

Outer Dowsing Offshore Wind

Environmental Statement

Chapter 7 Marine Physical Processes

Volume 2 Figures (Part 1 of 2)

Date: February 2025

Document Reference: 6.2.7

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

Rev: 2.0

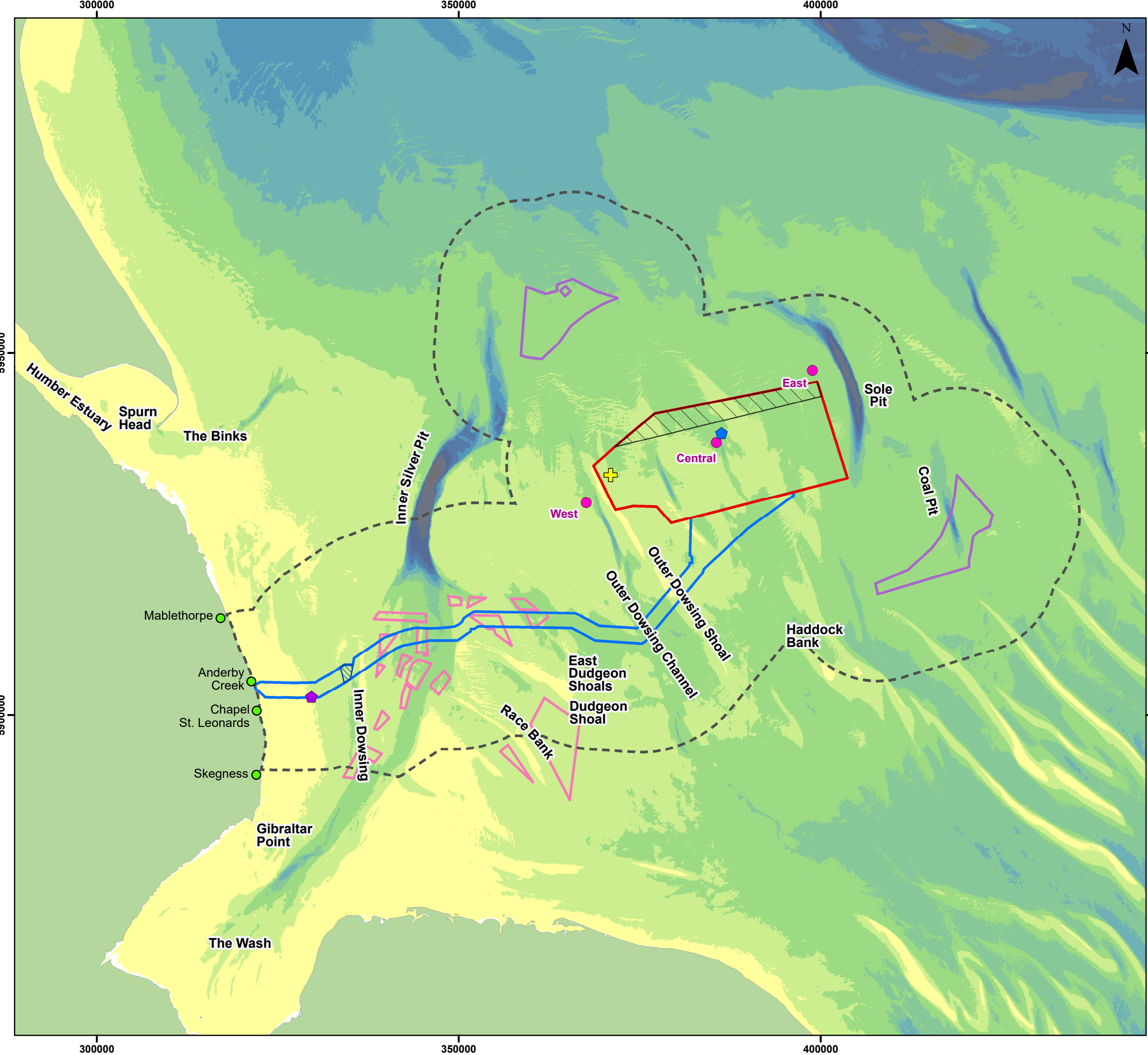
Company:		Outer Dowsing Offshore Wind		Asset:		Whole Asset	
Project:		Whole Wind Farm		Sub Project/Package:		Whole Asset	
Document Title or Description:		Chapter 7 Marine Physical Processes					
Internal Document Number:		PP1-ODOW-DEV-CS-REP-0115_02		3 rd Party Doc No (if applicable):		N/A	
Rev No.	Date	Status / Reason for Issue	Author	Checked by	Reviewed by	Approved by	
01	March 2024	DCO Application	GoBe	GoBe	Shepherd & Wedderburn	Outer Dowsing	
02	February 2025	Examination ES Update	GoBe	GoBe	Shepherd & Wedderburn	Outer Dowsing	

Change Log

- Examination ES Update: Updates to reflect, where relevant: clarifications to date in Examination; correcting errata; additional commitments made through Examination; changes to status of or addition of cumulative projects; Introduction of the Offshore Restricted Build Area (ORBA) and Removal of Northern Export Cable Corridor (ECC)

Table of Figures

- Figure 7.1 Study Area (document reference 6.2.7.1)
- Figure 7.2 Wave Regime (document reference 6.2.7.1)
- Figure 7.3 Mean Spring Tidal Range (document reference 6.2.7.1)
- Figure 7.4 Depth MetOceanWorks (document reference 6.2.7.1)
- Figure 7.5 Regional Marine Geology (document reference 6.2.7.1)
- Figure 7.6 Morphology (document reference 6.2.7.1)
- Figure 7.7 Seabed Sediments (document reference 6.2.7.1)
- Figure 7.8 Bedload Sediment Pathways (document reference 6.2.7.1)
- Figure 7.9 Designated Sites (document reference 6.2.7.1)
- Figure 7.10 MFE High Northerly Current Suspended (document reference 6.2.7.1)
- Figure 7.12 MFE Low Northerly Current Suspended (document reference 6.2.7.1)
- Figure 7.13 MFE Current Sedimented (document reference 6.2.7.1)



Legend

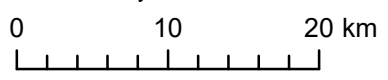
- Array Area
- Offshore Restricted Build Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Biogenic Reef Restoration Area
- Physical Processes Zone of Influence
- Cefas Dowsing WaveNet Site
- Chapel Point Directional Waverider Buoy
- Lidar Buoy SWLB059
- Metocean Model Data Points

Depth (m)

- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100



Coordinate System: WGS 1984 UTM Zone 31N



Scale: 1:500,000

A3 Page Size

Environmental Statement Version 2 Deadline 4a

Marine Physical Processes Study Area

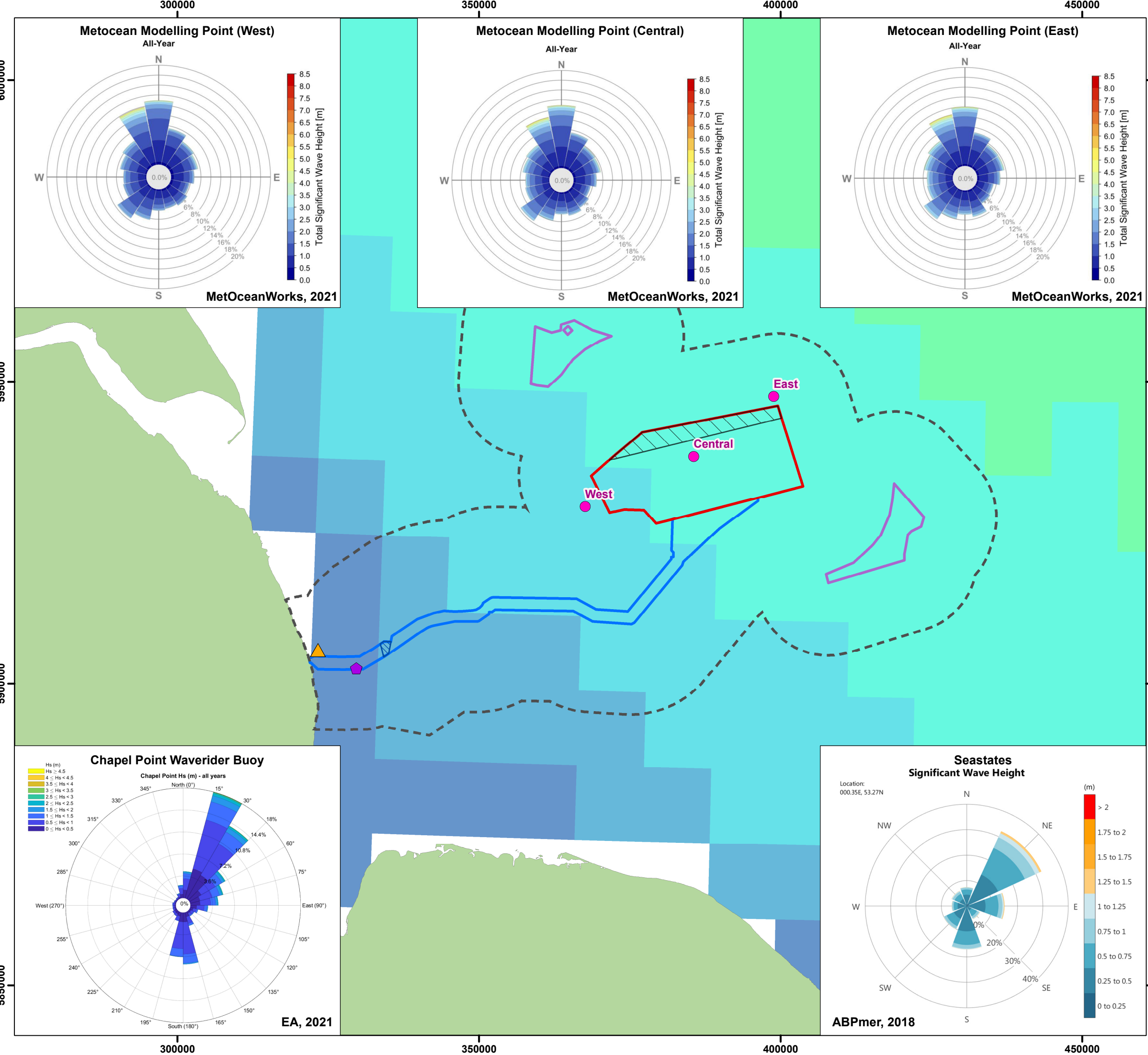
Figure 7.1



Date: 18/02/2025
Produced By: BPHB
Revision: 2.0



Contains ESRI Basemapping;
EMODnet 2020 bathymetry

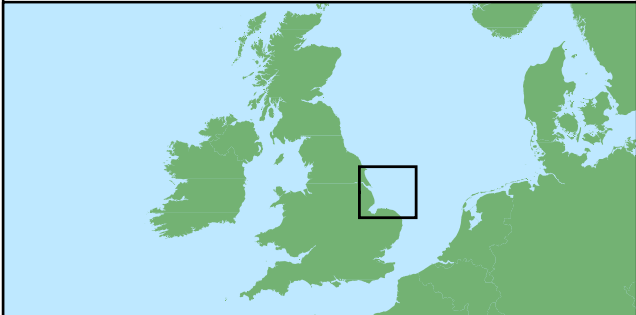


Legend

- Array Area
- Offshore Restricted Build Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Physical Processes Zone of Influence
- Metocean Model Data Points
- Chapel Point Directional Waverider Buoy
- Seastates Data (ABPmer, 2018)

Mean Winter Wave Height (m)

- < 1.25
- 1.25 - 1.5
- 1.5 - 1.75
- 1.75 - 2
- 2 - 2.25
- 2.25 - 2.5



Coordinate System: WGS 1984 UTM Zone 31N

0 10 20 km

Scale: 1:600,000

A3 Page Size

Environmental Statement Version 2 Deadline 4a

Wave Regime

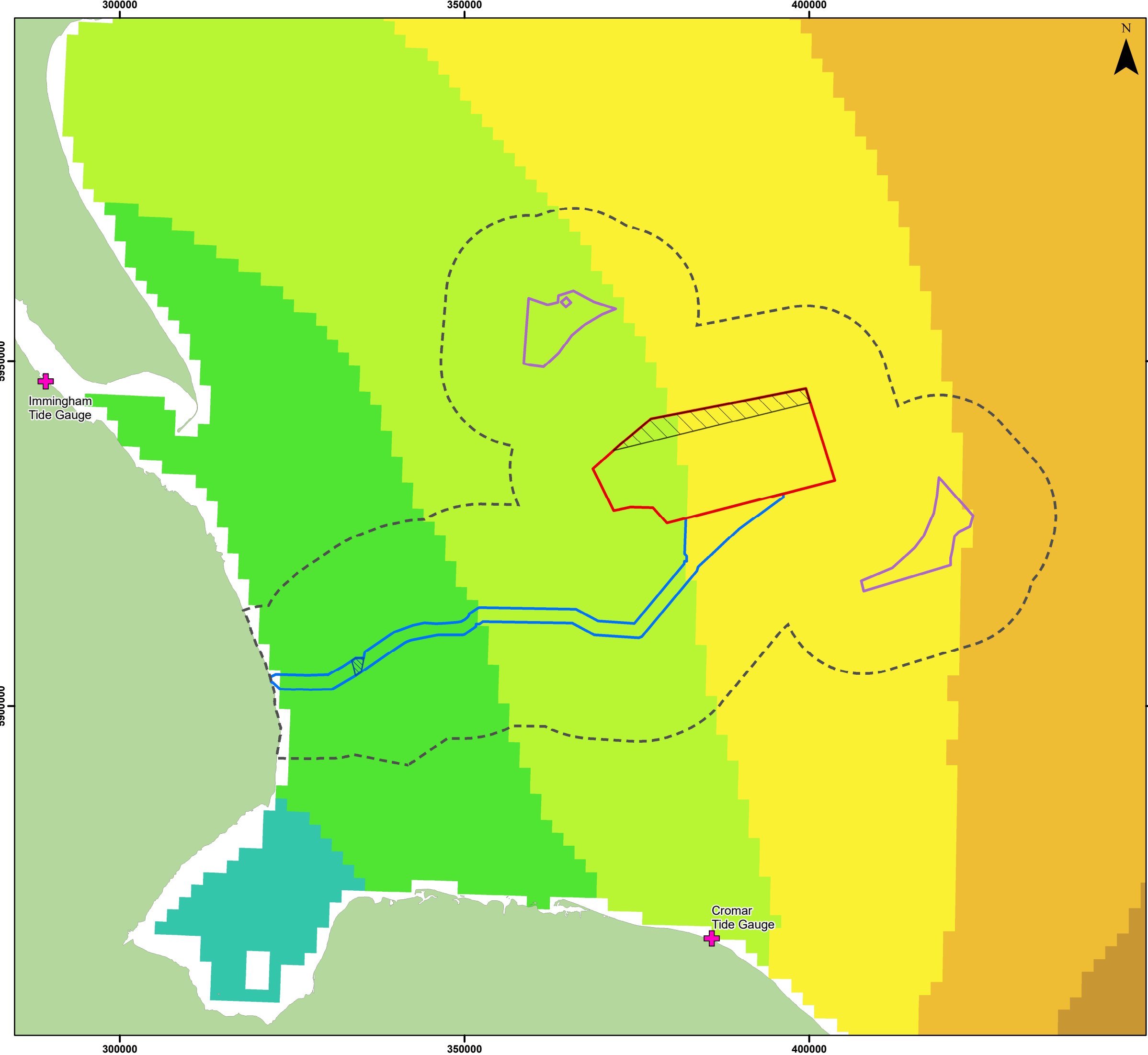
Figure 7.2



Date: 18/02/2025
Produced By: BPHB
Revision: 2.0



Contains ESRI Basemapping;
EMODnet 2020 bathymetry

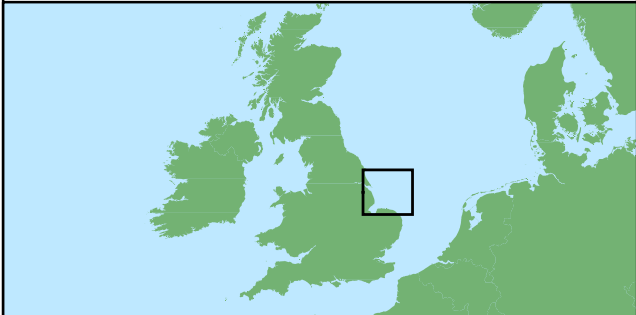


Legend

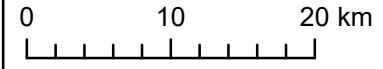
- Array Area
- Offshore Restricted Build Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Physical Processes Zone of Influence
- Tide Gauge Location

Mean Spring Tidal Range (m)

- 1.01 - 2
- 2.01 - 3
- 3.01 - 4
- 4.01 - 5
- 5.01 - 6
- 6.01 - 7



Coordinate System: WGS 1984 UTM Zone 31N



Scale: 1:525,000

A3 Page Size

Environmental Statement Version 2 Deadline 4a

Mean Spring Tidal Range
(ABPmer *et al.*, 2008)

Figure 7.3

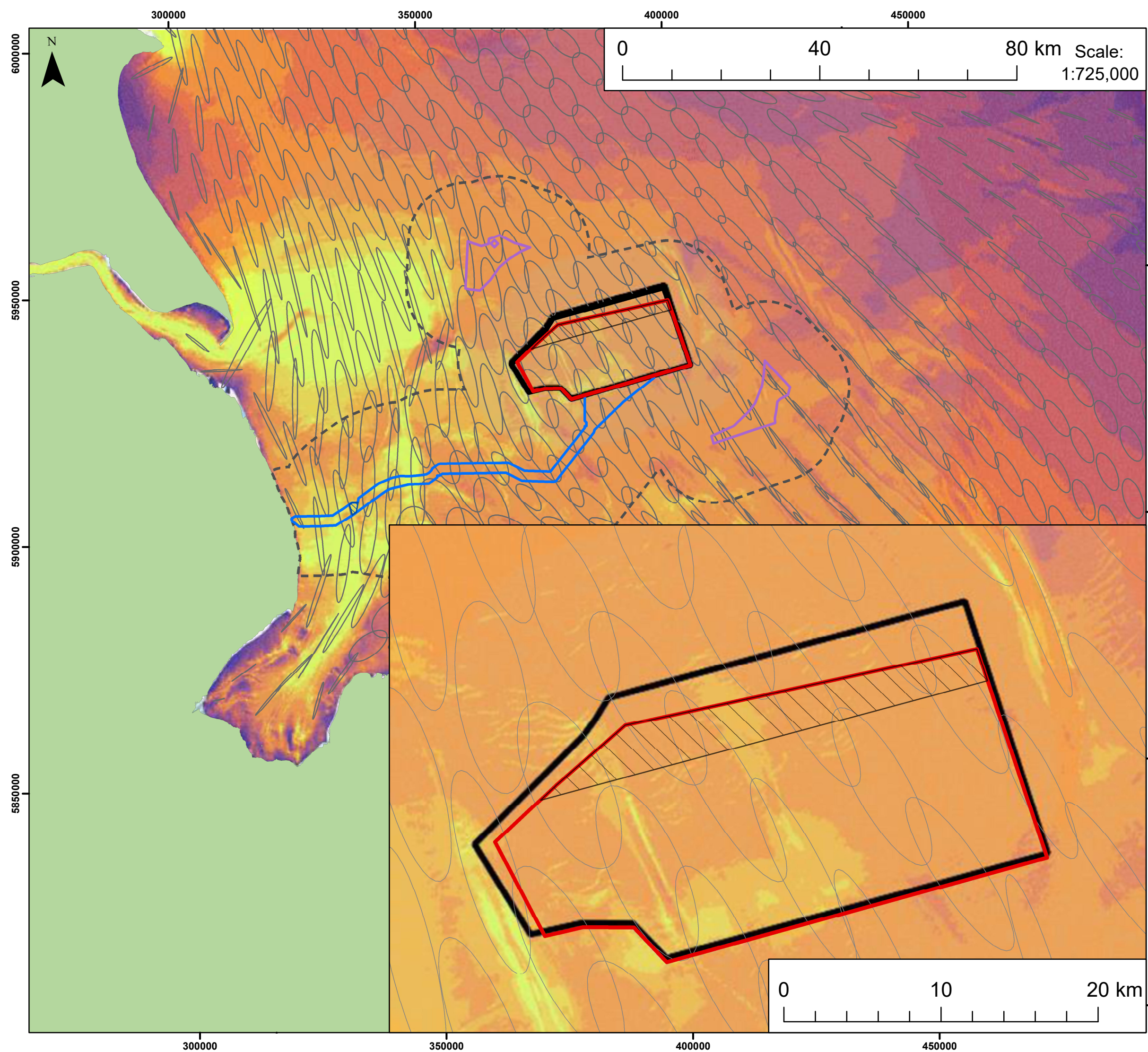


Date: 18/02/2025
Produced By: BPHB
Revision: 2.0



Contains ESRI Basemapping;
EMODnet 2020 bathymetry

Document Path: Z:\GIS\GIS_Productions\0152 Outer Dowsing EIA\GIS\Figures\Deadline 4a\Physical Processes\ODOW_0152_PP_Fig7.3_Mean_Spring_Tidal_Range_v2.mxd



Legend

- Array Area
- AfL Array Area
- Offshore Restricted Build Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Physical Processes Zone of Influence
- Spring Tidal Ellipses

Depth-averaged Current Speed (m/s)

0.4 - 0.5
0.5 - 0.6
0.6 - 0.7
0.7 - 0.8
0.8 - 0.9
0.9 - 1
1 - 1.2
1.2 - 1.3
1.3 - 1.4
> 1.4

Coordinate System: WGS 1984 UTM Zone 31N

A3 Page Size

Environmental Statement Version 2 Deadline 4a

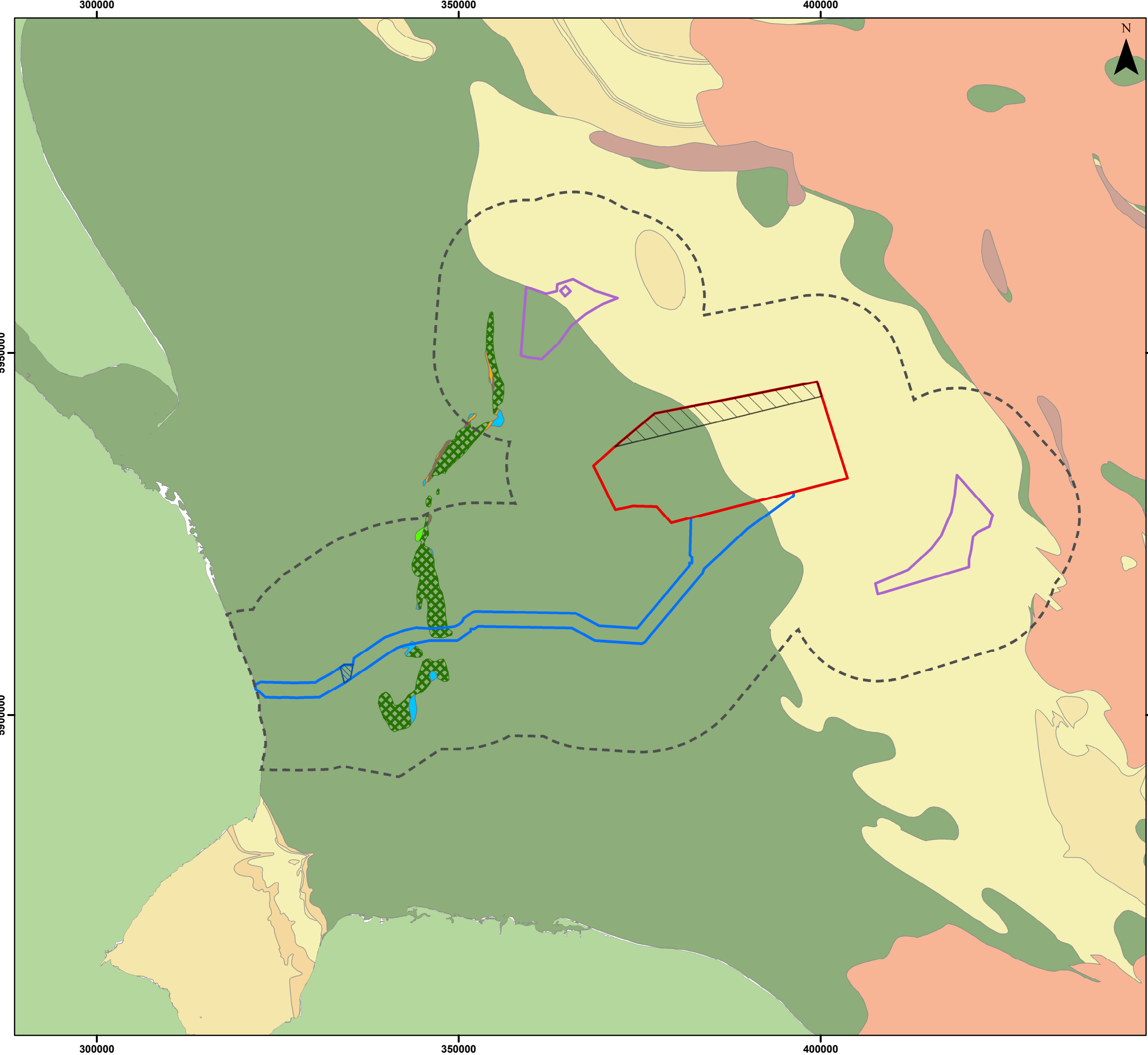
Maximum Modelled Depth-Averaged Spring Tidal Current Speeds and Spring Tidal Ellipses (MetOceanWorks, 2021)

Figure 7.4

Date: 18/02/2025
Produced By: BPHB
Revision: 2.0

Contains ESRI Basemapping;
EMODnet Geology 2016

Document Path: Z:\GIS\GIS - Projects\0152 Outer Dowsing EIA\GIS\Figures\Deadline 4a\Physical Processes\ODOW_0152_PP_Fig7.4_Depth_MetOceanWorks_v2.mxd



Legend

- Array Area
- Offshore Restricted Build Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Physical Processes Zone of Influence

Pre-Holocene Geology at/near Seabed (Tappin, 2011)

- Mesozoic - Chalk Group - Early to Late Cret.
- Quaternary - Bolders Bank Formation
- Quaternary - Egmond Ground Formation
- Quaternary - Sand Hole Formation
- Quaternary - Swarte Bank Formation

Bedrock Summary Lithologies (BGS)

- Chalk
- Mesozoic interbedded
- Mesozoic mudstones
- Mesozoic sandstones and limestones
- Palaeozoic sedimentary
- Tertiary interbedded

Coordinate System: WGS 1984 UTM Zone 31N

0 10 20 km

Scale: 1:500,000

A3 Page Size

Environmental Statement Version 2 Deadline 4a

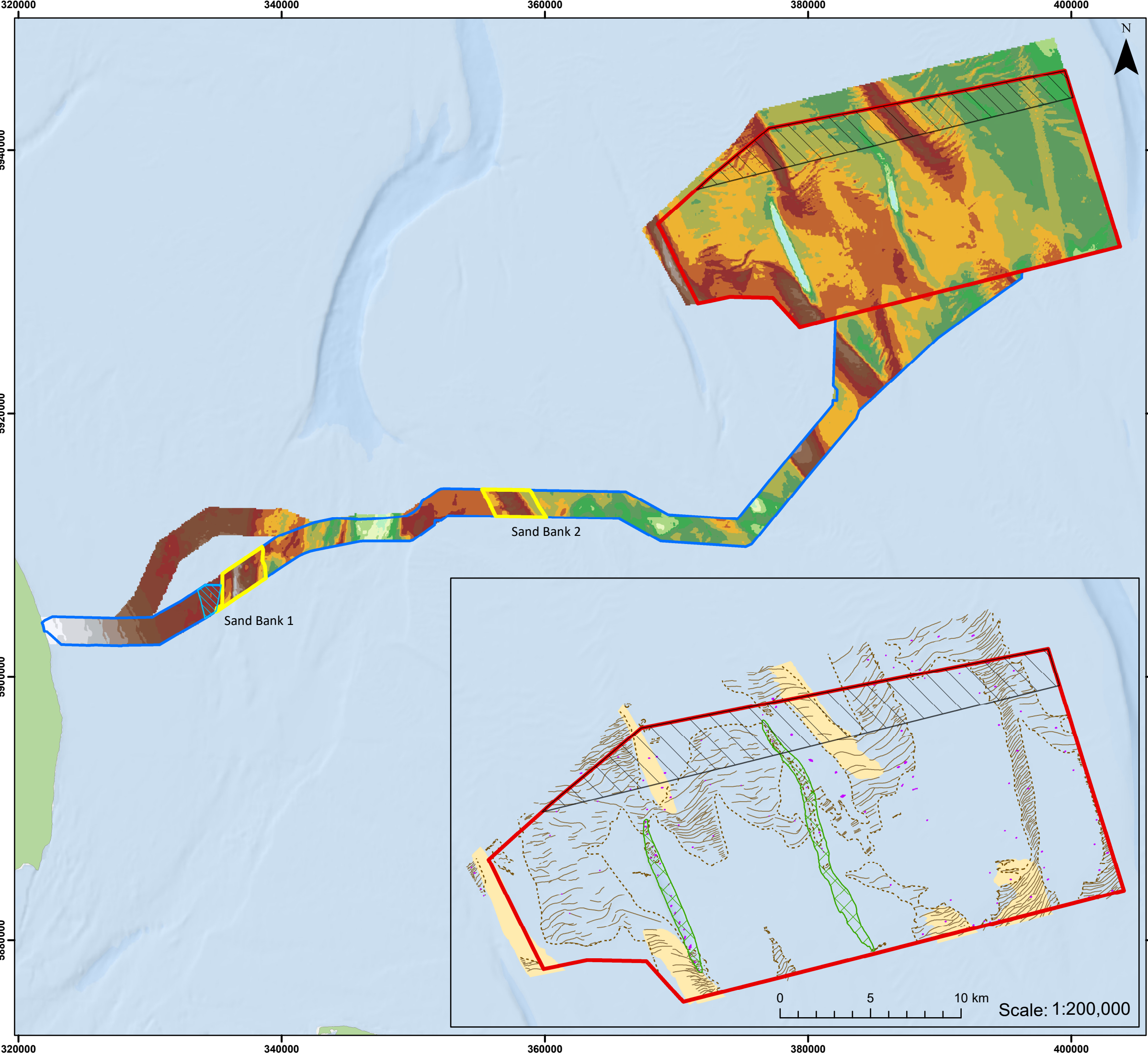
Regional Marine Geology

Figure 7.5

Date: 18/02/2025
 Produced By: BPHB
 Revision: 2.0

Contains ESRI Basemapping; EMODnet 2020 bathymetry

Document Path: Z:\GIS\GIS - Projects\0152 Outer Dowsing EIA\GIS\Figures\Deadline 4a\Physical Processes\ODOW_0152_PP_Fig7.5_Regional_Marine_Geology_v2.mxd



Legend

- Array Area
- Offshore Restricted Build Area
- Offshore Export Cable Corridor
- ORCP Area
- Sand Bank Zones
- Sandwaves Area
- Sandwaves Crest
- Sandbank
- Megaripples Crest
- Canyon

Depth (m) (EMODnet, 2020)

>32
30-32
28-30
26-28
24-26
22-24
20-22
18-20
16-18
14-16
12-14
10-12
8-10
6-8
4-6
2-4
0-2

Seafloor Morphology data provided by Enviros and is detailed in report 'Outer Dowsing Round 4 Draft Final Report - ENV21-21042-GTR4-04' May 2022

Coordinate System: WGS 1984 UTM Zone 31N

0 5 10 km

Scale: 1:275,000

A3 Page Size

Environmental Statement Version 2 Deadline 4a

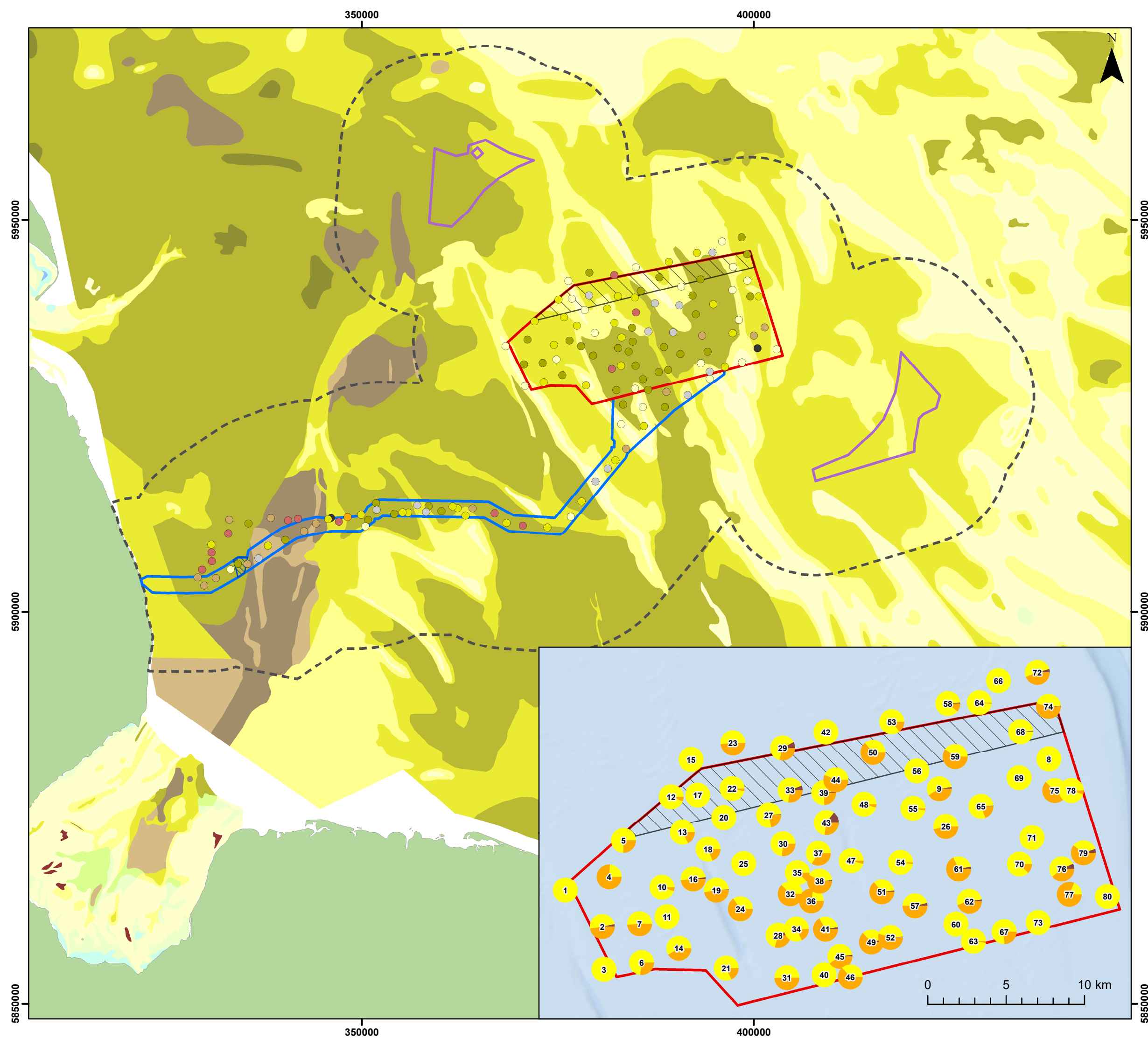
Morphology of Array Area, Offshore ECC and at Landfall

Figure 7.6

Date: 20/02/2025
Produced By: BPHB
Revision: 2.0

Contains ESRI Basemapping;
Esri, Garmin, GEBCO, NOAA
NGDC, and other contributors

Document Path: Z:\GIS\GIS - Projects\0152 Outer Dowsing EIA\GIS\Figures\Deadline 4a\Physical Processes\ODOW_0152_PP_Fig7.6_Morphology_v3.mxd



Legend

- Array Area
- Offshore Restricted Build Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Physical Processes Zone of Influence

Seabed Sediments (FOLK)

- 1.1.1 Mud
- 1.1.2 (gravelly) Mud
- 1.2.1 sandy Mud
- 1.3.1 muddy Sand
- 1.3.2 (gravelly) muddy Sand
- 2.1.1 Sand
- 2.1.2 (gravelly) Sand
- 3.1.1 gravelly Sand
- 3.2.1 sandy Gravel
- 3.3.1 Gravel
- 4.1.1 gravelly Mud
- 4.3.1 gravelly muddy Sand
- 4.4.1 muddy sandy Gravel
- 5. Rock and Boulders

Benthic Samples - Folk Class (GEOxyz, August / November 2022)

- Sand
- Slightly Gravelly Sand
- Slightly Gravelly Muddy Sand
- Gravelly Sand
- Sandy Gravel
- Muddy Sandy Gravel
- Gravelly Muddy Sand
- Gravel

Sediment composition (%)

- Fines
- Sand
- Gravel

Seabed Sediments 1:250 000 – Europe
© EMODnet Geology,
European Commission, 2016

Coordinate System: WGS 1984 UTM Zone 31N

0 10 20 km

Scale: 1:450,000

A3 Page Size

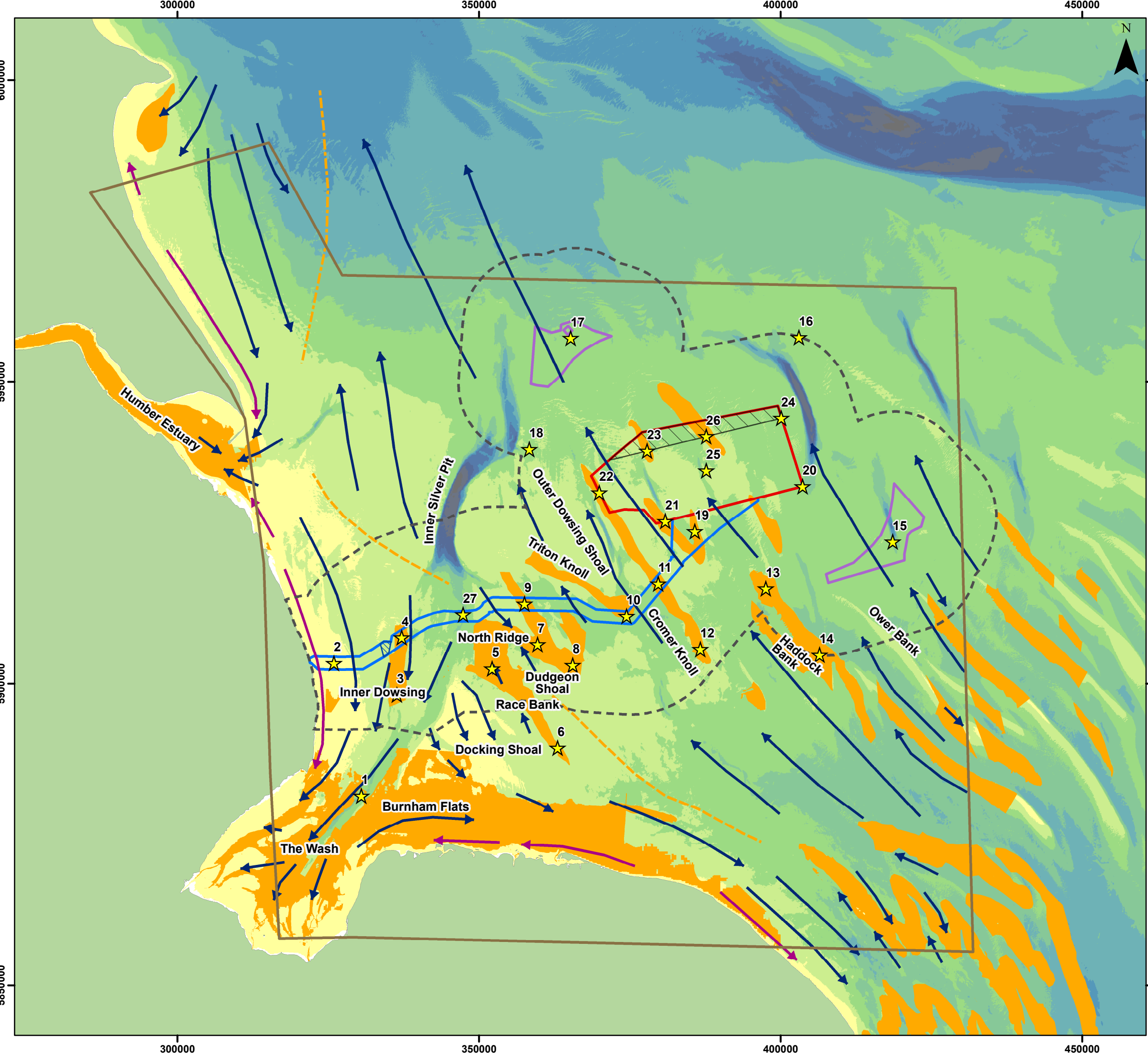
Environmental Statement Version 2 Deadline 4a

Surficial Seabed Sediments (Folk, 1954)

Figure 7.7

Date: 20/02/2025
Produced By: BPHB
Revision: 2.0

Contains ESRI Basemapping;
Esri, Garmin, GEBCO, NOAA
NGDC, and other
contributorsEMODnet Geology



Legend

- Array Area
- Offshore Restricted Build Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Physical Processes Zone of Influence
- Longshore Transport
- Bed Load Transport
- Bed Load Parting
- SEA Boundary
- Annex I Sandbanks (JNCC)
- HD Model Timeseries Extraction Points

Depth (m)

0 - 10
10 - 20
20 - 30
30 - 40
40 - 50
50 - 60
60 - 70
70 - 80
80 - 90
90 - 100

Longshore Transport, Bed Load Transport and Bed Load Parting from Kenyon and Cooper, 2005

Coordinate System: WGS 1984 UTM Zone 31N

0 10 20 km

Scale: 1:600,000

A3 Page Size

Environmental Statement Version 2 Deadline 4a

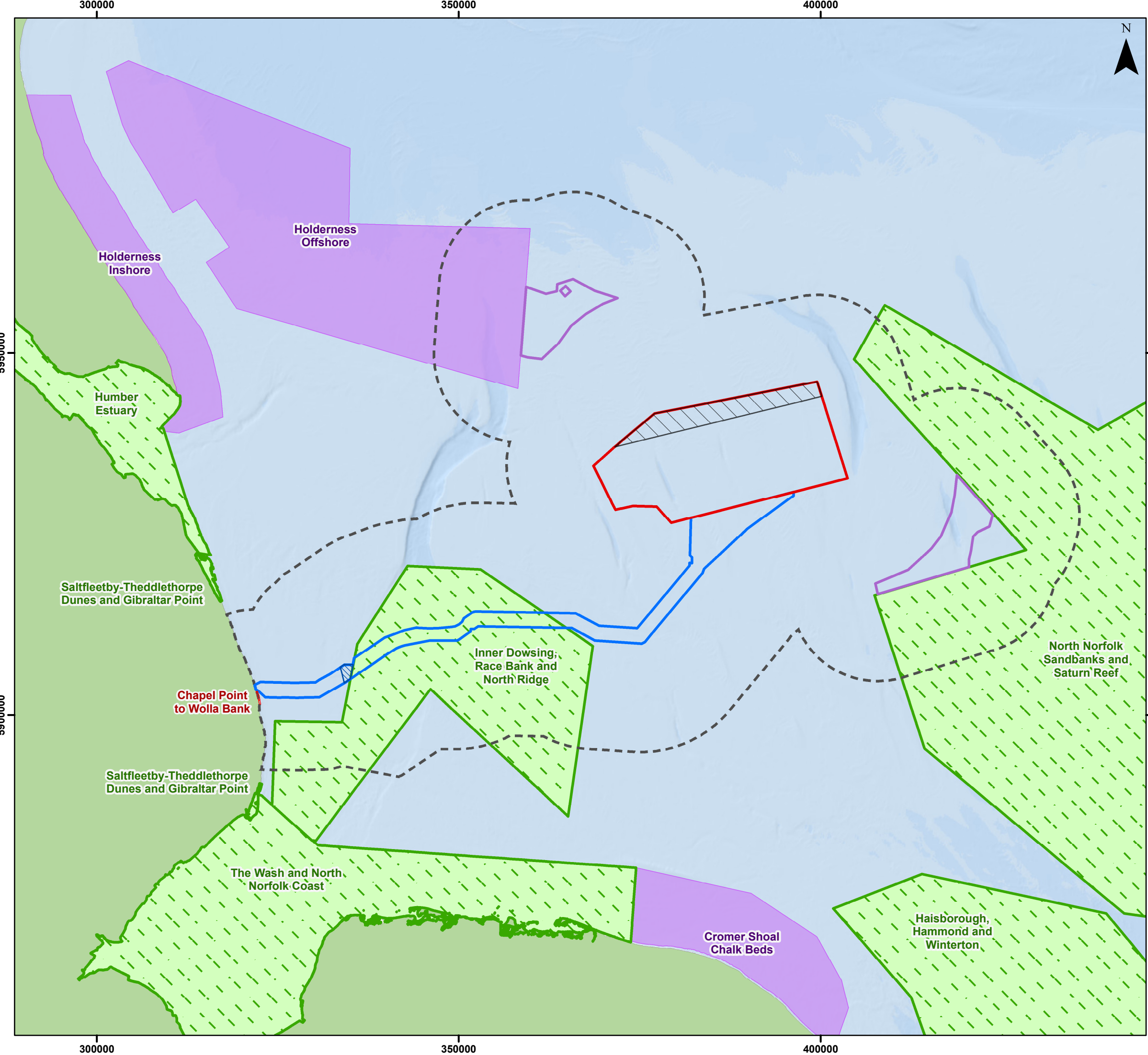
Bedload Sediment Pathways
(adapted from Kenyon and Cooper, 2005)

Figure 7.8

Date: 18/02/2025
Produced By: BPHB
Revision: 2.0

Contains ESRI Basemapping:
EMODnet Geology 2016

Document Path: Z:\GIS\GIS - Projects\0152 Outer Dowsing EIA\GIS\Figures\Deadline 4a\Physical Processes\ODOW_0152_PP_Fig7.8_Bedload_Sediment_Pathways_v3.mxd



Legend

- Array Area
- Offshore Restricted Build Area
- Offshore Export Cable Corridor
- ORCP Area
- Artificial Nesting Structure Area
- Physical Processes Zone of Influence
- Marine Conservation Zones
- Special Areas of Conservation
- Site of Special Scientific Interest



Coordinate System: WGS 1984 UTM Zone 31N
0 10 20 km
Scale: 1:500,000
A3 Page Size

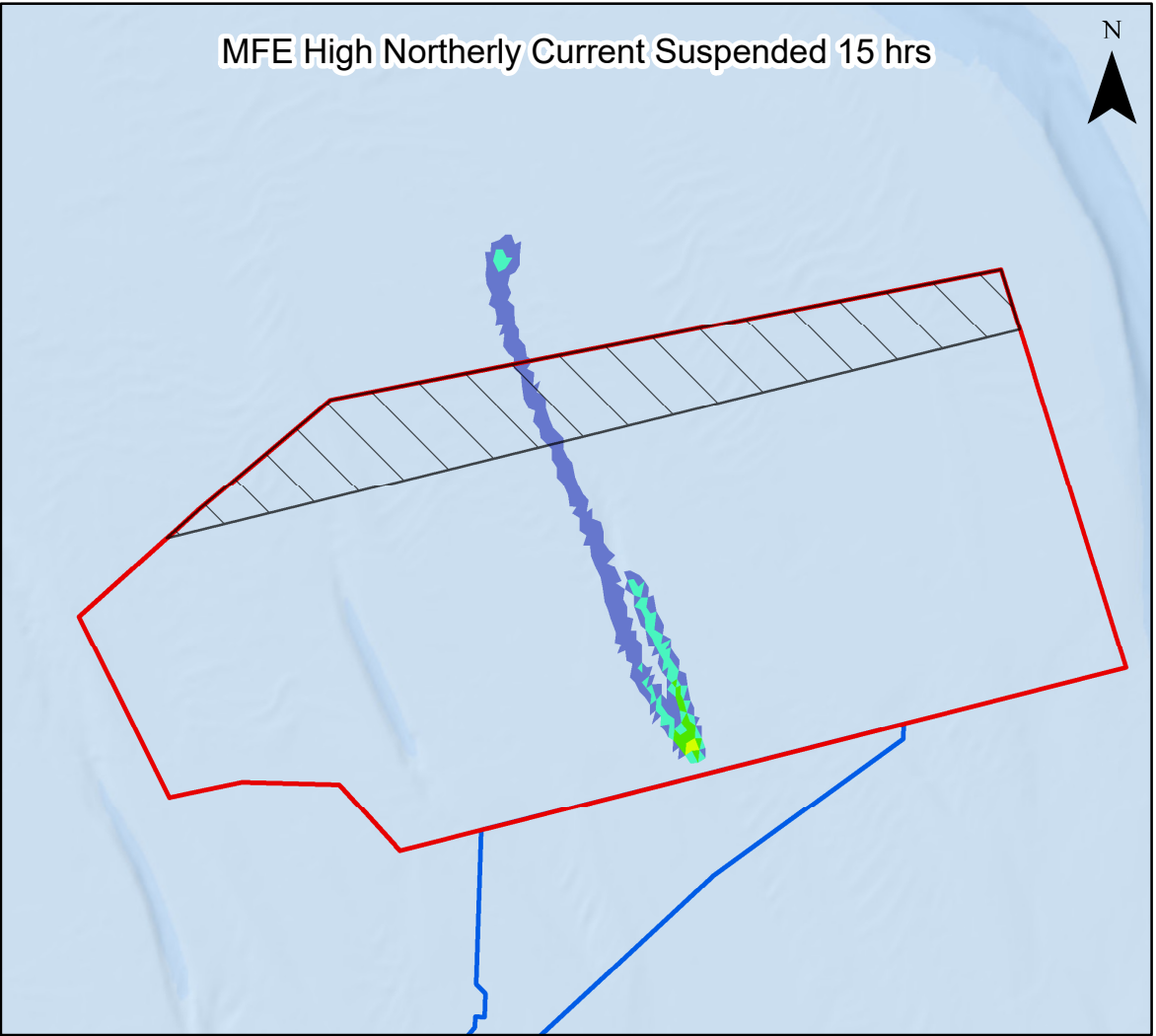
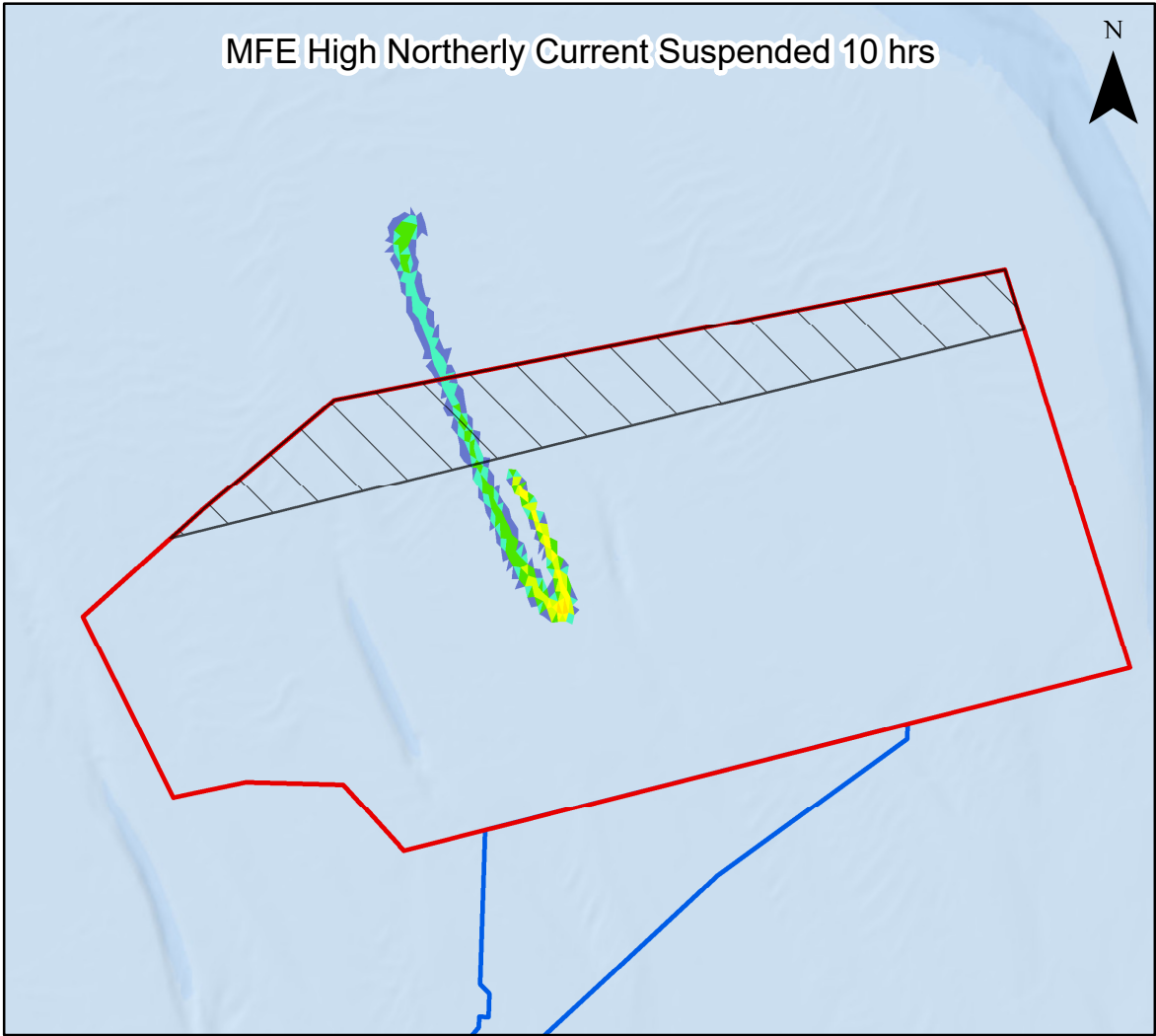
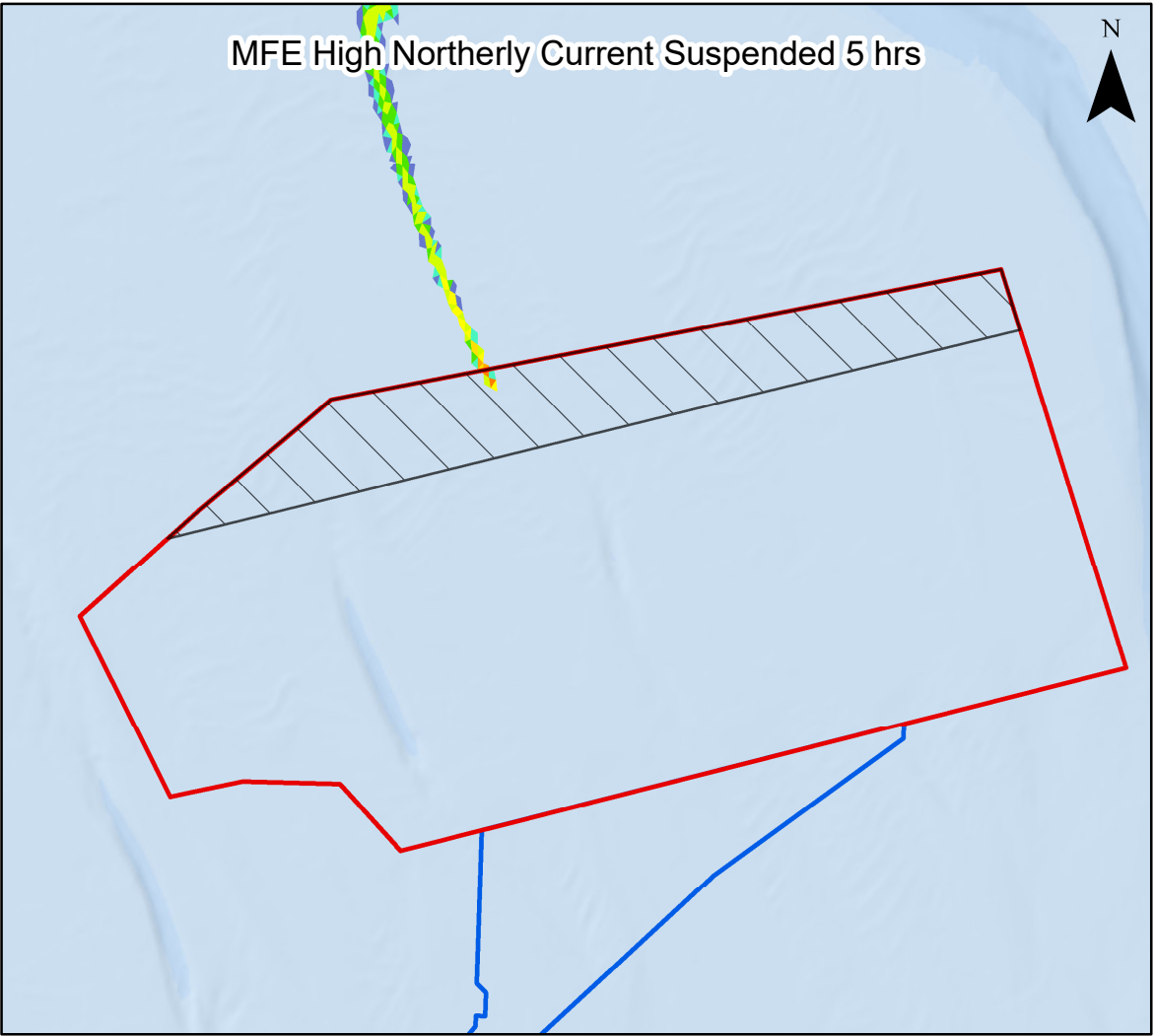
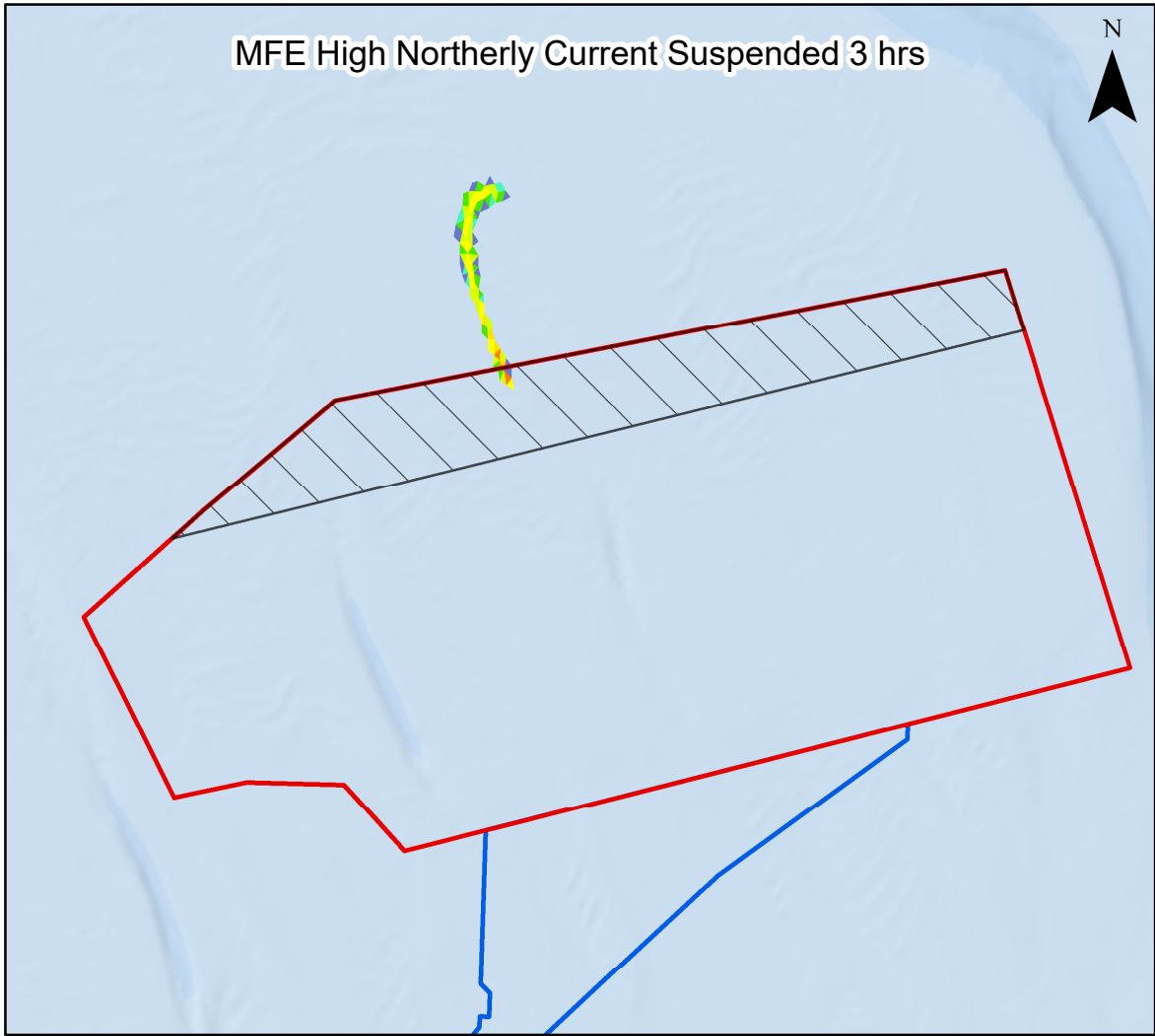
Environmental Statement Version 2 Deadline 4a

Designated Sites of relevance to
Marine Physical Processes

Figure 7.9



Document Path: Z:\GIS\GIS - Projects\0152 Outer Dowsing EIA\GIS\Figures\Deadline 4a\Physical Processes\ODOW_0152_PP_Fig7.9_Designated_Sites_v2.mxd



Legend

- Array Area
 - Offshore Restricted Build Area
 - Offshore Export Cable Corridor
- Suspended Sediment Concentrations (mg/l)**
- 1 - 4.99
 - 5 - 9.99
 - 10 - 19.99
 - 20 - 49.99
 - 50 - 99.99
 - 100 - 149.99
 - 150 - 249.99
 - 250 - 499.99
 - 500 - 999.99
 - <1000



Coordinate System: WGS 1984 UTM Zone 31N

0 5 10 km

Scale: 1:250,000

A3 Page Size

Environmental Statement Version 2 Deadline 4a

Suspended sediment concentrations 3, 5, 10 and 15 hours after the start of Mass Flow Excavator activities within the Project array area during a high spring ebb tide

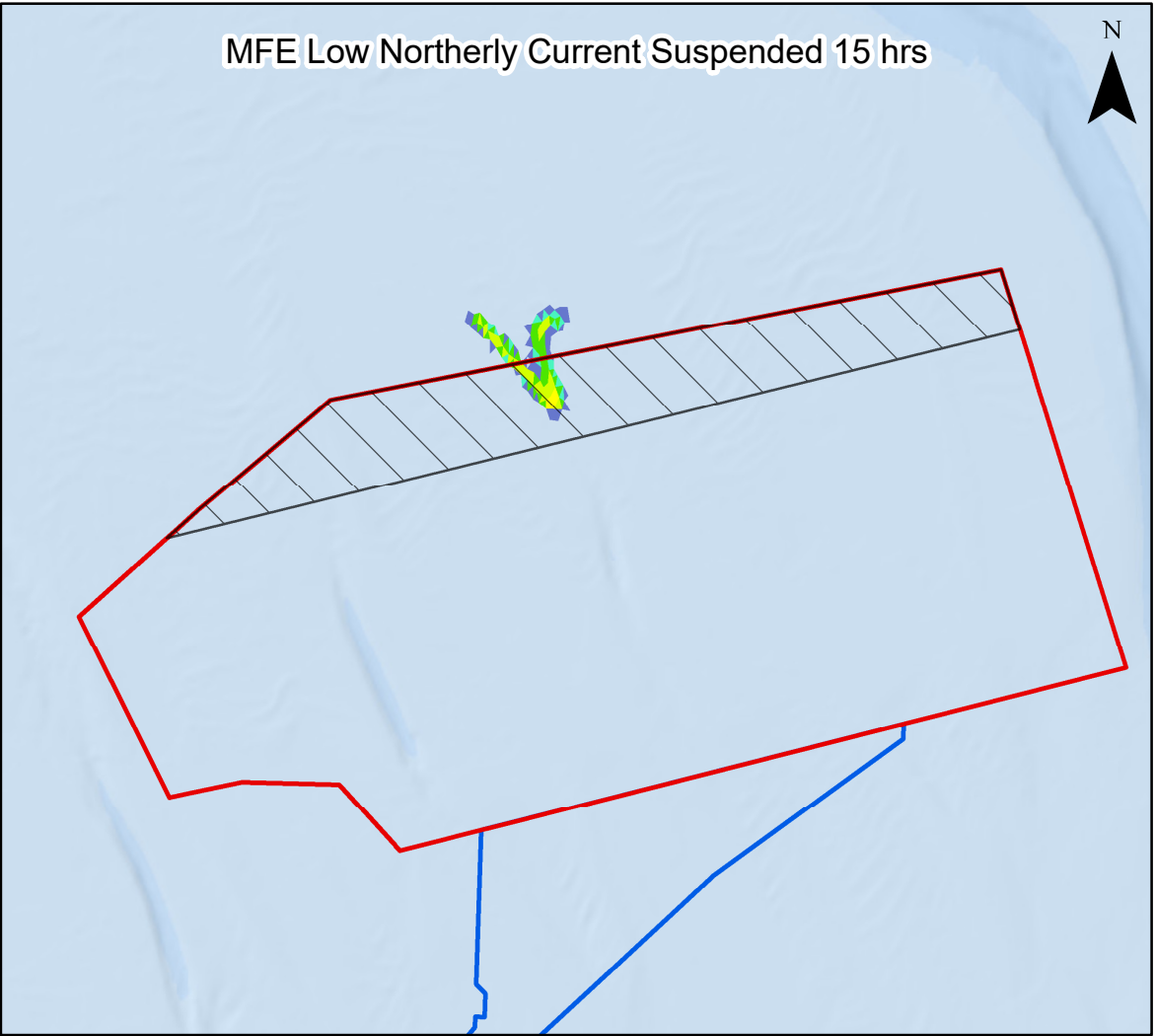
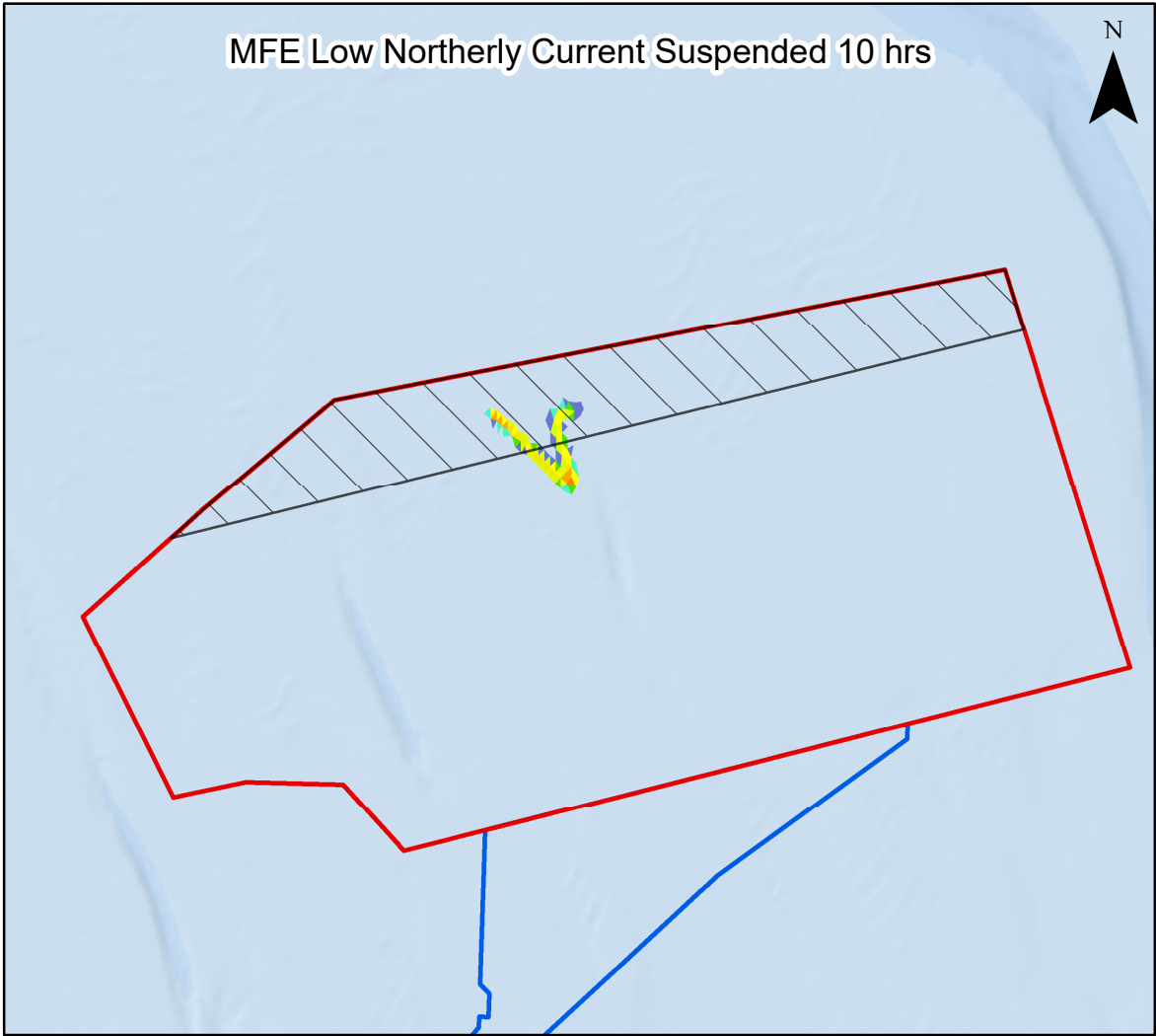
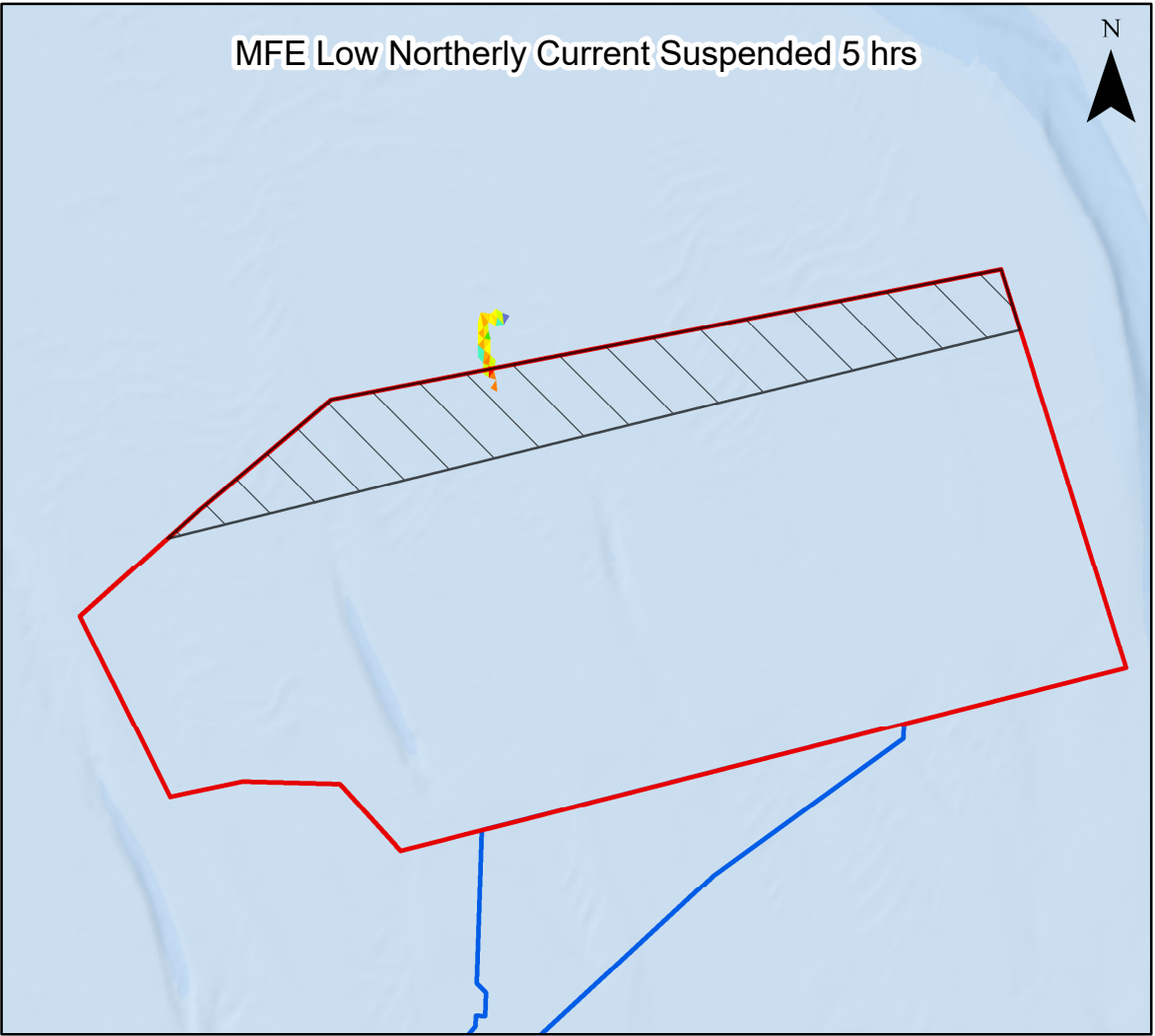
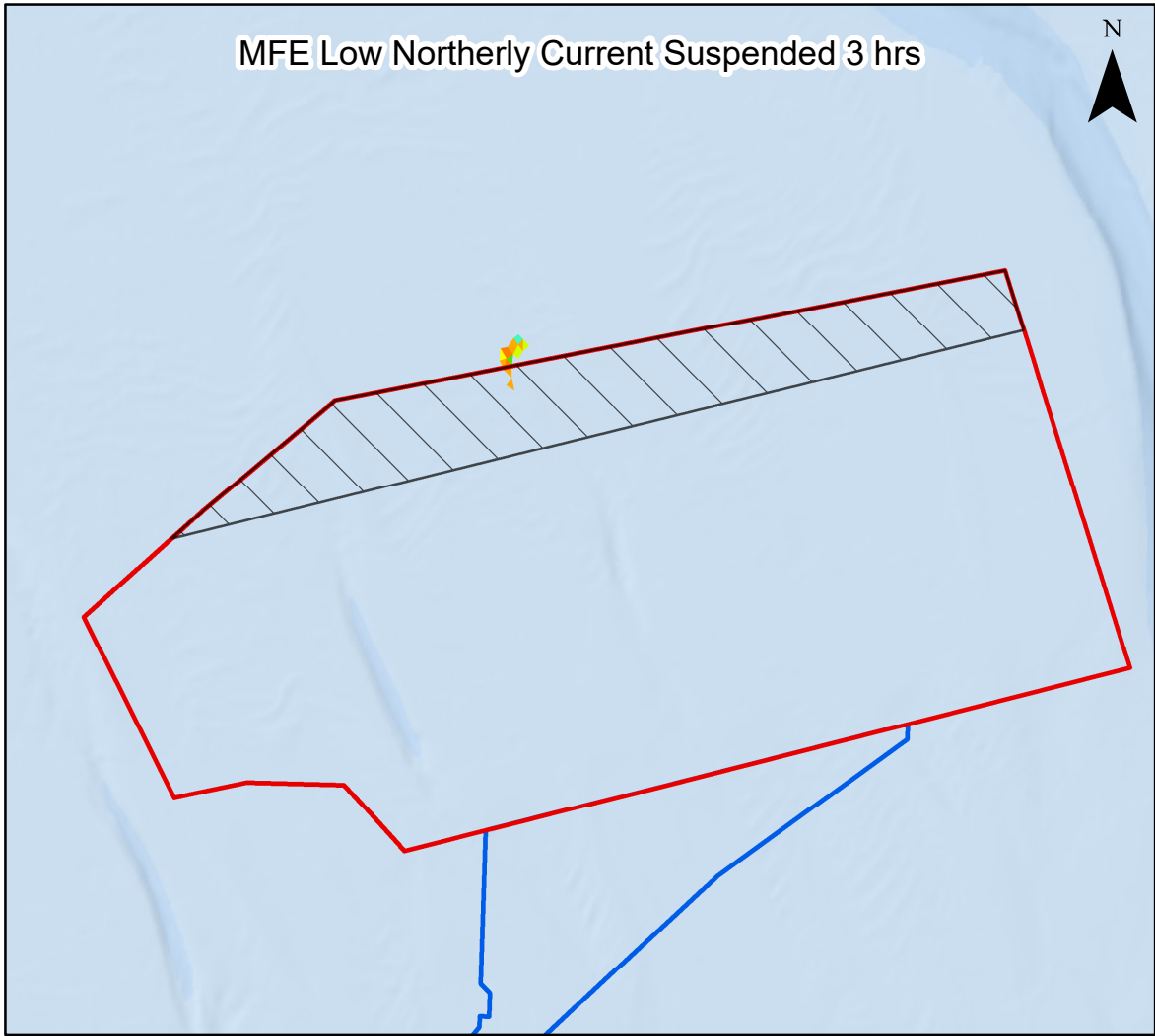
Figure 7.10



Date: 18/02/2025
Produced By: BPHB
Revision: 2.0



Contains ESRI Basemapping;
Esri, Garmin, GEBCO, NOAA
NGDC, and other contributors



Legend

- Array Area
 - Offshore Restricted Build Area
 - Offshore Export Cable Corridor
- Suspended Sediment Concentrations (mg/l)**
- 1 - 4.99
 - 5 - 9.99
 - 10 - 19.99
 - 20 - 49.99
 - 50 - 99.99
 - 100 - 149.99
 - 150 - 249.99
 - 250 - 499.99
 - 500 - 999.99
 - <1000



Coordinate System: WGS 1984 UTM Zone 31N

0 5 10 km

Scale: 1:250,000

A3 Page Size

Environmental Statement Version 2 Deadline 4a

Suspended sediment concentrations 3, 5, 10 and 15 hours after the start of Mass Flow Excavator activities within the Project array area during a low neap ebb tide

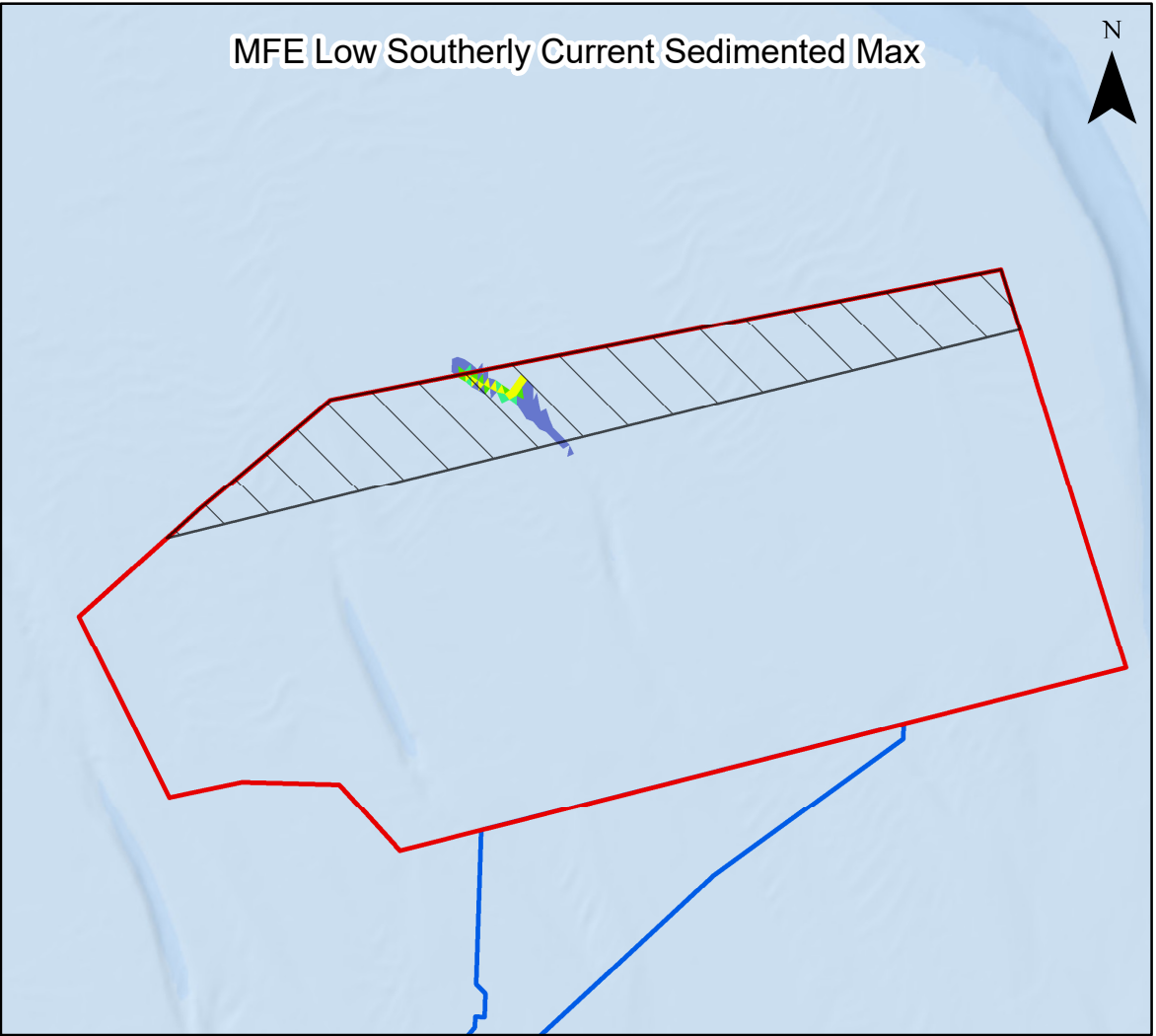
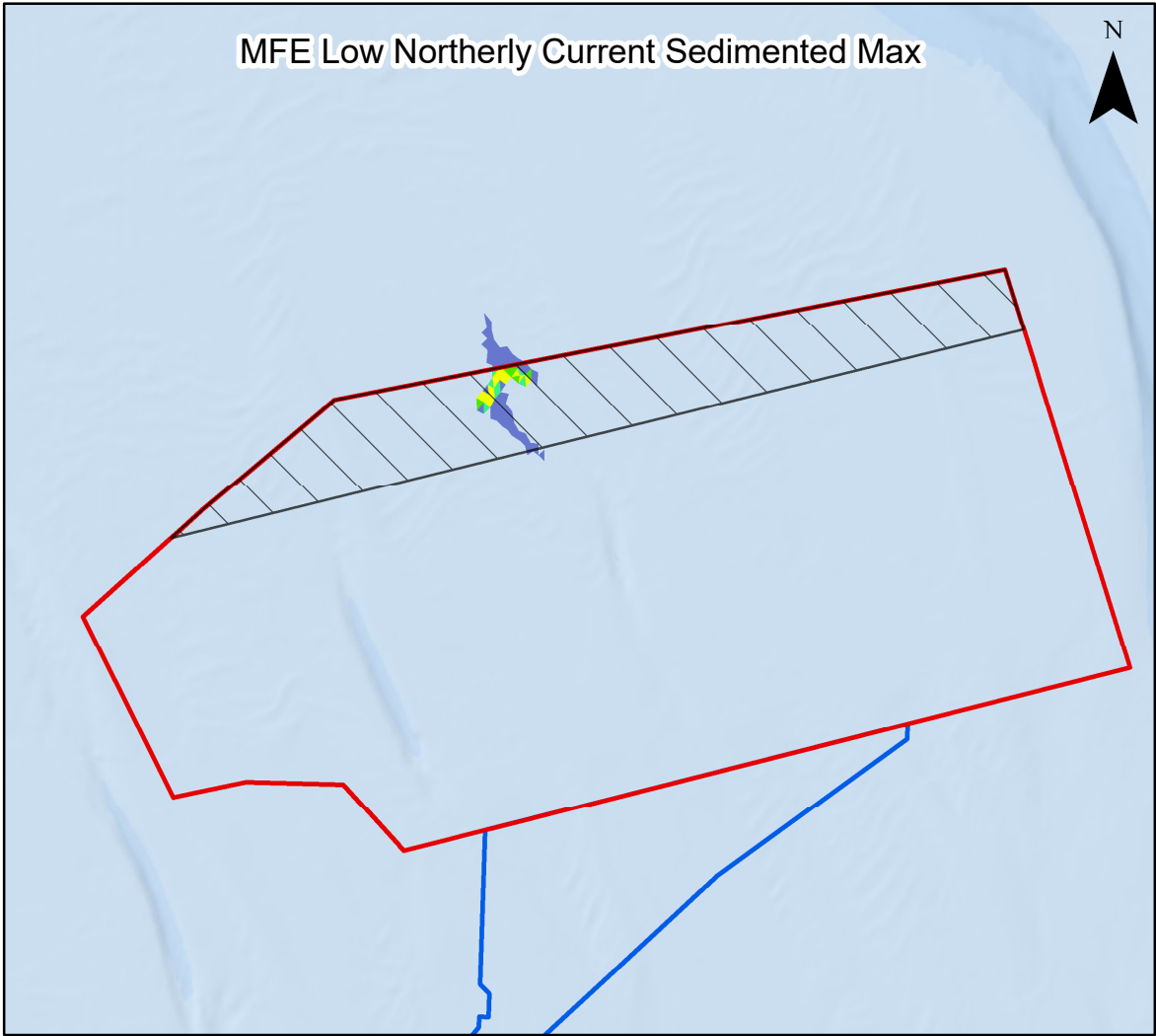
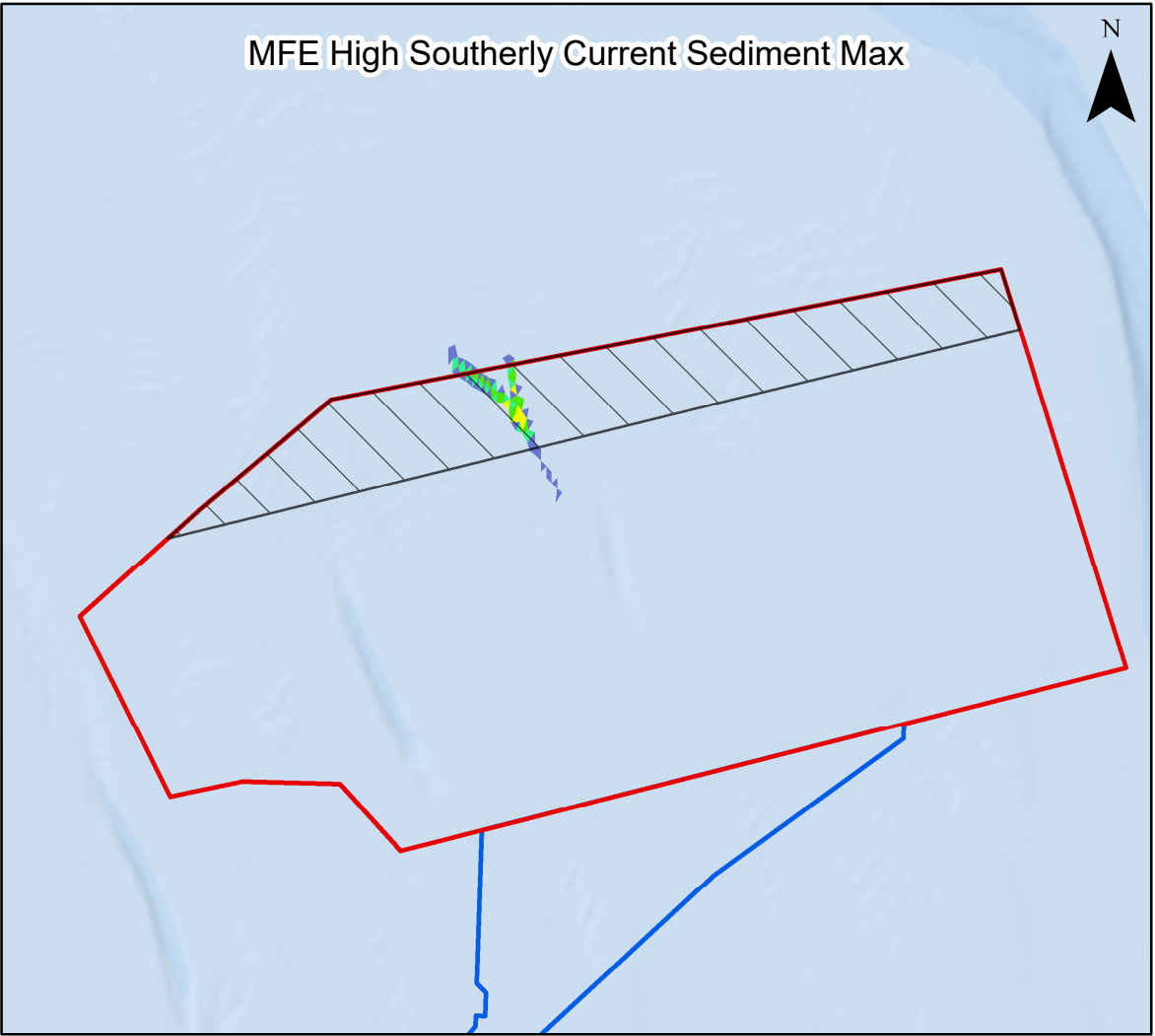
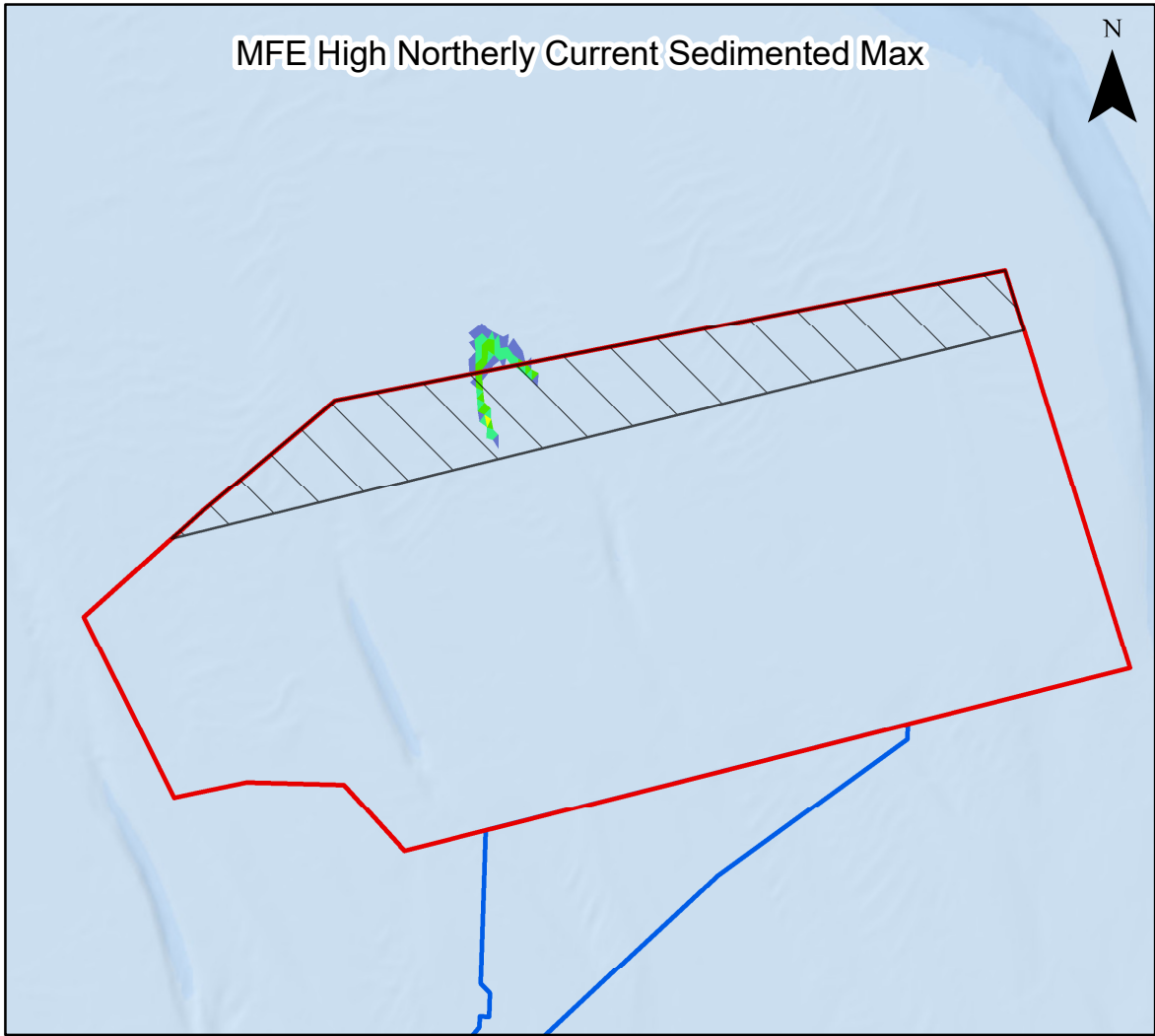
Figure 7.11



Date: 18/02/2025
Produced By: BPHB
Revision: 2.0



Contains ESRI Basemapping;
Esri, Garmin, GEBCO, NOAA
NGDC, and other contributors



Legend

- Array Area
 - Offshore Restricted Build Area
 - Offshore Export Cable Corridor
- Deposited Sediment (mm)**
- 1 - 4.99
 - 5 - 9.99
 - 10 - 19.99
 - 20 - 49.99
 - 50 - 99.99
 - 100 - 149.99
 - 150 - 249.99
 - 250 - 499.99
 - >500



Coordinate System: WGS 1984 UTM Zone 31N

0 5 10 km

Scale: 1:250,000 A3 Page Size

Environmental Statement Version 2 Deadline 4a

Maximum sediment deposition 20 hours after the start of Mass Flow Excavator activities within the Project array area, for a range of tidal conditions

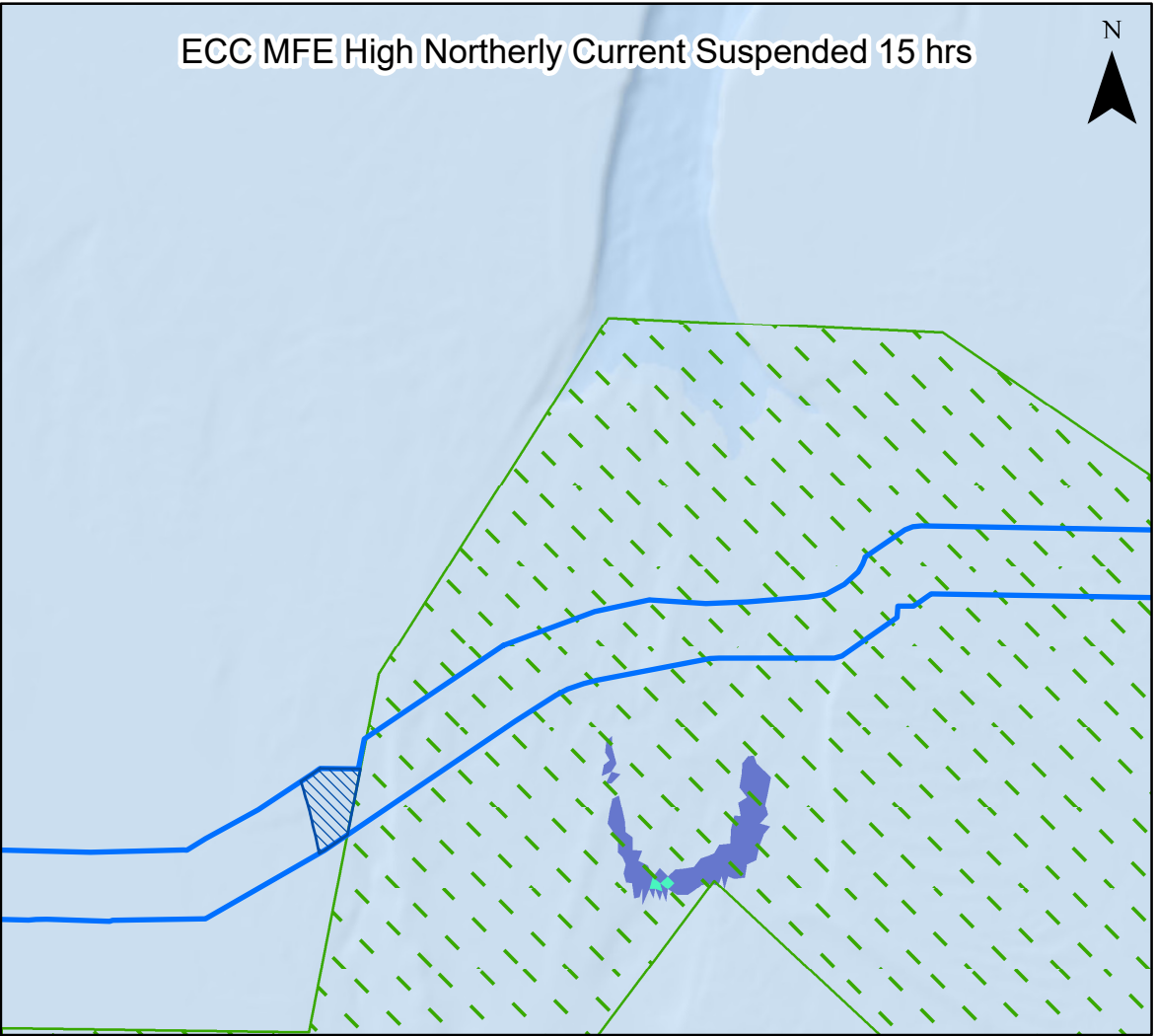
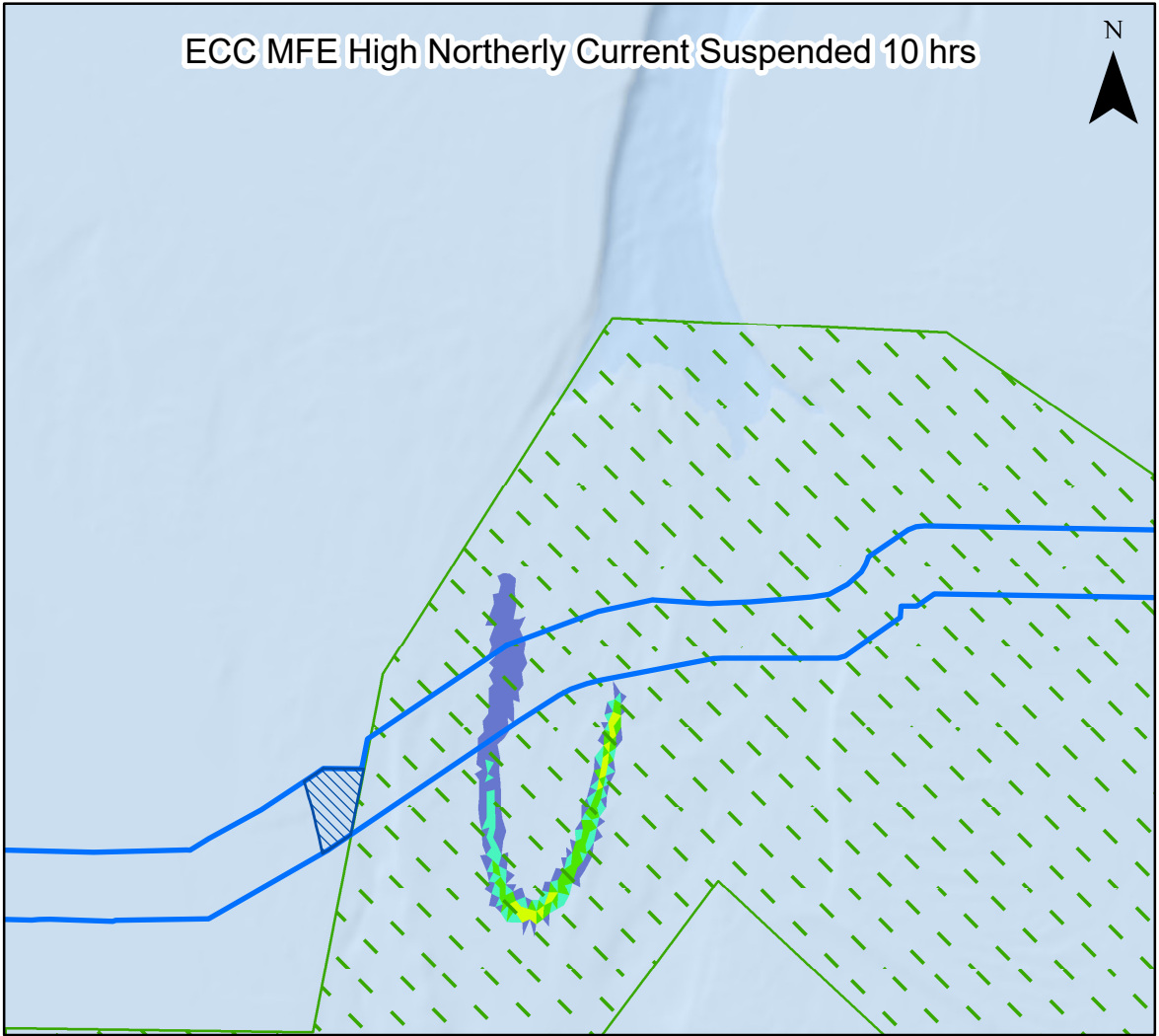
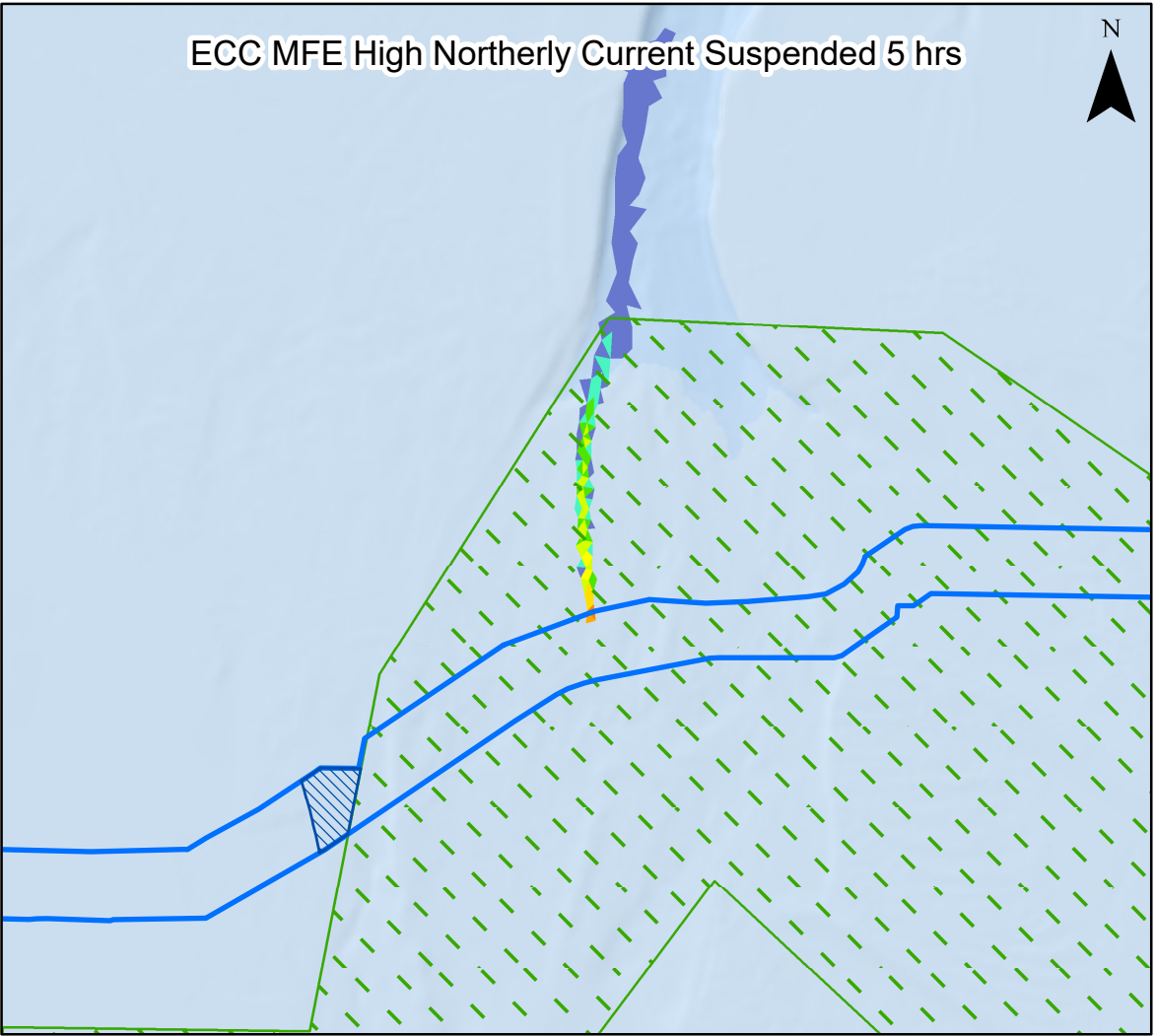
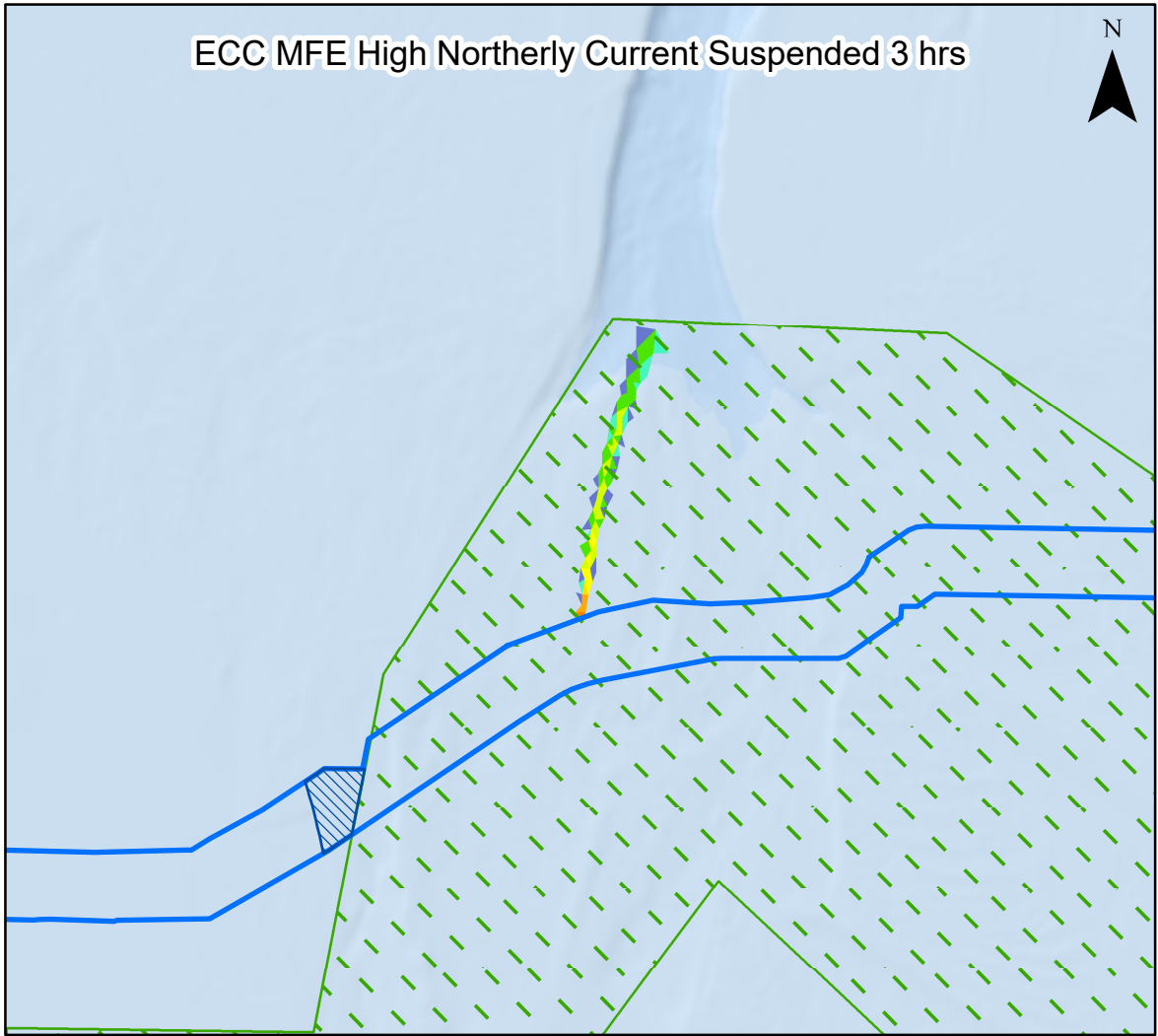
Figure 7.12



Date: 18/02/2025
Produced By: BPHB
Revision: 2.0

Contains ESRI Basemapping; Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

GoBe

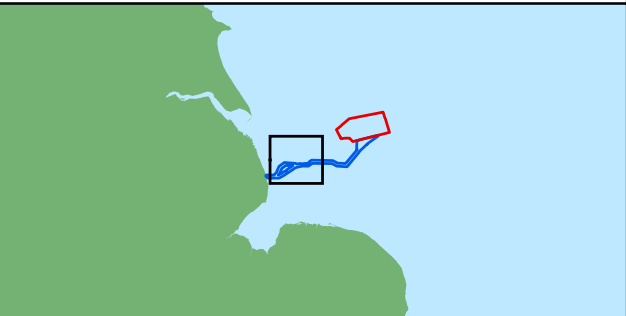


Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Area
- Special Areas of Conservation

Suspended Sediment Concentrations (mg/l)

- 1 - 4.99
- 5 - 9.99
- 10 - 19.99
- 20 - 49.99
- 50 - 99.99
- 100 - 149.99
- 150 - 249.99
- 250 - 499.99
- 500 - 999.99
- <1000



Coordinate System: WGS 1984 UTM Zone 31N

0 5 10 km

Scale: 1:225,000

A3 Page Size

Environmental Statement Version 2 Deadline 4a

Suspended sediment concentrations 3, 5, 10 and 15 hours after the start of Mass Flow Excavator activities along the offshore ECC during a high spring ebb tide

Figure 7.13



Date: 18/02/2025
Produced By: BPHB
Revision: 2.0

Contains ESRI Basemapping:
Esri, Garmin, GEBCO, NOAA
NGDC, and other contributors

GoBe

Document Path: Z:\GIS\GIS - Projects\0152 Outer Dowsing EIA\GIS\Figures\Deadline 4a\Physical Processes\ODOW_0152_PP_Fig_13_ECC_MFE_High_Northerly_Current_Suspended_v2.mxd