

Rampion 2 Wind Farm

Category 6: Environmental Statement

Volume 3, Chapter 8: Fish and shellfish - Figures

Date: August 2024

Revision C

Document Reference: 6.3.8

Pursuant to: APFP Regulation 5 (2) (a)

Ecodoc number: 004884743-03



Document revisions

Revision	Date	Status/reason for issue	Author	Checked by	Approved by
A	04/08/2023	Final for DCO Application	GoBe	RED	RED
B	28/02/2024	Amendments to Figures 8.9 and 8.10	GoBe	RED	RED
C	01/08/2024	Amendments to Figure 8.13	GoBe	RED	RED

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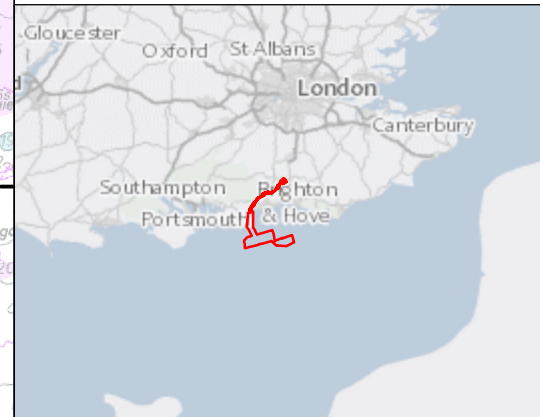
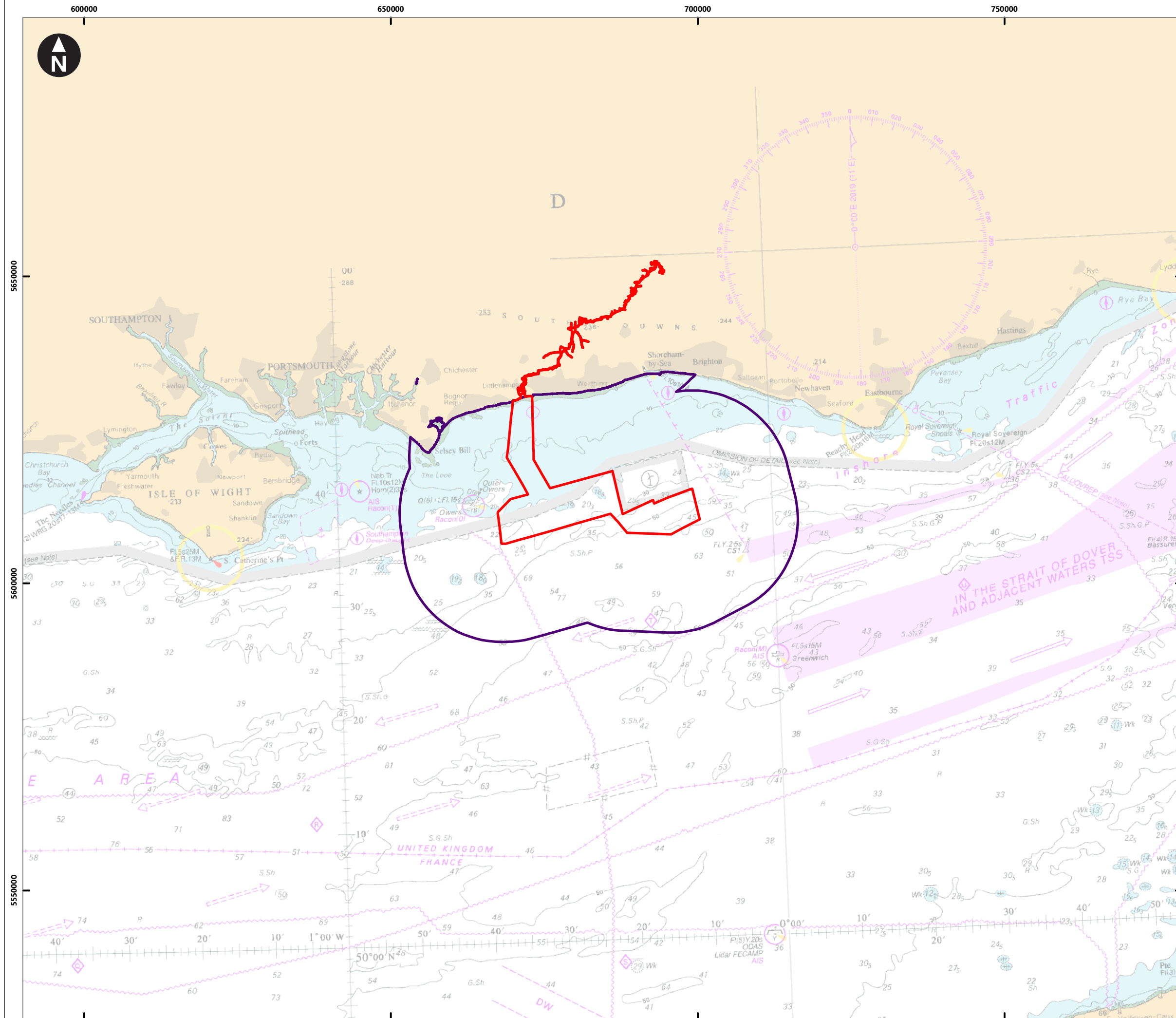
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Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area



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WGS 1984 UTM Zone 30N Transverse Mercator

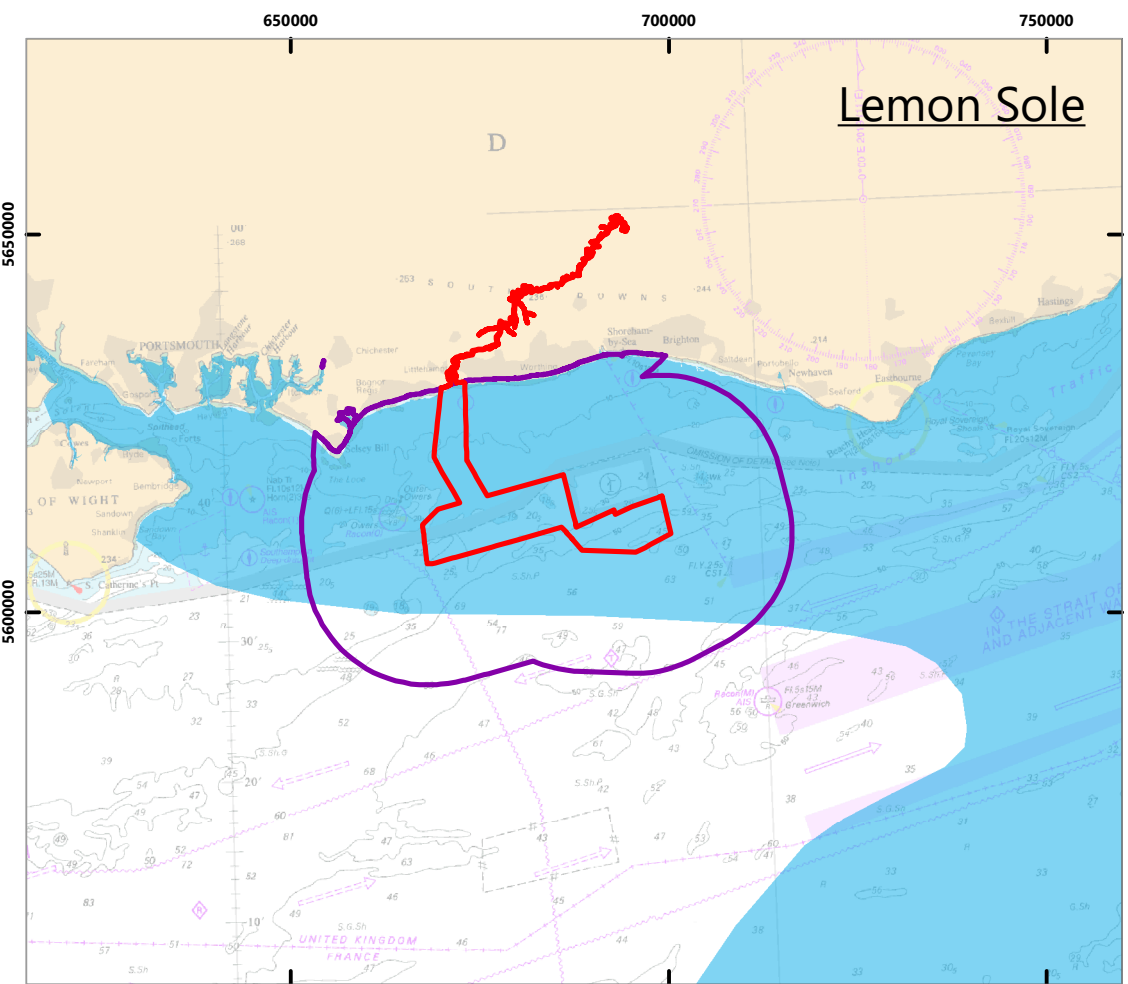
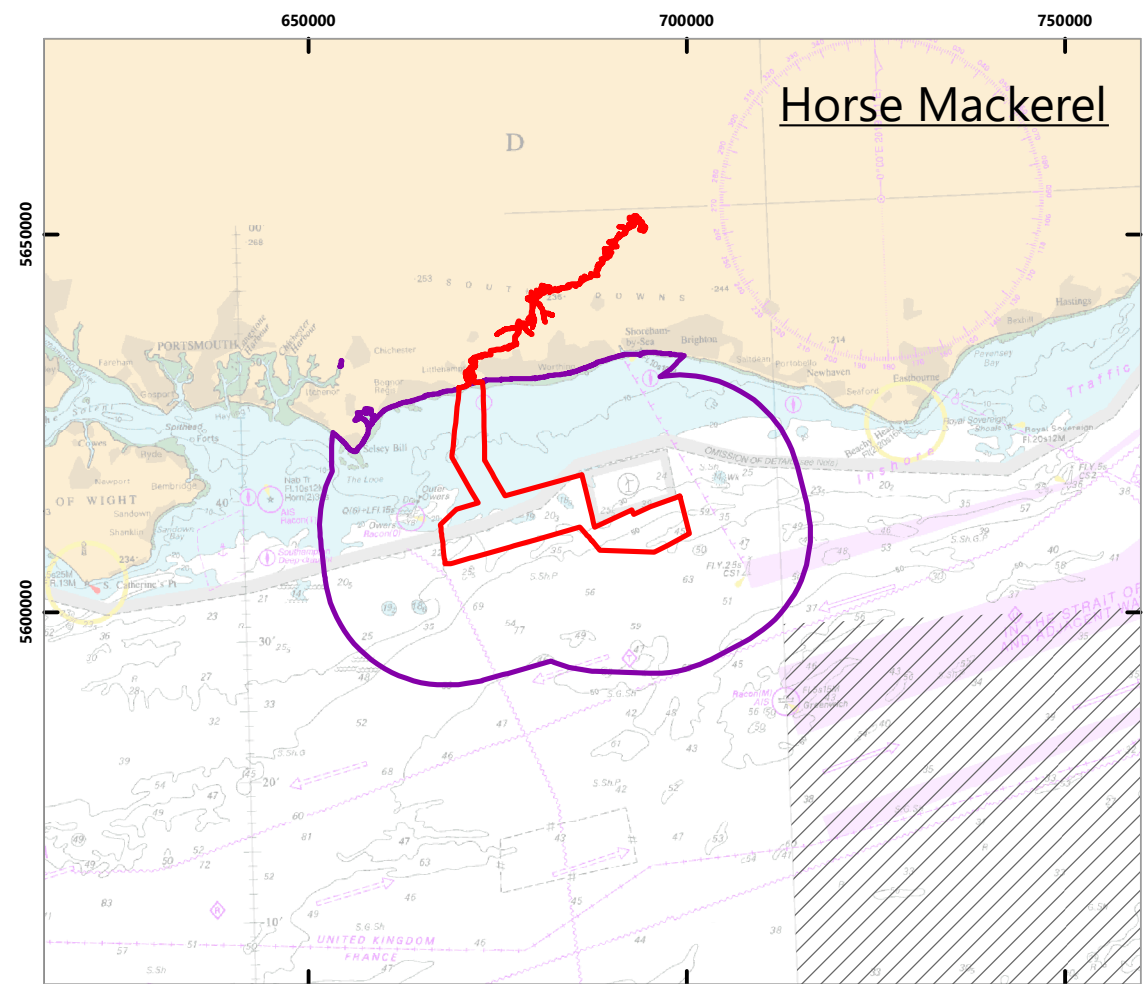
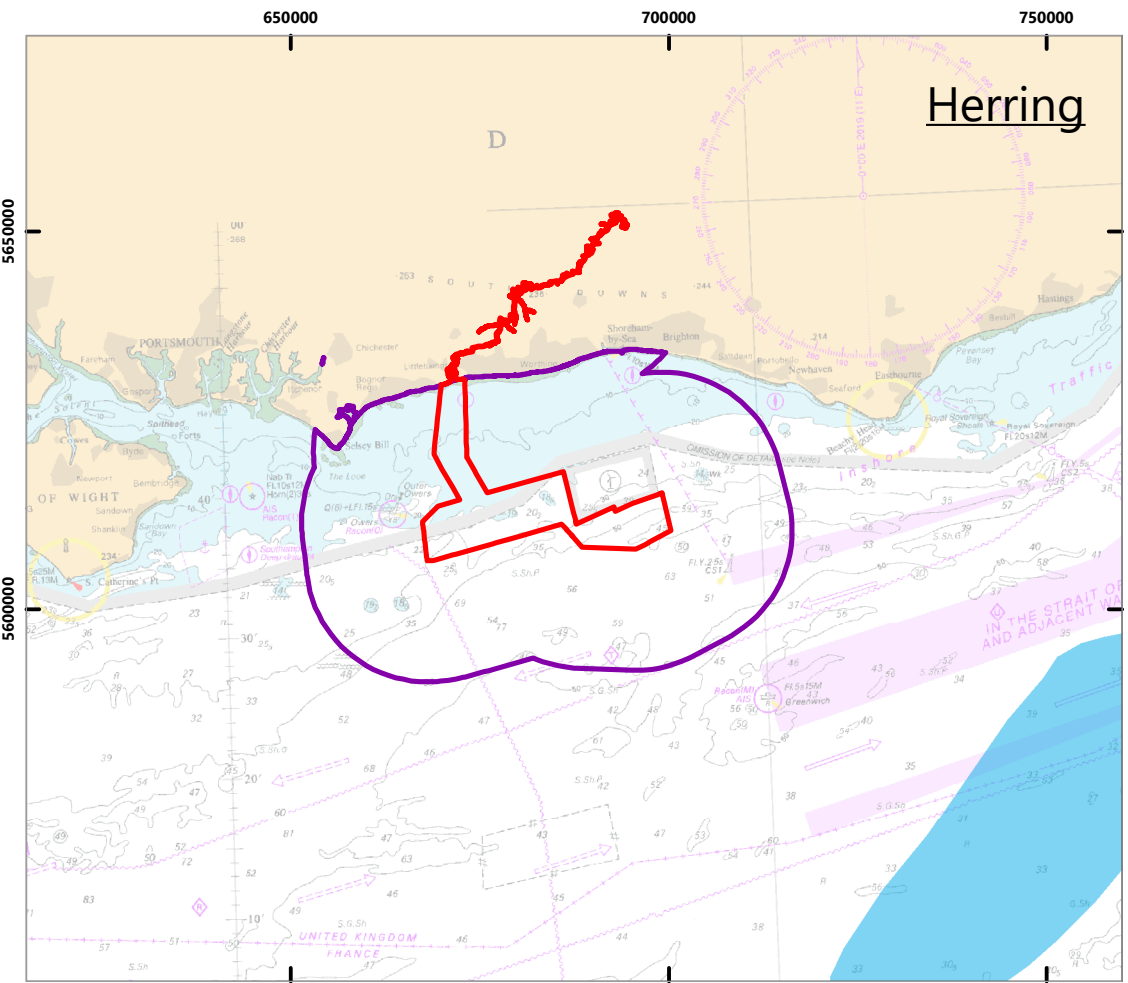
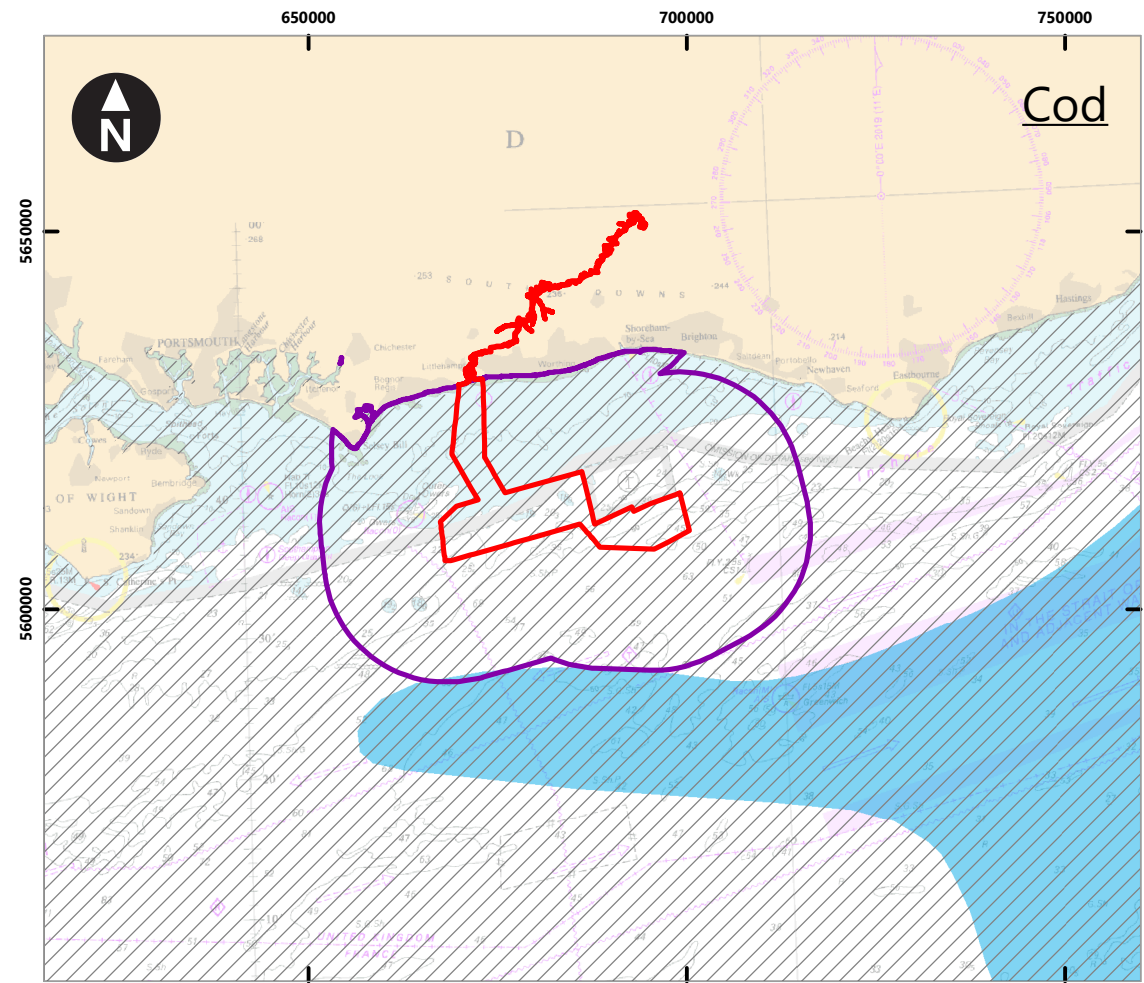
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Rampion 2 Offshore Wind Farm
 Figure 8.1 Rampion 2 fish and shellfish ecology Study Area

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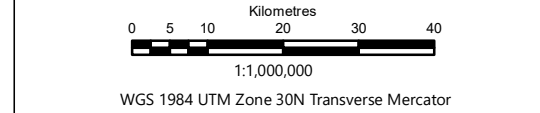
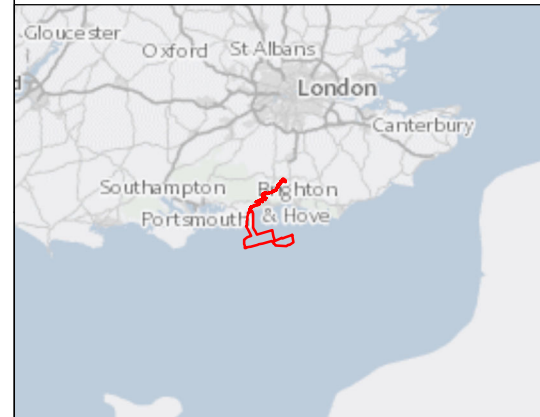
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Company: GOBE	Drawn By: SWM	Chk/Prvrd: NH	Drawn Date: 04/08/2023	Status: FINAL
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Key

- Proposed DCO Order Limits
- Fish and shellfish Study Area
- Spawning area Ellis et al. 2010
- Spawning area Coull et al. 1998



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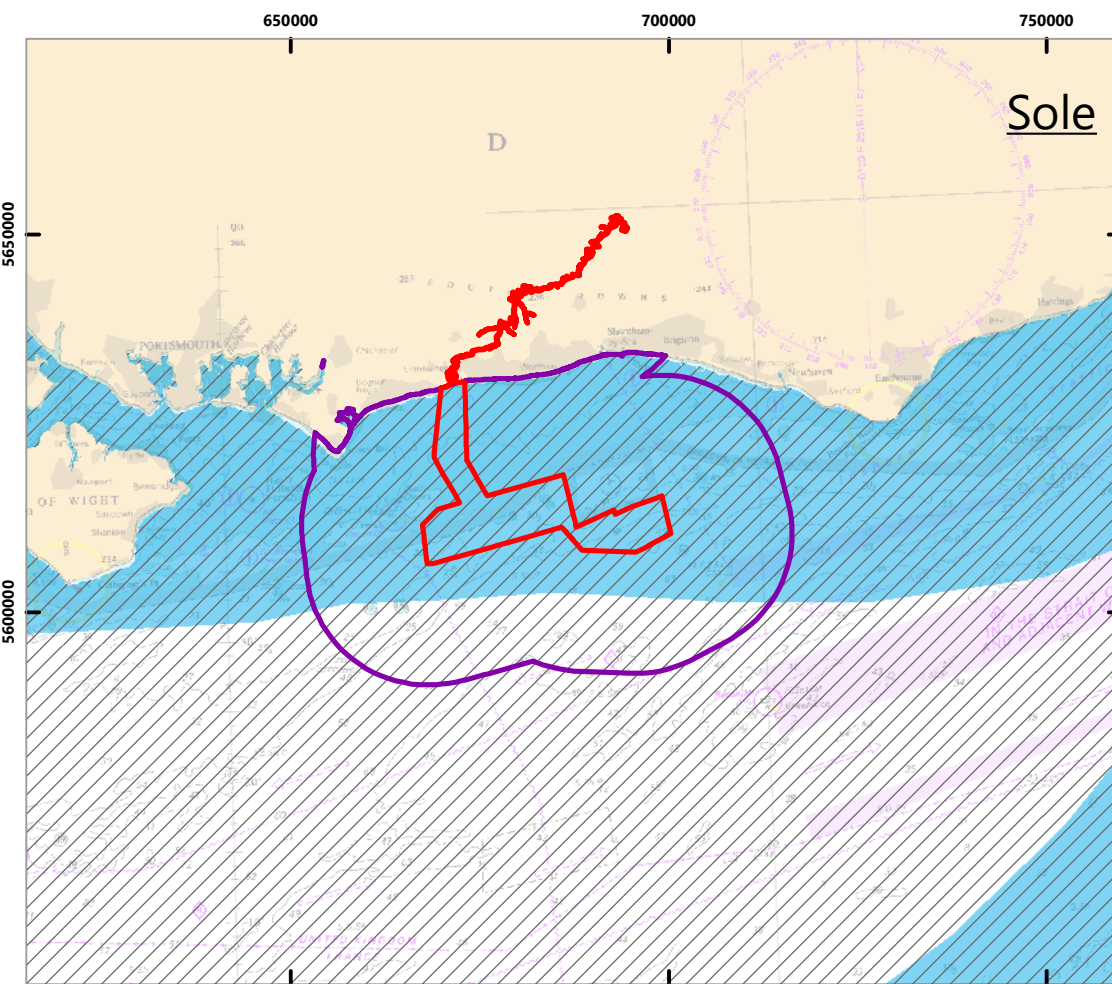
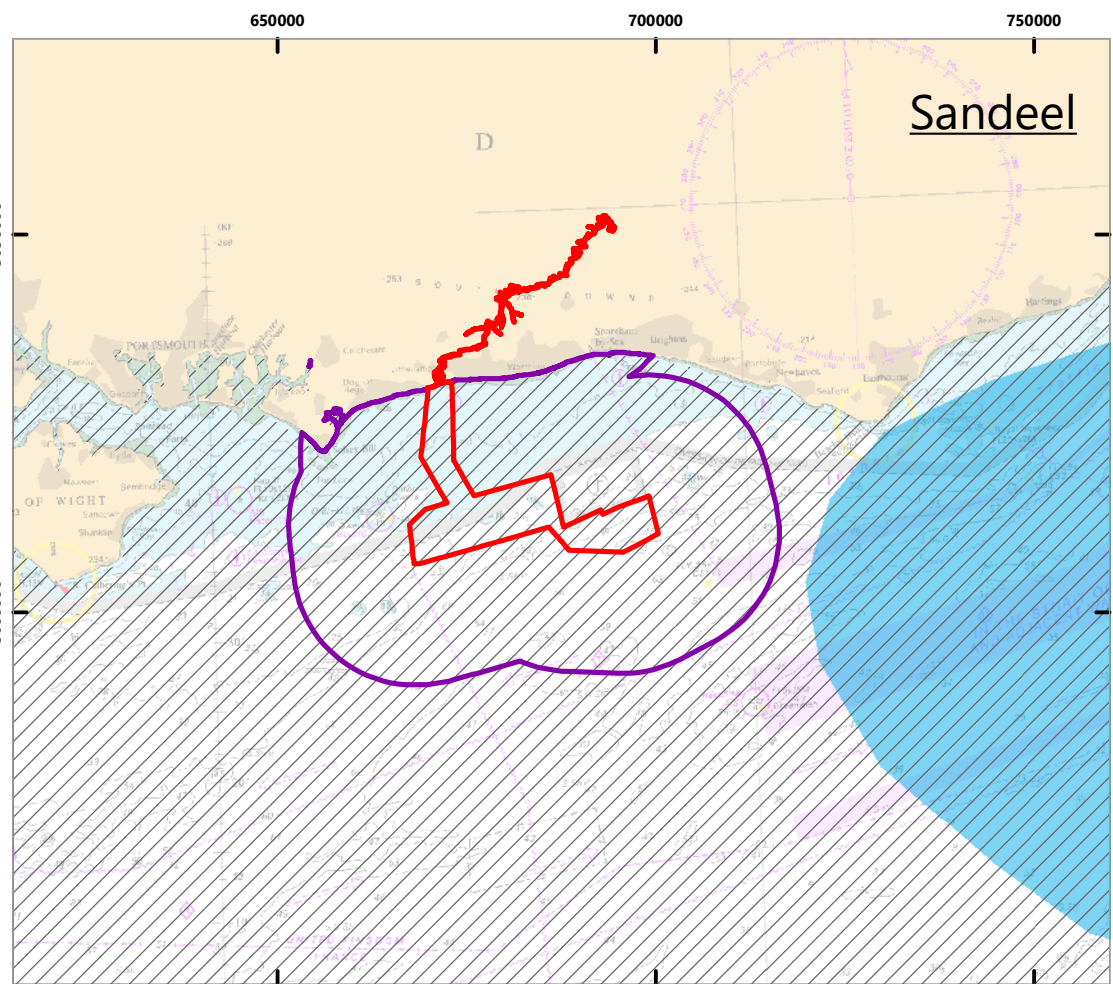
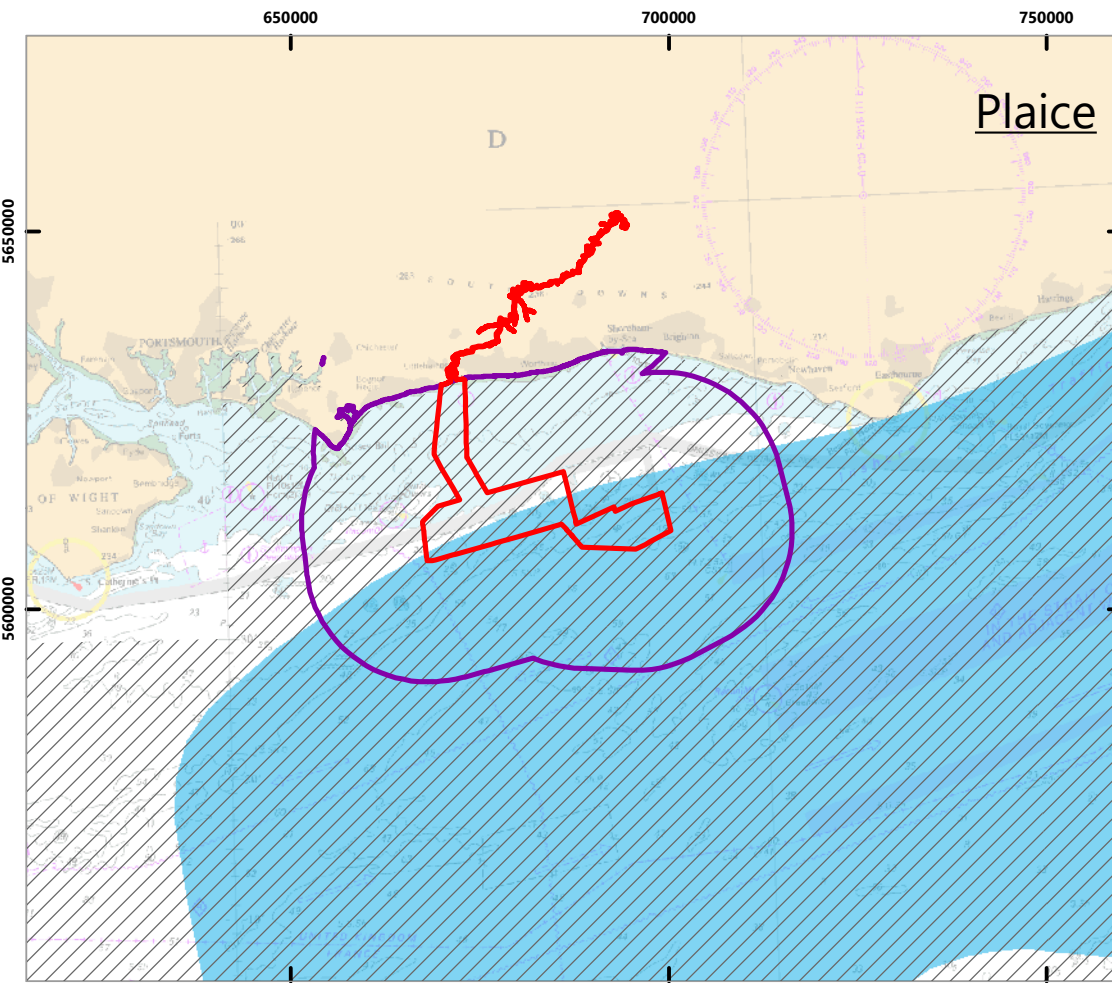
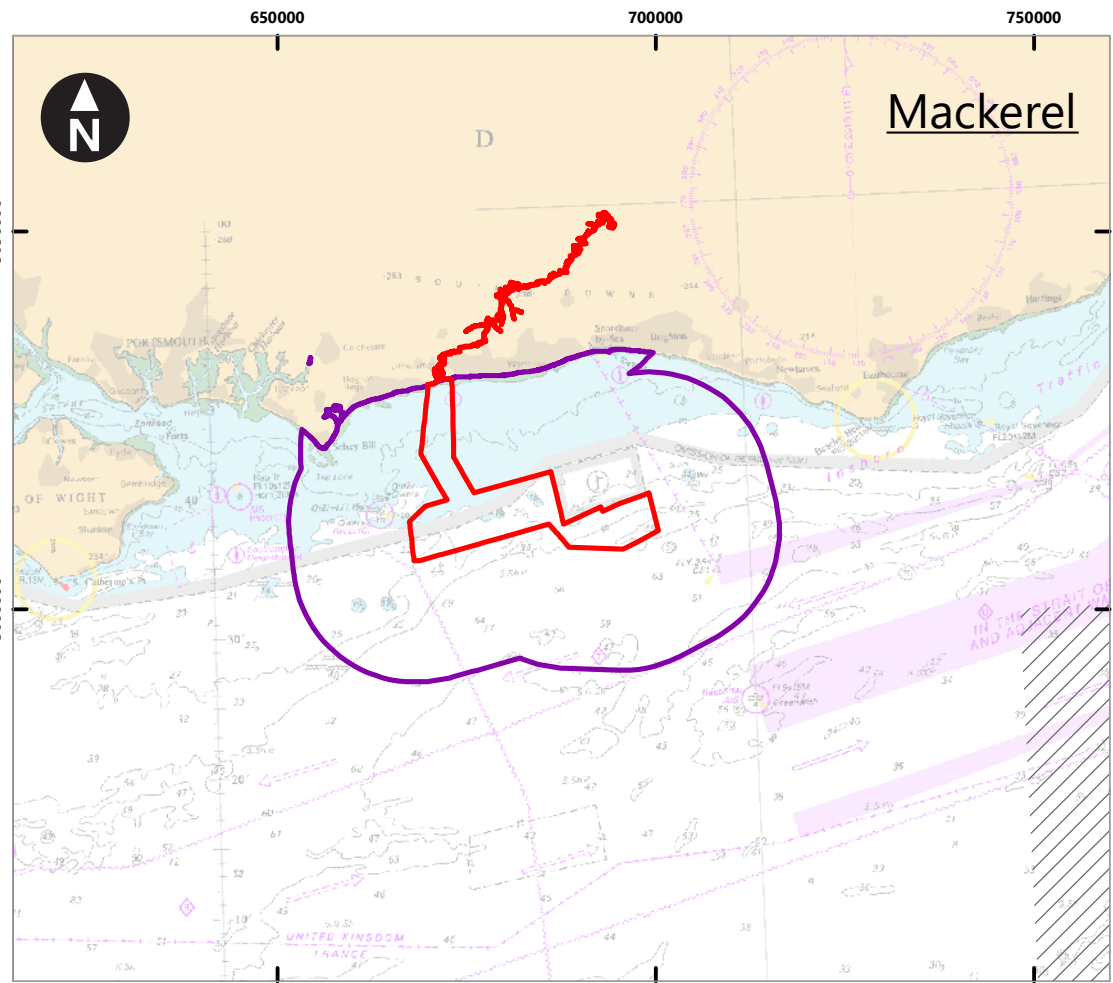
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Figure 8.2 Spawning grounds in relation to Rampion 2: cod, herring, horse mackerel and lemon sole

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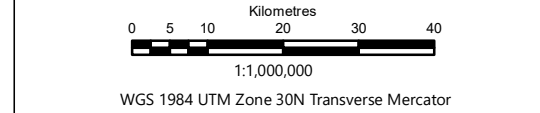
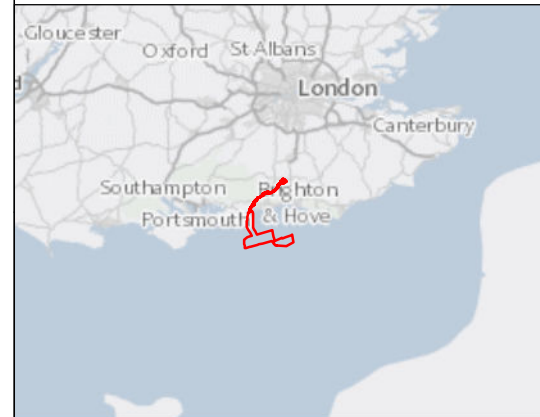
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Key

- Proposed DCO Order Limits
- Fish and shellfish Study Area
- Spawning area Ellis et al. 2010
- Spawning area Coull et al. 1998



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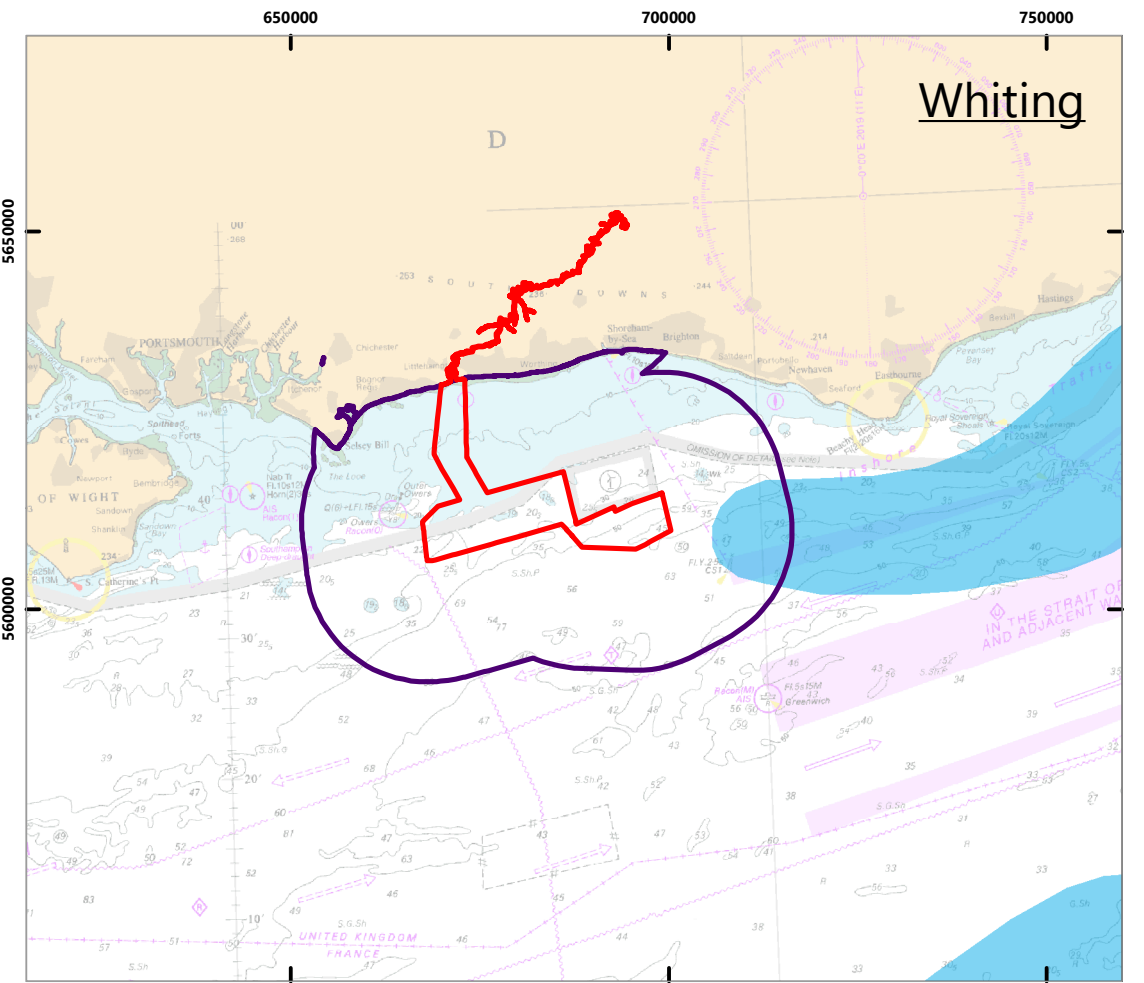
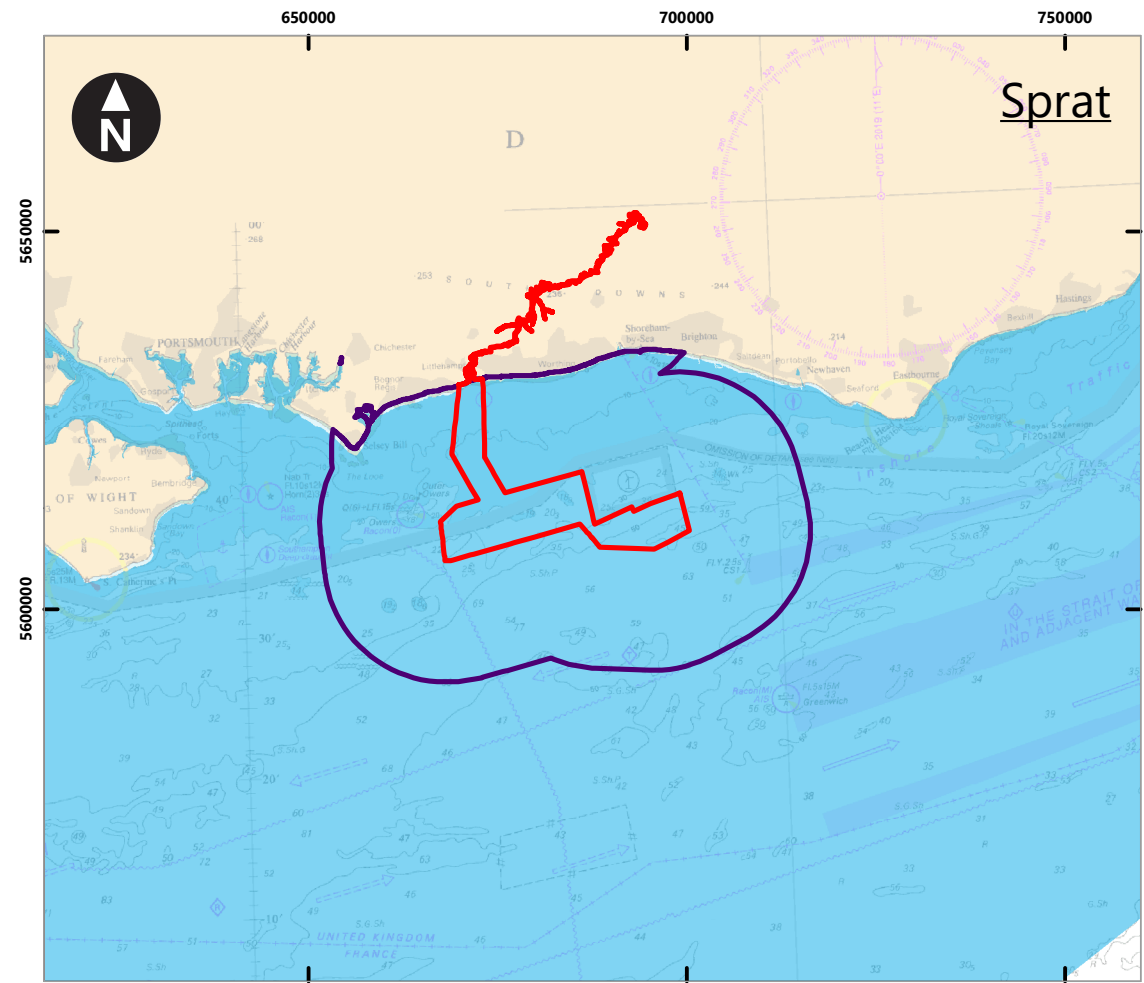
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Figure 8.3 Spawning grounds in relation to Rampion 2: Mackerel, Plaice, Sandeel, Sole

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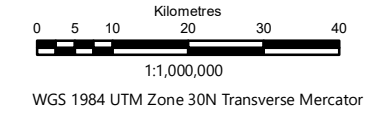
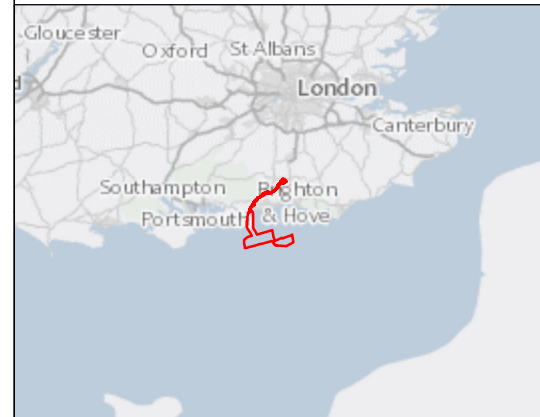
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Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Spawning area Ellis et al. 2010
- Spawning area Coull et al. 1998



Rampion Extension Development



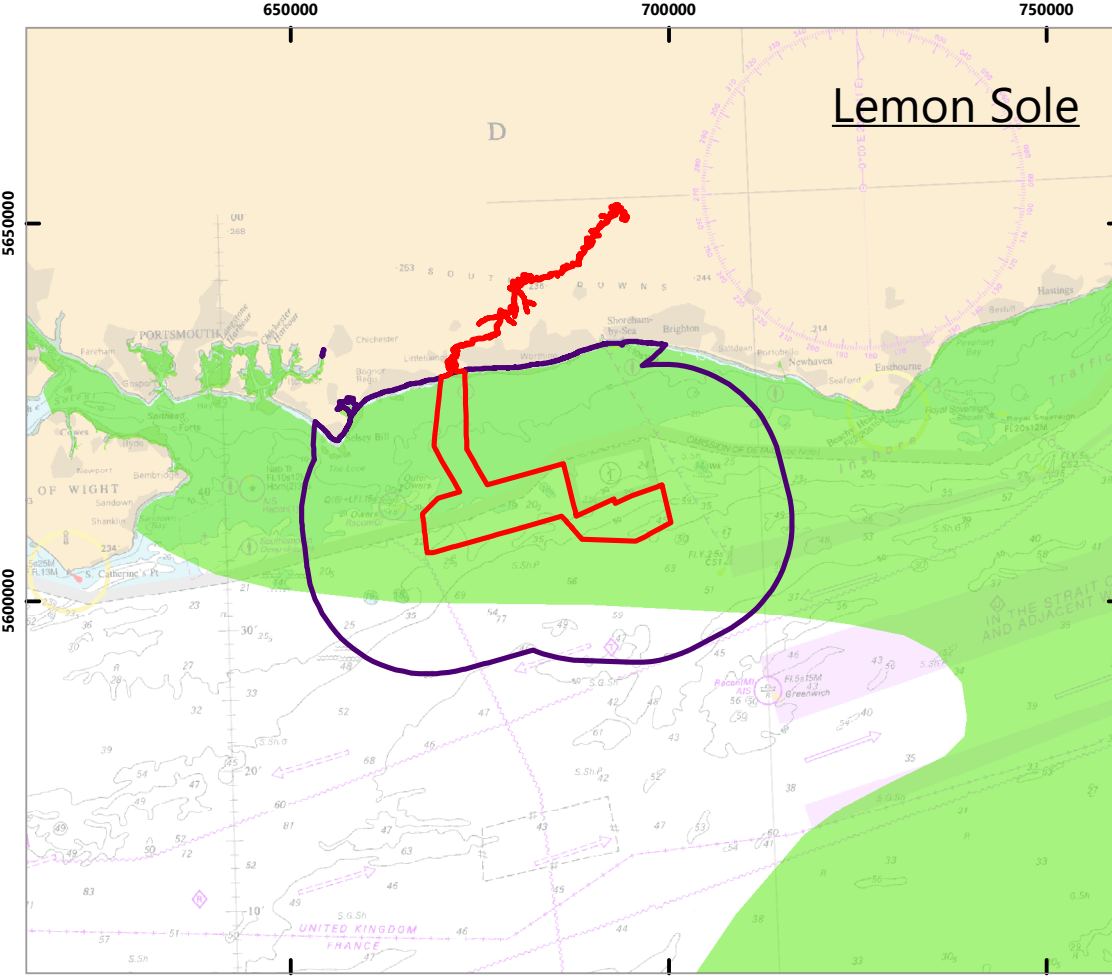
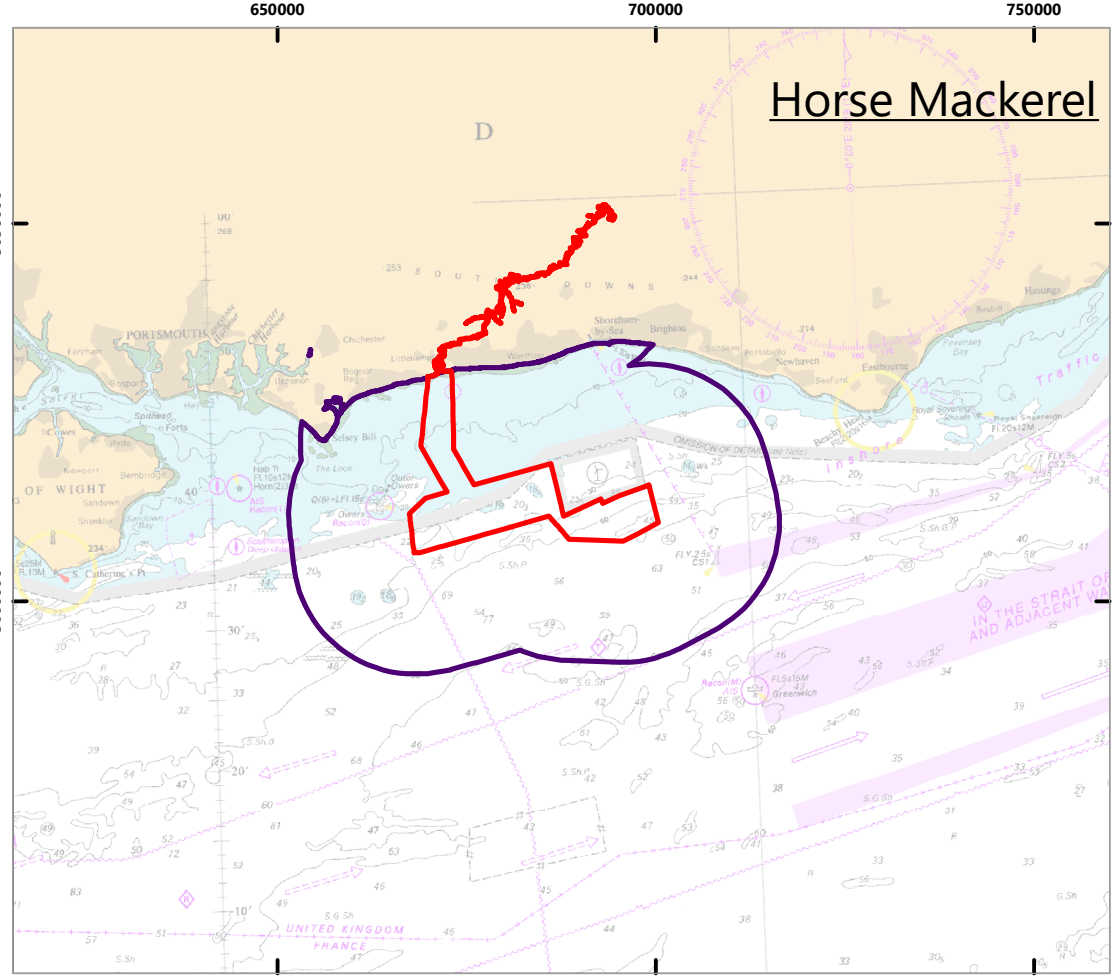
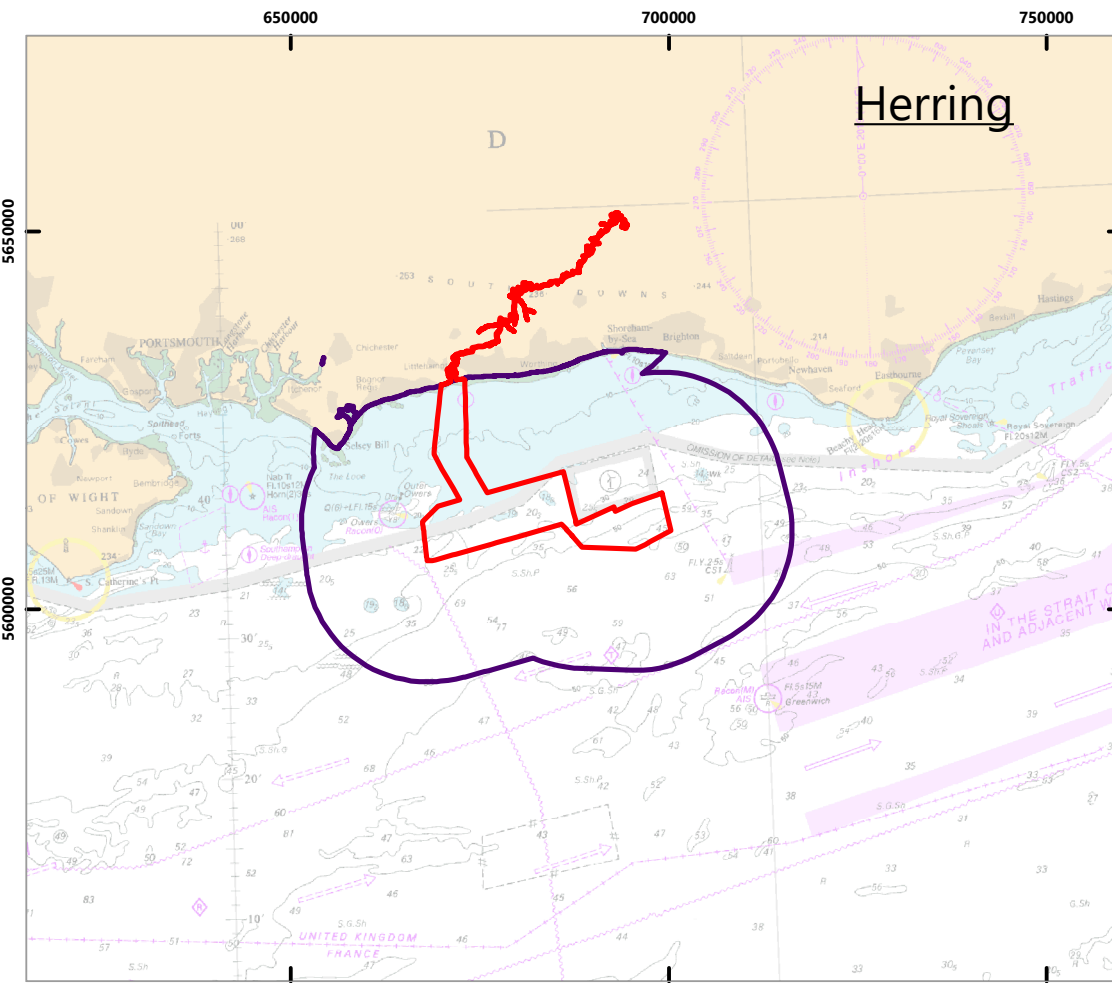
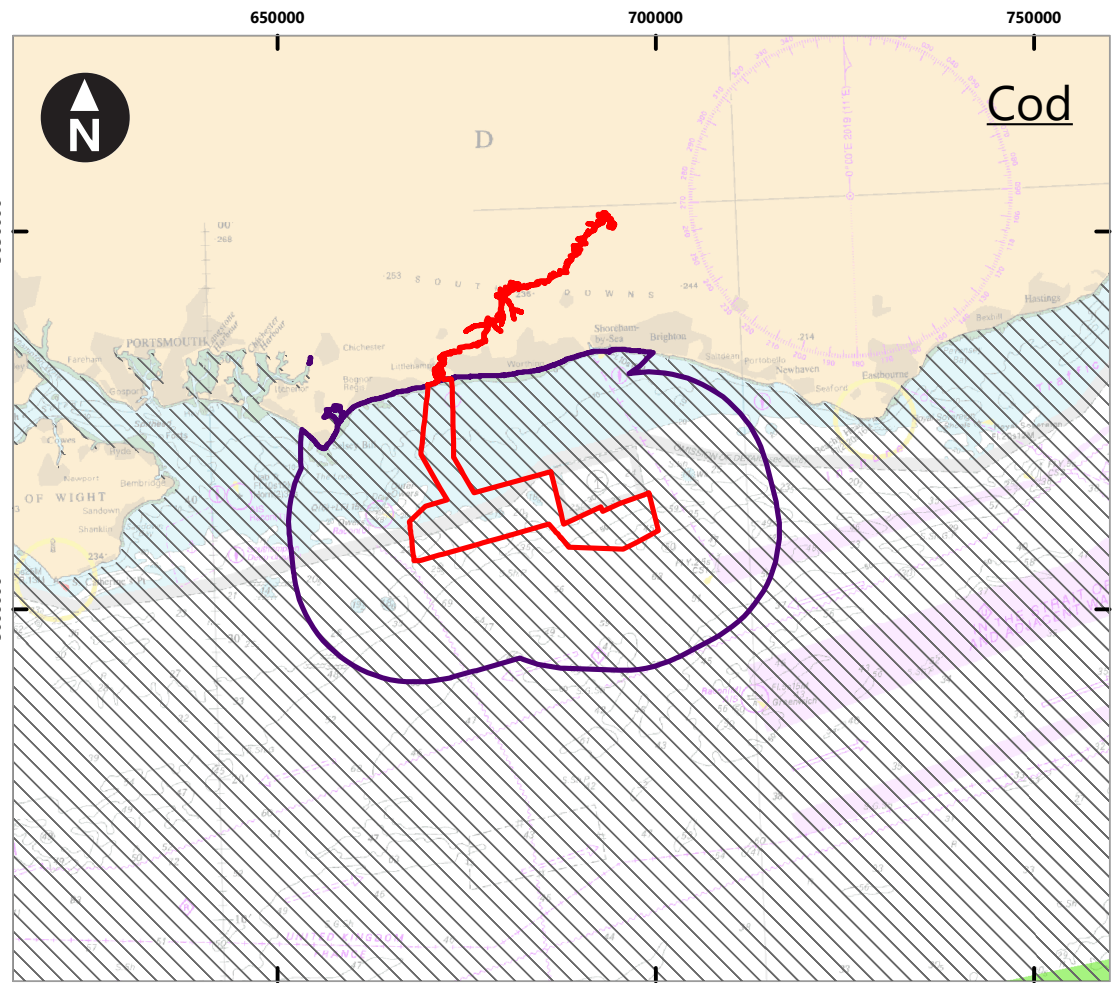
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Figure 8.4 Spawning grounds in relation to the Rampion 2 fish and shellfish ecology Study Area: sprat and whiting

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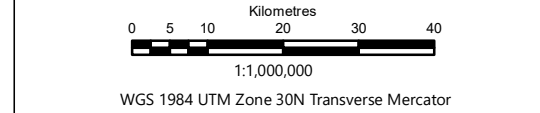
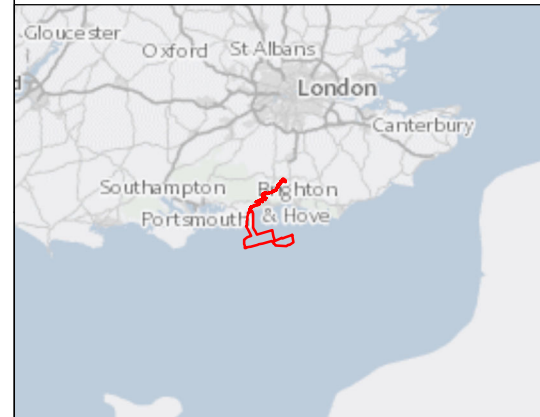
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Key

Legend

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Nursery grounds Coull et al. 1998
- Nursery grounds Ellis et al. 2010



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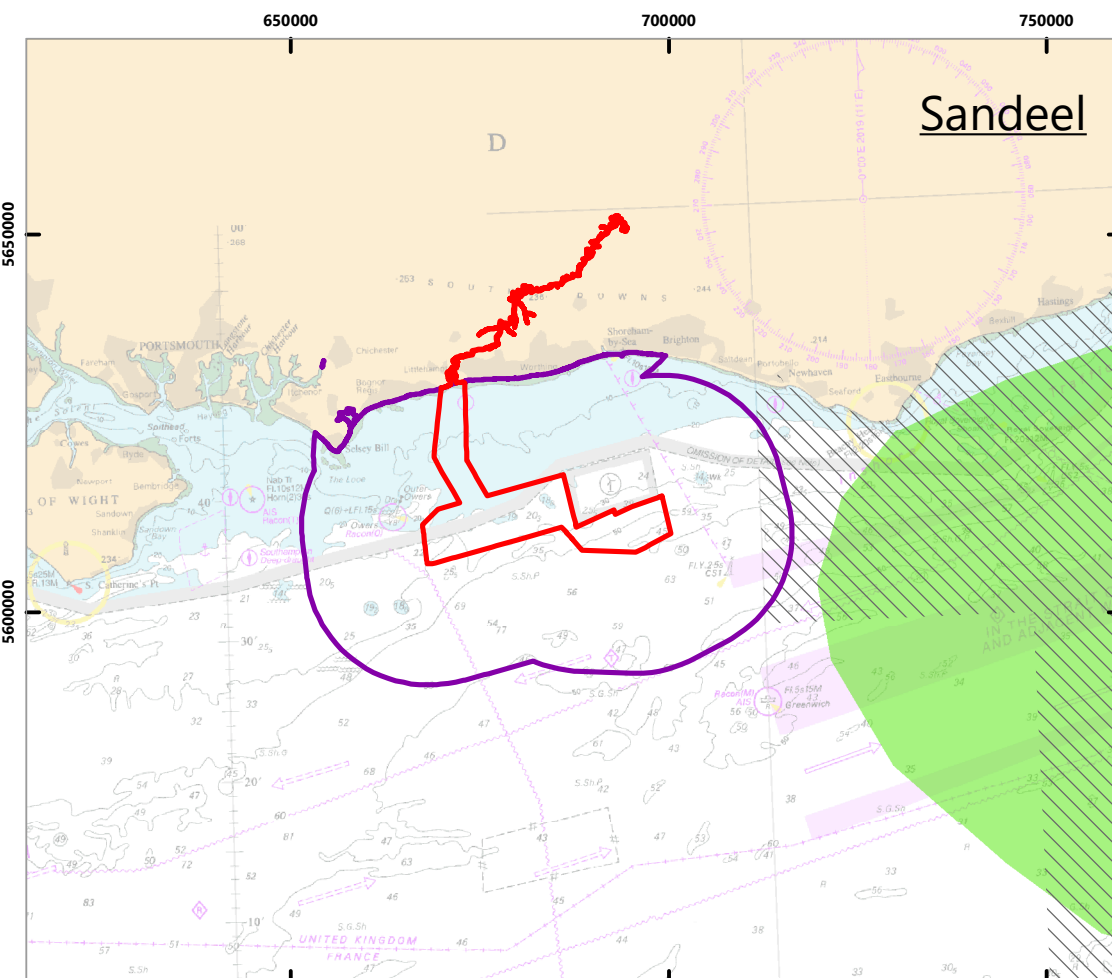
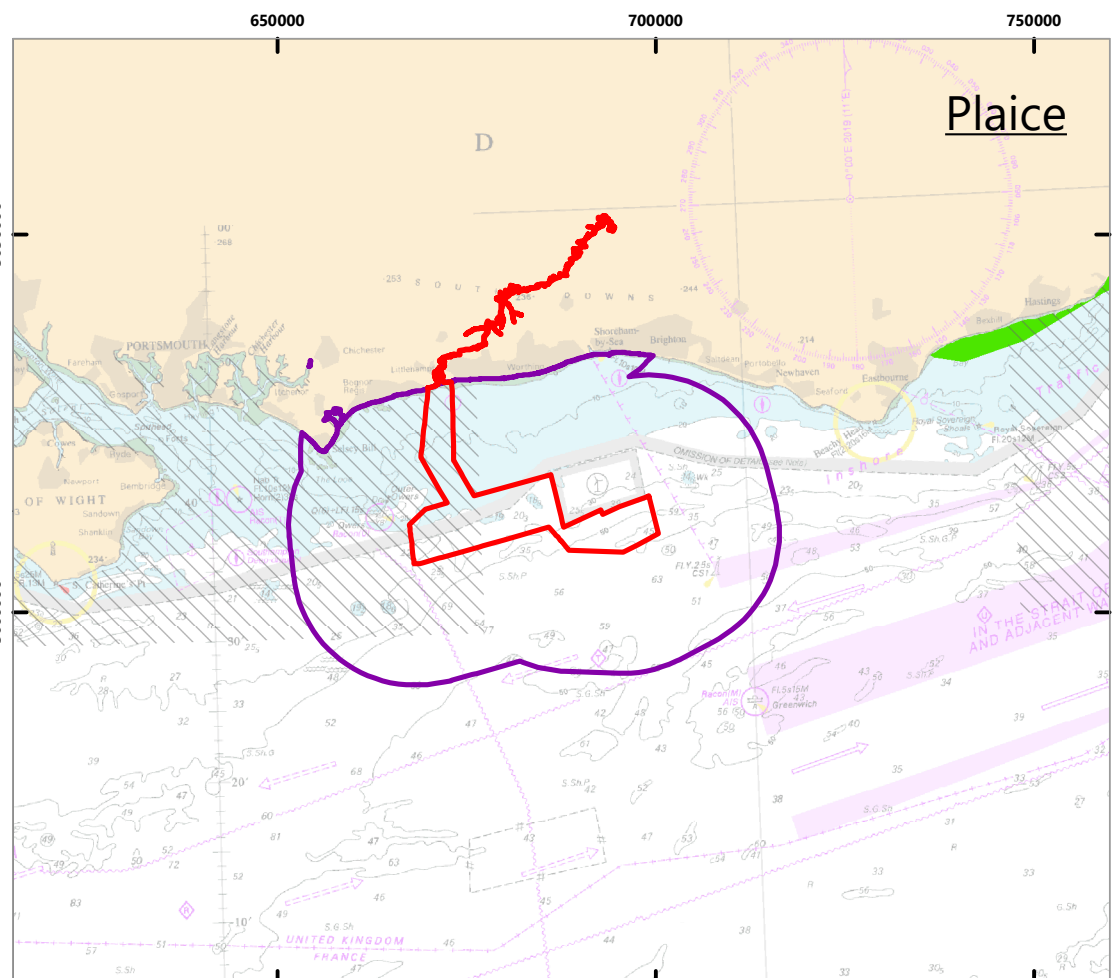
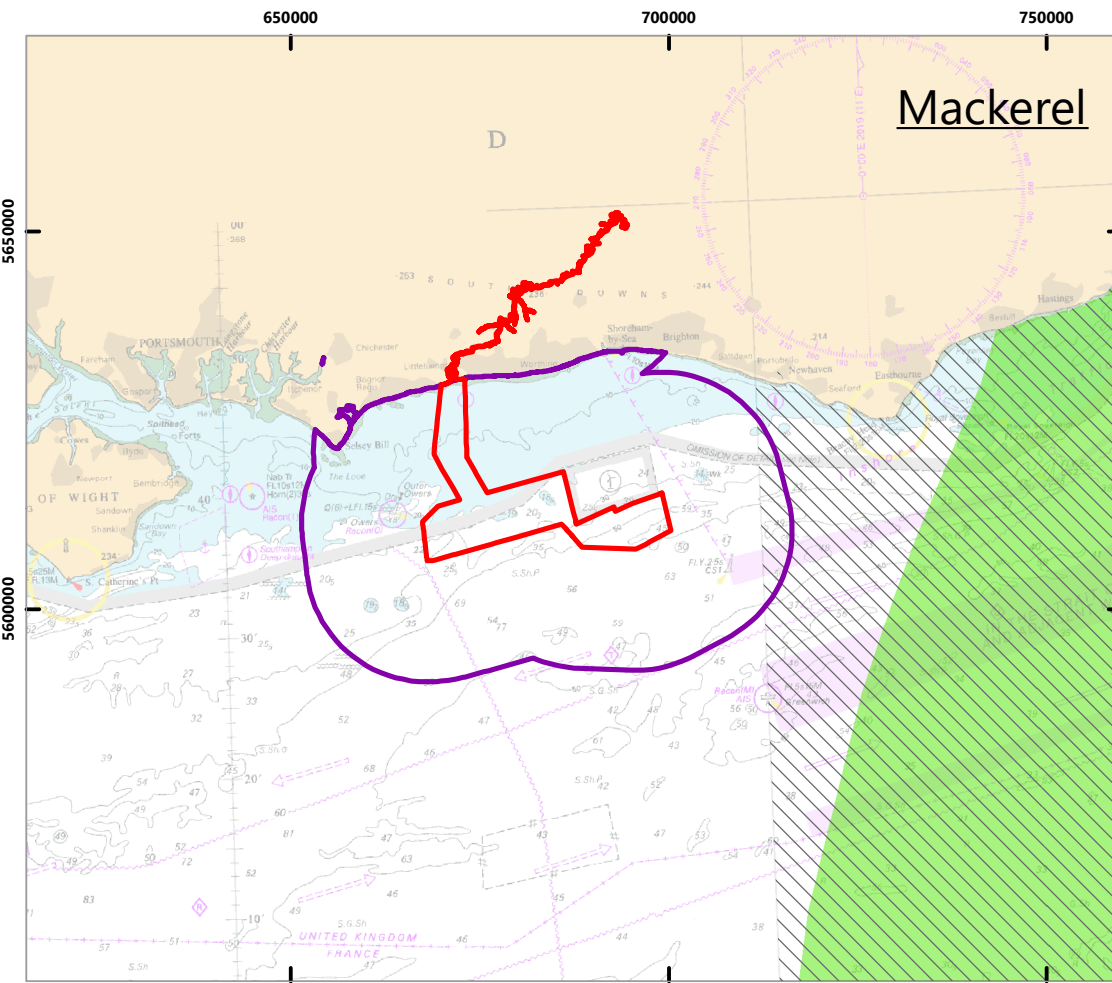
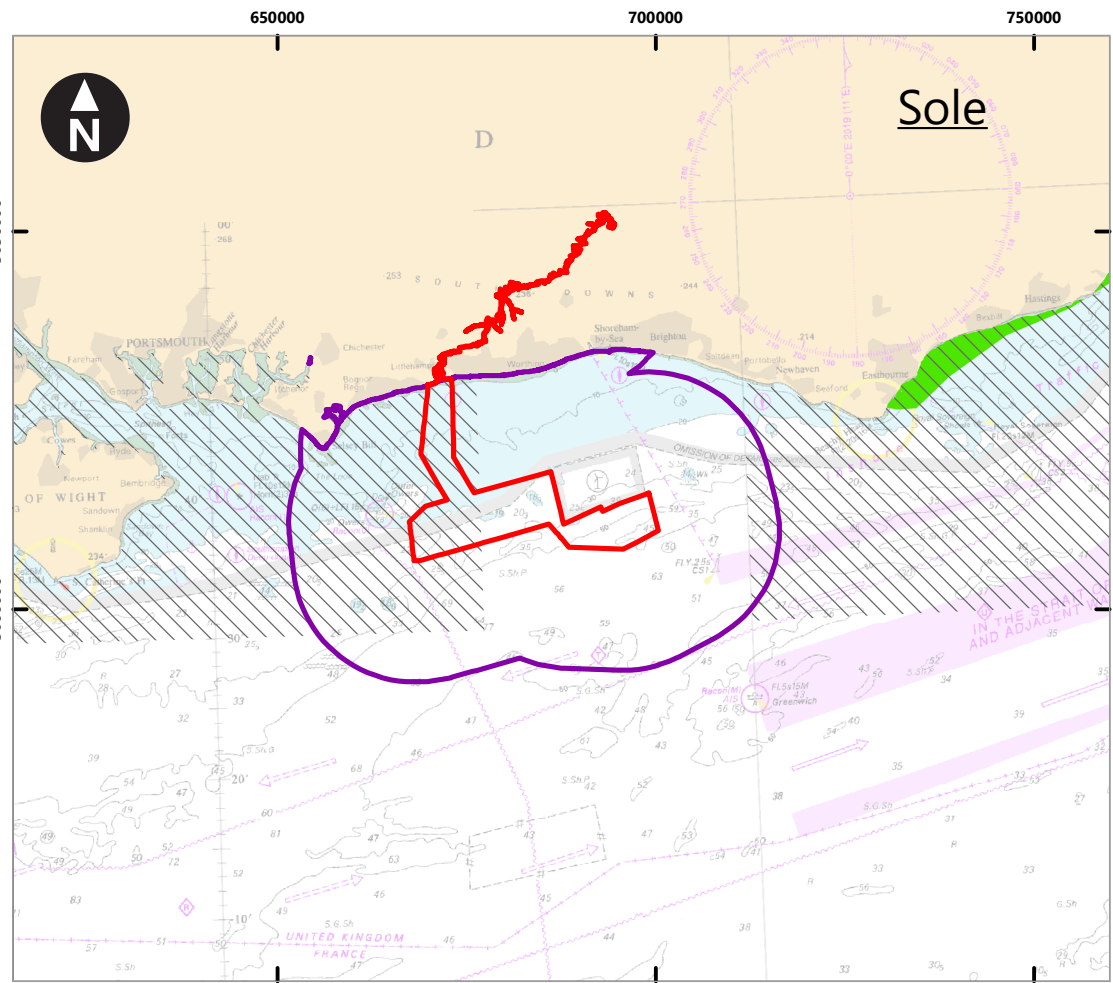
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Figure 8.5 Nursery grounds in relation to Rampion 2: cod, herring, horse mackerel and lemon sole

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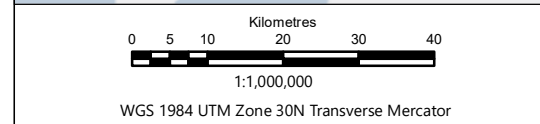
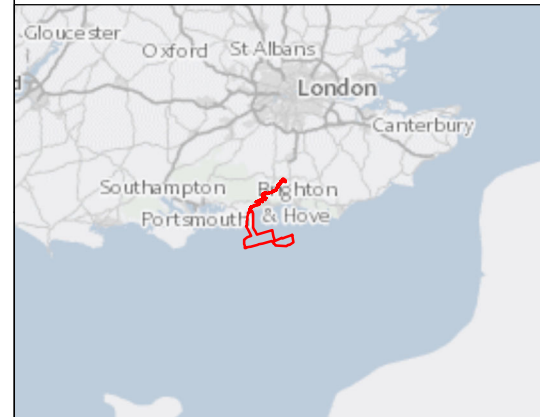
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Key

- Proposed DCO Order Limits
- Fish and shellfish Study Area
- Nursery grounds Ellis et al. 2010
- Nursery grounds Coull et al. 1998



Rampion Extension Development



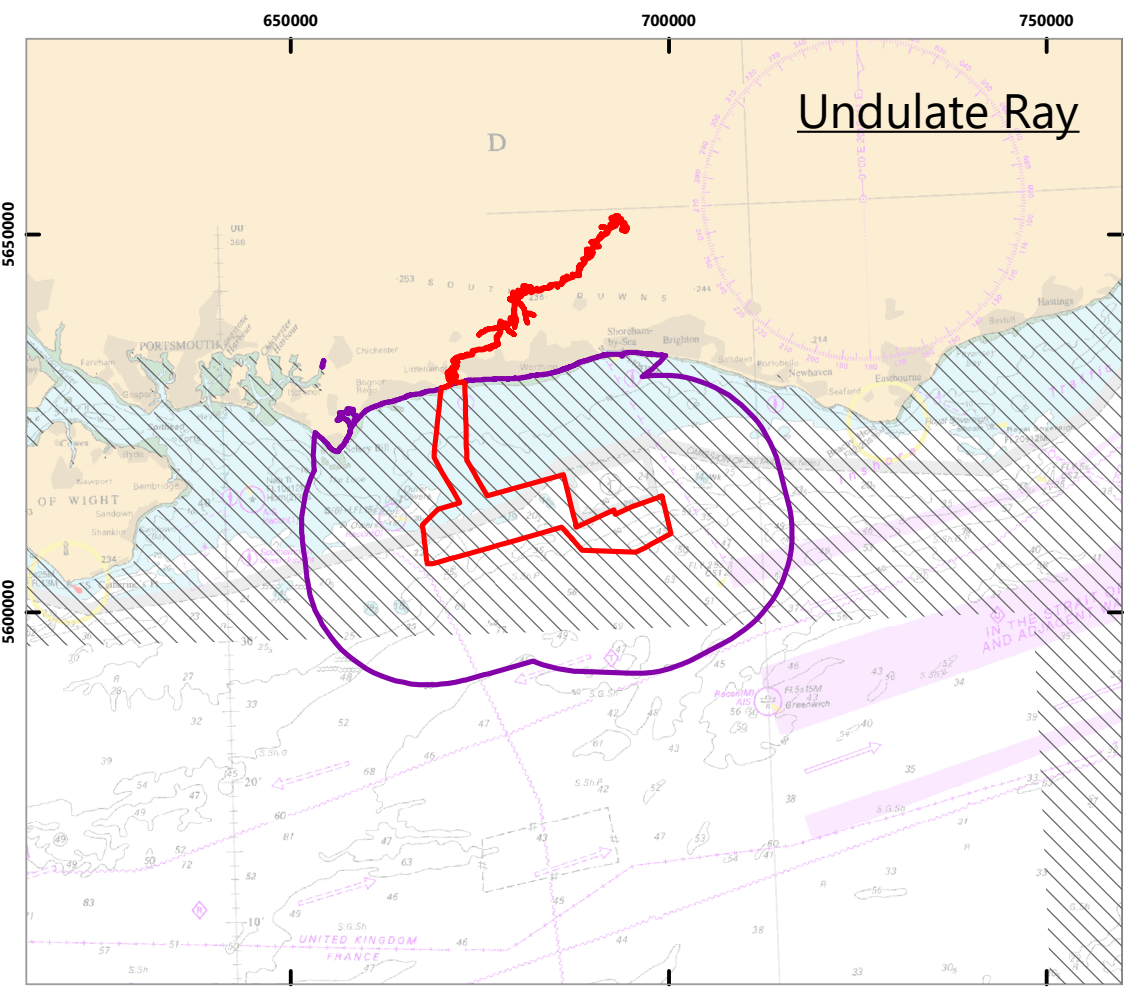
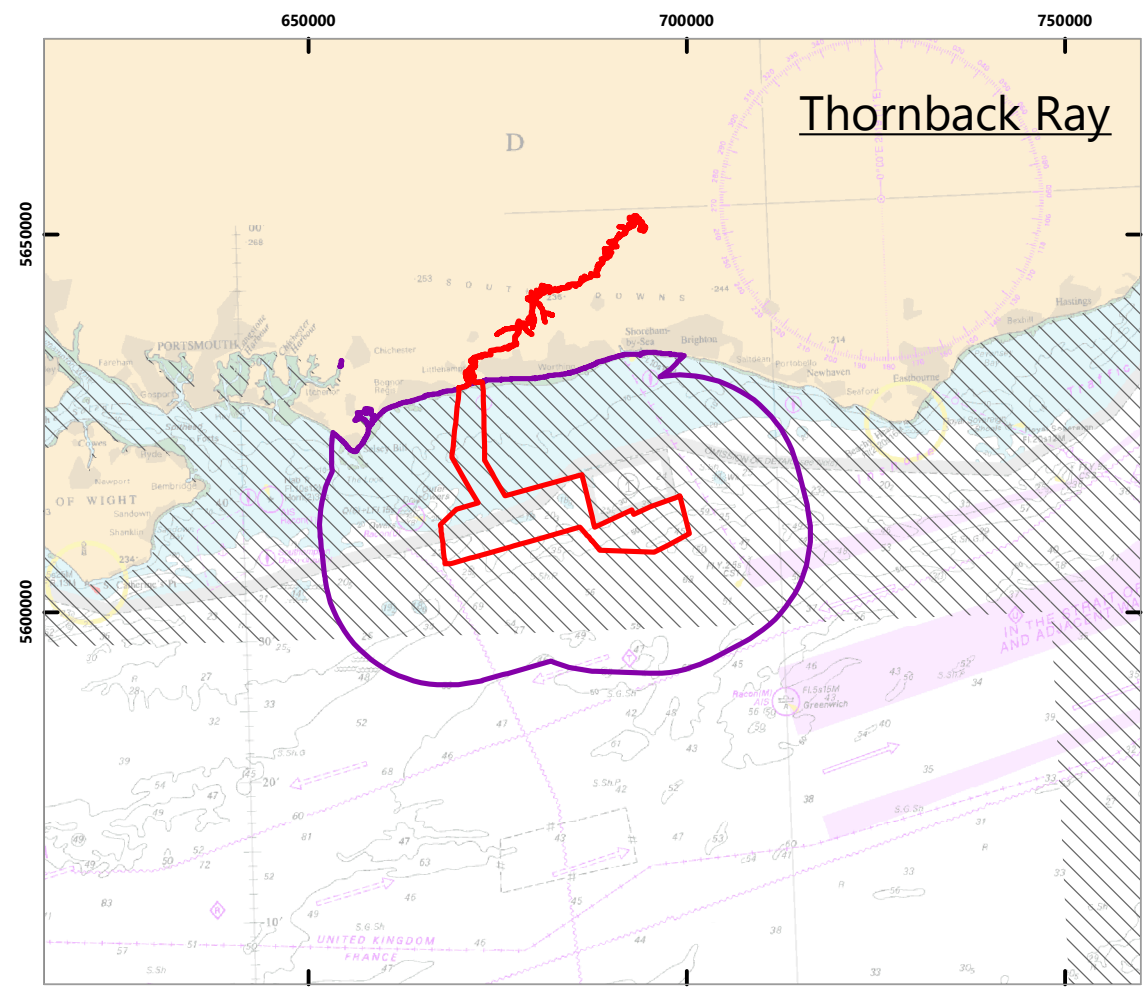
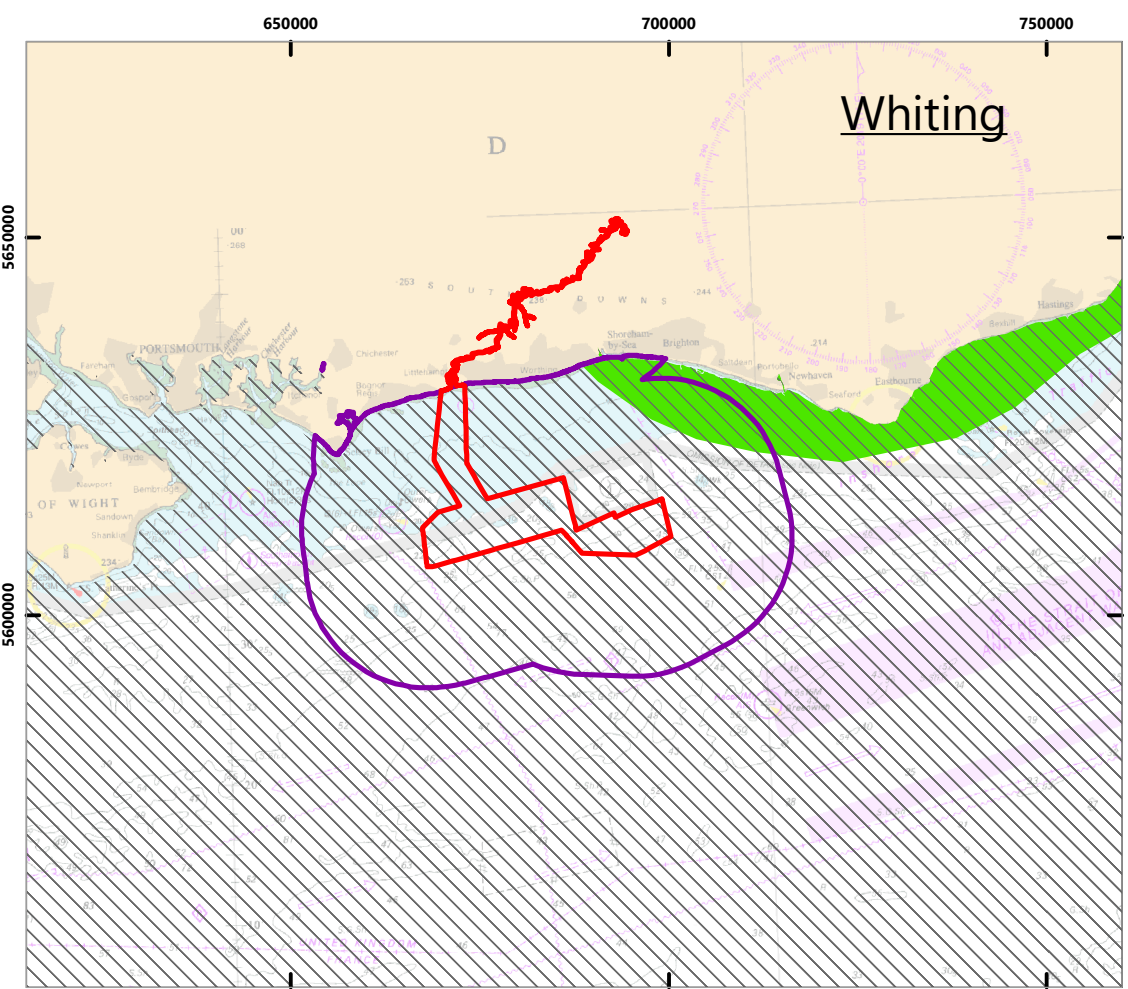
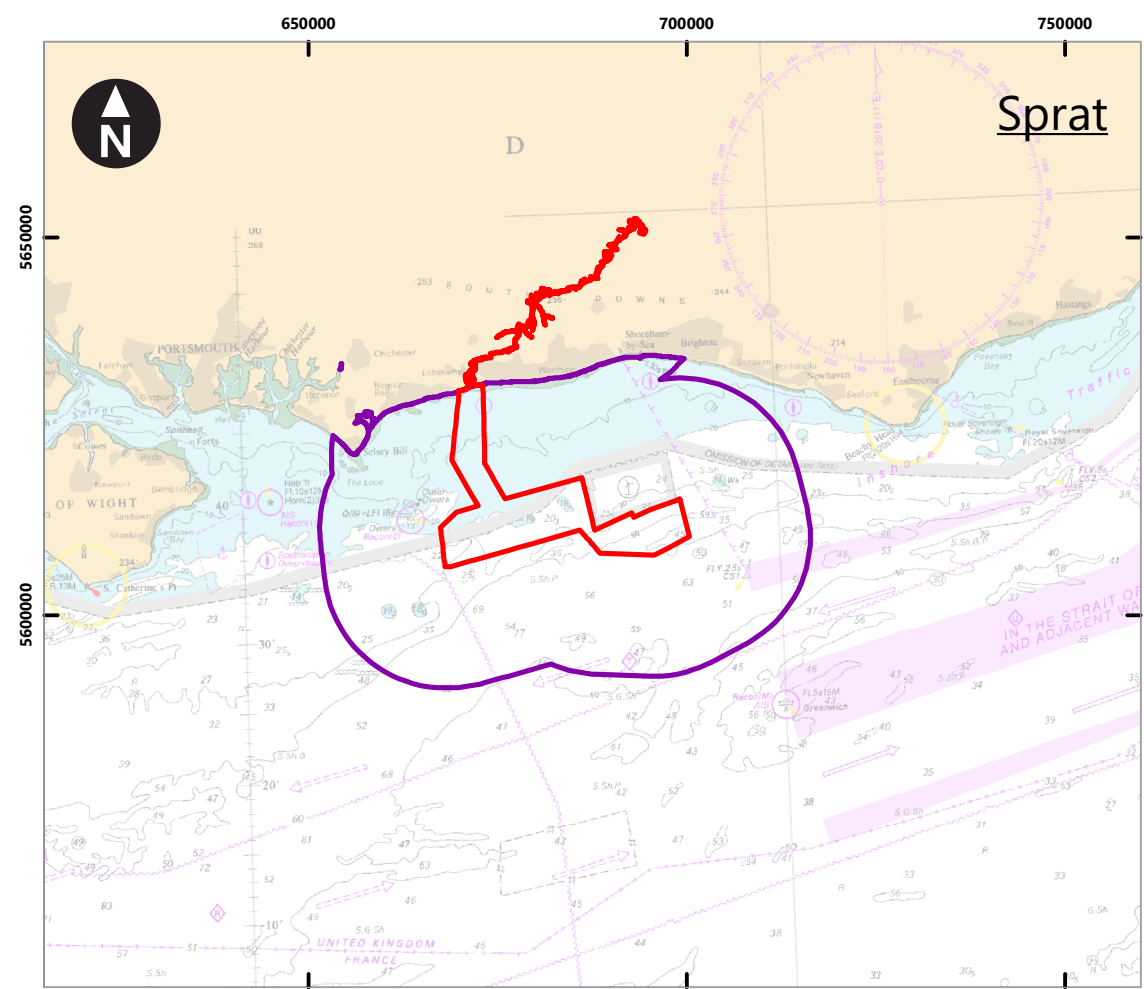
Rampion 2 Offshore Wind Farm

Figure 8.6 Nursery grounds in relation to Rampion 2: mackerel, plaice, sandeel and sole

Environmental Statement

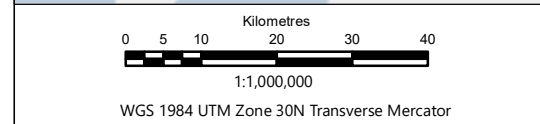
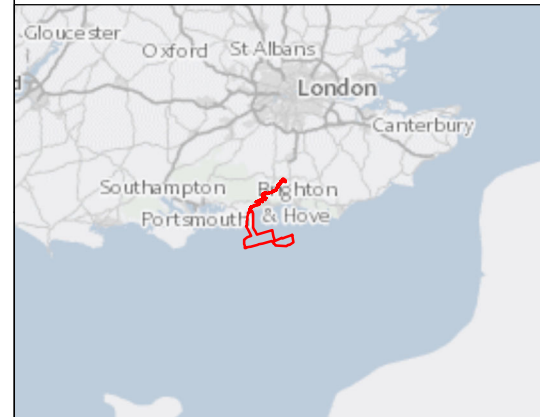
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Key

- Proposed DCO Order Limits
- Fish and shellfish Study Area
- Nursery grounds Coull et al. 1998
- Nursery grounds Ellis et al. 2010



Rampion Extension Development



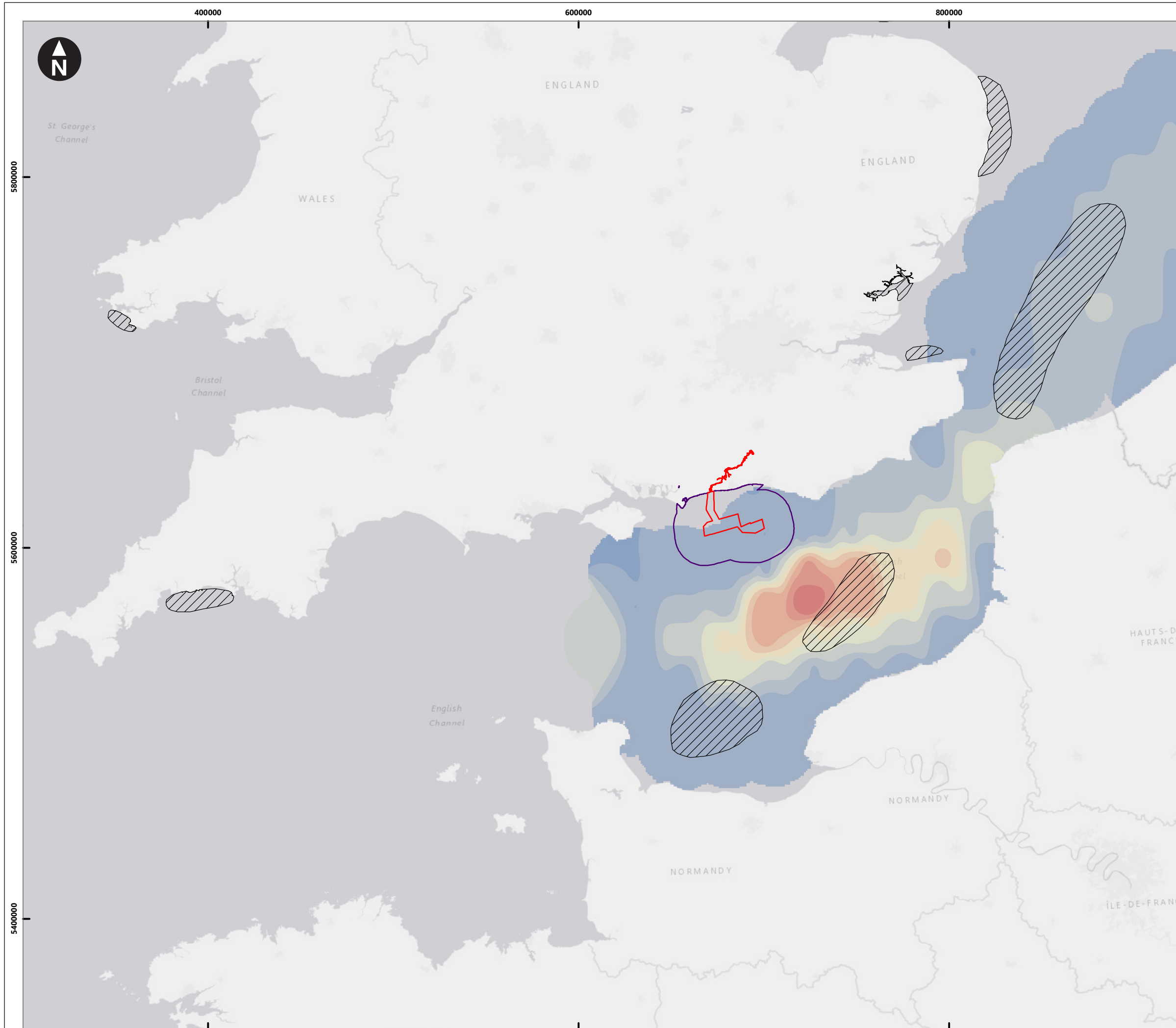
Rampion 2 Offshore Wind Farm

Figure 8.7 Nursery grounds in relation to Rampion 2: sprat, whiting, thornback ray and undulate ray

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-5380	Version: 1.0
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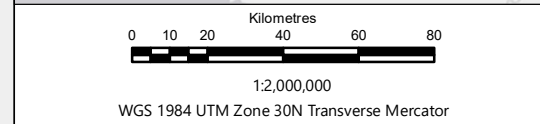
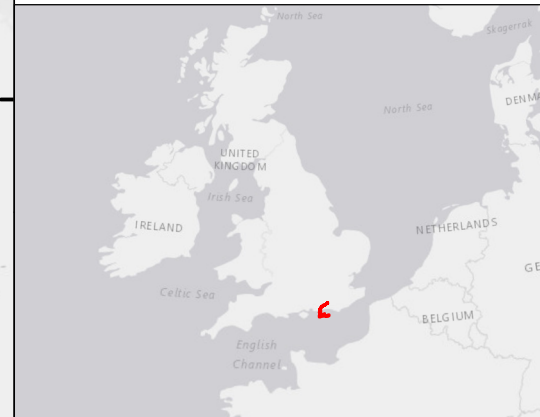
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Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Herring spawning (Coul et al. 1998)

IHLS 2007/2020 downs data
 Herring larval abundance per m²

	0
	0.1 - 2,500
	2,500 - 7,000
	7,000 - 14,000
	14,000 - 23,000
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	35,000 - 48,000
	48,000 - 63,000
	63,000 - 80,000
	80,000 - 98,500



Rampion Extension Development



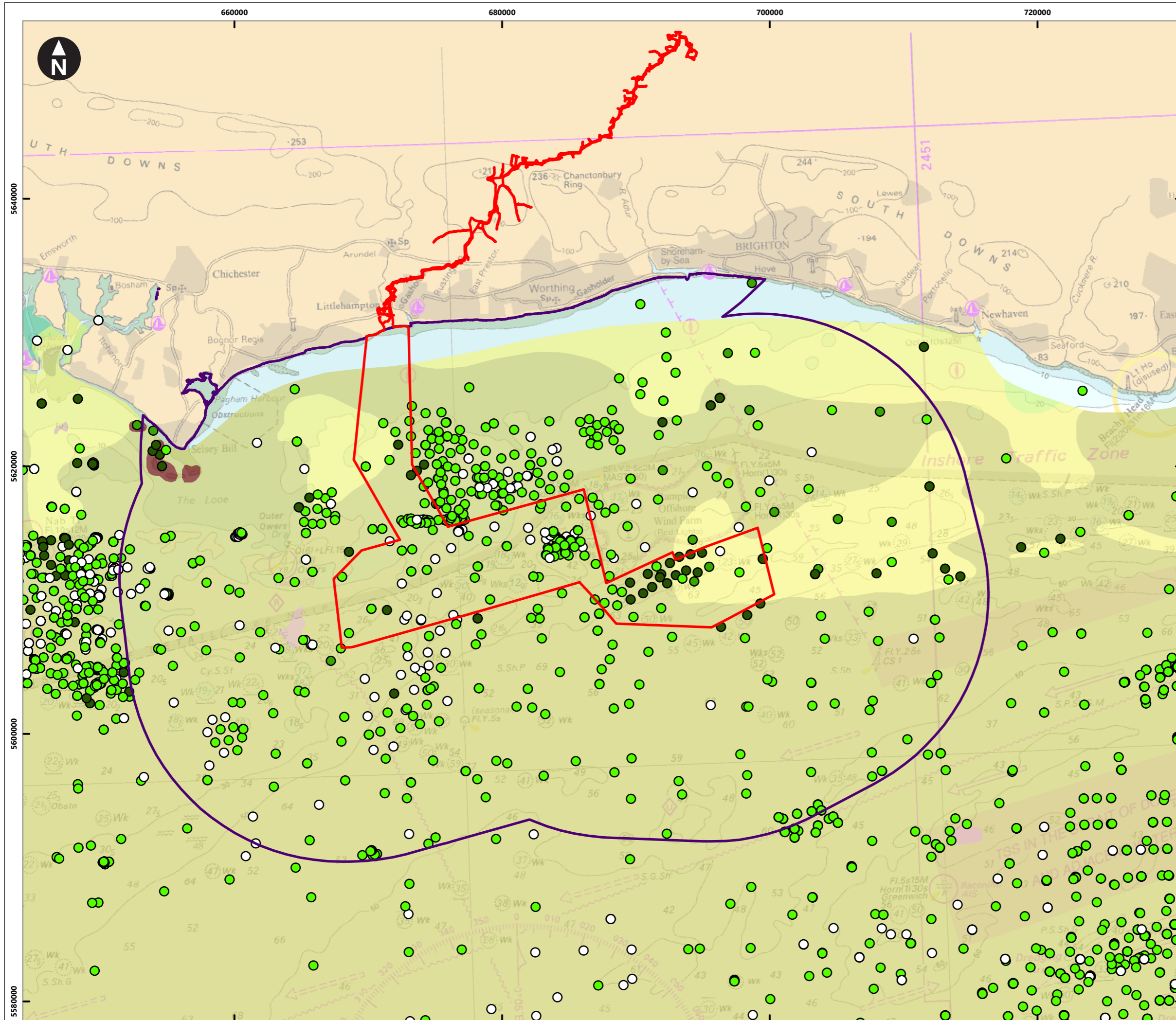
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Figure 8.8 Location of herring spawning grounds and IHLS comparison (2007-2020) in relation to Rampion 2

Environmental Statement

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Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area

Sandeel Habitat Suitability (Latto *et al.*, 2013)

- Prime, Preferred
- Sub-Prime, Preferred
- Suitable, Marginal
- Unsuitable

EMODnet Seabed Substrate (Folk 7 Class)

- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock and boulders

0 1.25 2.5 5 7.5 10 Kilometres
1:275,000
WGS 1984 UTM Zone 30N Transverse Mercator

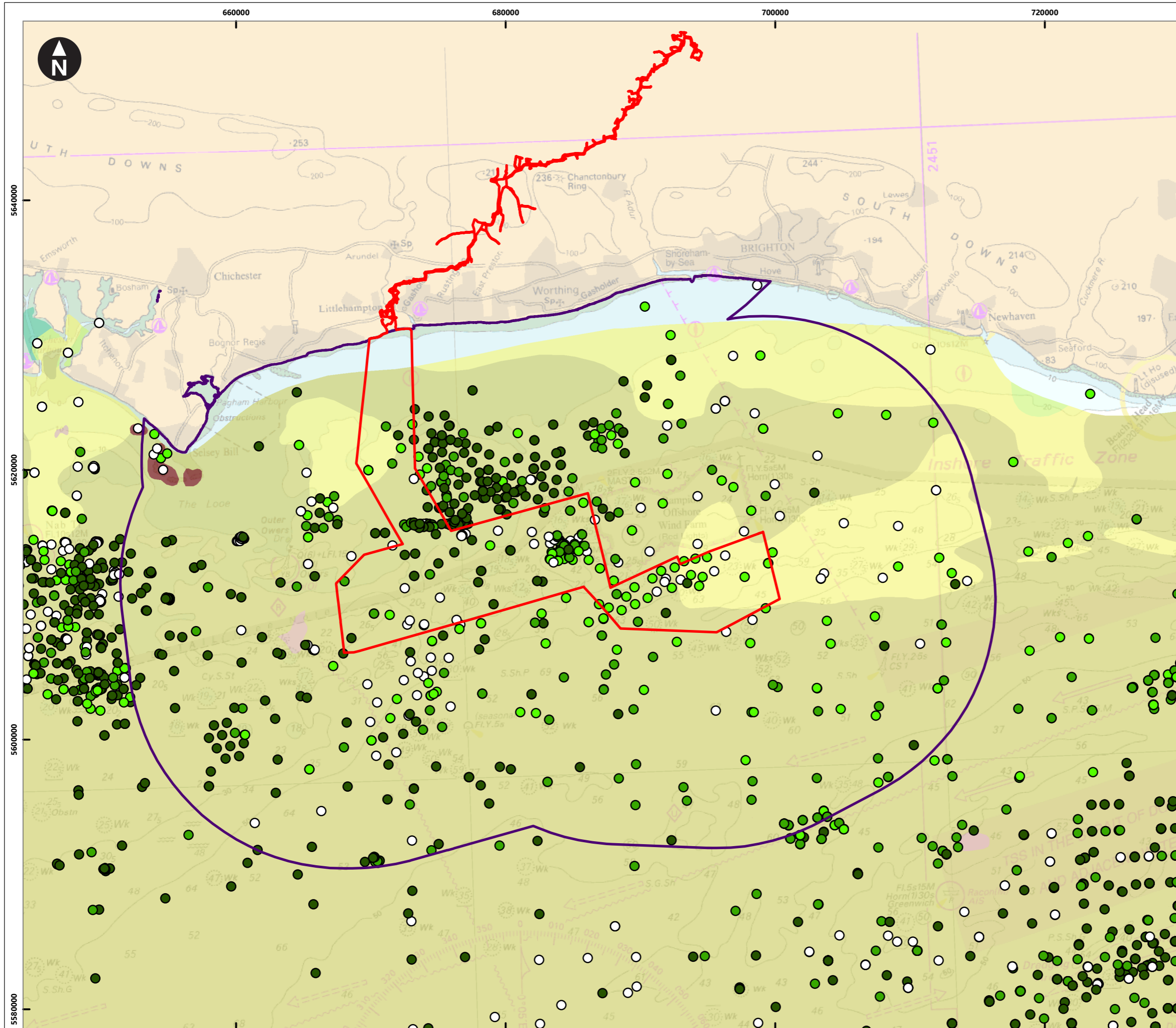
Rampion Extension Development

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Figure 8.9 Potential sandeel habitat sediment classifications within the Rampion 2 fish and shellfish ecology Study Area following methods in Latto *et al.* (2013). Also presented are the predicted broadscale seabed habitat map, using the EUNIS habitat classification (OEL, 2020b; UKSeaMap, 2021)

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GOBE	SWM	NH	14/02/2024	FINAL



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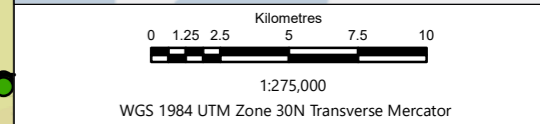
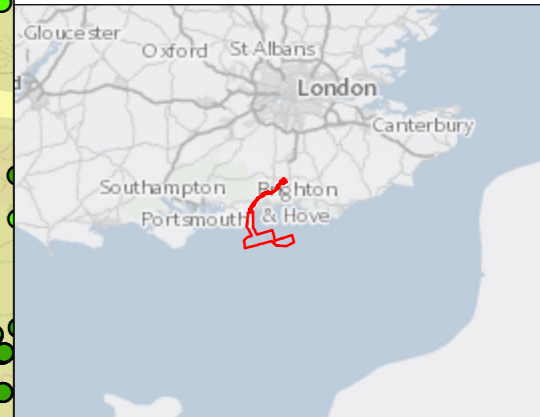
- Proposed DCO Order Limits
- Fish and Shellfish Study Area

Herring Habitat Suitability (Reach *et al.*, 2013)

- Prime, Preferred
- Sub-Prime, Preferred
- Suitable, Marginal
- Unsuitable

EMODnet Seabed Substrate (Folk 7 Class)

- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock and boulders

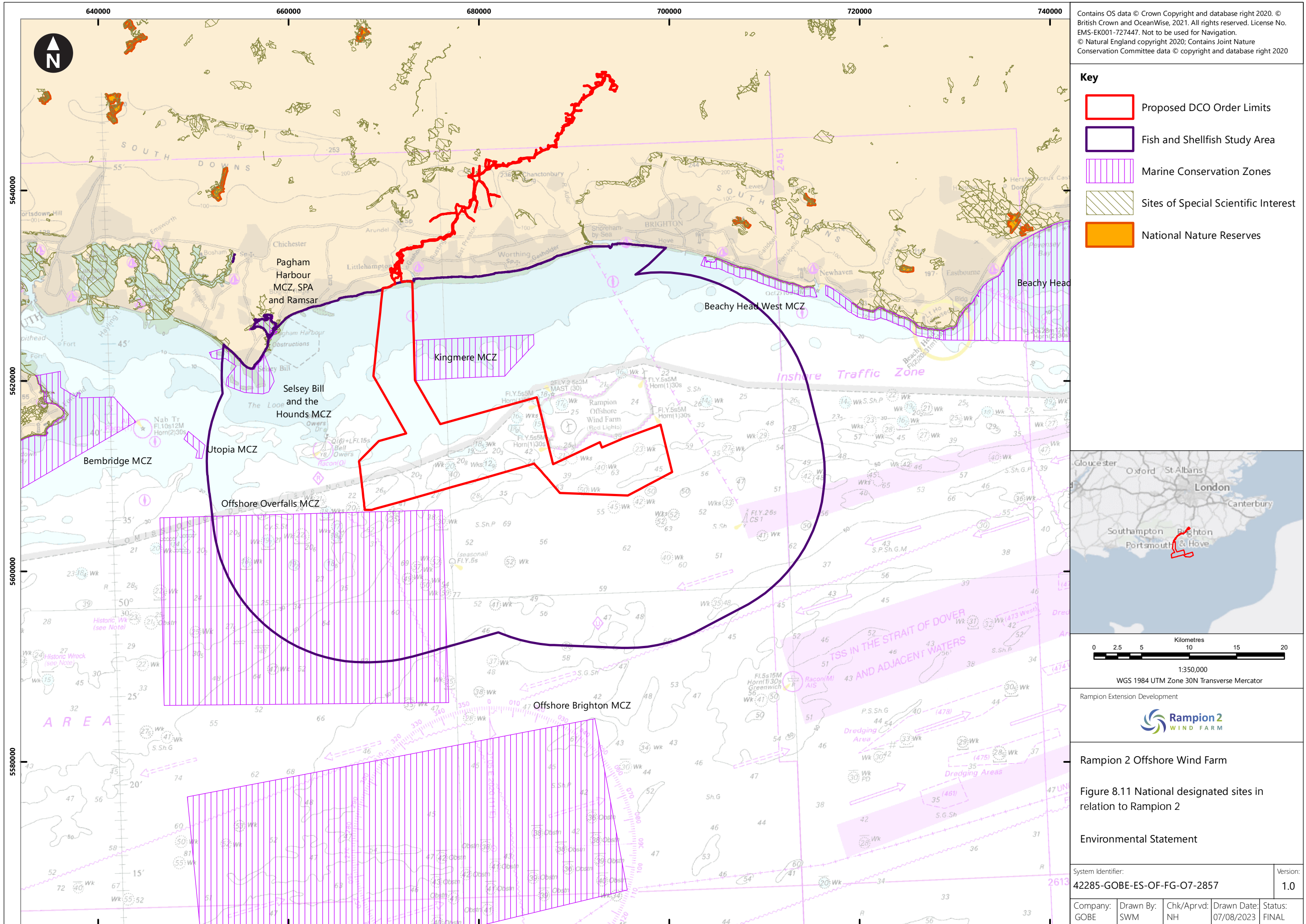


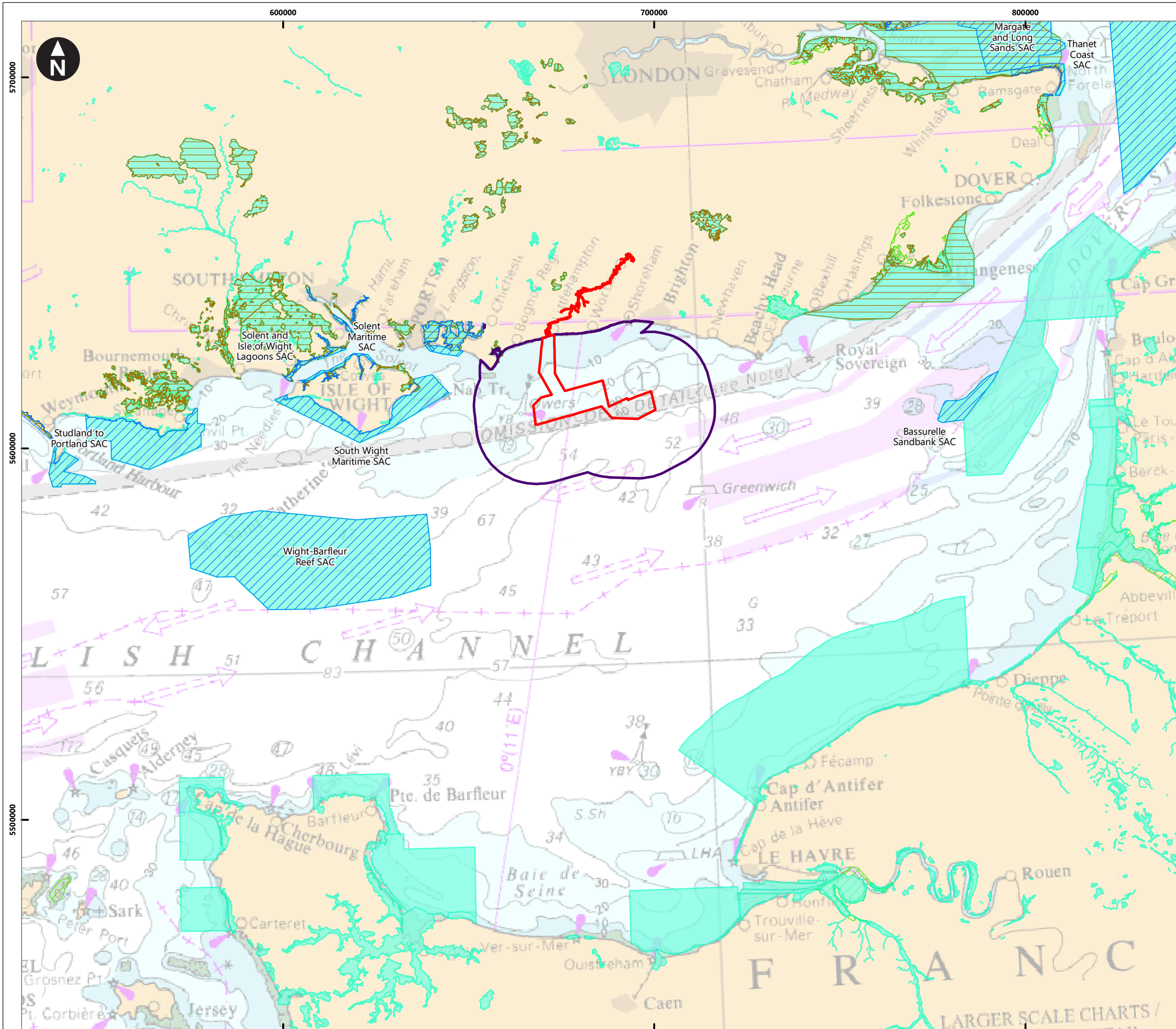
Rampion Extension Development

Rampion 2 Offshore Wind Farm
 Figure 8.10 Potential herring habitat sediment classifications within the Rampion 2 fish and shellfish ecology Study Area following methods in Reach *et al.* (2013). Also presented are the predicted broadscale seabed habitat map, using the EUNIS habitat classification (OEL, 2020b; UKSeaMap, 2021)

Environmental Statement
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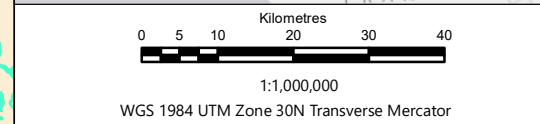




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Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Special Areas of Conservation with marine components
- Special Protection Areas
- Europe Natura 2000 sites
- Ramsar Sites



Rampion Extension Development

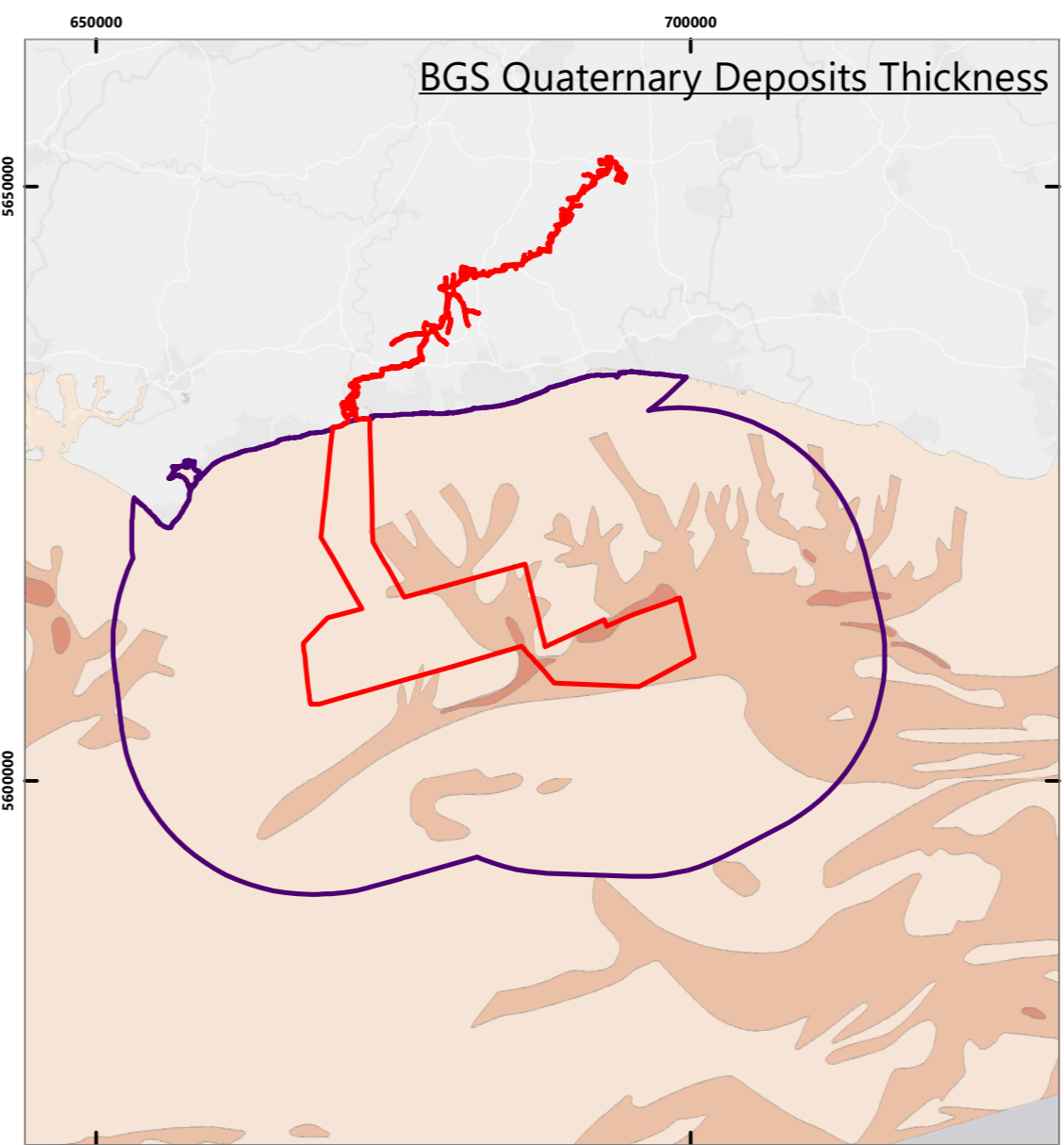
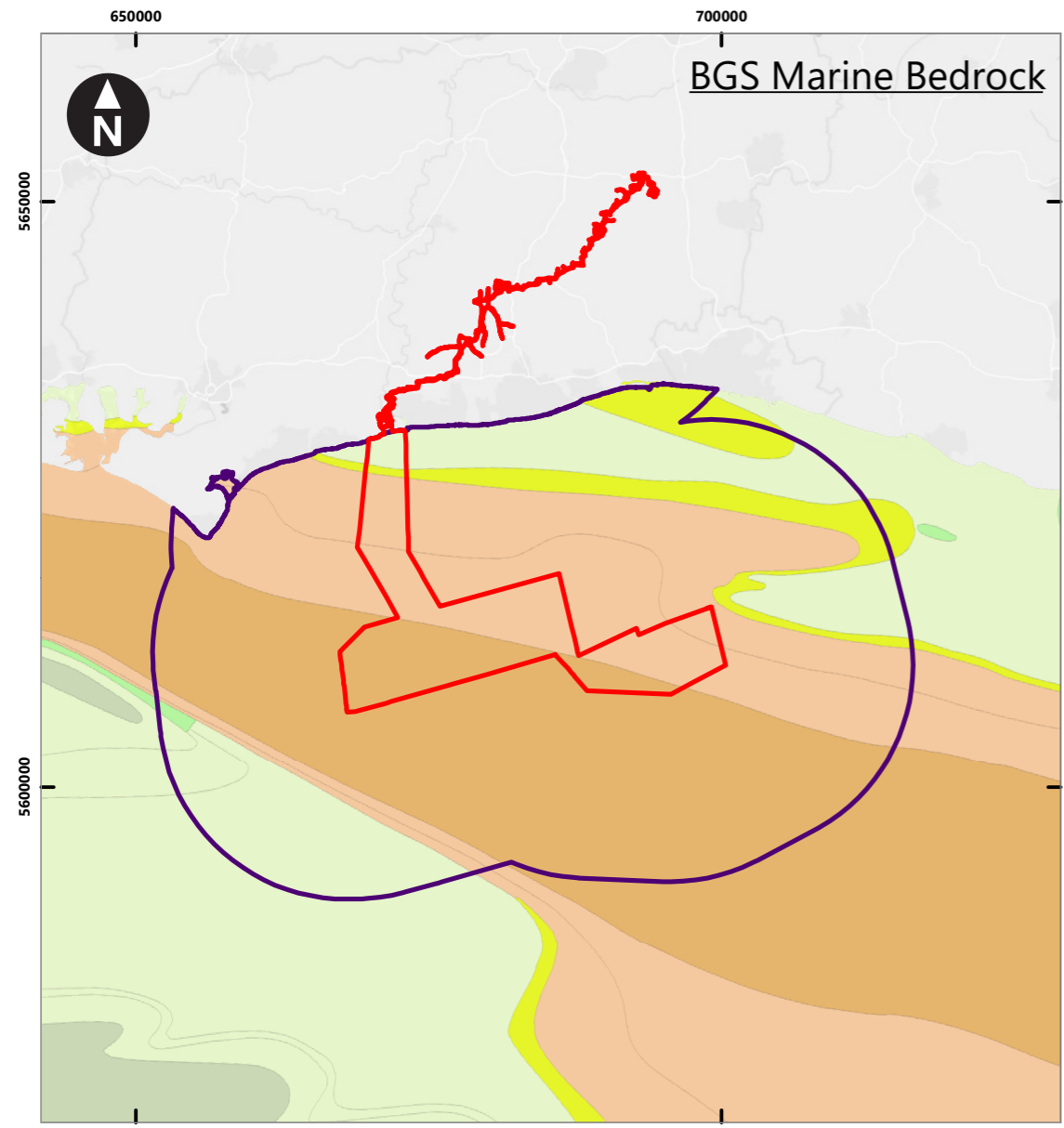


Rampion 2 Offshore Wind Farm

Figure 8.12 International designated sites in relation to Rampion 2

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-4444		Version: 1.0	
Company: GOBE	Drawn By: SWM	Chk/Prvrd: NH	Drawn Date: Status: 04/08/2023 FINAL

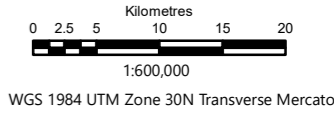
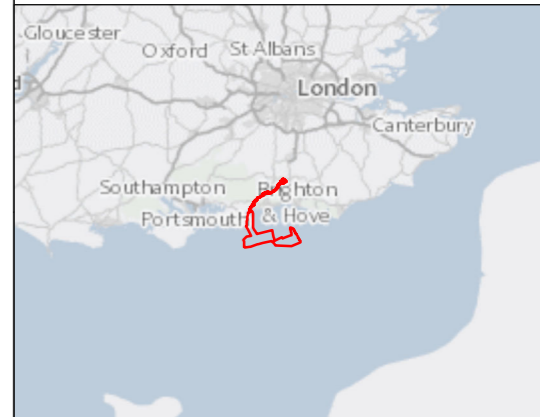


Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area

BGS - Quaternary Deposit Thickness

- <5m
- 5m - 20m
- 20m - 30m
- 30m - 50m
- >50m



BGS - Marine Bedrock (CATEGORY - DESCRIPTION)

- BARTON GROUP - ROCK, SILICICLASTIC, ARGILLACEOUS
- BRACKLESHAM GROUP - CLAY (UNDIFFERENTIATED) and SILT (UNDIFFERENTIATED) and SAND(UNDIFFERENTIATED)
- CHALK GROUP - CHALK
- LAMBETH GROUP - SANDSTONE (UNDIFFERENTIATED) and ROCK, SILICICLASTIC, ARGILLACEOUS
- LONDON CLAY FORMATION - MUDSTONE
- LOWER CHALK FORMATION [REMAINS IN INFORMAL USE BUT GENERALLY REGARDED AS OBSOLETE] - CHALK
- LOWER GREENSAND AND UPPER GREENSAND (UNDIFFERENTIATED) [OFFSHORE AREAS] - SANDSTONE (UNDIFFERENTIATED) and MUDSTONE
- UPPER CRETACEOUS ROCKS (UNDIFFERENTIATED) - CHALK
- WEALDEN GROUP - MUDSTONE
- WHITE CHALK SUBGROUP - CHALK

Rampion Extension Development

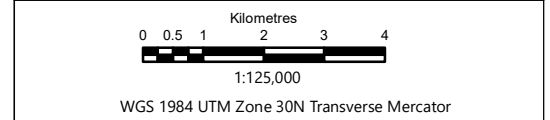
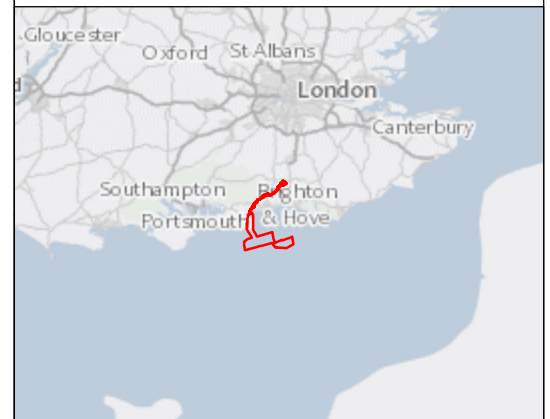
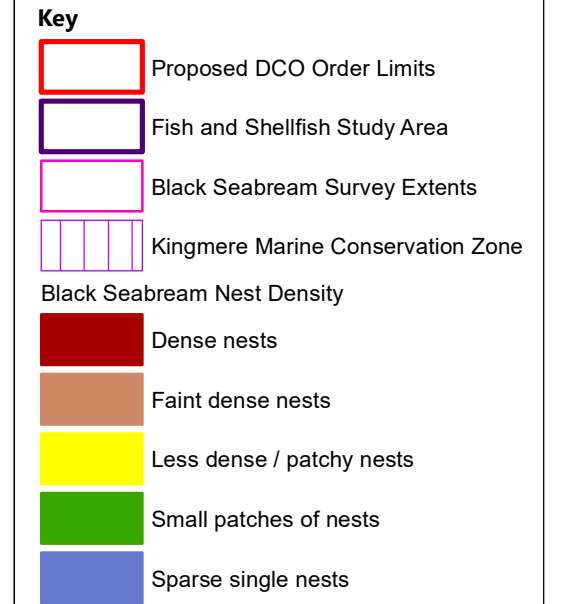
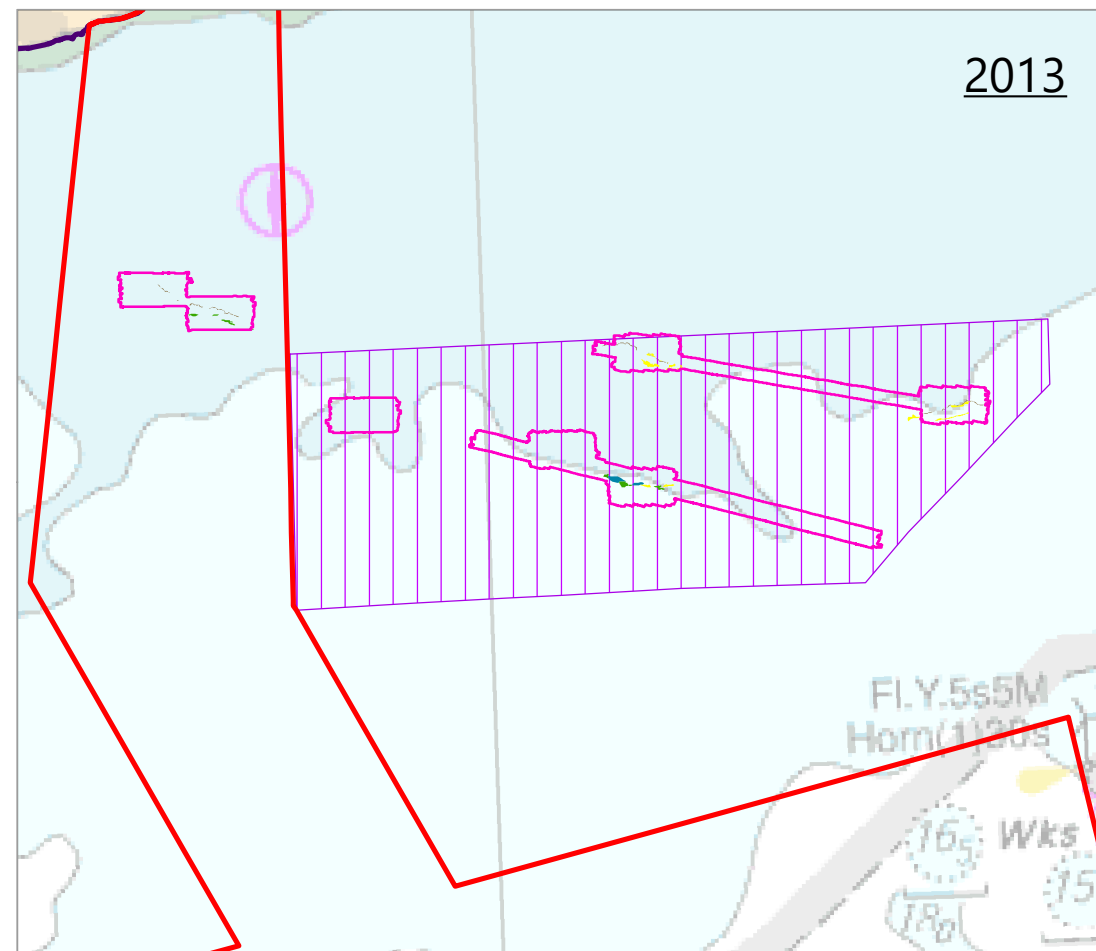
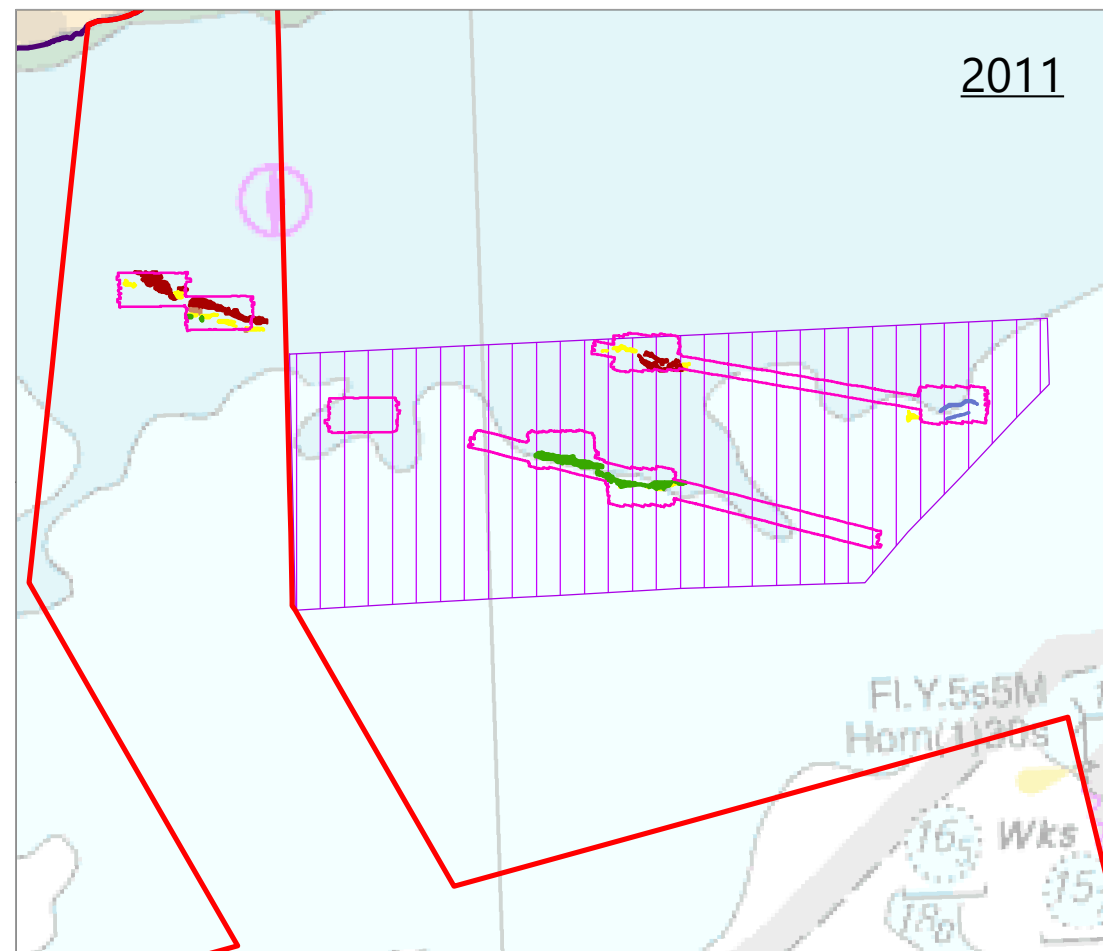
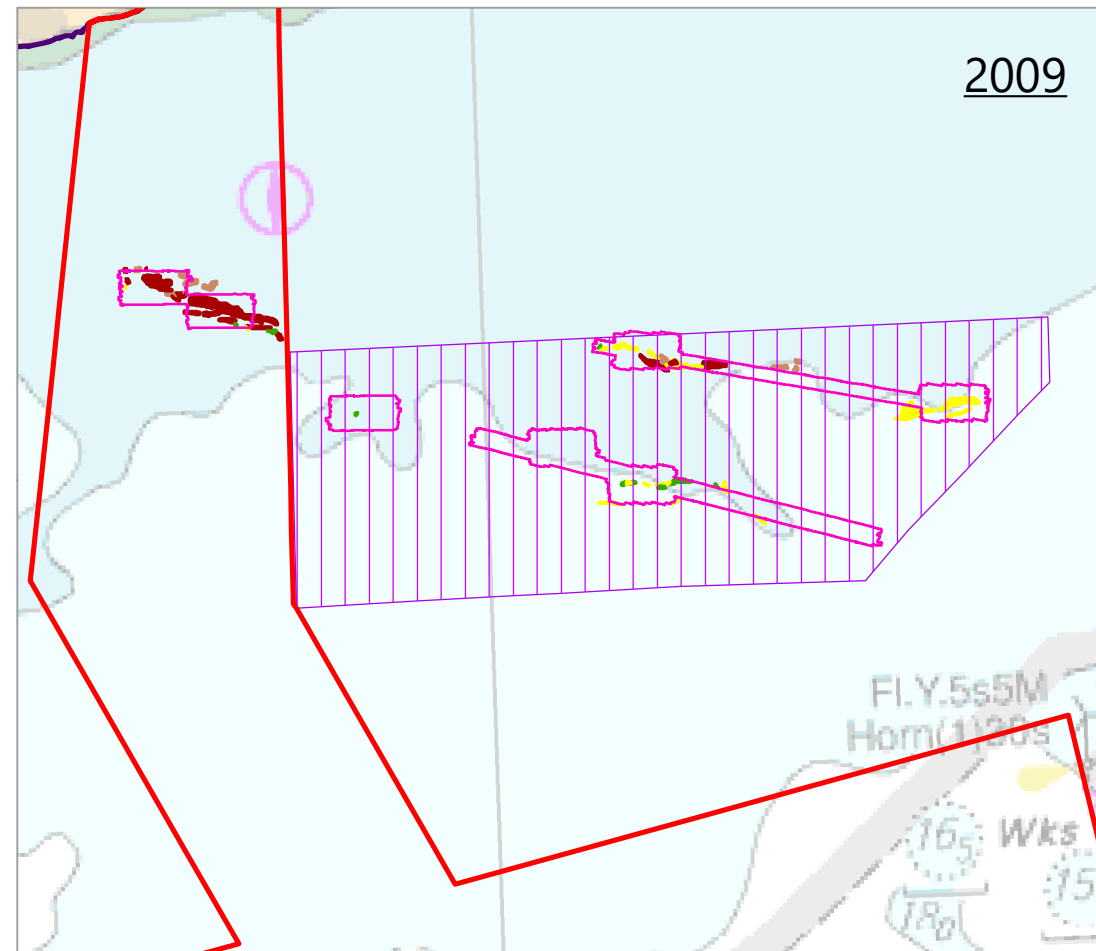
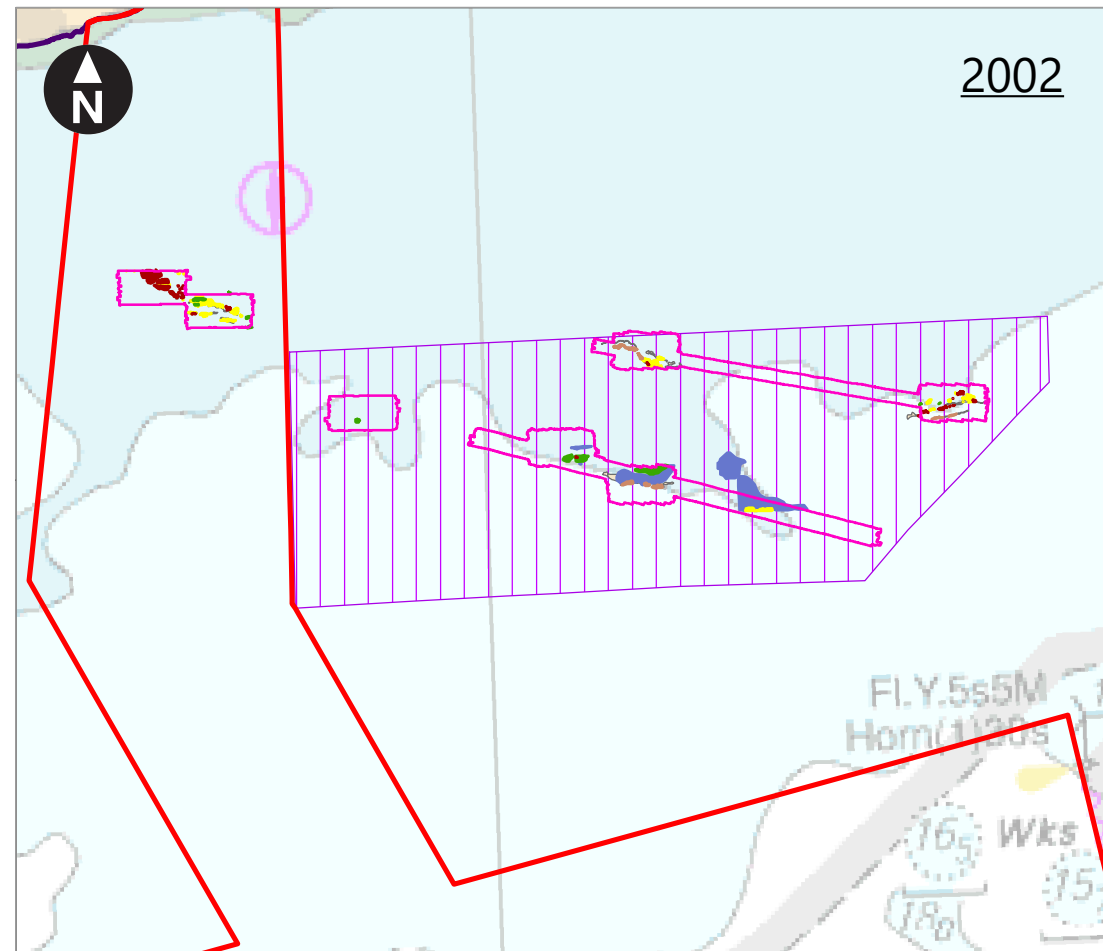
Rampion 2 Offshore Wind Farm

Figure 8.13 Location of potential black seabream spawning grounds in relation to Rampion 2

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-1809 Version: 1.0

Company: GOBE	Drawn By: SWM	Chk/Aprvd: NH	Drawn Date: 24/07/2024	Status: FINAL
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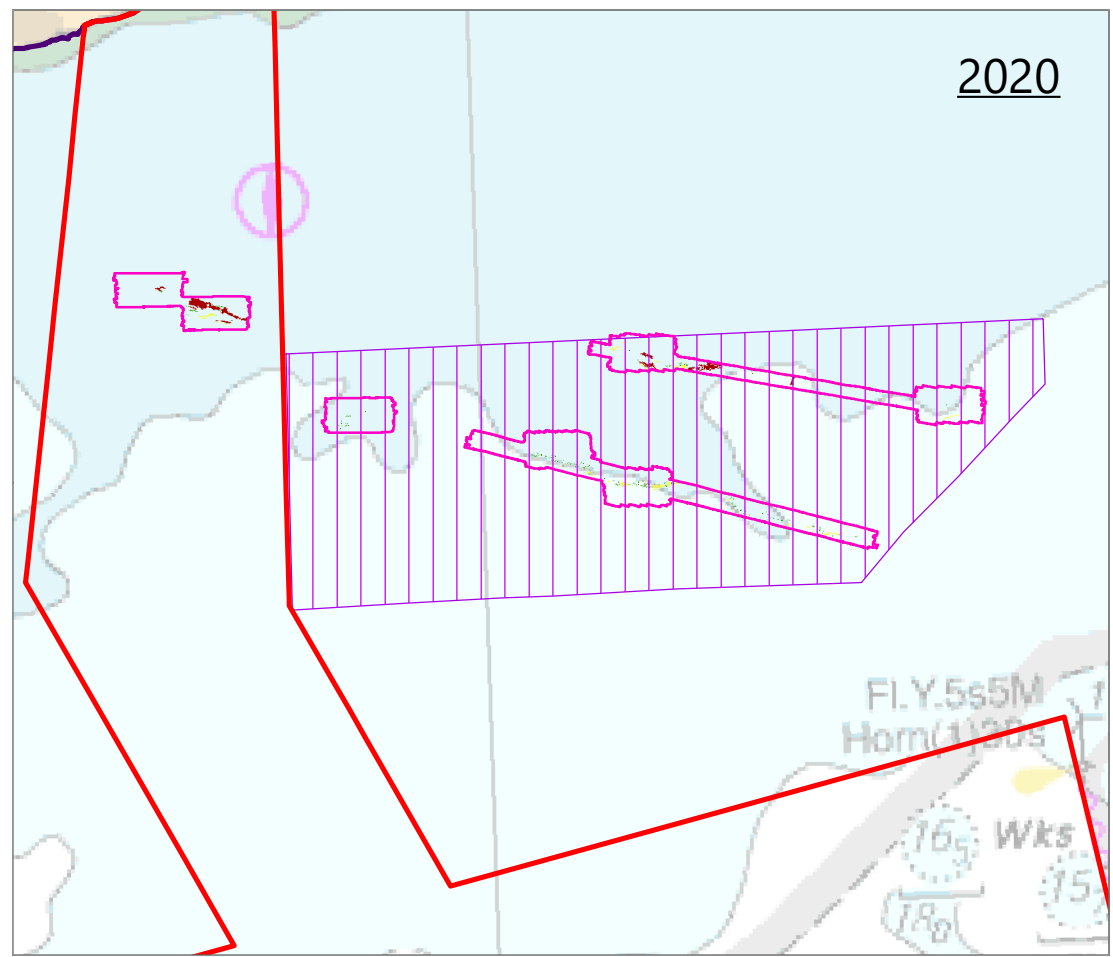
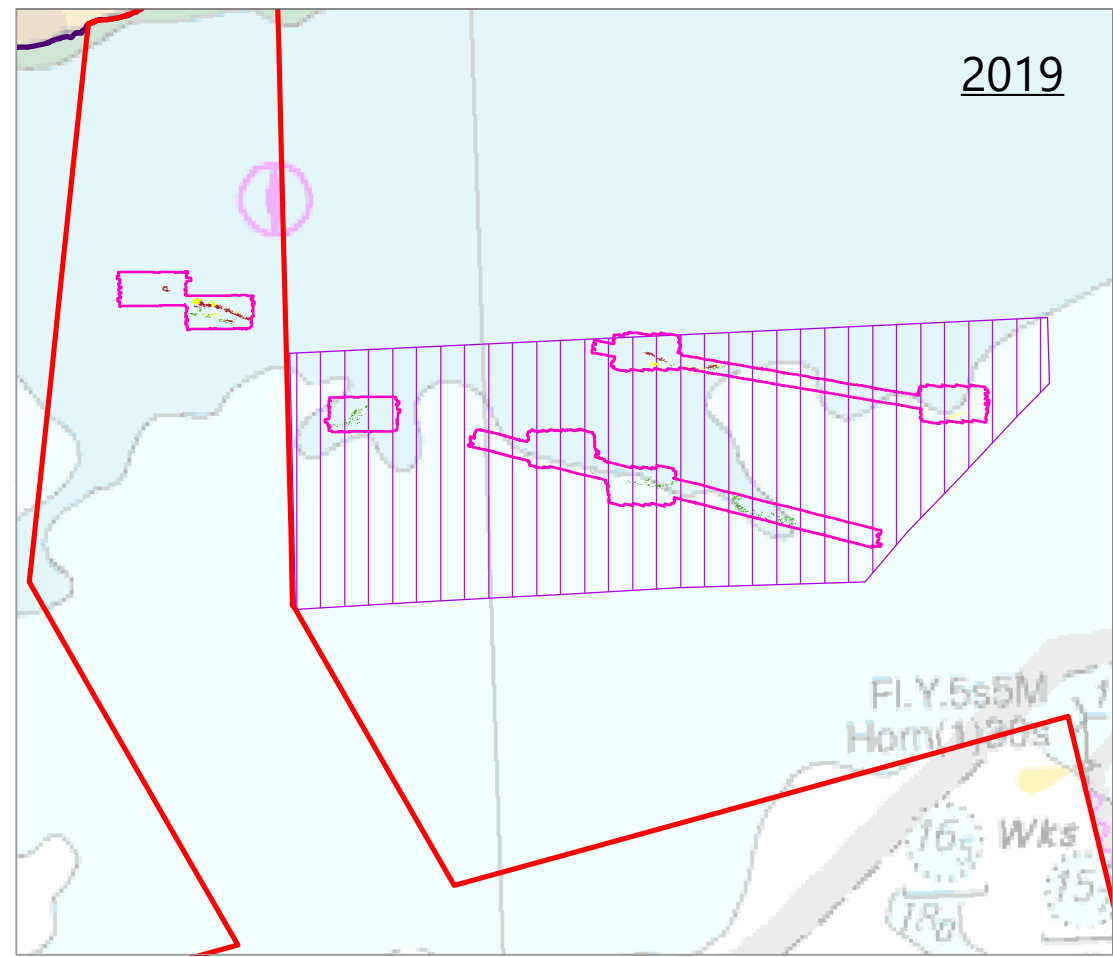
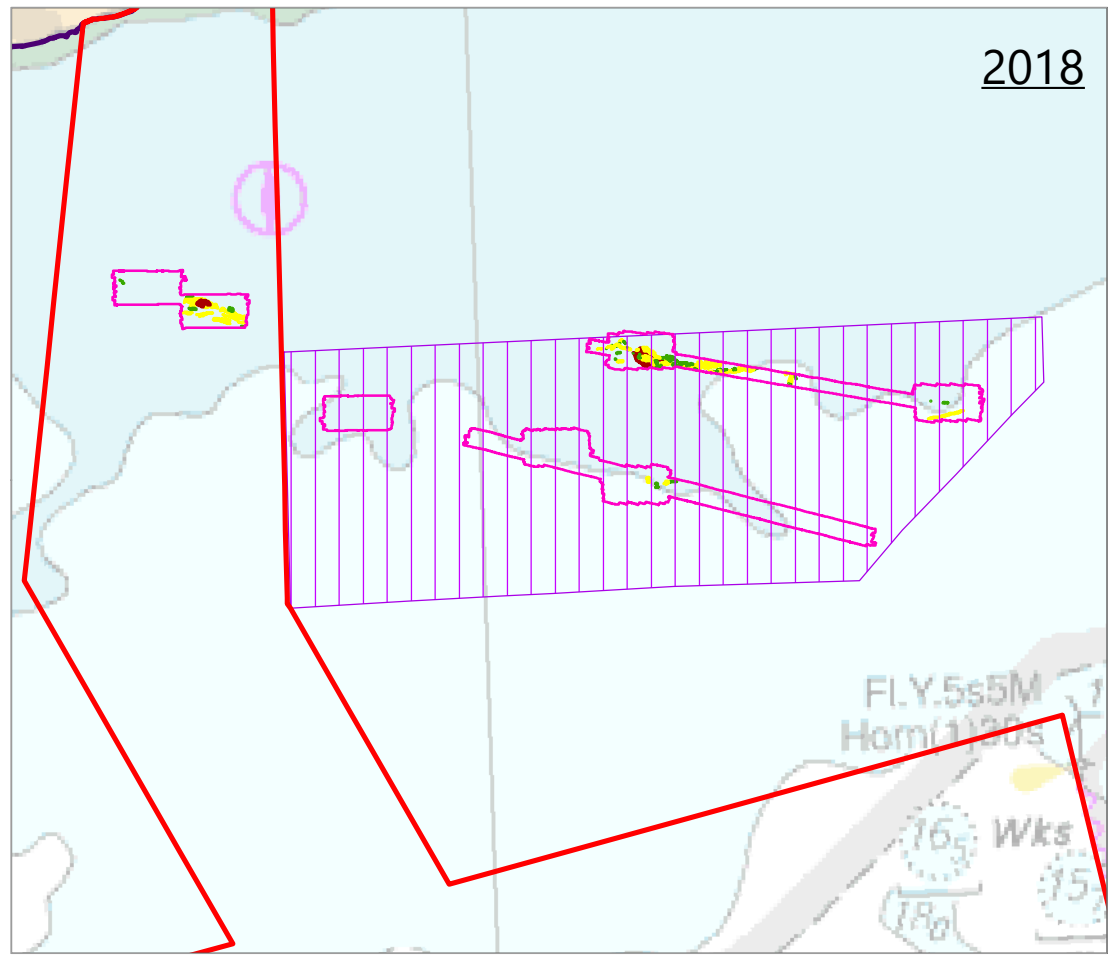
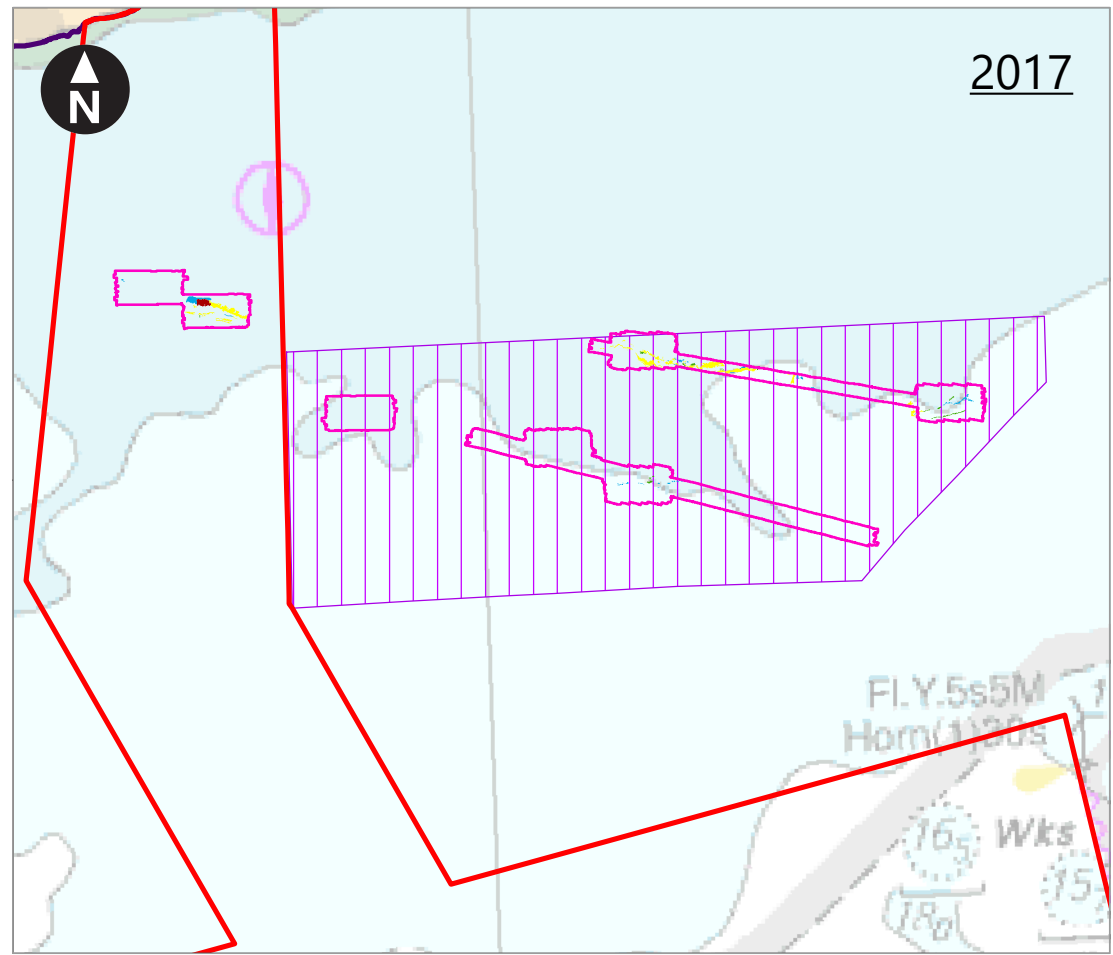
Rampion 2 Offshore Wind Farm

Figure 8.14a Location of black seabream nests within the Rampion 2 fish and shellfish Study Area

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-1521	Version: 1.0
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Company: GOBE	Drawn By: SWM	Chk/Aprvd: NH	Drawn Date: 04/08/2023	Status: FINAL
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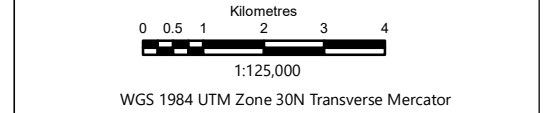
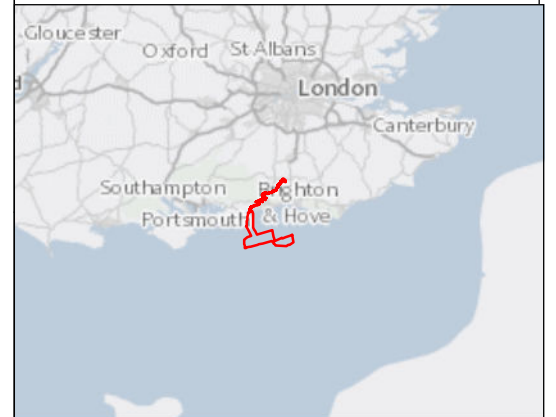


Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Black Bream Survey Extents
- Kingmere Marine Conservation Zone

Black bream nest density

- Dense nests
- Faint dense nests
- Less dense / patchy nests
- Small patches of nests
- Sparse single nests



Rampion Extension Development



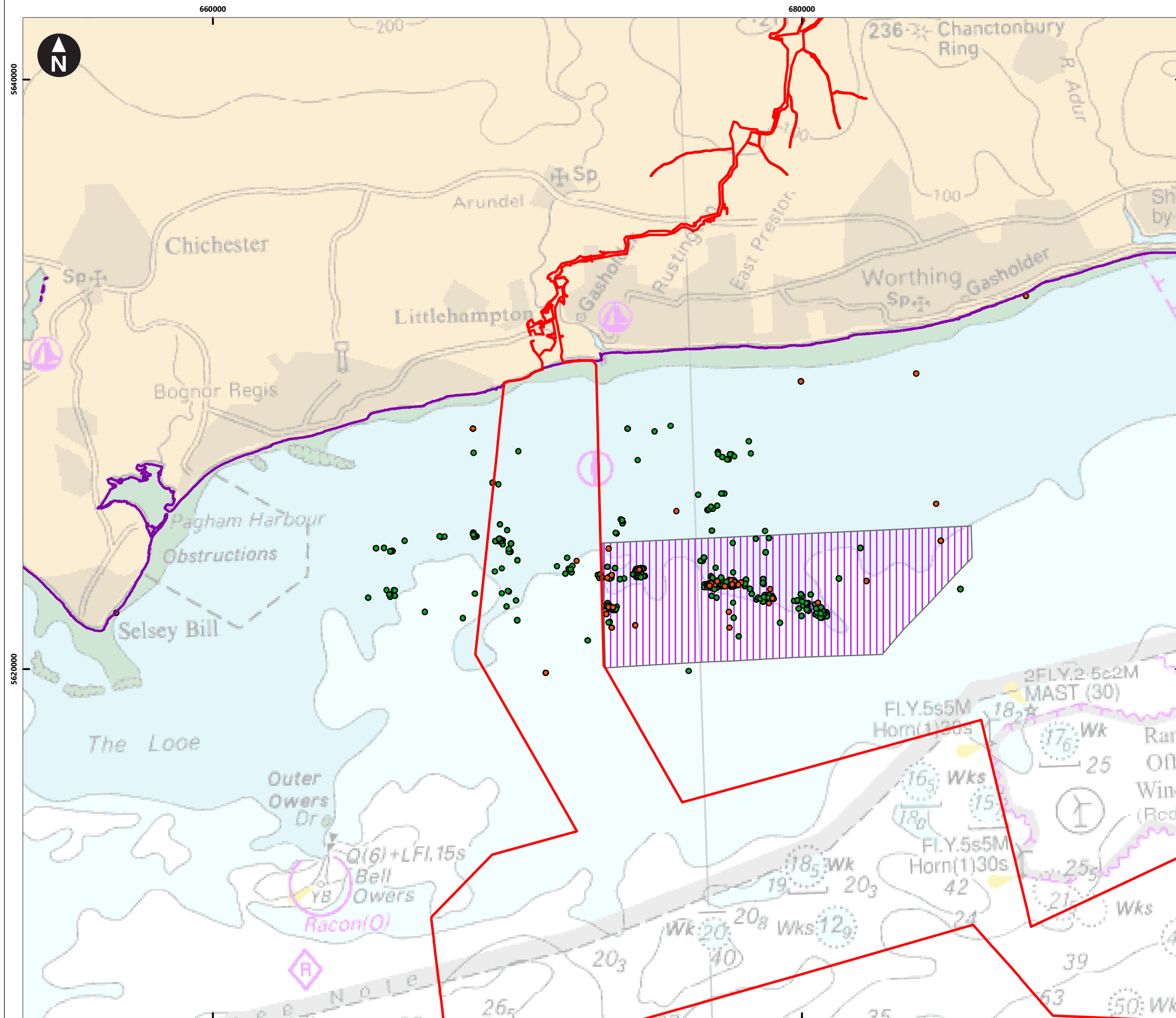
Rampion 2 Offshore Wind Farm

Figure 8.14b Locations and densities of black bream nests within the Rampion 2 fish and shellfish Study Area

Environmental Statement

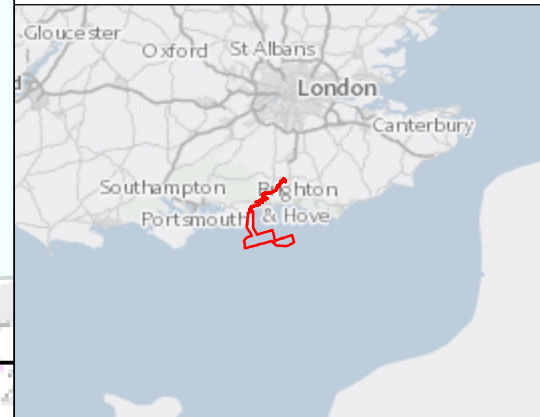
System Identifier: 42285-GOBE-ES-OF-FG-O7-5313	Version: 1.0
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Company: GOBE	Drawn By: SWM	Chk/Aprvd: NH	Drawn Date: 05/06/2023	Status: FINAL
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Key

- Proposed DCO Order Limits
- Fish and shellfish Study Area
- Kingmere Marine Conservation Zone
- Black seabream recapture (2014-2016)
- Black seabream release (2014-2016)



Kilometres
0 0.5 1 2 3 4

1:125,000
WGS 1984 UTM Zone 30N Transverse Mercator

Rampion Extension Development

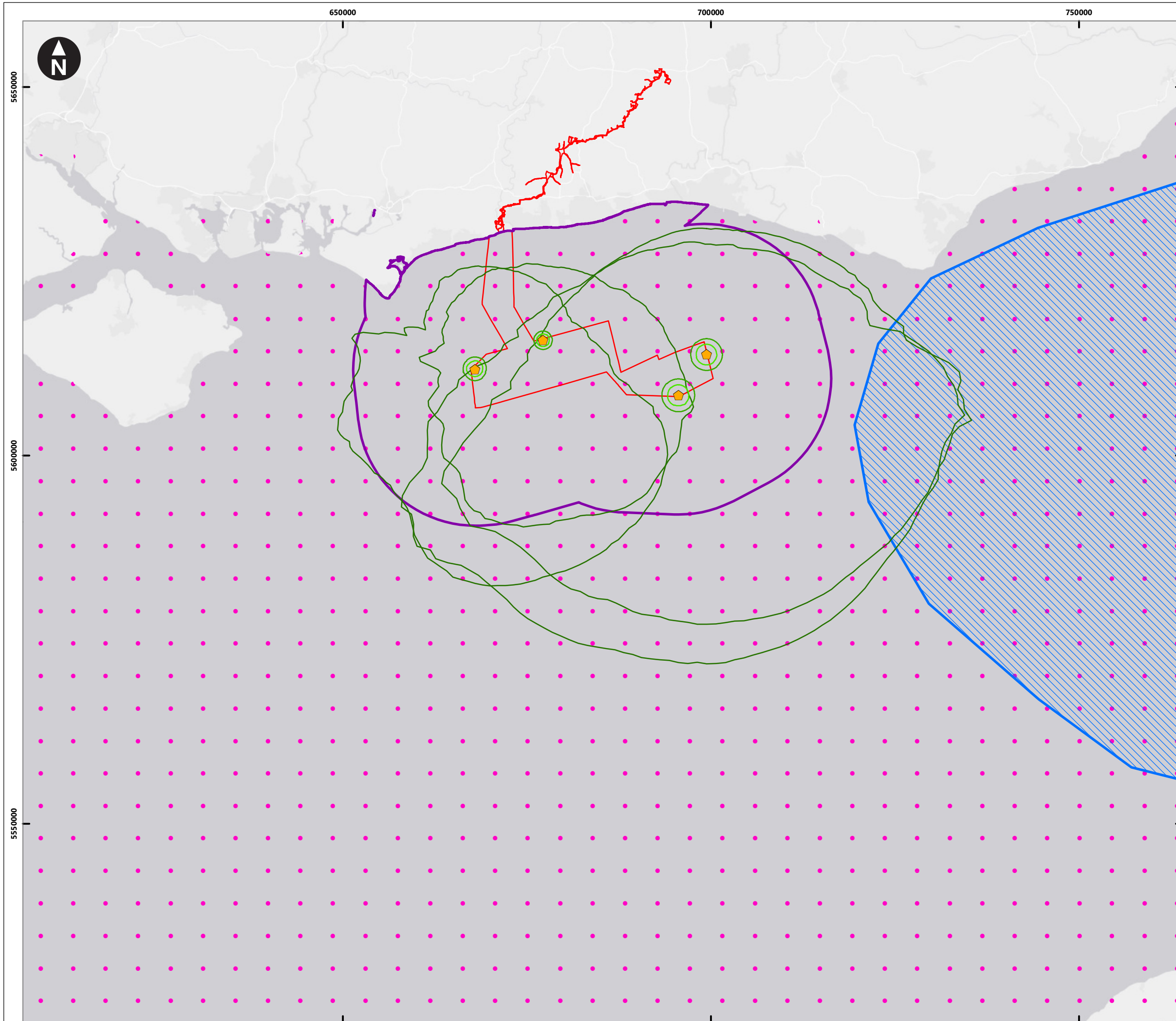
Rampion 2 Offshore Wind Farm

Figure 8.15 Black seabream catch and release locations (Sussex IFCA) within Rampion 2 fish and shellfish Study Area

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-6265	Version: 1.0
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Company: GOBE	Drawn By: SWM	Chk/Aprvd: NH	Drawn Date: 04/08/2023	Status: FINAL
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 Contains data sourced from Coull et al. 1998; and data derived from ICES 2021

Key

- Proposed DCO Order Limits
- Fish and shellfish Study Area
- ◆ Noise Modelling Locations
- MDS Monopile Contours 4,400 kJ dB SELcum:
 - 219dB
 - 216dB
 - 186dB
- Spawning Grounds, Coull-1998 (Species):
 - Sandeel,
- Spawning Grounds, Ellis-2010 (Species, Intensity):
 - Sandeel, Lower



0 2.5 5 10 15 20
 Kilometres
 1:500,000
 WGS 1984 UTM Zone 30N Transverse Mercator

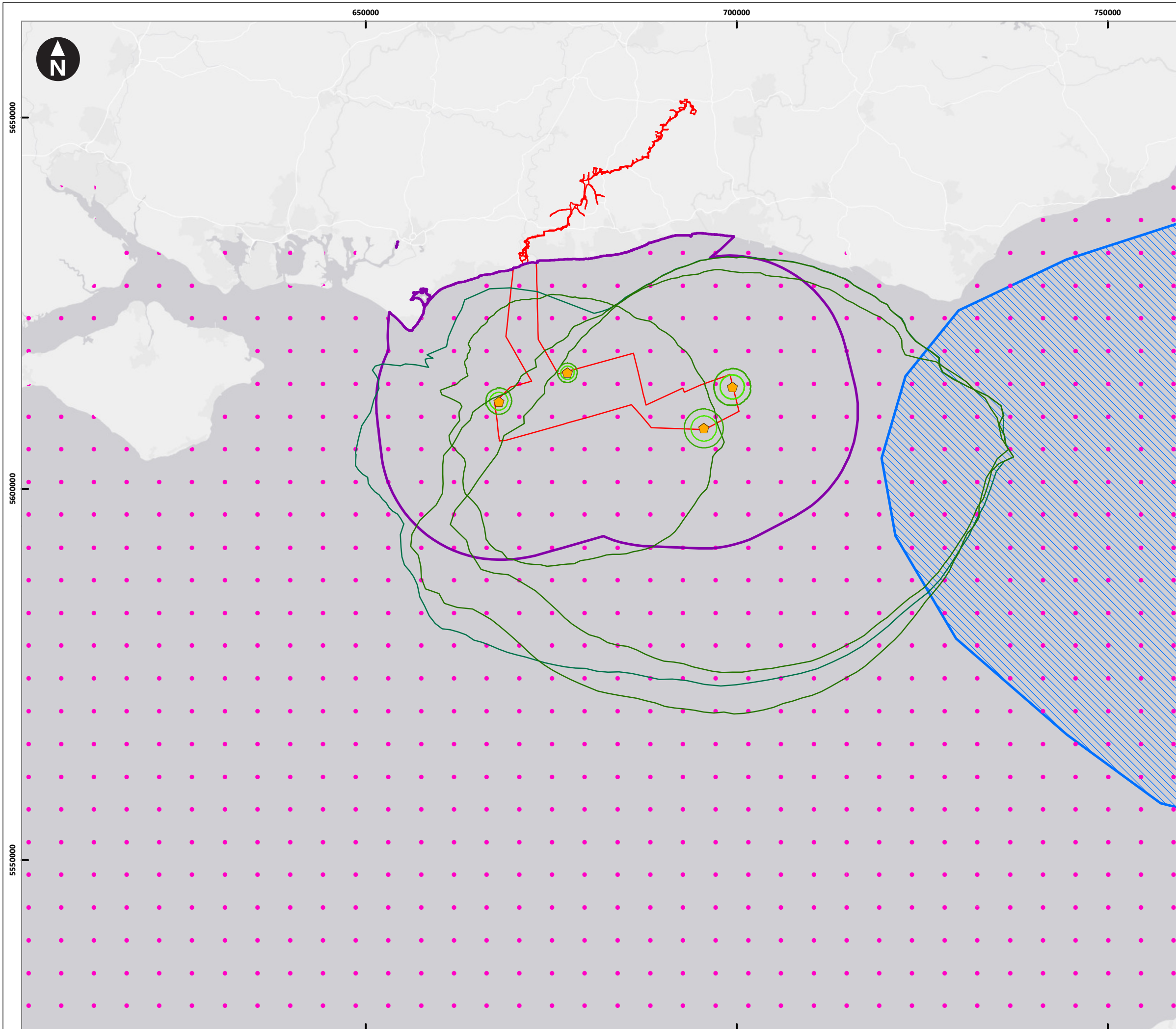
Rampion Extension Development


Rampion 2 Offshore Wind Farm
 Figure 8.16 Predicted worst case impact ranges for spawning sandeel from the sequential piling of monopile foundations (SELCum)

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-9457	Version: 1.0
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Company: GOBE	Drawn By: SWM	Chk/Aprvd: NH	Drawn Date: 05/06/2023	Status: FINAL
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Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
 Contains data sourced from Coull et al. 1998; and data derived from ICES 2021

Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- ⬠ Noise Modelling Locations

MDS Multileg Contours 2,500 kJ dB SELcum:

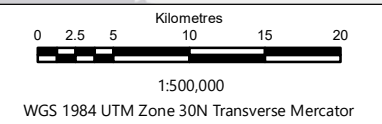
- 219dB
- 216dB
- 186dB

Spawning Grounds, Coull-1998 (Species):

- Sandeel,

Spawning Grounds, Ellis-2010 (Species, Intensity):

- Sandeel, Lower



Rampion Extension Development



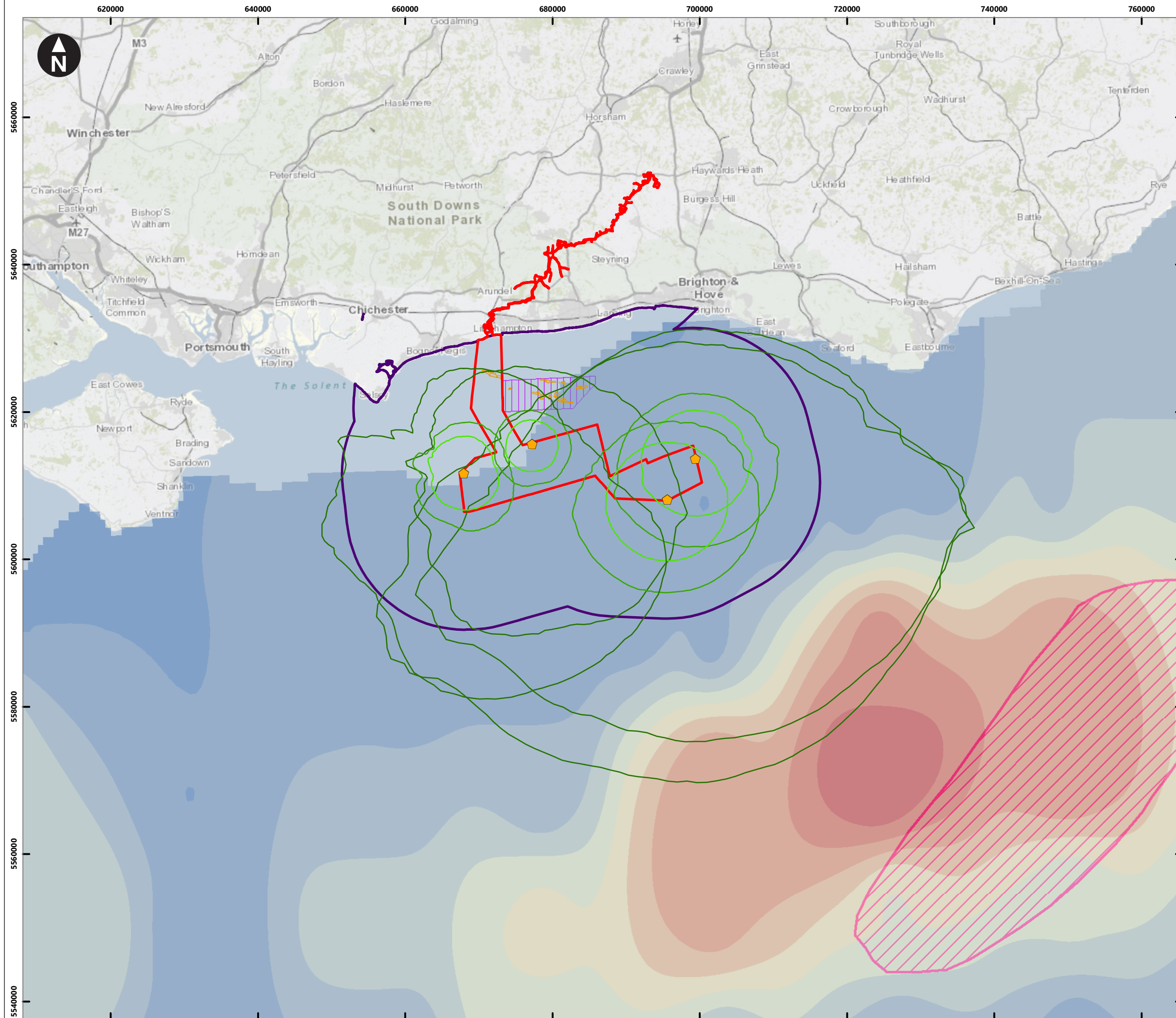
Rampion 2 Offshore Wind Farm

Figure 8.17 Predicted worst case impact ranges for spawning sandeel from the sequential piling of multileg foundations (SELCum)

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-1039				Version: 1.0
Company: GOBE	Drawn By: SWM	Chk/Prvd: NH	Drawn Date: 04/08/2023	Status: FINAL

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Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Breem nest extents (historic surveys)

IHLS 2007/2020 downs data
Larval abundance per m²

- 0
- 0.1 - 2,500
- 2,500 - 7,000
- 7,000 - 14,000
- 14,000 - 23,000
- 23,000 - 35,000
- 35,000 - 48,000
- 48,000 - 63,000
- 63,000 - 80,000
- 80,000 - 98,500

Kingmere MCZ

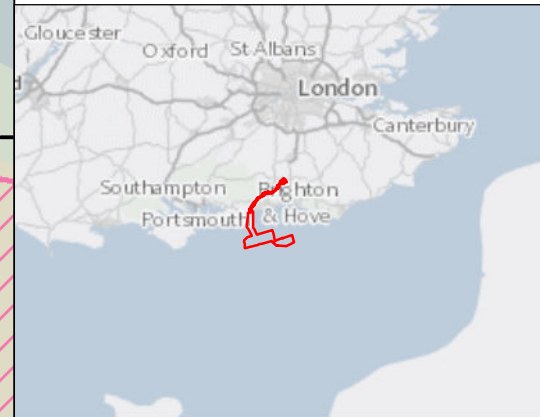
Spawning Grounds (Coull et al 1999):
Herring

MDS Multileg Contours 2,500 kJ dB SELcum:
207dB

203dB

186dB

Noise Modelling Locations

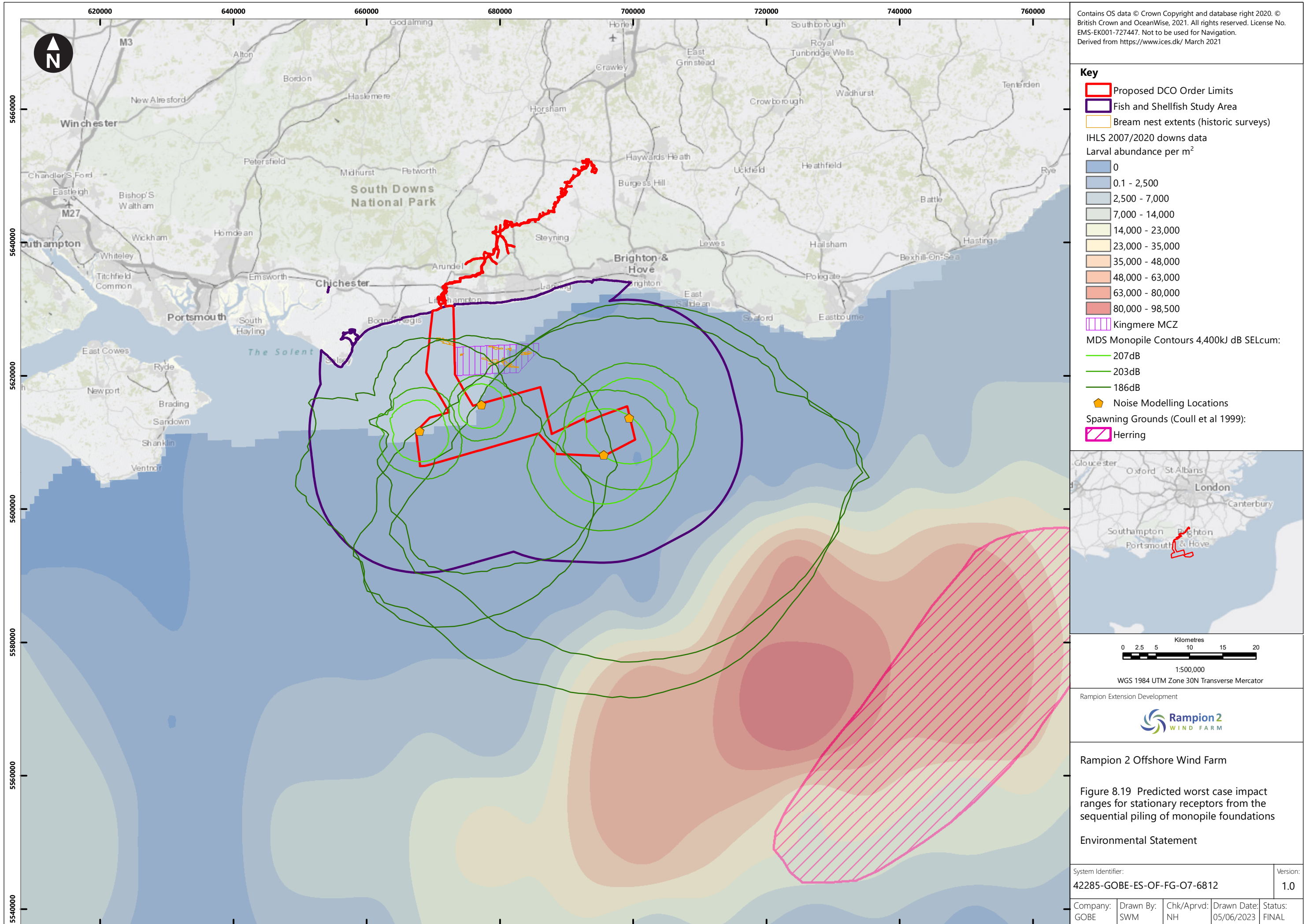


0 2.5 5 10 15 20
Kilometres
1:5,000,000
WGS 1984 UTM Zone 30N Transverse Mercator

Rampion Extension Development


Rampion 2 Offshore Wind Farm
Figure 8.18 Predicted worst case impact ranges for stationary receptors from the sequential piling of multileg foundations
Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-8217				Version: 1.0
Company: GOBE	Drawn By: SWM	Chk/Prvd: NH	Drawn Date: 25/07/2023	Status: FINAL



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Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Breem nest extents (historic surveys)

IHLS 2007/2020 downs data
Larval abundance per m²

- 0
- 0.1 - 2,500
- 2,500 - 7,000
- 7,000 - 14,000
- 14,000 - 23,000
- 23,000 - 35,000
- 35,000 - 48,000
- 48,000 - 63,000
- 63,000 - 80,000
- 80,000 - 98,500

- Kingmere MCZ

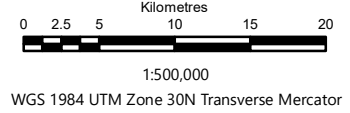
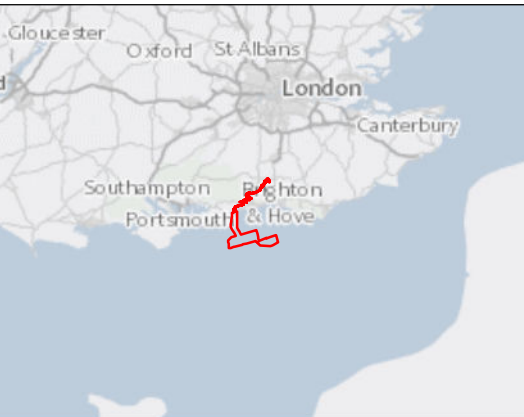
MDS Monopile Contours 4,400kJ dB SELcum:

- 207dB
- 203dB
- 186dB

- ◆ Noise Modelling Locations

Spawning Grounds (Coull et al 1999):

- Herring



Rampion Extension Development



Rampion 2 Offshore Wind Farm

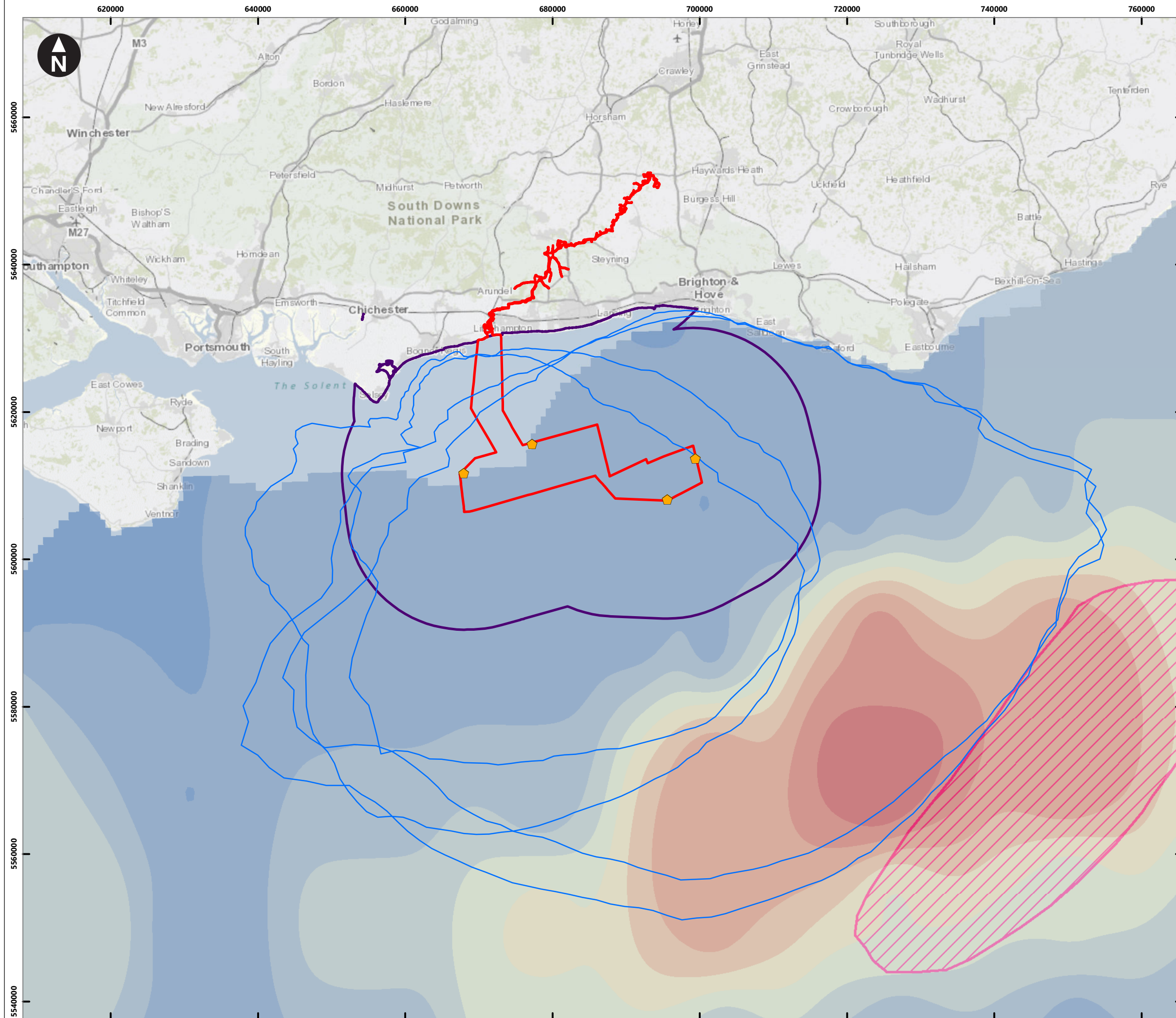
Figure 8.19 Predicted worst case impact ranges for stationary receptors from the sequential piling of monopile foundations

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-6812	Version: 1.0
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Company: GOBE	Drawn By: SWM	Chk/Prvd: NH	Drawn Date: 05/06/2023	Status: FINAL
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Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area

IHLS 2007/2020 downs data
Larval abundance per m²

- 0
- 0.1 - 2,500
- 2,500 - 7,000
- 7,000 - 14,000
- 14,000 - 23,000
- 23,000 - 35,000
- 35,000 - 48,000
- 48,000 - 63,000
- 63,000 - 80,000
- 80,000 - 98,500

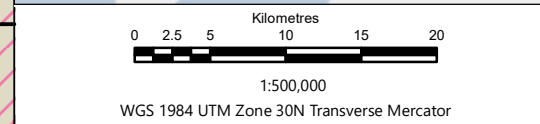
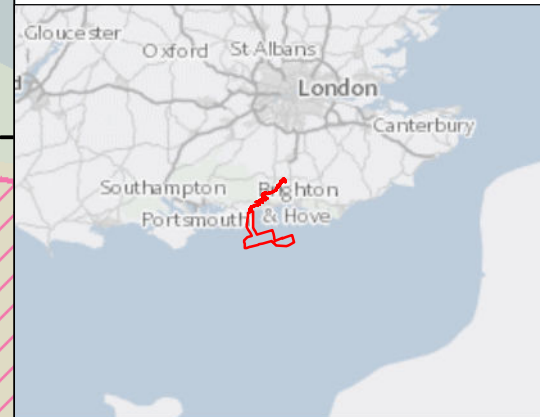
- ◆ Noise Modelling Locations

MDS Monopile Contours 4,400kJ dB SELs:

- 135dB

Spawning Grounds (Coull et al 1999):

- Herring



Rampion Extension Development



Rampion 2 Offshore Wind Farm

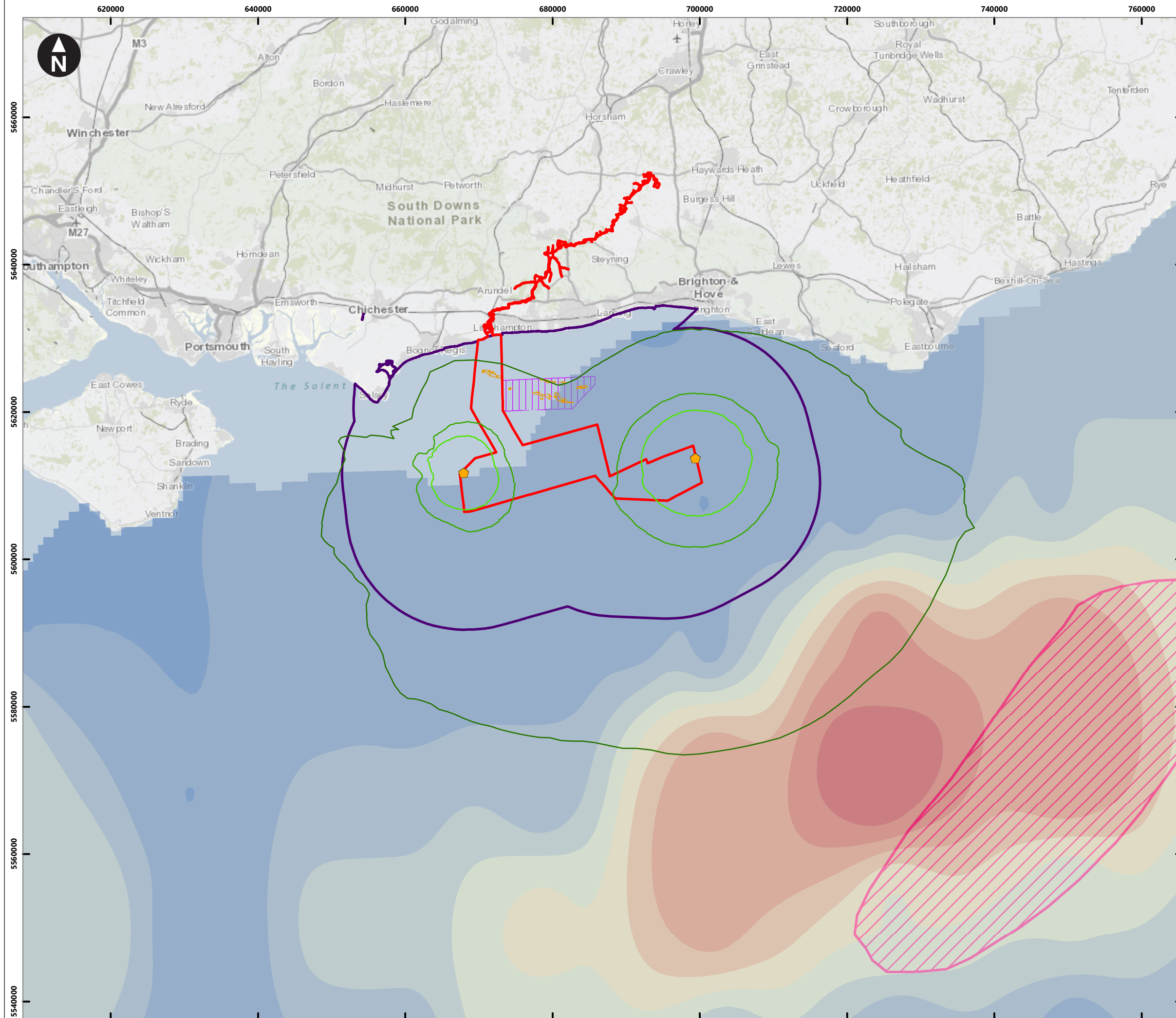
Figure 8.20: Predicted worst-case behavioural response impact ranges of herring from the sequential piling of monopile foundations

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-2329 Version: 1.0

Company: GOBE	Drawn By: SWM	Chk/Prvd: NH	Drawn Date: 02/06/2023	Status: FINAL
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Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Breem nest extents (historic surveys)

IHLS 2007/2020 downs data
Larval abundance per m²

- 0
- 0.1 - 2,500
- 2,500 - 7,000
- 7,000 - 14,000
- 14,000 - 23,000
- 23,000 - 35,000
- 35,000 - 48,000
- 48,000 - 63,000
- 63,000 - 80,000
- 80,000 - 98,500

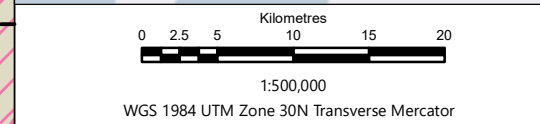
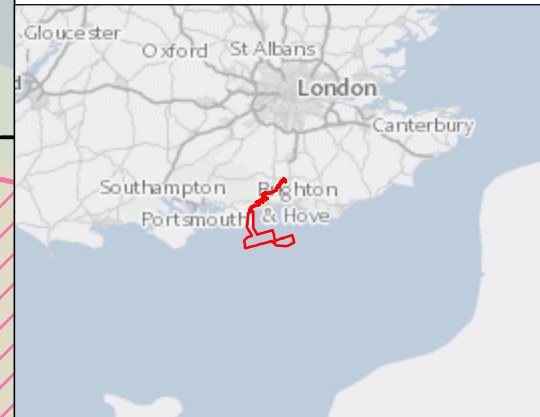
MDS Multileg foundation contours 2500 kJ dB SEL cum

- 207 dB
- 203 dB
- 186 dB

- Kingmere MCZ

Spawning Grounds (Coull et al 1999):

- Herring
- Noise Modelling Locations



Rampion Extension Development

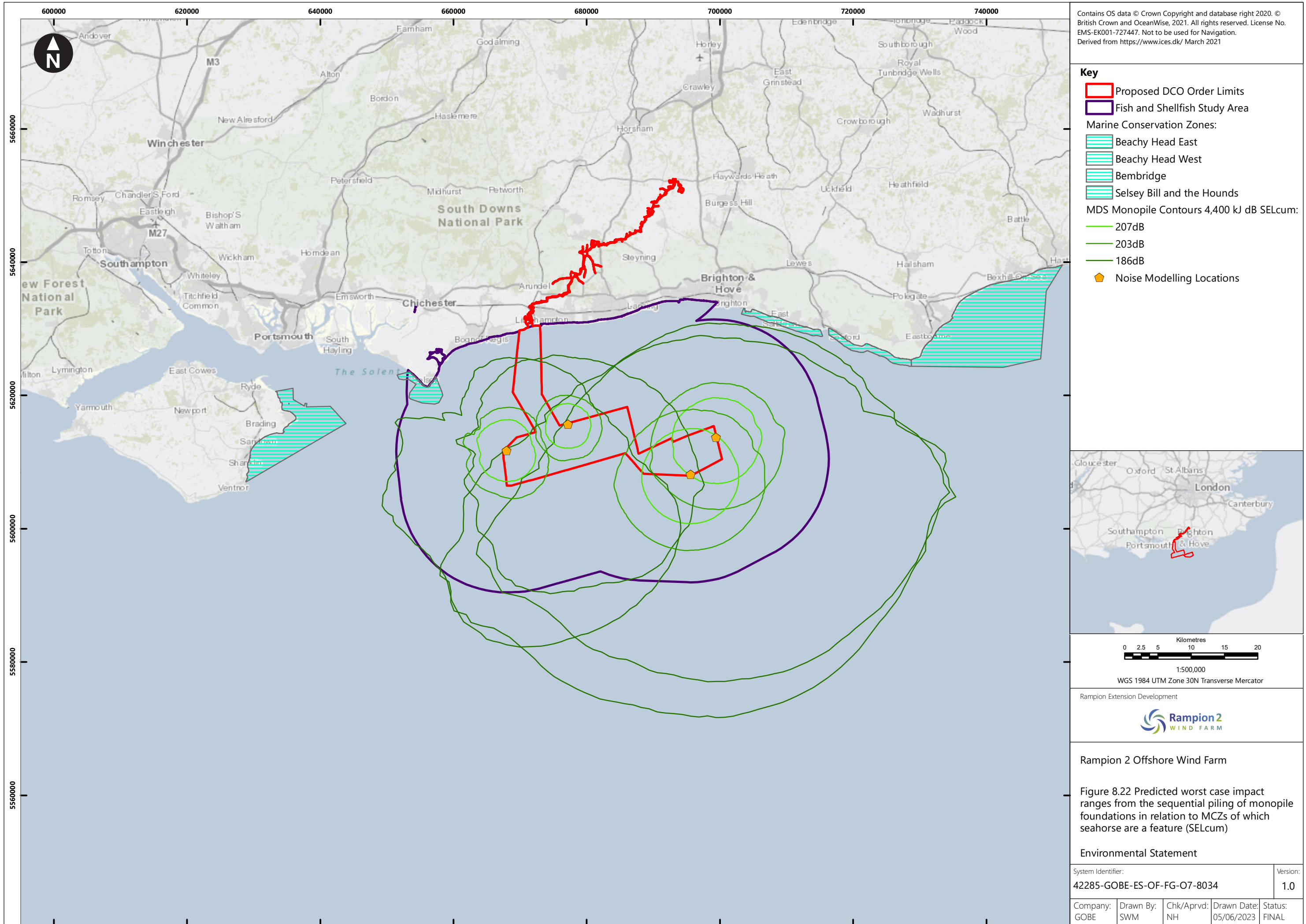


Rampion 2 Offshore Wind Farm

Figure 8.21: Predicted worst case impact ranges of stationary receptors from the simultaneous piling of multileg foundations

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-4890				Version: 1.0
Company: GOBE	Drawn By: SWM	Chk/Prvd: NH	Drawn Date: 28/07/2023	Status: FINAL



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Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area

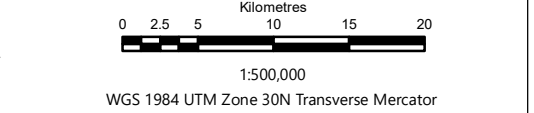
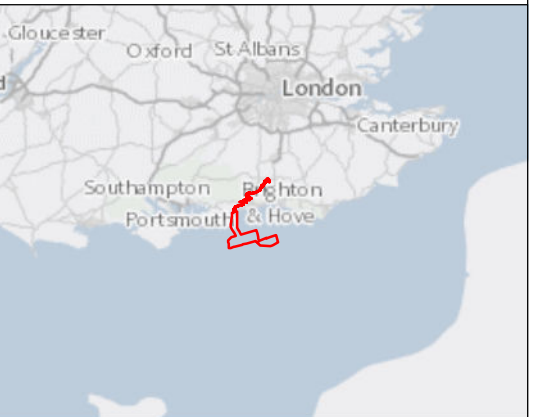
Marine Conservation Zones:

- Beachy Head East
- Beachy Head West
- Bembridge
- Selsey Bill and the Hounds

MDS Monopile Contours 4,400 kJ dB SELcum:

- 207dB
- 203dB
- 186dB

◆ Noise Modelling Locations



Rampion 2 Offshore Wind Farm

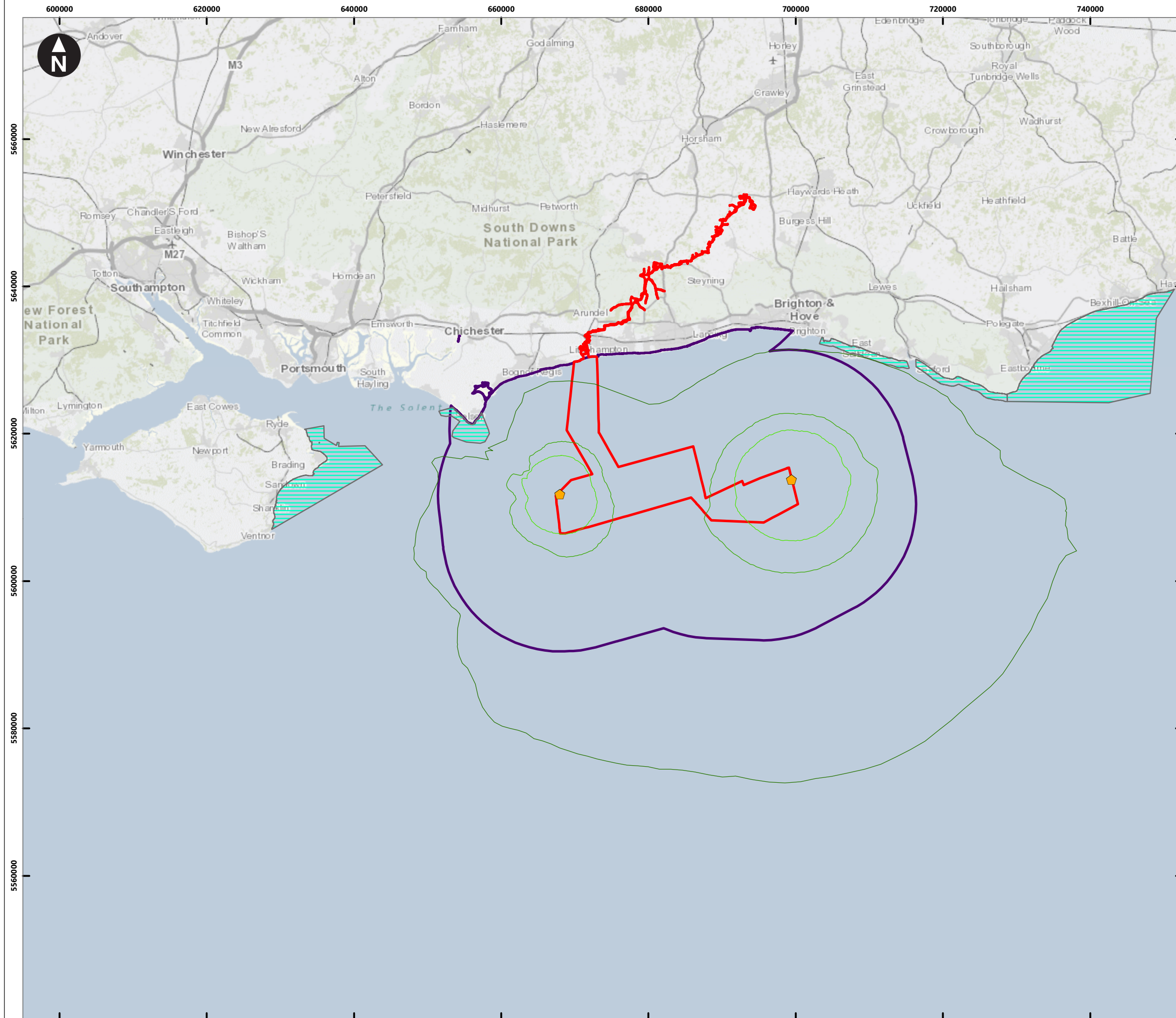
Figure 8.22 Predicted worst case impact ranges from the sequential piling of monopile foundations in relation to MCZs of which seahorse are a feature (SELcum)

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-8034	Version: 1.0
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Company: GOBE	Drawn By: SWM	Chk/Aprvd: NH	Drawn Date: 05/06/2023	Status: FINAL
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Key

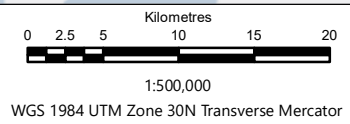
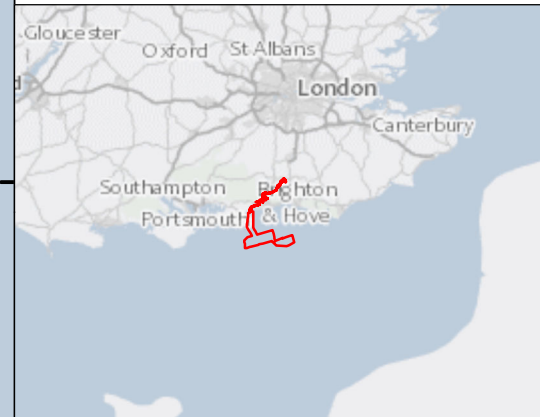
- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- ◆ Noise Modelling Locations

Marine Conservation Zones:

- Beachy Head East
- Beachy Head West
- Bembridge
- Selsey Bill and the Hounds

MDS Multileg Foundation Contours 2500kJ dB SELcum:

- 207dB
- 203dB
- 186dB



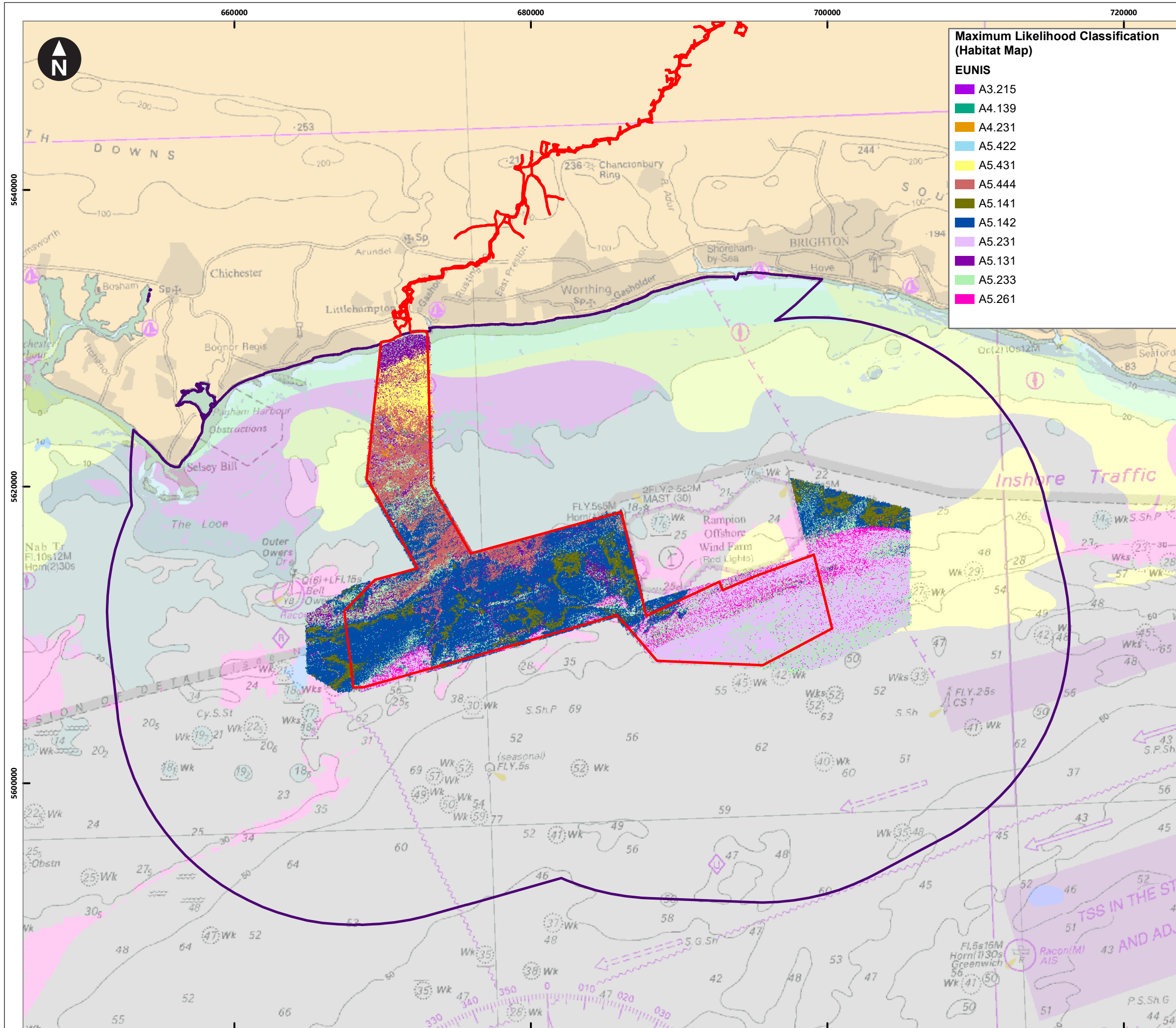
Rampion 2 Offshore Wind Farm

Figure 8.23 Predicted worst case impact ranges from the simultaneous piling of multileg foundations in relation to MCZs of which seahorse are a feature (SELcum)

Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-9499	Version: 1.0
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Company: GOBE	Drawn By: SWM	Chk/Aprvd: NH	Drawn Date: 28/07/2023	Status: FINAL
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Maximum Likelihood Classification (Habitat Map)

EUNIS

- A3.215
- A4.139
- A4.231
- A5.422
- A5.431
- A5.444
- A5.141
- A5.142
- A5.231
- A5.131
- A5.233
- A5.261

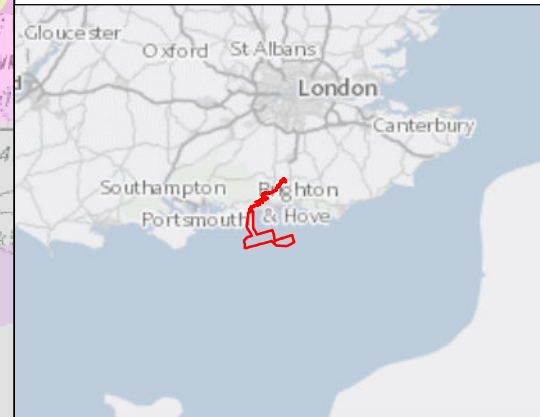
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Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area

UK Sea Map 2021 (EUNIS)

- Hard substrata
- Coarse substrate
- Sand
- Mixed sediment
- Undefined



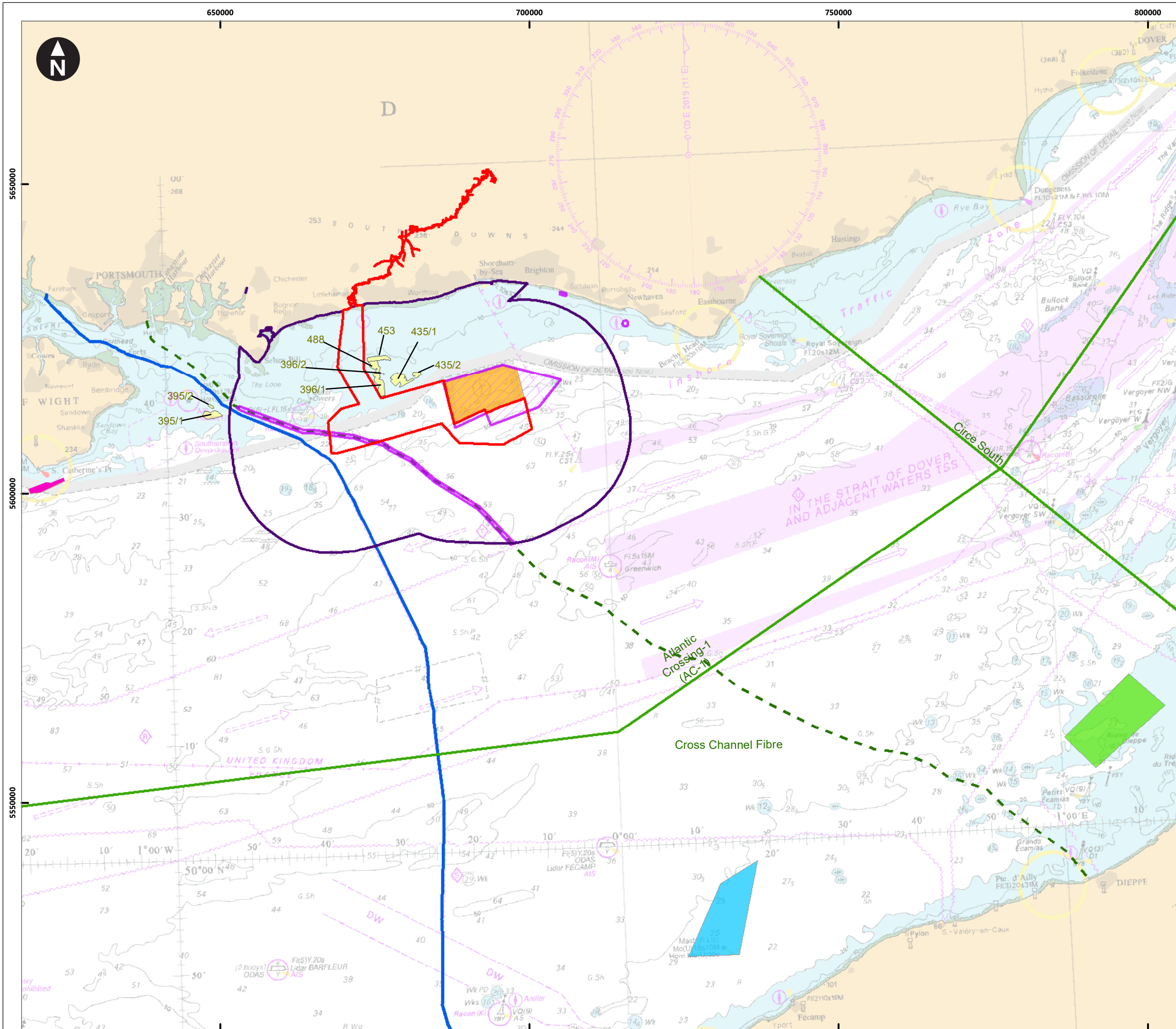
0 1 2 4 6 8
Kilometres
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WGS 1984 UTM Zone 30N Transverse Mercator

Rampion Extension Development

Rampion 2 Offshore Wind Farm
 Figure 8.24 Rampion 2 Level 5 benthic predictive habitat map
 Environmental Statement

System Identifier: 42285-GOBE-ES-OF-FG-07-7006
 Version: 1.0

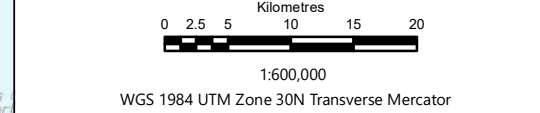
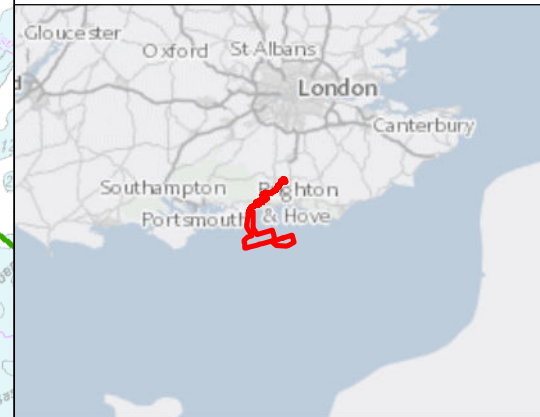
Company: GOBE	Drawn By: SWM	Chk/Prvrd: NH	Drawn Date: 05/06/2023	Status: FINAL
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Key

- Proposed DCO Order Limits
- Fish and Shellfish Study Area
- Tidal Sites Agreements
- Open disposal site
- Dieppe - Le Treport wind farm
- Fecamp wind farm
- Rampion wind farm
- Cable
- Proposed Aquind cable
- Planned IFA-2 cable
- Tidal Energy Centre
- Aggregate license area



Rampion Extension Development

Rampion 2 Offshore Wind Farm

Figure 8.25 Projects screened into the cumulative assessment

Environmental Statement

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Company: GOBE	Drawn By: SWM	Chk/Prvrd: NH	Drawn Date: 19/07/2023	Status: FINAL