Salamander Offshore Wind Farm

Offshore EIA Report

Volume ER.A.4, Annex 9.4: Benthic Features Impact Assessment Southern Trench MPA

SALAMANDER

Powered by Ørsted and
Simply Blue Group

Salamander Offshore Wind Farm - Southern Trench Nature Conservation Marine Protected Area

Risk Assessment - Burrowed Mud and Quaternary of Scotland

PREPARED FOR

SALAMANDER

DATE
21 March 2024

DOCUMENT DETAILS

The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.	
DOCUMENT TITLE	Salamander Offshore Wind Farm - Southern Trench Nature Conservation Marine Protected Area
DOCUMENT SUBTITLE	Risk Assessment - Burrowed Mud and Quaternary of Scotland
Date	21 March 2024
Version	01
Author	Marja Aberson, Damien Kirby
Client name	Salamander Wind Project Company Limited

DOCUMENT HISTORY

				ERM APPROVAL TO ISSUE	
VERSION	REVISION	AUTHOR	REVIEWED BY	NAME	DATE
01	1	Marja Aberson	Damien Kirby	Damien Kirby	21.03.2024

SIGNATURE PAGE

Salamander Offshore Wind Farm - Southern Trench Nature Conservation Marine Protected Area

Risk Assessment - Burrowed Mud and Quaternary of Scotland

Marja Aberson
Principal Marine Consultant

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

Acronyms	Description
ECC	Export Cable Corridor
FeAST	Feature Activity Sensitivity Tool
JNCC	Joint Nature Conservation Committee
MarESA	Marine Evidence Sensitivity Assessment
MD-LOT	Marine Directorate – Licensing Operation Team
MPA	Marine Protected Area
NC MPA	Nature Conservation Marine Protected Area
nm	Nautical mile
SSC	Suspended sediment concentration
SWPC	Salamander Wind Project Company Limited

Abbreviations	Description
Applicant	Salamander Wind Project Company (SWPC) Limited (formerly called Simply Blue Energy (Scotland) Limited), a joint venture between Ørsted, Simply Blue Group and Subsea7.
Bedforms	Features on the seabed (e.g. sand waves, ripples) resulting from the movement of sediment over it).
Benthic	Animals or plants that live on the seabed.
Moraine	Any accumulation of unconsolidated sediment and rock debris transported and deposited by a glacier.
Nearshore Export Cable Corridor	The Offshore Export Cable Corridor west of the 1°40 line to shore.
Offshore Array Area	The offshore area within which the wind turbine generators (WTGs), floating substructures, mooring lines and anchors, and inter-array cables and associated infrastructure will be located.
Offshore Development	The entire Offshore Development, including all offshore components of the Salamander Project (WTGs, Inter-array and Offshore Export Cable(s), floating substructures, mooring lines and anchors, and all other associated offshore infrastructure) required across all Salamander Project phases from development to decommissioning, for which the Applicant is seeking consent.
Offshore Export Cable Corridor	The area that will contain the Offshore Export Cable(s) between the boundary of the Offshore Array Area and Mean High Water Springs.
Salamander Project	The proposed Salamander Offshore Wind Farm. The term covers all elements of both the offshore and onshore aspects of the project.
Scour	Local erosion of sediments caused by local flow acceleration around an obstacle and associated turbulence enhancement.
Surficial sediments	Sediments located at the seabed surface (not necessarily of the same characters as underlying sediment).

Abbreviations	Description
Suspended sediment concentration	Suspended sediment concentration
Tidal excursion ellipse	The path followed by a water particle in one complete tidal cycle.
Wider Survey Area	Defined as the offshore area that was surveyed during the 2020 geophysical survey.

1. INTRODUCTION

Nature Conservation (NC) Marine Protected Areas (MPAs) in Scotland are governed by the provisions of the of the Marine (Scotland) Act 2010 and the UK Marine and Coastal Access Act (2009); these protected sites contribute to The Scottish MPA network (NatureScot, 2020a). Under section 126 of the Marine and Coastal Access act 2009 ("the 2009 Act"), and Section 83 of the Marine (Scotland) Act 2010, the Scottish Government's Marine Directorate - Licensing Operations Team (MD-LOT) in granting authorisation for a licensable activity, is required to consider whether a licensable activity is capable of affecting (other than insignificantly) a protected feature in a NC MPA.

The Offshore Export Cable Corridor (ECC) of the Offshore Development of the Salamander Project directly overlaps the southern region of the Southern Trench NC MPA, that was designated under the Southern Trench Nature Conservation Marine Protected Area Order 2020 (The Scottish Government, 2020). Under the formal Scoping Opinion, NatureScot (5 May 2023) had advised that impacts to the benthic feature burrowed mud of the Southern Trench NC MPA (hereafter referred to as Southern Trench MPA), should be scoped in for assessment for all phases of the development, and that this should be assessed separately against the Southern Trench MPA's Conservation Objectives. Furthermore, both the Marine Directorate and NatureScot (20 September 2023), identified the need for an assessment of the Quaternary feature of the MPA, and in particular the area of moraines that may potentially overlap the Offshore ECC.

1.1 SCOPE OF WORKS

The purpose of this document is to present an assessment of potential impacts from the Offshore Development for burrowed mud and Quaternary of Scotland listed designated features of the Southern Trench MPA.

This assessment should be read alongside and in consideration of the following:

- **Volume ER.A.3, Chapter 7: Marine Physical Processes;**
- **Volume ER.A.3, Chapter 9: Benthic and Intertidal Ecology.**

An assessment of potential impacts from the Offshore Development on Minke whale *Balaeonoptera actutorostrata,* a listed feature of the Southern Trench MPA, is presented in **Volume ER.A.4, Annex 11.2: Marine Mammal Impact Assessment Southern Trench MPA**.

2. SOUTHERN TRENCH MARINE PROTECTED AREA

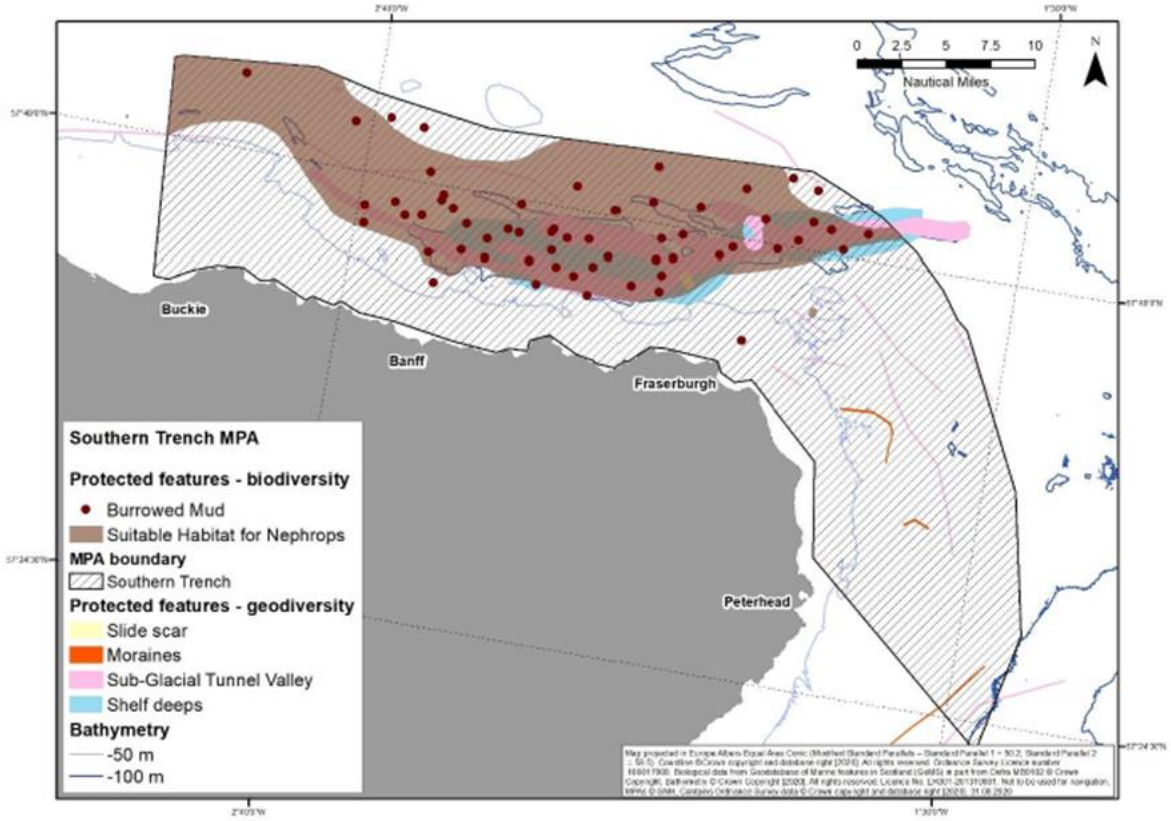
The Southern Trench MPA (EU Site Code 555703756) lies off the Aberdeenshire coast, between Buckie in the west, to Peterhead in the east, where it encompasses a 58 km long, 9 km wide and 250 m deep trench that was carved out by glaciers (NatureScot, 2020b). The MPA was designated in December 2020, covering an area of 239,800 hectares (ha), and designated for the following biodiversity and geodiversity features and types:

- **Biodiversity**:
  - Burrowed mud (inshore sublittoral sediment (Marine));

  - Fronts (Large-scale feature (Marine));
  - Minke whale (*Balaenoptera actutorostrata* (mammals (Marine)); and
  - Shelf deeps (large-scale feature (Marine)).
- **Geodiversity:**
  - Quaternary of Scotland – subglacial tunnel valleys and moraines (Quaternary geology and geomorphology); and
  - Submarine Mass Movement -slide scars (Geomorphology).

Figure 1 below shows the distribution of protected biodiversity and geodiversity features of the Southern Trench MPA (excluding minke whale and fronts).

FIGURE 1: LOCATION OF THE SOUTHERN TRENCH MARINE PROTECTED AREA AND DISTRIBUTION OF PROTECTED BURROWED MUD AND GEODIVERSITY FEATURES (NATURESCOT, 2020C).



2.1 BURROWED MUD

Burrowed mud is listed under Scotland's Priority Marine Features (PMFs), and an OSPAR threatened and/or declining habitat ('sea-pens and burrowing megafauna communities') (NatureScot, 2020d).

The burrowed mud of the Southern Trench MPA is covered by thick, soft mud, inhabited by the Norway lobster *Nephrops norvegicus*, crabs, sea pens, and tube anemones. As shown in Figure 1, the distribution of burrowed mud within the MPA is predominantly confined to the western region of the site.

The current feature condition of burrowed mud is "**Favourable**" (NatureScot, 2020c).

2.2 QUATERNARY OF SCOTLAND

Within the Southern Trench MPA, the Quaternary of Scotland feature encompasses moraines and subglacial tunnel valleys. Moraines are a relict feature that are composed of glacial till (poorly sorted boulders, gravels, sand and clays of variable consolidation), where within the MPA they are interspersed within the subglacial tunnel valley systems (erosional features formed by ice over millennia) (NatureScot, 2020c). As shown in Figure 1, they are present at shallower depths further east, to the north and east of Peterhead. The current feature condition of Quaternary of Scotland is "**Favourable**" (NatureScot, 2020c).

3. METHODOLOGY

When determining whether to authorise a licensable activity, MD-LOT first considers whether it is satisfied that there is "No Significant Risk" of the activity hindering the achievement of the Conservation Objectives or purpose of the NC MPA. If the Applicant seeking authorisation is not able to satisfy MD-LOT that there will be No Significant Risk, a licence can then only be granted if MD-LOT is satisfied that:

1. There is no other means of proceeding with the activity which would create a substantially lower risk;
2. The benefit to the public of proceeding with the activity, clearly outweighs the risk of damage to the environment that will be created by proceeding;
3. That the Applicant seeking authorisation will undertake, or make arrangements for the undertaking of, measure of equivalent environmental benefit to the damage which the activity will, or is likely to have in, or on the MPA concerned.

It is understood that during the process, consultation will be sought from the appropriate nature conservation bodies (NatureScot for MPAs within 12 nautical miles (nm) or the Joint Nature Conservation Committee (JNCC) for MPAs out with 12 nm).

The approach to an assessment for a NC MPA, is split into the following stages of 'Screening' and the 'Main Assessment'.

3.1 SCREENING

Screening will focus on what can reasonably be predicted as a consequence of the proposal, and whether it is 'capable of affecting (other than insignificantly)' a protected feature of a NC MPA. This should include a consideration of the scale, timing, and duration of the activity, including those activities occurring out with the boundary of a NC MPA.

Stage 1

An initial screening is undertaken to identify if it can be reasonably predicted if the proposal is 'capable of affecting', through removal from any further consideration those proposals/functions that are not in any way connected to the protected feature(s) of the NC MPA. This can be determined by considering whether the activity will exert a pressure, of which the protected feature(s) are sensitive to.

Stage 2

Following Screening Stage 1, if it can be reasonably predicted that a proposal has the 'capability of affecting', Screening Stage 2 will consider whether the proposed activity will affect the protected features of a NC MPA, other than insignificantly. Here, a consideration of the degree of pressure that is predicted to occur on a spatial basis will help establish the level of effect that may occur.

If it is concluded that the activity or function is 'capable of affecting (other than insignificantly)' the protected features of a NC MPA, then it is carried forward into the Main Assessment (see below).

3.2 MAIN ASSESSMENT

The Main Assessment will focus on determining whether there is, or may be, a Significant Risk of the Offshore Development hindering the achievement of the Conservation Objectives of the NC MPA.

It is understood that consideration of whether there may be a Significant Risk of hindering the achievement of the Conservation Objectives of the protected features of a NC MPA is to be carried out on a case-by-case basis.

As described for Screening, the present report (the Risk Assessment) considers the scale, timing, and duration of activities. However, this assessment is based on the potential impact on the achievement of the Conservation Objectives of the protected feature, and not on the feature itself.

Conservation objectives for MPA features are high level criteria, describing the desired condition of the feature, and have 2 objectives:

- So far as already in favourable condition, remain in such condition;
- So far as not already in favourable condition, be brought into such condition, and remain in such condition (Scottish Government, 2020).

The Main Assessment will, therefore, consider whether the Offshore Development could potentially impact the NC MPA, so that the features are no longer in favourable condition, or prevent the features from recovering to a favourable condition.

With respect to marine habitat, "favourable condition' means that:

- Its extent is stable or increasing; and
- Its structures and functions, its quality, and the composition of its characteristic biological communities are such that it is in a condition which is healthy and not deteriorating (Scottish Government, 2020).

Any temporary deterioration in condition can be disregarded if the marine habitat is sufficiently healthy and resilient to allow recovery (NatureScot, 2020c).

With respect to a feature of geomorphological interest, "favourable condition" means that:

- Its extent, component elements and integrity are maintained;
- Its structure and functioning are unimpaired; and

- Its surface remains sufficiently unobscured for the purposes of determining whether the criteria in paragraphs (a) and (b) are satisfied (Scottish Government, 2020).

In relation to geomorphological features, any temporary short-term and/or minor changes in the protected feature due to anthropogenic activity is considered to not compromise the Conservation Objectives and should only be considered on a case-by-case basis (NatureScot, 2020c).

Furthermore, any alterations to the protected feature due to natural process are to be disregarded in the Risk Assessment when assessing against the Conservation Objectives. However, it should be taken into account if pressures arising from the activity subsequently reduce a feature's resilience to climatic changes, and if such changes hinder their ability to recover from anthropogenic activities (NatureScot, 2020c).

It will also be important in the Main Assessment, that there is a consideration of potential cumulative impacts from other proposed projects and/or plans having a Significant Risk to the Conservation Objectives of the NC MPA.

It will also be important in the Main Assessment, that there is a consideration of potential cumulative impacts from other proposed projects and/or plans having a Significant Risk to the Conservation Objectives of the NC MPA.

4. ASSESSMENT – BURROWED MUD

4.1 SCREENING

Stage 1

Is the Offshore Development capable of affecting the burrowed mud designated feature of the Southern Trench MPA?

The Offshore Development may be capable of affecting the protected feature burrowed mud of the Southern Trench MPA, where the Offshore ECC directly overlaps the MPA.

There may be the potential for near-field direct impacts on this protected feature, such as through temporary habitat loss and disturbance, and long-term habitat loss. The NatureScot Feature Activity Sensitivity Tool (FeAST) assesses that for sub-surface abrasion/penetration, physical removal (extraction of substratum), and removal of target and non-target species, that burrowed mud has a Medium sensitivity to these pressures. Whilst this feature has a High sensitivity to a physical change (to another seabed type) that may occur through placement of rock on the seabed for cable scour protection (FeAST, 2023), it is unlikely that scour protection would be required on these soft sediments, as full cable burial should be expected to be achievable (compared to coarser substrates).

There may be the potential for far-field indirect impacts on this protected feature through increases in suspended sediment concentration (SSC) and associated deposition, notably during the construction phase of the Offshore Development where sediments will be disturbed during cable installation and become resuspended. FeAST assesses that for burrowed mud, it has a Low sensitivity to changes in water clarity caused by increases in SSC, and following deposition, it has a Low sensitivity to light siltation rate changes (<5 cm of sediment), and Medium sensitivity to heavy deposition (>5 cm of sediment) (FeAST, 2023).

It may be **reasonably predicted that the Offshore Development of the Salamander Project has the capability of affecting burrowed mud and therefore, will be assessed further under Screening Stage 2.**

Stage 2

Is the Offshore Development capable of affecting (other than insignificantly) the burrowed mud designated feature of the Southern Trench MPA?

At two sites within the Offshore Array Area of the Offshore Development, the sea pen *Pennatula phopshorea* was identified from imagery collected during the baseline surveys, and at four sites across the Wider Survey Area, in areas of muddy Sand (see **Volume ER.A.3, Chapter 9: Benthic and Intertidal Ecology, Section 3.7 'Baseline Environment'**). However, it was determined that while *P. phosporea* is a species characteristic of burrowed mud (and the OSPAR habitat Sea pen and burrowing megafauna communities), the absence of burrows and other key species observed (e.g. Norway lobster *Nephrops norvegicus*) that characterise this feature, indicate that it is not present.

At present, the Salamander Project has been unable to acquire project specific, or secondary survey data, within the nearshore ~8 km area of the Offshore ECC (hereafter referred to as Nearshore ECC). A desk-top review of regional seabed substrata, as determined from survey data collected in the vicinity, was carried out to infer the likely seabed type within the Nearshore ECC. Based on the assumption that the Nearshore ECC does not differ markedly from the surrounding area, the seabed within the Nearshore ECC is likely to comprise Circalittoral sand and Infralittoral sand, and potentially with circalittoral rock and biogenic reef overlapping. It is, therefore, also considered likely that sediments present in this Nearshore ECC will not represent the feature of burrowed mud. Survey data will be acquired post-consent, pre-construction, to verify the absence of burrowed mud within the Nearshore ECC.

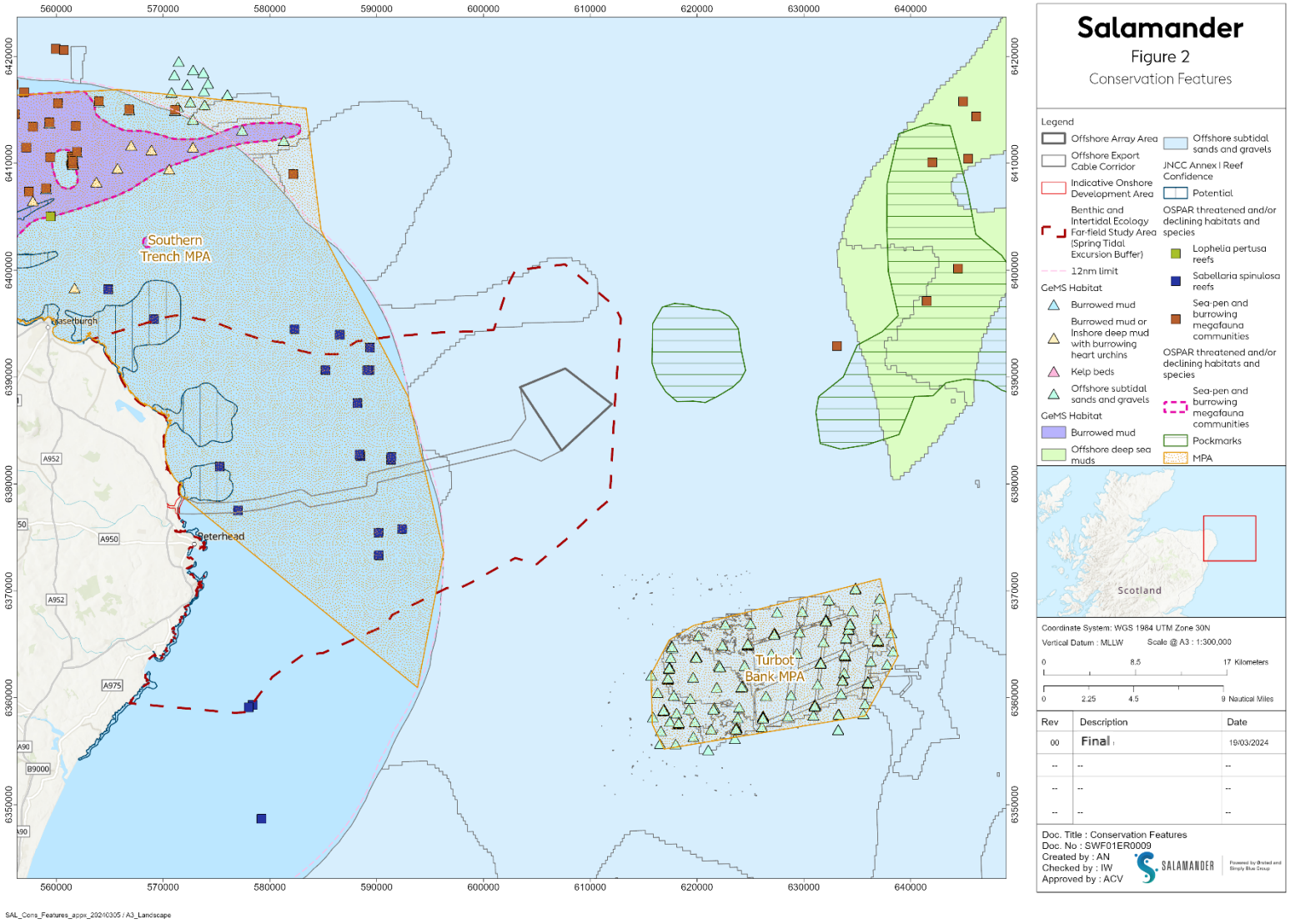
It is concluded that during all phases of the Offshore Development, there will not be any significant risk of a spatial overlap between the project footprint and the protected feature occurring, and as such, no temporary habitat loss or disturbance, long term habitat loss, and impacts to habitats or species as a result of the Offshore Development activities.

Although the Offshore Development directly overlaps the southern region of the Southern Trench MPA, the Benthic and Intertidal Ecology Study Area boundary is itself approximately 6.9 km south of the nearest known extent of the protected feature of burrowed mud (shown in Figure 1 above, and Error! Reference source not found. below). The boundary of the Benthic and Intertidal Study Area is comprised of both the Offshore Development (near-field), and the adjacent areas that may be affected by indirect impacts (far-field), such as increases in SSC and deposition. The far-field Study Area was defined by a spring tidal excursion ellipse buffer around the Offshore Array Area and the Offshore ECC, and thus the maximum distance away from the Offshore Development which suspended sediment plumes may be advected, and thus meaningfully interact with sensitive receptors.

Due to the distance of this feature and the far-field Benthic and Intertidal Ecology Study Area (the spring tidal excursion buffer), an assessment has not been carried forward in **Volume ER.A.3, Chapter 9: Benthic and Intertidal Ecology**, for impacts to the feature burrowed mud. It is predicted that there will be no significant elevated SSC levels or associated deposition on the seabed occurring.

It is determined overall that the **Offshore Development of the Salamander Project is not capable of affecting (other than insignificantly) the protected feature of burrowed mud, and therefore will not be assessed further**.

FIGURE 2: CONSERVATION FEATURES WITHIN THE BENTHIC AND INTERTIDAL ECOLOGY STUDY AREA



5. ASSESSMENT -QUATERNARY OF SCOTLAND (SUBGLACIAL TUNNEL VALLEYS AND MORAINES)

5.1 SCREENING

Stage 1

Is the Offshore Development capable of affecting the Quaternary of Scotland designated feature of the Southern Trench MPA?

The Offshore Development may be capable of affecting the Quaternary of Scotland feature (moraines), a geodiversity protected feature of the Southern Trench MPA, as the Offshore ECC and the Marine Physical Processes Study Area both directly overlap the MPA (see **Figure 7-1** in **Volume ER.A.3, Chapter 7: Marine Physical Processes**).

It is understood that levelling of sand waves may be necessary during the construction phase of the Offshore Development, which has the potential to change local seabed morphology within the Offshore Development Area. Where levelling is required (either by dredger and/or Mass Flow Excavator (MFE), or other suitable methods), the disturbed material will be disposed of nearby on the seabed, leaving mounds; depending on the nature of material and local hydrodynamics this disposal mound may persist, potentially for the project lifetime. The levelling of moraines cannot be ruled out at this stage, as the potential locations, and footprint of dredging activity, and volume of material dredged is unknown at this stage. However, it is acknowledged that clearance of these ridge features is the worst-case scenario. Such disturbance caused by levelling this consolidated material would be avoided where possible as it is likely be time consuming and not cost-effective.

Cable installation into surficial sediments, or more consolidated Quaternary material will be required for the Offshore Development, and in theory such works may also overlap moraines. This will result in direct physical disturbance to the protected feature, and their partial removal during trenching. For the Offshore ECC, a maximum of two trenches will be excavated, each up to 42.5 km in length, and up to 7.5 m wide to average depths of 2 m.

It is reasonable to assume that if any disposal mounds deposited on the seabed from sand wave levelling and/or cable installation comprise material dredged from moraines, that they will likely comprise consolidated boulder clay. Such mounds will become semi-permanent or permanent seabed features, that will persist over the lifetime of the Offshore Development, and potentially beyond.

Moraines have a varying resistance to impacts that may arise from the above described activities, as this is influenced by the composition and level of consolidation of the till (NatureScot, 2020c). In FeAST, the protected feature has been reviewed for its sensitivity to physical pressures (FeAST, 2023). Should activities overlap a moraine, the sensitivity of the feature to initial sub-surface abrasion or penetration will depend on the degree of its consolidation. Based on a combination of secondary and/or proxy data, and expert opinion, a Medium sensitivity is assigned overall. By comparison, should there be the partial removal (extraction) of a moraine, then this relic feature will have no resilience, and the effect would be deemed to be permanent, with a High sensitivity assigned.

The placement of disturbed and extracted moraines on to the adjacent seabed surface as spoil heaps will be expected to become a long-term or permanent deposit. Beyond the surficial less consolidated sediments that may accumulate over and around this deposited feature, it is considered unlikely that there will be any significant scour effects on these features via changes in hydrodynamics and sediment transport; the feature is assessed as having a Medium sensitivity to local water flow (tidal current) changes, and a Low sensitivity to surface abrasion (FeAST, 2023).

It is considered that there is no risk that the Offshore Development may be capable of affecting the Quaternary of Scotland feature (Subglacial Tunnel Valleys). This is supported by the following from the Southern Trench MPA Conservation and Management Advice (NatureScot, 2020c):

"*Subglacial tunnel valleys are highly resistant to human activities (having been formed in bedrock by erosion under ice sheets) and are either considered not sensitive or to have a low sensitivity to pressures arising from human activities. In the vast majority of instances, most pressures associated with human activity in the marine environment will not be sufficient to impact geological and geomorphological seabed features (Brooks, 2013).*"

In consideration of the localised spatial extent of activities associated with the Offshore Development, and the distance of these activities from subglacial tunnel valleys within the Southern Trench MPA (**Error! Reference source not found.**), in combination with the feature's, high resistance to the associated pressures, it is considered there is no realistic risk to this feature from the proposed works.

In consideration of the above review, it may be **reasonably predicted that the Offshore Development of the Salamander Project has the capability of affecting moraines but does not have capability to affect Subglacial Tunnel Valleys, and therefore, moraines will be assessed further under Screening Stage 2 and Subglacial Tunnel Valleys will not be taken forward for further assessment under Screening Stage 2.**

Stage 2

Is the Offshore Development capable of affecting (other than insignificantly) the moraine designated feature of the Southern Trench MPA?

Within the Marine Physical Processes Study Area, moraines and channels of glacial origins are reported to be widespread and these were considered as receptors in **Volume ER.A.3, Chapter 7: Marine Physical Processes**, where a semi-quantitative, desk-based assessment has been presented in the impact assessment.

Figure 1 above shows the mapped moraine extent within the Southern Trench MPA and **Error! Reference source not found.** below, illustrates the spatial overlap between the Offshore Array Area and the Offshore ECC, and an indicative extent of moraines in the region. There is the potential for a spatial overlap of bedform features of moraines and sand waves, with the Offshore Array Area (**Error! Reference source not found.**). However, the Offshore Array Area is located outside of the boundary of Southern Trench MPA, and as such, the designated protected moraine features within the MPA will not be at risk of physical disturbance through sand wave clearance occurring within the Offshore Array Area.

Within the boundary of the MPA, there are a number of moraines in the vicinity of the Offshore ECC; however, no classified moraines are defined within it. Should they be found to extend and overlap the Offshore ECC, they may be at risk from impacts associated with cable installation (e.g. physical disturbance and partial removal (extraction)). Furthermore, at present, the Salamander Project has been unable to acquire project specific, or secondary survey data within the Nearshore ECC (~8 km), and it cannot be confirmed at present if moraines will be at risk of disturbance from cable installation in this area. Data acquired post-consent, pre-construction will verify the presence/absence of this feature within the Nearshore ECC.

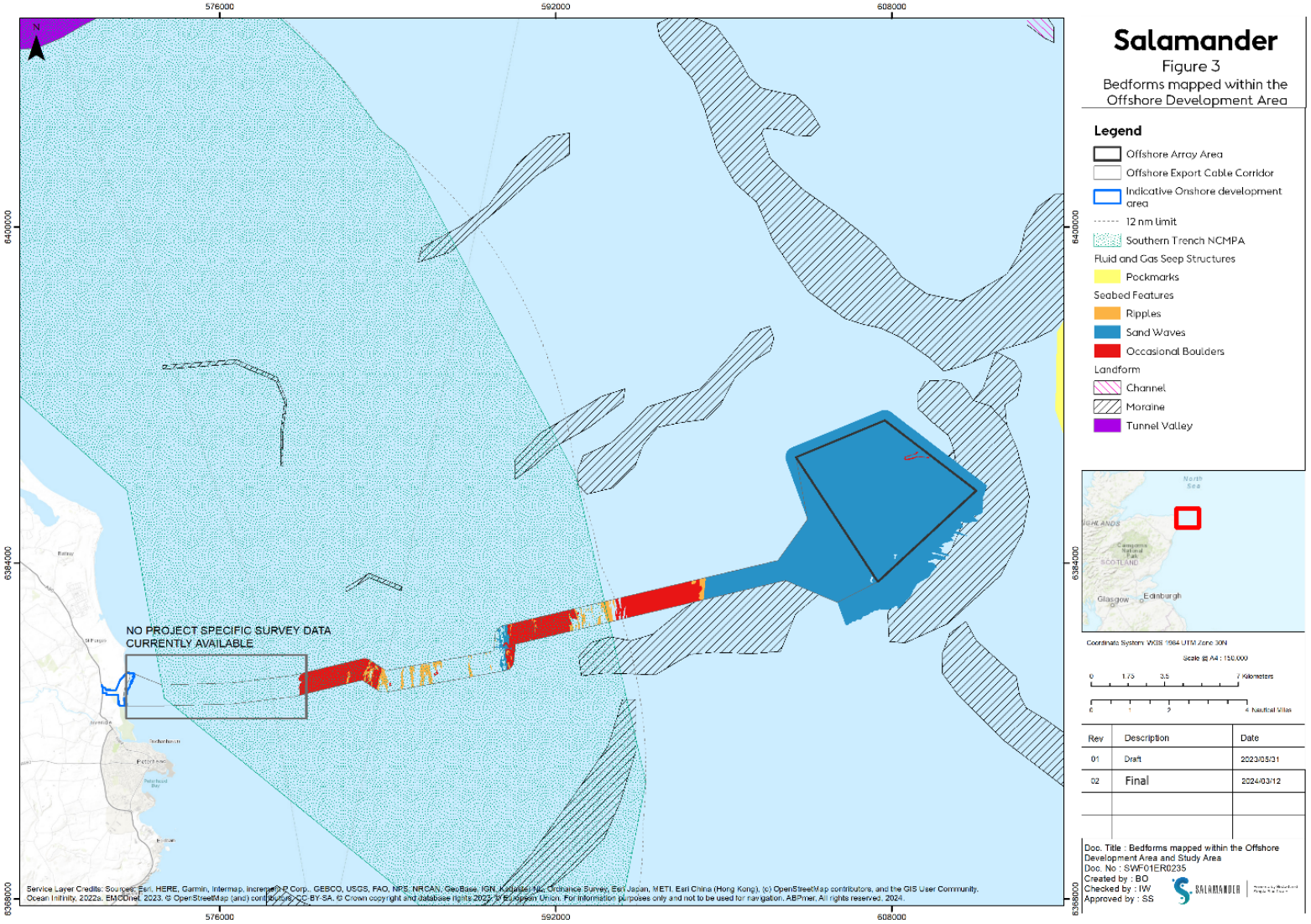
Should there be direct physical disturbance and partial removal (extraction) of this feature through cable installation during the construction phase, it is determined that it can result in a local irreversible change. This risk of physical impact occurring, may be reduced through the primary embedded mitigation measure of the completion of a Cable Burial Risk Assessment (CBRA). A CBRA will help identify the preferred route and avoid sensitive features wherever practicable. In addition, reviewing pre-construction geophysical cable route survey data for moraines is included as tertiary embedded mitigation. This will help support the identification and presence of morphological features of interest that may require mitigation prior to construction works (including micrositing where relevant).

It is noted that whilst any interaction between construction works and moraines will result in a permanent impact, its spatial effect would be highly localised, and of Negligible significance overall, in relation to the spatial extent and distribution of these features within the Southern Trench MPA.

It is considered unlikely that the Offshore Development will have a significant impact on the designated protected feature of moraines. Should, moraines be identified as being present in the Nearshore ECC area, any potential impacts will be mitigated through a pre-construction cable route survey. The Salamander Project has committed to avoidance of sensitive features during cable routing wherever practicable.

It is therefore, concluded that the **Offshore Development of the Salamander Project is not capable of affecting (other than insignificantly) the protected feature of moraines, but on a precautionary basis, and in recognition of comments received within the Scoping Opinion (MD-LOT, 2023), this will be carried forward into the Main Assessment.**

FIGURE 3: BEDFORMS MAPPED WITHIN THE OFFHORE DEVELOPMENT AREA AND MARINE PHYSICAL PROCESSES STUDY AREA AND INDICATIVE LANDFORMS (NATURESCOT, 2020; EMODNET, 2023)



5.2 MAIN ASSESMENT

Is there a significant risk of the Offshore Development hindering the achievement of the Conservation Objectives of the Southern Trench MPA?

The Main Assessment for moraines has primarily been informed through a review of the Conservation and Management Advice for Southern Trench MPA (NatureScot, 2020c).

5.2.1 CONSERVATION BENEFITS OF THE SOUTHERN TRENCH MPA

In relation to geodiversity and the moraines feature, the Southern Trench MPA has the benefit of providing protection of an area where the site's geodiversity features contribute towards an understanding of past ice sheet behaviour and global climate change. Wider benefits can also include the reconstruction of past ice sheets, and the story telling of past global climate change that will be of relevance for future climate change projections.

5.2.2 CONSERVATION OBJECTIVES OF THE SOUTHERN TRENCH MPA

The Conservation Objectives of the Southern Trench MPA, are that the protected features:

- So far as already in favourable condition, remain in such condition.
- So far as not already in favourable condition, be brought into such condition, and remain in such condition (Scottish Government, 2020).

The specific feature condition status of moraines is currently assessed as **Favourable**[1].

"Favourable condition" with regards to a geodiversity feature, means that:

a) its extent, component elements and integrity are maintained;
b) its structure and functioning are unimpaired;
c) its surface remains sufficiently unobscured[2] for the purposes of determining whether the criteria in paragraphs (a) and (b) are satisfied (Scottish Government, 2020).

As all of the designated features of the Southern Trench MPA are listed as to be in favourable condition, the Conservation Objectives seek to conserve this condition.

5.2.3 CONSERVATION ADVICE FOR MANAGEMENT OF ACTIVITIES OF THE SOUTHERN TRENCH MPA

NatureScot provides advice to support the management of activities, where it is considered necessary to achieve the Conservation Objectives for protected features. Advice may include management to remove or avoid pressures, management to reduce or limit pressures, or that no additional management is required.

For the Southern Trench MPA, NatureScot does not provide conservation advice to support the management of activities in relation to the geodiversity feature of moraines. Whilst 'cables and pipelines' and 'renewables energy' are activities considered to impact the MPA, conservation advice is only available for the biodiversity protected features of burrowed mud and minke whale.

[1] As per the latest assessment date of 2019(NatureScot, 2020).
[2] For the purpose of determining whether a feature of geomorphological interest in sufficiently unobscured, any obscuring of that feature entirely by natural processes is disregarded.

5.2.4 RISK ASSESSMENT

Under Screening (Section **Error! Reference source not found.**), it was determined that the Offshore Development is not capable of affecting (other than insignificantly), the protected feature of moraines. However, on a precautionary basis it is carried forward into the Main Assessment here, where it will be assessed if there is a Significant Risk to the Conservation Objectives of Southern Trench MPA.

Table 1 below presents an assessment of risk of the Offshore Development alone (and cumulatively with other projects and/or plans), significantly hindering the achievement of the Conservation Objectives of the Southern Trench MPA for moraines.

6. SUMMARY CONCLUSIONS

Overall, it is concluded that the Offshore Development of the Salamander Project is not capable of affecting, other than insignificantly, the protected features burrowed mud, subglacial valleys, and moraines, of the Southern Trench MPA. This conclusion was reached in both Screening of these features within Sections 4.1 and 5.1, and further supported in the precautionary Main Assessment provide in Section 5.2. Therefore, it is assessed that the Salamander Project does not pose a significant risk of hindering the achievement of the Conservation Objectives or purpose of the Southern Trench MPA.

TABLE 1:ASSESSMENT OF RISK TO THE SITE-SPECIFIC CONSERVATION OBJECTIVES OF THE SOUTHERN TRENCH MARINE PROTECTED AREA QUATERNARY OF SCOTLAND AND MORAINE FEATURE.

Risk of Project	Potential Cumulative Impacts with other Plans/Projects	Additional Mitigation	Risk to Conservation Objectives
(A) Conserve the feature's extent, component elements and integrity			
The relic feature of moraines, has a Medium sensitivity to direct sub-surface penetration/abrasion physical disturbance that could occur during construction (sand wave levelling and cable installation), and a High sensitivity to any resulting partial removal (extraction), that may then be required. The specific location of levelling or cable protection works is not currently known, and thus the risk of overlap with moraines cannot be ruled out. Any physical disturbance and partial removal of this feature, whilst will be a permanent impact, is expected to be highly localised. Moraines are a widely distributed geological feature of the Southern Trench MPA, where they are extensive both within and outside the site boundary (see Figure 1 and **Error! Reference source not found.**). Any direct impacts occurring to this feature through penetration and removal caused during sand wave levelling and/or cable installation, will make a negligible difference to conservation of the feature's overall extent within the MPA The deposition of partially removed moraine features on the seabed, adjacent to any footprint of works may potentially	Theoretically, there is a risk of cumulative effects arising from the installation of subsea cables of the Offshore Development, and all other offshore wind farm (OWF) export cables, inter-connectors, and electricity transmission cables scoped into assessment within **Volume ER.A.3, Chapter 7: Marine Physical Processes**: • Green Volt Floating OWF export cable • MarramWind OWF export cable; • Central North Sea Electrification (CNSE) project; • Cenos Floating OWF Export cable; • Eastern Green Link 2; • Hywind Scotland pilot park	**None** Embedded Mitigation only: - Geophysical surveys - CBRA	**No Significant Risk**

Risk of Project	Potential Cumulative Impacts with other Plans/Projects	Additional Mitigation	Risk to Conservation Objectives
remain *in situ* for the lifetime of the Offshore Development, and beyond. Localised deposition of these features may change local hydrodynamics (water flow), for which the feature is assessed overall as having a Medium Sensitivity; however, a Low sensitivity is assigned for surface abrasion should this flow change cause associated scour. Moraines of the Southern Trench MPA are described as comprising boulder clay, a well consolidated material, and thus may show some resistance to scour. It is, therefore, unlikely that the worst-case scenario, where extracted moraines are deposited on the seabed, will significantly change their component elements and integrity over time. Only the finer surficial sediments that settle on these features would be expected to be transported away or subject to scour effects. It is predicted overall that it is unlikely that the conservation of the components and integrity of the feature will be at risk from the Offshore Development.	export cable; • Muir Mhòr OWF export cable; • Buchan Floating OWF export cable; • NorthConnect. It was assessed in the chapter that as no classified moraines are defined along the section of the Offshore ECC within the MPA boundary, there was negligible risk of cumulative effects, and this pathway was not considered further. In the event that moraines are identified as present, any potential impacts will be mitigated through a pre-construction cable route surveys prior to construction works where which will help identify the presence of seabed features of interest that may require further consideration. The Salamander Project has committed to avoidance of		

Risk of Project	Potential Cumulative Impacts with other Plans/Projects	Additional Mitigation	Risk to Conservation Objectives
	sensitive features during cable routing wherever practicable. Accordingly, it is assessed that there will be no significant risk to the conservation of the feature's overall extent, component elements, and integrity within the Southern Trench MPA.		
(B) Conserve the structure and functioning of the features so that they are impaired			
Moraines, (including subglacial valleys) represent the Quaternary of Scotland feature which cuts though Quaternary deposition and the underlying bedrock. Subglacial tunnels provide some form of sediment stabilisations, however, the overarching feature of Quaternary of Scotland (including moraines), are also important for furthering the scientific understanding of ice sheet drainage. This overarching feature represents one of the largest and best preserved examples in the UK of an enclosed glacial seabed basin. Its function for scientific importance will be at risk, should the Offshore Development impact the site-specific Conservation Objective described	**No** (As assessed above)	**None** Embedded mitigation only - Geophysical Surveys - CBRA	**No Significant Risk**

Risk of Project	Potential Cumulative Impacts with other Plans/Projects	Additional Mitigation	Risk to Conservation Objectives
above (for (A): extent, component elements and integrity of the feature). As assessed under (A) (above), any activity of the Offshore Development alone, will not significantly risk the conservation of the feature's extent, component elements, and integrity. Whilst there will be the permanent removal and displacement of the feature through cable installation, and potentially sand wave levelling, this magnitude of spatial impact would be highly localised, and therefore, would not significantly impact the overall feature's structure and function.			
(C) Conserve the surface of the feature so that it remains sufficiently unobscured for the purposes of determining whether the criteria in Conservation Objectives (A) and (B) are satisfied			
It is assessed to be unlikely that the proposed works for the Offshore Development would result in an obscuring of the surface of the feature, as such that an assessment of Conservation Objectives listed under (A) and (B) could not be fully met. If the footprint of construction works overlap the feature, this this would be highly limited across a spatial scale and so would not significantly obscure the surface. Should there be	**No** (As assessed above)	**None** Embedded mitigation only: - Geophysical Surveys - CBRA	**No Significant Risk**

Risk of Project	Potential Cumulative Impacts with other Plans/Projects	Additional Mitigation	Risk to Conservation Objectives
partial removal (extraction) through cable installation and/or sand wave levelling across the Offshore ECC, this would, as a worst case, deposit the removed section of moraine feature on adjacent seabed area(s) and thus not be removed from the MPA.			

7. REFERENCES

EMODnet, 2023. EMODnet Product Catalogue Viewer – geomorphology polygons. Available online at: EMODnet Product Catalogue (europa.eu) [Accessed March 2024].

FeAST, 2023. *Feature Activity Sensitivity Tool.* Available online at: https://feature-activity-sensitivity-tool.scot/search-feature [Accessed November 2023].

Marine Scotland, 2019. *Marine Protected Area Assessment for Offshore Transmission Infrastructure Associated with Moray West Offshore Wind Farm.*

MD-LOT (Marine Directorate Licensing Operations Team), *2023. Scoping Opinion for Salamander Offshore Wind Farm*.

NatureScot, 2020a. *Background to NCMPA selection*. Available at: https://www.nature.scot/professional-advice/protected-areas-and-species/protected-areas/marine-protected-areas/background-ncmpa-selection [Accessed November 2023].

NatureScot, 2020b. *Southern Trench Marine Protected Area Site Summary*. Available online at: https://sitelink.nature.scot/site/10477#features [Accessed November 2023].

NatureScot, 2020c. *Conservation and Management Advice Southern Trench MPA*. Available online at: https://sitelink.nature.scot/site/10477 [Accessed November 2023].

NatureScot, 2020d. *Burrowed mud*. Available online at: https://www.nature.scot/landscapes-and-habitats/habitat-types/coast-and-seas/marine-habitats/burrowed-mud [Accessed November 2023].

Scottish Government, 2020. *Scottish Ministerial Order. Environmental Protection Marine Management. The Southern Trench Nature Conservation Marine Protected Area Order 2020*.

ERM HAS OVER 160 OFFICES ACROSS THE FOLLOWING COUNTRIES AND TERRITORIES WORLDWIDE

Argentina
Australia
Belgium
Brazil
Canada
China
Colombia
France
Germany
Ghana
Guyana
Hong Kong
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Kenya
Malaysia
Mexico
Mozambique
The Netherlands
New Zealand
Peru
Poland
Portugal
Romania
Senegal
Singapore
South Africa
South Korea
Spain
Switzerland
Taiwan
Tanzania
Thailand
UAE
UK
US
Vietnam

ERM's London UK
2nd Floor
exchequer court
33 St Mary Axe
London, EC3A 8AA

T: 020 3206 5200

www.erm.com