.8
Kyle North to Kyle South Umbilical Wet Splice	Kyle North	2.6	1.2	0.6

Appendix A.9 Stabilisation Materials

Stabilisation Feature	Total Number	Total weight (Te)	Locations	Exposed/Buried/Condition
Concrete Mattresses[6] (6 m x 3 m x 0.15 m)	1,340	8,392	Various locations across pipeline infrastructure	Latest survey information indicates that there is a mixture of some mattresses are doubled up, rock covered, shared with other pipelines and multiple overlaps.
Concrete Mattresses[7] (6 m x 3 m x 0.3 m)	210	1,798	Various locations across pipeline infrastructure	Latest survey information indicates that there is a mixture of some mattresses are doubled up, rock covered, shared with other pipelines and multiple overlaps.
Grout Bags (25 kg bags)[8]	13,500	306.25	Various locations across pipeline infrastructure	Latest survey information indicates that there is a mixture of some grout bags covered by mattresses and some exposed.

[6] Concrete mattresses are: 6 m x 3 m x 0.15 m (approximate mass of each mattress 6.7 Te)
[7] Concrete mattresses are: 6 m x 3 m x 0.3 m (approximate mass of each mattress 8.3 Te)
[8] The quantity of grout bags is an estimate as the as-built data is not explicit.

APPENDIX B CNRI POLICIES

Appendix B.1 CNRI Health & Safety Policy

Canadian Natural

CORPORATE STATEMENT ON
HEALTH & SAFETY

Canadian Natural Resources Limited (Canadian Natural) is committed to conducting its operations in a manner that will protect the health, safety and welfare of their employees, contractors and the public. By integrating health and safety into all aspects of Canadian Natural operations with the goal of "No Harm to People – No Safety Incidents" in the workplace, Canadian Natural will:

- Provide the right resources to execute the requirements of the Safety Management System in line with our Health and Safety Statement;
- Comply with government regulations, industry guidelines, best management practices and company policies and procedures in the planning, design and operation of Canadian Natural wells, facilities and equipment;
- Provide strong leadership to the identification, assessment and management of health and safety risks at all levels of the organization and promote a participative culture;
- Proactively identify significant changes affecting health and safety systems, respond appropriately to issues and concerns and provide a mechanism for feedback;
- Provide appropriate training and equipment to Canadian Natural employees, enhancing their ability to recognize hazards and minimize risk during company operations;
- Require contractors working for Canadian Natural to be adequately supervised, trained and competent in the duties they perform;
- Ensure employees are not subject to, or participate in, harassment or violence;
- Ensure that effective emergency response measures are in place and provide prompt and effective response to any emergency situation; and
- Investigate health and safety incidents and near misses effectively to prevent recurrence, and ensure lessons learned, including those from the experiences of others, are effectively communicated and implemented across all parts of the organization.

Managers and supervisors are responsible for identifying safety needs, communicating safety hazards, investigating hazardous conditions and accidents, providing training, and ensuring equipment is properly maintained. They are responsible to respond to safety concerns raised by employees, contractors and the public.

Employees share the responsibility to work in a manner that will safeguard themselves with equal concern for co-workers, contractors and the public. They are responsible to identify and mitigate hazards, refuse and report work that is unsafe.

Canadian Natural's Management is committed to achieving Safety Excellence through continuous improvement. Annual safety performance objectives and targets are tracked and corporate status reports will be presented regularly to the Management and Board of Directors.

Tim McKay	Darren Fichter	Scott Stauth
President	**Chief Operating Officer Exploration & Production**	**Chief Operating Officer Oil Sands**

Delivering Safety Excellence — Canadian Natural — Doing it Right!

Reviewed annually by June 16th

CNQ-OVR-POL-SAF-000001_6

Appendix B.2 CNRI Environmental Management Policy

Canadian Natural

CORPORATE STATEMENT ON
ENVIRONMENTAL MANAGEMENT

Environmental stewardship is a fundamental value of Canadian Natural Resources Limited (Canadian Natural). The Company recognizes that every employee and contractor has a vital role to play in identifying, minimizing and mitigating environmental impacts from our operations to improve environmental performance. Canadian Natural's commitment to responsible environmental management will be incorporated into business activities through the following guiding principles:

- Ensure all employees and others engaged on Canadian Natural's behalf are aware of the commitment to improve environmental performance of Canadian Natural's operations;
- Provide strong leadership and promote a participative culture to proactively identify, assess and manage environmental risks and associated impacts;
- Strive to reduce the impacts of our activities through adaptive management while considering social and economic factors;
- Reduce the environmental footprint of our activities by continually improving energy efficiency, managing greenhouse gases, air emissions, water use and other resources; reduce and recycle waste materials and preserve and restore natural biodiversity through closure planning and reclamation;
- Identify significant changes affecting environmental management systems, listen to and respond appropriately to stakeholder issues and concerns and provide a mechanism for feedback;
- Ensure that effective emergency response measures are in place and provide prompt, effective and efficient response to any emergency situation;
- Investigate environmental incidents effectively to prevent recurrence, and communicate and implement lessons learned across all parts of the organization, including those from the experiences of others;
- Engage and communicate with the public regarding Canadian Natural activities;
- Manage tailings and mine waste structures, including water retention structures, safely and responsibly from design to closure; and
- Ensure that Canadian Natural operations comply with government regulations, industry guidelines and company policies and procedures concerning environmental management.

Canadian Natural's Management is responsible for developing specific operational procedures and standards that are consistent with this policy and are accountable for the maintenance, regular review and interpretation of this policy. Canadian Natural expects its suppliers, partners and business associates to have compatible environmental procedures and values.

Canadian Natural's Management is committed to achieving continual improvement in environmental performance through annual environmental objectives, targets, monitoring and measurement. Performance is reviewed and corporate status reports are presented regularly to Management and the Board of Directors.

Tim McKay	Darren Fichter	Scott Stauth
President	**Chief Operating Officer Exploration & Production**	**Chief Operating Officer Oil Sands**

DELIVERING ENVIRONMENTAL EXCELLENCE
Canadian Natural
Doing it Right!

Reviewed annually by June 16th

APPENDIX C ENVID

CNR Banff and Kyle Decommissioning Programme 3 ENVID Worksheet

Environmental Impact Review					Risk Assessment				Identified Actions		
Operational Phase	Project Element	Activity	Event to be Assessed	Summary of Environmental Impact	Existing controls (External and Internal)	Likelihood	Severity	Significance	Location and receptor- specific sensitivities	Comment	Status
General	Vessels	Vessel Physical Presence	Physical Presence	Disturbance to vessel operations offshore (e.g. fisheries and other maritime users); disturbance to marine species	Stakeholder engagement. Existing controls through DP Vessels and the usual notifications (key stakeholders). The Cardinal Buoys mark subsea infrastructure that was previously marked by the FPSO/FSO. The drill centres have their own subsea safety zones. So between the subsea ones and the cardinal buoys all infrastructure will be marked. Appropriate notifications to mariners will be issued and application will be submitted to update admiralty charts.	1	2	2	The **North Sea Link electricity interconnector** between Norway and the UK is currently under construction and will be operational by 2021. The planned cable passes ~2 km from the Kyle Field. The cable will cross the disused Kyle South to Curlew production pipeline in a SW-NE direction. This activity is unlikely to coincide with the decom operations.	Vessel focus will be in the existing 500m zones or area marked by Cardinal buoys. Overall, not expected to be an increase on pre-decommissioing vessel activity. Eventual increased access to fishing grounds.	Scoped Out
		Vessel Discharges	Discharges to Sea	Vessel discharge of grey water, bilge water, etc.	MARPOL compliance, bilge management procedures, good operating practices, vessel audit procedures and contractor management procedures will all be in place throughout.	5	1	5	No location-specific sensitivites identified	Routine discharges	Scoped out
		Vessel engine noise	Underwater Noise	Underwater noise - behavioural modifications to marine mammals and potentially fish.	Vessel noise will not have significant sound levels - unlikely to be far above ambient noise levels.	3	2	6	**Grey and Harbour seals:** Very low abundance in project area. 0-1 animals per 25km2. **Harbour porpoise:** Most likely to be in project area in summer. 0.59 animals per km2. **Atlantic white-sided dolphin:** Mostly in deeper waters, in the project area in July. 0.01 animals per km2. **Short-beaked common dolphin:** Most likely to be in project area in August but very infrequent. No abundance estimate due to rarity. **Minke whale:** Most likely to be in project area in May/June. 0.04 animals per km2. **White-beaked dolphin:** Visible almost all year in the project area (Feb, Jul, Aug, Sep, Oct, Nov) with peaks in number in summer. 0.24 animals per km2.	Overall, not expected to be an increase on pre-decommissioing vessel activity.	Scoped out
	Power generation	Project Emissions	Emissions to Air	Gaseous emissions to atmosphere cause increased degradation of local/regional air quality (NOx and particulates). Transboundary air pollution. Contributing to global warming (CO2).	Low compared to operational emissions when BANFF FPSO was in operation, minimise vessel movement as much as possible.	5	1	5	Impacts may result from emissions associted with the recycling of materials or the replacement of materials to accout for those decommissioned in situ (depending on CA outcome)	Emissions values will be included but will very likely represent a negligible proportion of all UKCS emissions over the year.	Scoped out
		Project Energy Use	Resource Use	Impact on climate change and reduction of resources of hydrocarbons. Products used for recycling.	Low compared to operational energy use, minimise vessel movement as much as possible	5	1	5	Impacts may result from energy use associted with the recycling of materials or the replacement of materials to accout for those decommissioned in situ (depending on CA outcome)	Energy value likely to be small. Replacement of materials decommissioned in situ is a theoretical value to replace the amount which would otherwise be recycled.	Scoped out
	Waste	Waste Management	Waste	Use of landfill and landfill resource take (non-hazardous); special disposal (hazardous)	All wastes, including normal, hazardous and special wastes, will be shipped to shore for processing. All waste will be dealt with and captured in a Waste Management Plan. There will be an accurate Waste inventory- tracking waste from cradle to grave. Any transfrontier shipments of waste, including those for landfill, will be non-hazardous and will be managed under a Waste Management Plan and will comply with relevant legislation.	5	1	5		Majority of material shipped to shore will be recycled (>97%). Any residual is expected to be negligible. Will be handled in line with CNR's Waste Management Strategy	Scoped out
Preparation	Substructures	Flushing and cleaning of substructures	Discharges to Sea	Liquid discharge to sea - Water quality in immediate vicinity of discharge will be reduced slightly, but effects are usually minimised by rapid dilution in massive receiving body of water; planktonic organisms most vulnerable receptor. Potential NORM impacts.	All the decommissioning activities in the B&K Area will take place after the cleaning and flushing of its relevant infrastructure. The subsea structures will be Drained, Flushed, Purged and Vented (DFPV) prior to the commencement of any decommissioning activities.	5	1	5	No location-specific sensitivites identified	Any residual remaining material will be in trace levels/volumes following the DFPV regime and will not pose any significant risk to water quality. Sampling was taken after the pipeline cleaning operations. Samples ranged between 41.7 mg/l - 4 mg/l (all below the permitted allowance). Lines were cut, left open ended with untreated seawater. Well cleaning is outwith the scope of this EA and will be P&A, covered by their own permitting regime.	Scoped out
		Marine growth removal from substructures	Waste	Disposal to landfill. As a worst case assume landfill, but look for alternative route.	All wastes, including special wastes, such as marine growth, will be shipped to shore for processing. All wastes will be addressed in a project-specific Waste Management Plan.	5	1	5	No location-specific sensitivites identified	Managed in line with existing disposal procedures for marine growth. Soft growth will be jetted off. Harder material will be disposed of onshore.	Scoped out
	Pipelines & Umbilicals	Flushing, cleaning and disconnection of pipelines and umbilicals	Discharges to Sea	Liquid discharge to sea - Water quality in immediate vicinity of discharge will be reduced, but effects are usually minimised by rapid dilution in massive receiving body of water; planktonic organisms most vulnerable receptor. Pollution of the marine ecosystem. Organic enrichment and chemical contaminant effects in water column and seabed sediments. Potential NORM impacts.	All the decommissioning activities in the B&K Area will take place after the cleaning and flushing of pipelines. Residuals at cut ends released into the marine environment (post-flushing - should be low). Flooding into the pipeline only up to a certain level (pressure dependent), so displacement is not complete pipeline.	5	1	5	No location-specific sensitivites identified	Any residual remaining material will be in trace levels/volumes following flushing and cleaning and will not pose any significant risk to water quality.	Scoped out

Decommissioning Activity	Subsea structures	External cutting with diamond wire (Internal shear cutting also anticipated for pile(s), but external cutting represents a worst-case)	Underwater Noise	Behavioural modifications to marine mammals and potentially fish. Population impacts due to cumulative impact or impacting a reproductively significant number of individuals or location.	Diamond wire cutting noise will not have significant sound levels. Cutting activities will be minimised and carried out in isolation where possible.	3	2	6	**Grey and Harbour seals:** Very low abundance in project area. 0-1 animals per 25km2. **Harbour porpoise:** Most likely to be in project area in summer. 0.59 animals per km2. **Atlantic white-sided dolphin:** Mostly in deeper waters, in the project area in July. 0.01 animals per km2. **Short-beaked common dolphin:** Most likely to be in project area in August but very infrequent. No abundance estimate due to rarity. **Minke whale:** Most likely to be in project area in May/June. 0.04 animals per km2. **White-beaked dolphin:** Visible almost all year in the project area (Feb, Jul, Aug, Sep, Oct, Nov) with peaks in number in summer. 0.24 animals per km2.	To remove the subsea structures, the cutting of flowlines will likely be done with shears, thereby minimising produced underwater noise during this activity. There is potential that external cuttings using diamond wire may be required; however, noise associated with this activity will be temporary and generated very close to the seabed, where absorption rates are highest.	Scoped out
			Disturbance to the Seabed	Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub-lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles.	Volume of sediment mobilised proportional to area of sediment disturbed Potential for the use of grit during cutting activities. This material is inert and will be used in small quantities having a negligible impact on the surrounding seabed.	5	2	10	**OSPAR 'Seapens and burrowing megafauna'** found at Banff and Kyle (North and South). This habitat is not sensitive to smothering but is highly sensitive and not resilient against physical change to the sediment and abrasion. **East of Gannet and Montrose MPA** is conserved for ocean quahog and their habitat and deep sea muds. The ocean quahog aggregations are mostly located along the eastern border of the site (away from the decommissioning activities).	Stand-alone, not a significant impact but need to be considered due to presence of MPA and potential cumulative impact	Scope in
		Lifting and Removal	Disturbance to the Seabed	Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub-lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles. Potential impact on East of Gannet and Montrose fields MPA, specifically ocean quahog PMF (OSPAR, 2008)	Volume of sediment mobilised proportional to area of sediment disturbed. THC levels and low and evidence of cuttings are negligible in this area.	5	2	10	**OSPAR 'Seapens and burrowing megafauna'** found at Banff and Kyle (North and South). This habitat is not sensitive to smothering but is highly sensitive and not resilient against physical change to the sediment and abrasion. **East of Gannet and Montrose MPA** is conserved for ocean quahog and their habitat and deep sea muds. The ocean quahog aggregations are mostly located along the eastern border of the site (away from the decommissioning activities) so will not be affected by smothering. Total hydrocarbon content (THC) values were generally comparable to, or below the average background concentration typical of the CNS - there woud not be a discernable impact from drill cuttings	Stand-alone, not a significant impact but need to be considered due to presence of MPA and potential cumulative impact	Scope in
	Pipelines and Umbilicals	External cutting with diamond wire	Disturbance to the Seabed	Localised physical seabed disturbance during excavation resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub-lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles. Potential impact on East of Gannet and Montrose fields MPA, specifically ocean quahog PMF (OSPAR, 2008)	Volume of sediment mobilised proportional to area of sediment disturbed	5	2	10	Sediment was **A5.27 'Deep circalittoral sand'** and **A5.37 'Dep circalittoral mud'** at Banff. Kyle is entirely mud. Fauna much the same between Banff and Kyle. **No adult ocean quahog** spotted at either site during surveys and no recorded presence of the species in the fields on NMPi. **OSPAR 'Seapens and burrowing megafauna'** found at Banff and Kyle (North and South). Burrows at Banff ranges from 'absent' to 'frequent' and 'common' using the SACFOR classification. Burrows at Kyle were 'absent' to 'common' and 'abundant' at one sampled site. None of the burrows showed evidence of Nephrops. **East of Gannet and Montrose MPA** is conserved for ocean quahog and their habitat and deep sea muds. The ocean quahog aggregations are mostly located along the eastern border of the site (away from the decommissioning activities) so will not be affected by smothering.	Stand-alone, not a significant impact but need to be considered due to presence of MPA and potential cumulative impact	Scope in
			Underwater Noise	Behavioural modifications to marine mammals and potentially fish. Population impacts due to cumulative impact or impacting a reproductively significant number of individuals or location.	Diamond wire cutting noise will not have significant sound levels. Cutting activities will be minimised and carried out in isolation where possible.	5	1	5	**Grey and Harbour seals:** Very low abundance in project area. 0-1 animals per 25km2. **Harbour porpoise:** Most likely to be in project area in summer. 0.59 animals per km2. **Atlantic white-sided dolphin:** Mostly in deeper waters, in the project area in July. 0.01 animals per km2. **Short-beaked common dolphin:** Most likely to be in project area in August but very infrequent. No abundance estimate due to rarity. **Minke whale:** Most likely to be in project area in May/June. 0.04 animals per km2. **White-beaked dolphin:** Visible almost all year in the project area (Feb, Jul, Aug, Sep, Oct, Nov) with peaks in number in summer. 0.24 animals per km2.	Noise associated with this activity will be temporary and generated very close to the seabed, where absorption rates are highest.	Scope out
		Physical presence of free spans/ exposures/ berms	Physical presence	Snagging risk to trawl and other demersal fisheries from pipelines and any sediment berms	Continued monitoring for an agreed period and remediation if required, accurate mapping of decommissioned *in situ* location and state Following seabed clearance, the subsea 500m zones will be opened up to other sea users having a positive impact.	2	5	10	Stakeholder concern	Remediation of berms/ scour to be decided following CA process (see below for assessment of remediation). Depth of Burial situation to be assessed within EA	Scope in
		Cut and Lift/ Reverse reel	Disturbance to the Seabed	Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub-lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles. Potential impact on East of Gannet and Montrose fields MPA, specifically ocean quahog PMF (OSPAR, 2008	Volume of sediment mobilised proportional to area of sediment disturbed	5	2	10	Sediment was **A5.27 'Deep circalittoral sand'** and **A5.37 'Dep circalittoral mud'** at Banff. Kyle is entirely **A5.37 'Dep circalittoral mud'**. Therefore is potential for berms to form. Total hydrocarbon content (THC) values were generally comparable to, or below the average background concentration typical of the CNS - there woud not be a discernable impacts from drill cuttings	Stand-alone, not a significant impact but need to be considered due to presence of MPA, cumulative impact and potential for berm development	Scope in

Legacy	Surveys	Geotechnical survey activities - may include grab sampling	**Disturbance to the Seabed**	Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub-lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles. Potential impact on East of Gannet and Montrose fields MPA, specifically ocean quahog PMF (OSPAR, 2008	Volume of sediment mobilised proportional to area of sediment disturbed (very localised)	1	2	2	**OSPAR 'Seapens and burrowing megafauna'** found at Banff and Kyle (North and South). This habitat is not sensitive to smothering but is highly sensitive and not resilient against physical change to the sediment and abrasion. **East of Gannet and Montrose MPA** is conserved for ocean quahog and their habitat and deep sea muds. The ocean quahog aggregations are mostly located along the eastern border of the site (away from the decommissioning activities) so will not be affected by smothering.	Seabed disturbance from benthic surveys will be negligible and limited to the immediate vicinity of the installations, with the odd grab sample along the pipelines, though this is unlikely. Covered by permitting	Scope out
		Geophysical survey activities	**Underwater Noise**	Underwater noise - Physiological harm, behavioural modifications to marine mammals, turtles and potentially fish. Population impacts due to cumulative impact or impacting a reproductively significant number of individuals or location.	Noise impacts to marine species from use of seismic, sub-bottom profiler, and other survey equipment. JNCC (2017) Guidelines will be employed for mitigation of noise impacts to marine mammals for future survey work involving seismic survey equipment. Future permitting will cover post-decommissioning geophysical surveys. Multibeam will likely be used for imaging and identification of any exposures.	3	2	6	**Grey and Harbour seals:** Very low abundance in project area. 0-1 animals per 25km2. **Harbour porpoise:** Most likely to be in project area in summer. 0.59 animals per km2. **Atlantic white-sided dolphin:** Mostly in deeper waters, in the project area in July. 0.01 animals per km2. **Short-beaked common dolphin:** Most likely to be in project area in August but very infrequent. No abundance estimate due to rarity. **Minke whale:** Most likely to be in project area in May/June. 0.04 animals per km2. **White-beaked dolphin:** Visible almost all year in the project area (Feb, Jul, Aug, Sep, Oct, Nov) with peaks in number in summer. 0.24 animals per km2.	Covered by permitting	Scope out
	Remediation	Introduction of new substrate	**Disturbance to the Seabed**	Introduction of new substrate which may alter habitat architecture, influencing water movement, sediment accumulation and light conditions.	Minimise introduction of material where possible	5	2	10	**OSPAR 'Seapens and burrowing megafauna'** found at Banff and Kyle (North and South). This habitat is not sensitive to smothering but is highly sensitive and not resilient against physical change to the sediment and abrasion.	If rock material is required (following CA), this needs to be considered due to presence of MPA and potential cumulative impact	Scope in if necessary following CA
		Rock dump/ reburial	**Disturbance to the Seabed**	Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub-lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles. Potential impact on East of Gannet and Montrose fields MPA, specifically ocean quahog PMF (OSPAR, 2008)	The use of rockdump will be minimised where possible. Volume of sediment mobilised proportional to area of sediment disturbed.	5	2	10	Sediment was **A5.27 'Deep circalittoral sand'** and **A5.37 'Dep circalittoral mud'** at Banff. Kyle is entirely **A5.37 'Dep circalittoral mud'.** Therefore is potential for berms to form.	Usually relatively small footprint compared to volume of trawling taking place in surrounding edges. If rock material is required (following CA), this needs to be considered due to presence of MPA	Scope in if necessary following CA
	Degradation	Long-term release of pipeline constituents	**Discharges to Sea**	Liquid / solid discharge to sea - Pollution of the marine ecosystem. Organic enrichment and chemical contaminant effects in water column and seabed sediments.	Continued monitoring for an agreed period and remediation if required, accurate mapping of decommissioned in situ location and state.	5	1	5		Any residual remaining material will be in trace levels/volumes and will not pose any significant risk to water quality.	Scoped out
		Free spans	**Physical presence**	Snagging risk to trawl and other demersal fisheries	Eventual corrosion and collapse of structures pose a potential snagging risk. Continued monitoring and remediation will be undertaken where required. Continued monitoring for an agreed period and remediation if required, accurate mapping of decommissioned in situ location and state.	2	5	10	Stakeholder concern		Scoped in
Unplanned events	Decommissioning activity	Unplanned vessel collision	**Unplanned event**	Loss of containment Pollution of the marine ecosystem. Organic enrichment and chemical contaminant effects in water column and seabed sediments.	OPEP MAS Navaids SOPEP	1	5	5	Risk of collision low given location in an area of low to very low activity	Likelihood very low given the procedures in place	Scoped out
		Well blowout	**Unplanned event**	Loss of containment following dropped object on wellhead or overtrawl. Pollution of the marine ecosystem. Contamination can be long-lasting.	OPEP Navaids SOPEP Project Vessels present when activity taking place within 500m safety exclusion zone(s). Other vessels will not be present within the 500m zone at any time prior to P&A. There is only a likelihood of a dropped object on the wellheads when there are operational vessels in field CNR have updated our OPEP to reflect a response and will have a TOPEP in place during operations. In order to leave the wells shut in we conducted a Wells Shut in Risk Assessment, and there was a very low chance of loss of containment.	1	5	5		Likelihood very low given the procedures in place	Scoped out
		Unplanned loss of material to sea (Dropped Object)	**Unplanned event/ Disturbance to the Seabed**	Localised physical seabed disturbance resulting in community change. Recovery time and extent dependent on type of seabed and species present and location specific estimate within EA. Lethal/sub-lethal effects on benthic and epibenthic fauna from physical abrasion; Smothering of organisms following settlement of resuspended particles. Potential impact on East of Gannet and Montrose fields MPA, specifically ocean quahog PMF (OSPAR, 2008)	Volume of sediment mobilised proportional to area of sediment disturbed . Impacts to the gross physical nature of the MPA are not expected. PON2 applicaiton will be submitted in the unikely event of a dropped object Everything will be endeavoured to be retrieved. All unplanned losses in the marine environment will be attempted to be remediated, and notifications to other mariners will be sent out. Debris clearance surveys will aid in the identification of any dropped objects.	1	2	2	Total hydrocarbon content (THC) values were generally comparable to, or below the average background concentration typical of the CNS - there woud not be a discernable impact from drill cuttings	Likelihood and consequence very low given the procedures in place	Scoped out

APPENDIX D ENERGY AND EMISSIONS SUMMARY

Appendix D.1 Energy and emissions by project activity

Planned activity	Operations energy (GJ)	Operations CO_2 (Te)
Offshore transportation	111,680.3	8,291.8
Onshore deconstruction	5,653.3	ND
Onshore transportation	38.9	2.8
Recycling of materials	21,979.5	2,310.0
New manufacture to replace recyclable materials	1,620.2	49.1
Total	140,972.1	10,653.6

Appendix D.2 Offshore transport energy and emissions

Vessel type	Total Duration (days)				Operations energy (GJ)	Operations CO_2 (Te)
	Mob / Demob	Transit	Working	Wait on Weather		
Diving Support Vessel	1.5	1.17	15.25	3.05	14,445.7	1,072.5
Construction Support Vessel	19.75	12.92	45.81	8.72	55,100.0	4,091.0
Rock Vessel	4.6	3.0	13.0	2.20	11,257.7	835.8
Survey Vessel	6.0	3.0	33.0	3.6	30,876.8	2,292.5
Total					111680.3	8291.8

APPENDIX E PIPELINE EXPOSURES SUMMARY

Appendix E.1 Survey Assessment Summary Reports

Appendix E.1.1 PL1546

Pipeline / Umbilical Ident.	PL1546
Pipeline / Umbilical Description	Trenched & Buried, P2 10" Banff Oil Production
Start Location	Banff Production Manifold
End Location	Riser Base

Survey Assessment Summary										
Survey Year	**Qty.**	**Exposure Lengths (m)**								**Total Exposure Length (m)**
2019	5	7.6	24.2	5.4	18.6	32.3				88.2
2017	3	7.5	22	0.7						30.0
2016	1		21.65							21.65
Notes:										
The areas of span are located toward the ends of the pipeline.										
Images:										

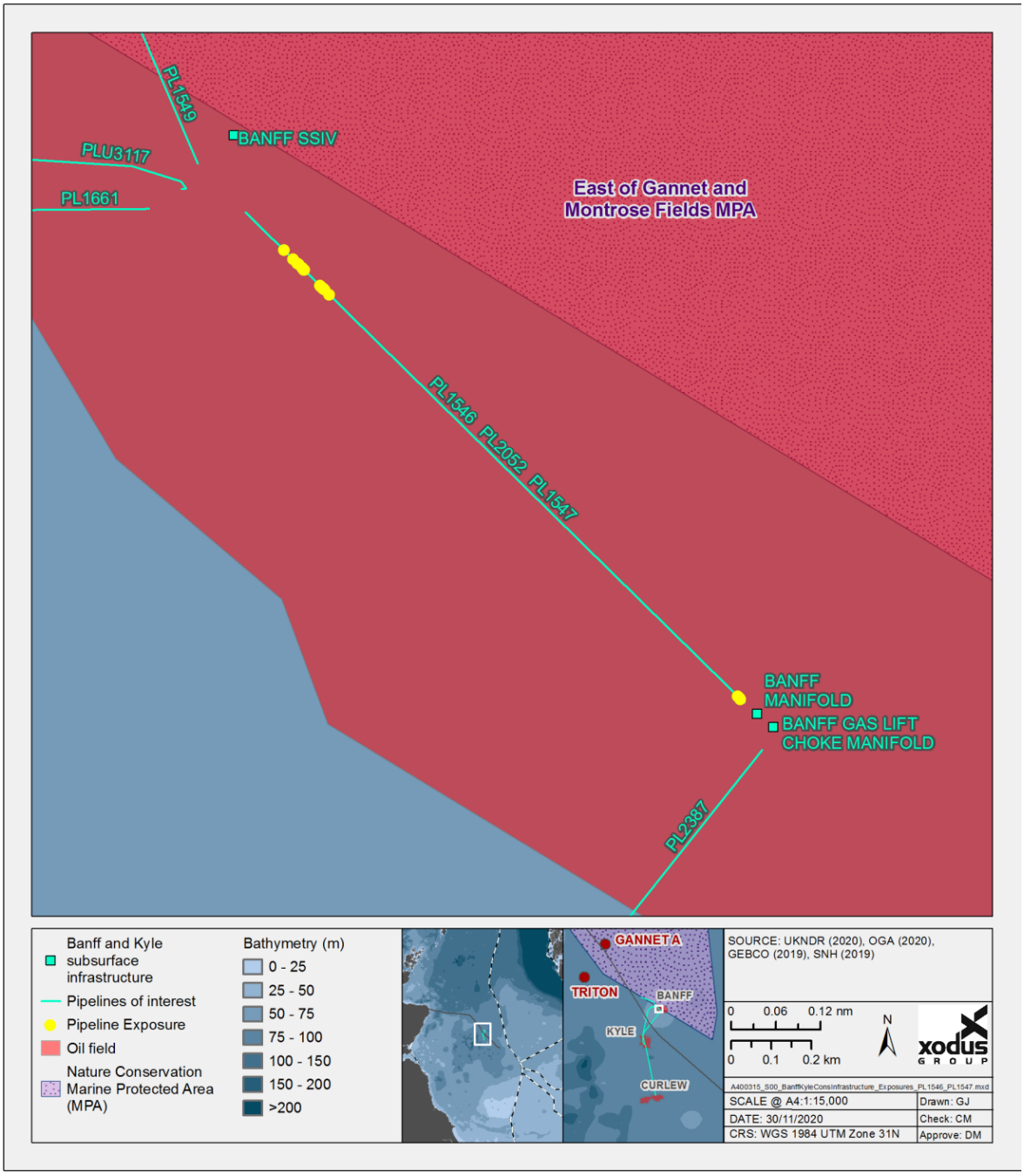
PL1546 KP0.054

PL1546_KP1.494

PL1546_KP1.619

PL1546_KP1.693

Location Map



Video References

2019	PL1546_KP0.054	PL1546_KP1.494	PL1546_KP1.580	PL1546_KP1.619	PL1546_KP1.693
2017	PL1546_2017_1	PL1546_2017_2	PL1546_2017_3		
2016	PL1546_2016_1	PL1546_2016_2			

Appendix E.1.2 PL1547

Pipeline / Umbilical Ident.	PL1547
Pipeline / Umbilical Description	Trenched & Buried, P1 10" Banff Oil Production
Start Location	Banff Production Manifold
End Location	Riser Base

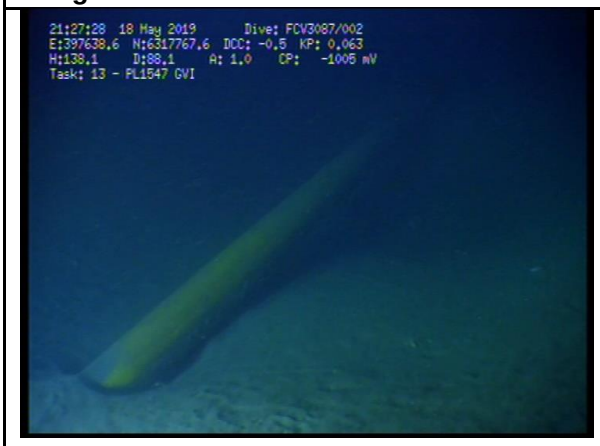
Survey Assessment Summary

Survey Year	Qty.	Exposure Lengths (m)								Total Exposure Length (m)
2019	4		7.78	3.61	10.6	55.2				22.0
2017	5	38	7.2	4.1	12	61				121.2
2016	5	65.3	8.7		11.4	61.3	4.4			151.1

Notes:

The largest exposure was a section of the pipeline that was covered in mattresses. Spans are due to excavation works carried out.

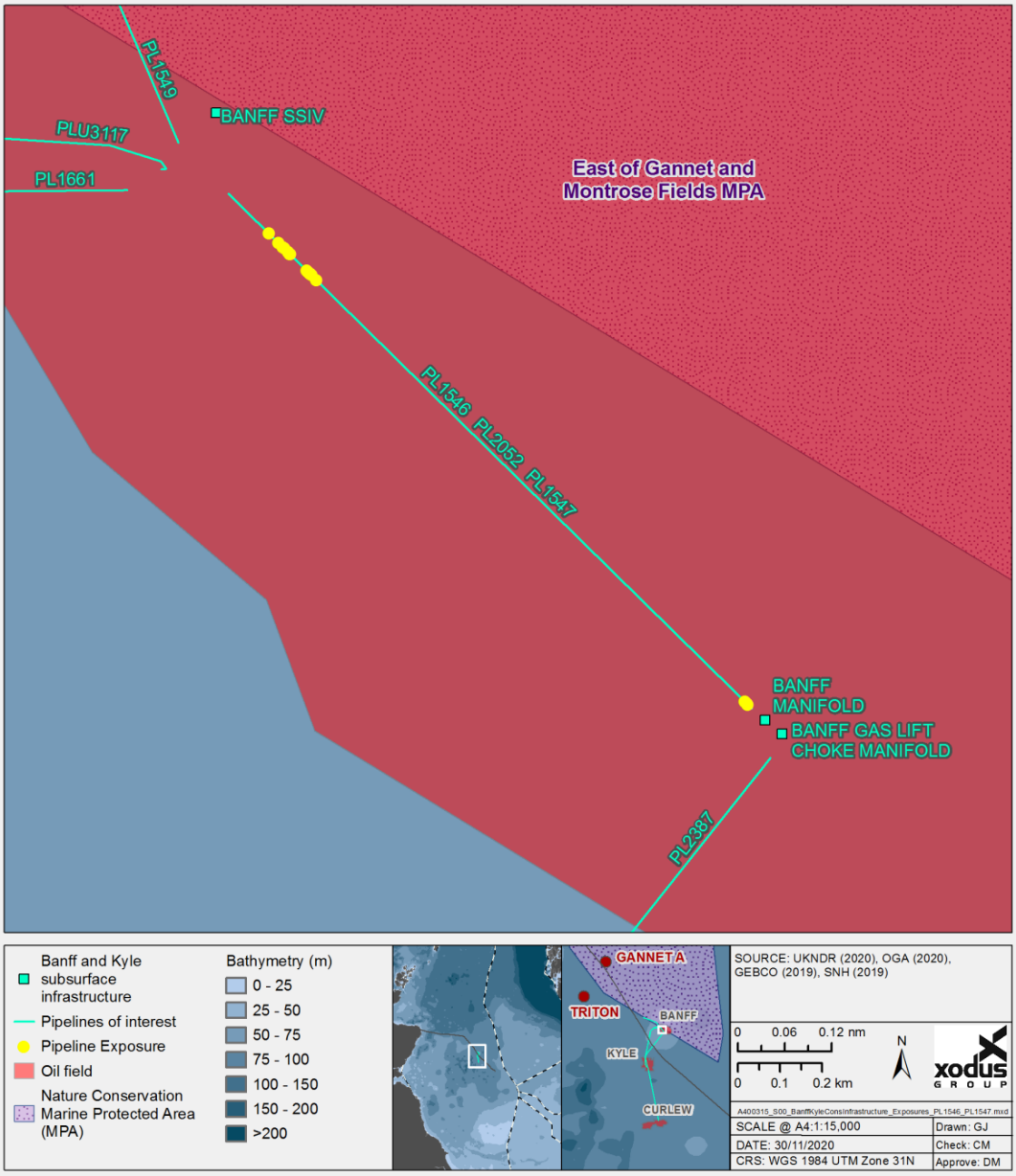
Images:



VLCSNAP-2020-10-29 KP 0.06

VLCSNAP-2020-10-29 KP 1.5

Location Map



Video References

2019	vlcsnap-2020-10-29 kp 0.06	vlcsnap-2020-10-29 kp 1.5			
2017	PL1547_2017_1	PL1547_2017_2	PL1547_2017_3	PL1547_2017_4	PL1547_2017_5
2016	2016_MATTRESS	2015-039-EXP_2016_PICS	2015-038-EXP_2016_PICS		

Appendix E.1.3 PL1548

Pipeline / Umbilical Ident.	PL1548
Pipeline / Umbilical Description	Trenched & Buried, 10" Water Injection (Disconnected)
Start Location	Riser Base
End Location	Banff Production Manifold

Survey Assessment Summary

Survey Year	Qty.	Exposure Lengths (m)								Total Exposure Length (m)
2019	8	18.9	20.9	11.1		7.7	3.9	20.2	19.1	101.9
2017										
2016	5	6.53	19.02	20.12	9.79	12.49				67.9

Notes:

The largest exposure was a section of the pipeline that was covered in mattresses.

Images:

PL1548_21-07-46

PL1548_21-09-49

PL1548_21-12-34

PL1548_21-14-37

PL1548_21-53-18

PL1548_21-56-18

PL1548_21-56-47

PL1548_21-58-13

Location Map

The location of the pipeline was not available meaning it was not possible to plot the exposure points.

Video References

2019	PL1548_21-07-46	PL1548_21-09-49	PL1548_21-12-34	PL1548_21-14-37	PL1548_21-53-18	PL1548_21-56-18
2017						
2016	PL1548_2016_1	PL1548_2016_2	PL1548_2016_3	PL1548_2016_4	PL1548_2016_5	

Appendix E.1.4 PL1550

Pipeline / Umbilical Ident.	PL1550
Pipeline / Umbilical Description	Trenched & Buried 12" Banff Oil Export
Start Location	Tie-in Spool
End Location	12" Flexible Flowline

Survey Assessment Summary

Survey Year	Qty.	Exposure Lengths (m)								Total Exposure Length (m)
2019	6		14.32	4.03	67.66	3.20	11.66	11.05		111.91
2017										
2016										
2015	7	17.81	13.16	5.41	65.69	4.77	12.03	12.17		131.03

Notes:

The largest exposure was a section of the pipeline that was covered in mattresses.

Images:

PL1550_KP0.672-0.701

PL1550_KP0.701-0.768

PL1550_KP0.776-0.790

Location Map					
The location of the pipeline was not available meaning it was not possible to plot the exposure points.					
Video References					
2019	PL1550_KP0.672-0.701	PL1550_KP0.701-0.768	PL1550_KP0.768-0.770	PL1550_KP0.776-0.790	
2017					
2016					
2015	PL1550_2015_1	PL1550_2015_2	PL1550_2015_3	PL1550_2015_4	PL1550_2015_5

Appendix E.1.5 PL1660

Pipeline / Umbilical Ident.	PL1660
Pipeline / Umbilical Description	Trenched & Rock Covered, Kyle 8" Production Pipeline
Start Location	North Kyle Drill Centre Tie-in Tee
End Location	Riser Base

Survey Assessment Summary

Survey Year	Qty.	Exposure Lengths (m)								Total Exposure Length (m)
2019	2	10	13							23.0
2017	3			10	10	11				31.0
2016										
2015										

Notes:

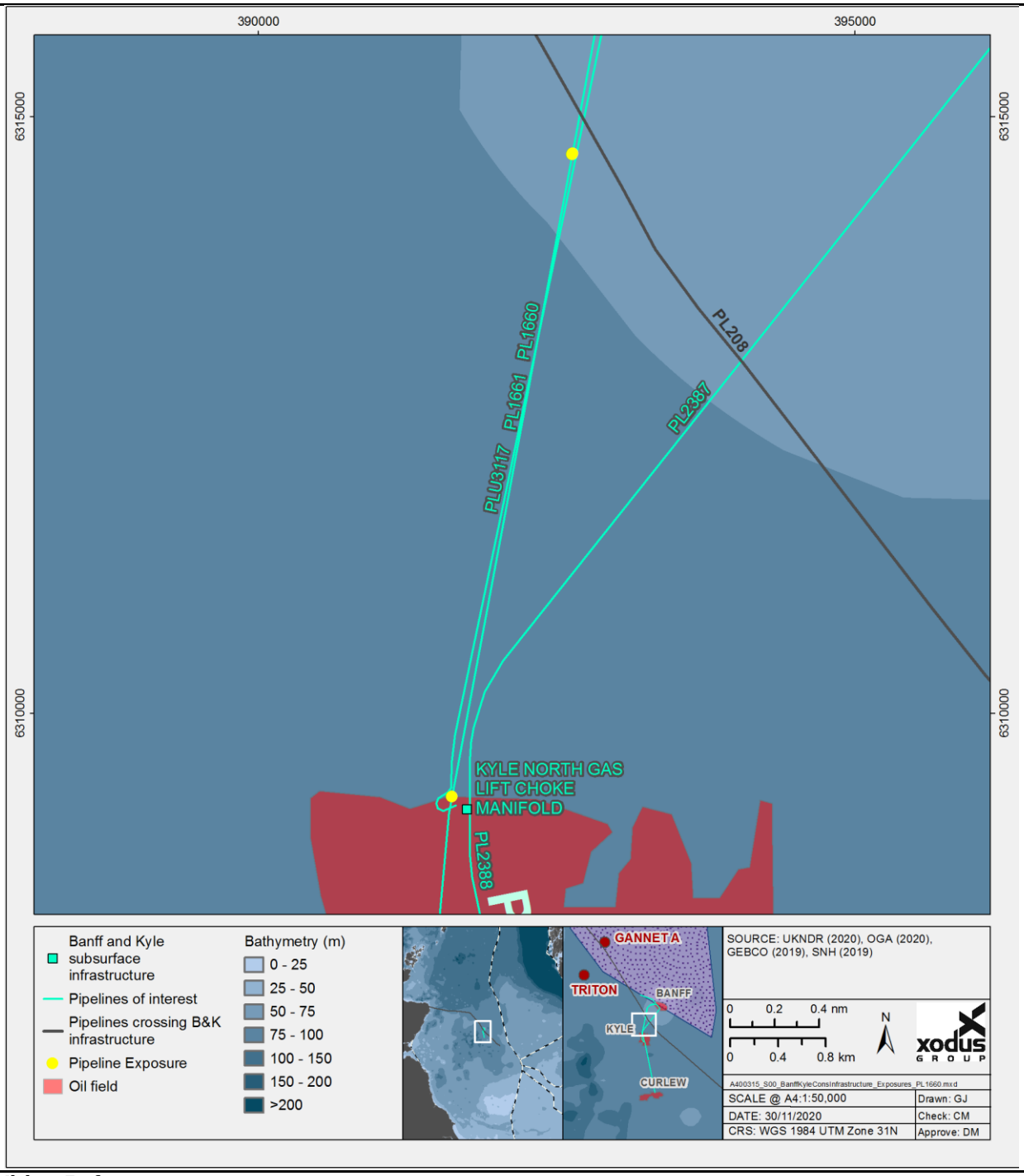
It is assumed that the exposures are the same, however, the video did not contain positional information that could be cross referenced between the years.

Images:

2019-2015-007_SPA

2019-2015-015_SPA

Location Map



Video References				
2019	2019 - 2015 - 014 and 015	2019 - 2015 - 007 - SPA		
2017	2017-2015-005	2017-2015-007		
2016				

Appendix E.1.6 PL1799.1-8

Pipeline / Umbilical Ident.	PL1799.1-8
Pipeline / Umbilical Description	Trenched & Rock Covered, Main Kyle Umbilical
Start Location	Kyle North SDU/SAM
End Location	Kyle South SDU

Survey Assessment Summary										
Survey Year	**Qty.**	**Exposure Lengths (m)**								**Total Exposure Length (m)**
2019	1	0.6	13							0.6
2017	3									
2016										
2015										
Notes:										
Only a small section of pipeline could be seen.										
Images:										
No images available										
Location Map										
The location of the pipeline was not available meaning it was not possible to plot the exposure points.										
Video References										
2019										
2017										
2016										