The Nautical Institute

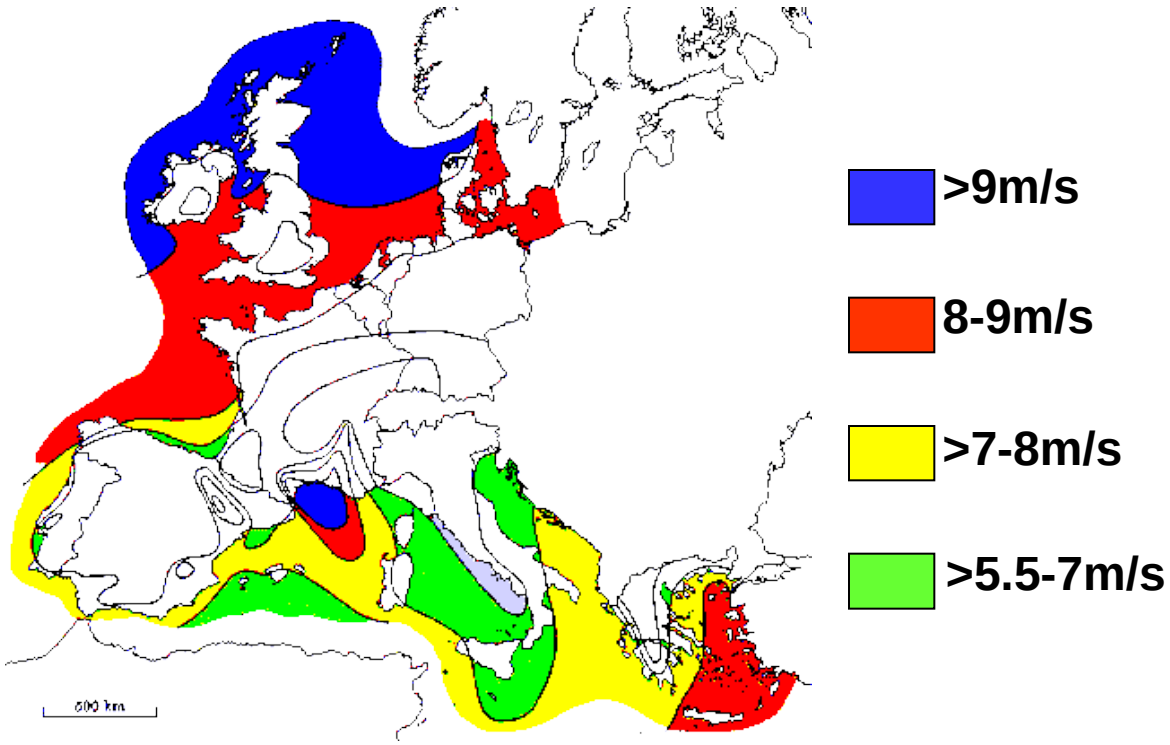
The Navigational Challenges of Offshore Windfarms

(& other offshore renewal energy projects)

IUMI Zurich 2010

Biggest wind resource in Europe

- **Huge energy resource**
- **Combating climate change**
- **Securing UK energy supplies**
- **Jobs and investment**



Source: renewableUK

Projects Underway Rounds 1 & 2

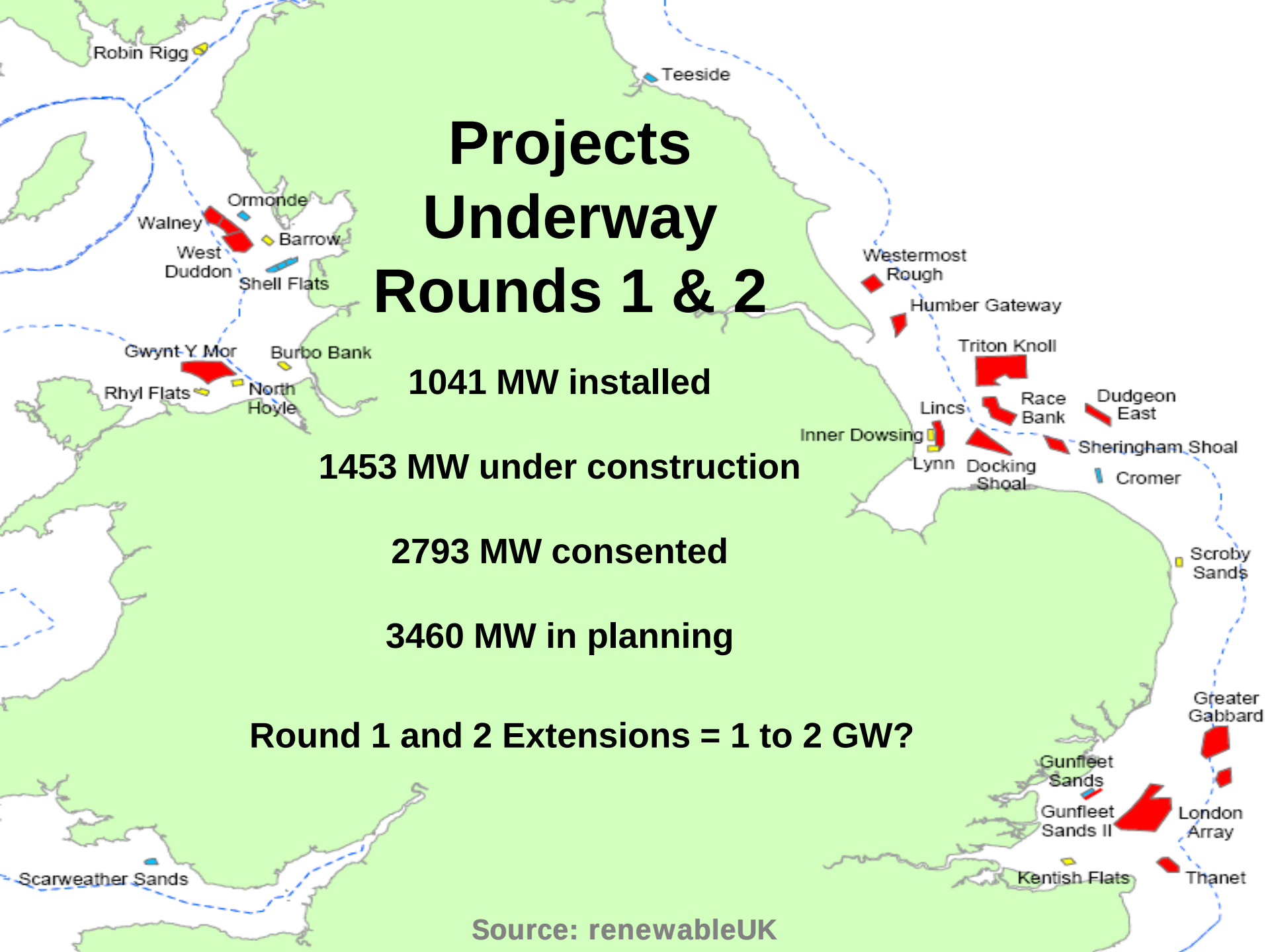
1041 MW installed

1453 MW under construction

2793 MW consented

3460 MW in planning

Round 1 and 2 Extensions = 1 to 2 GW?

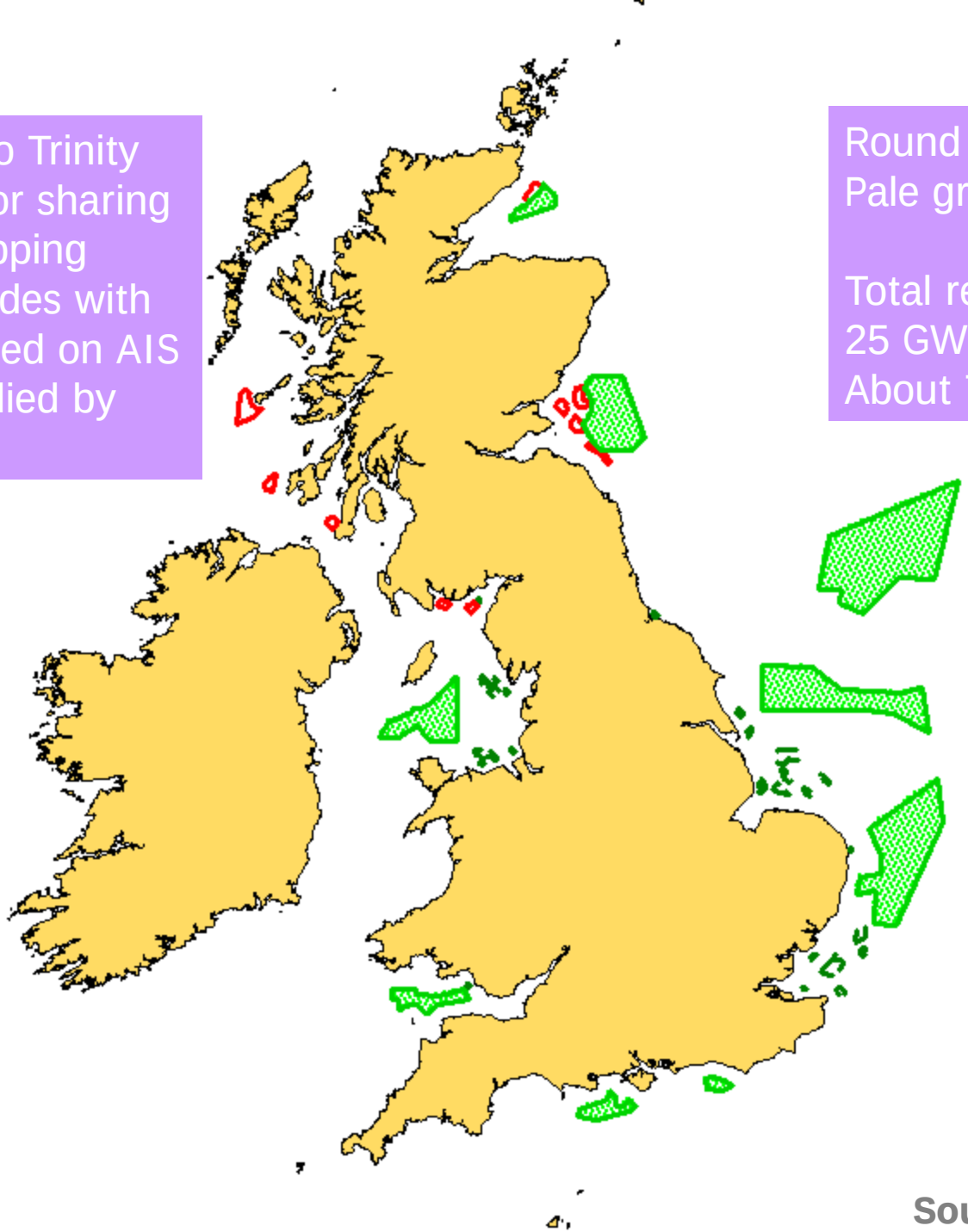


Source: renewableUK

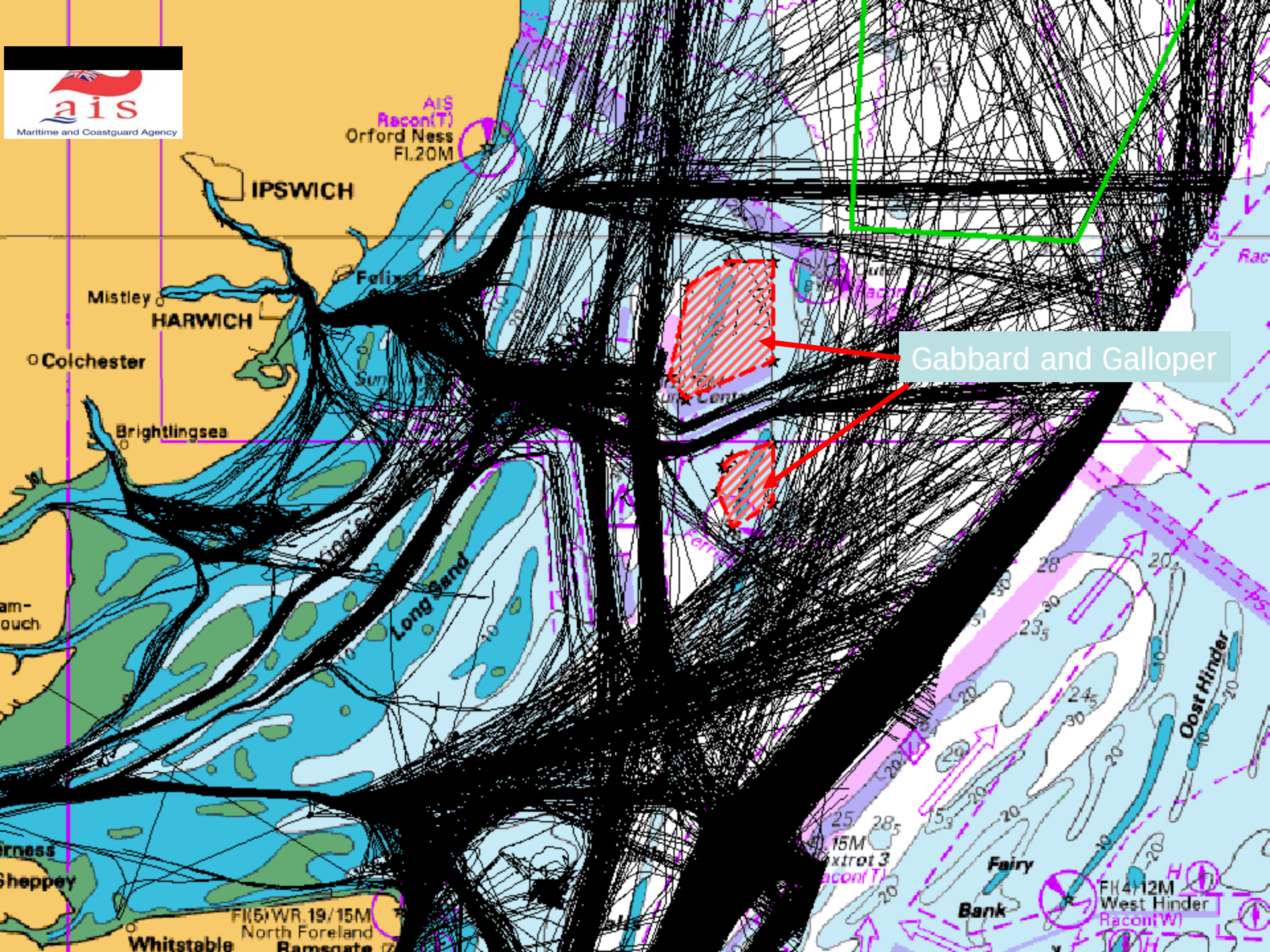
Grateful thanks to Trinity House, London for sharing the following shipping traffic analysis slides with the Institute, based on AIS information supplied by the MCA.

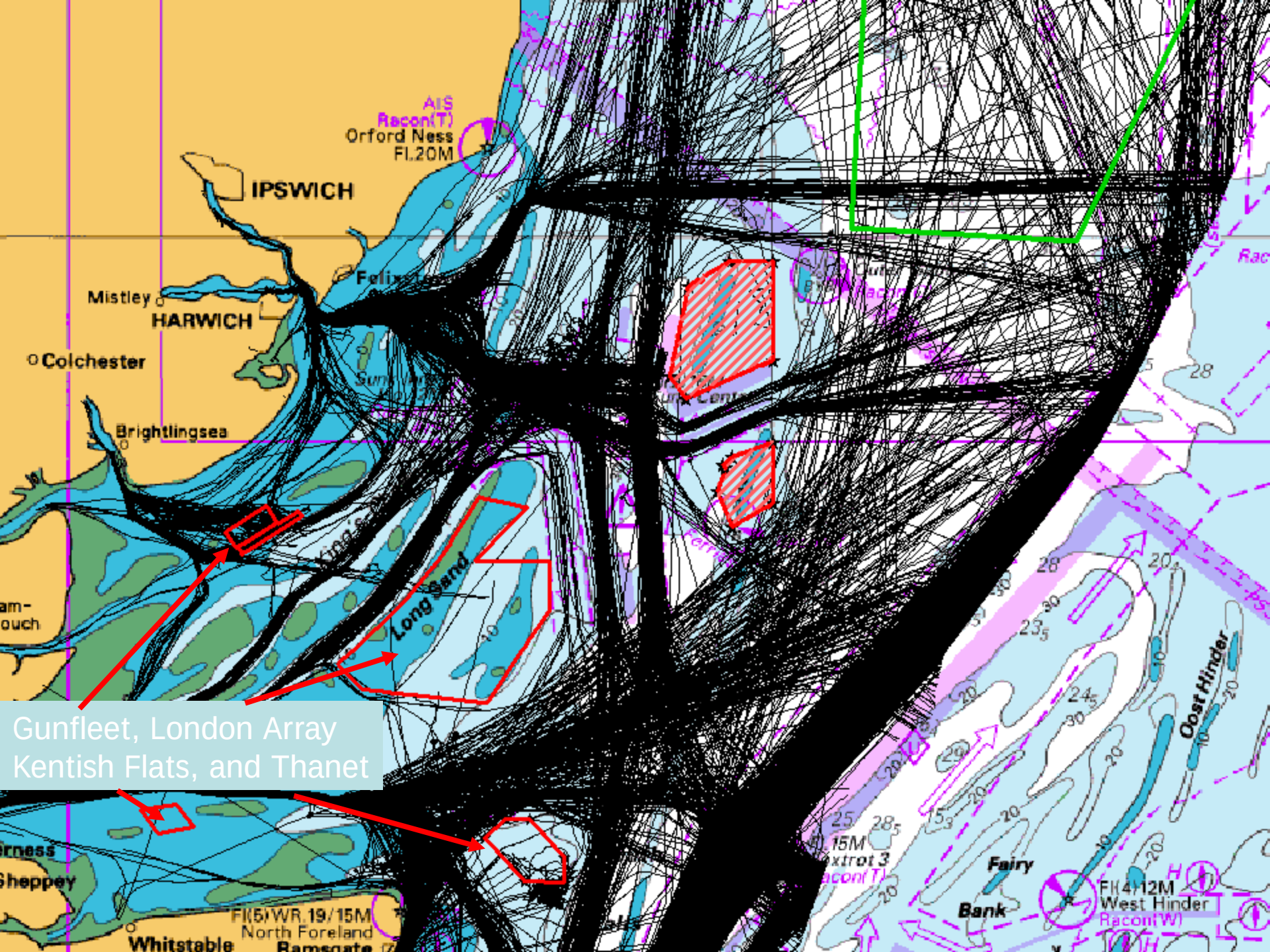
Round 3
Pale green areas

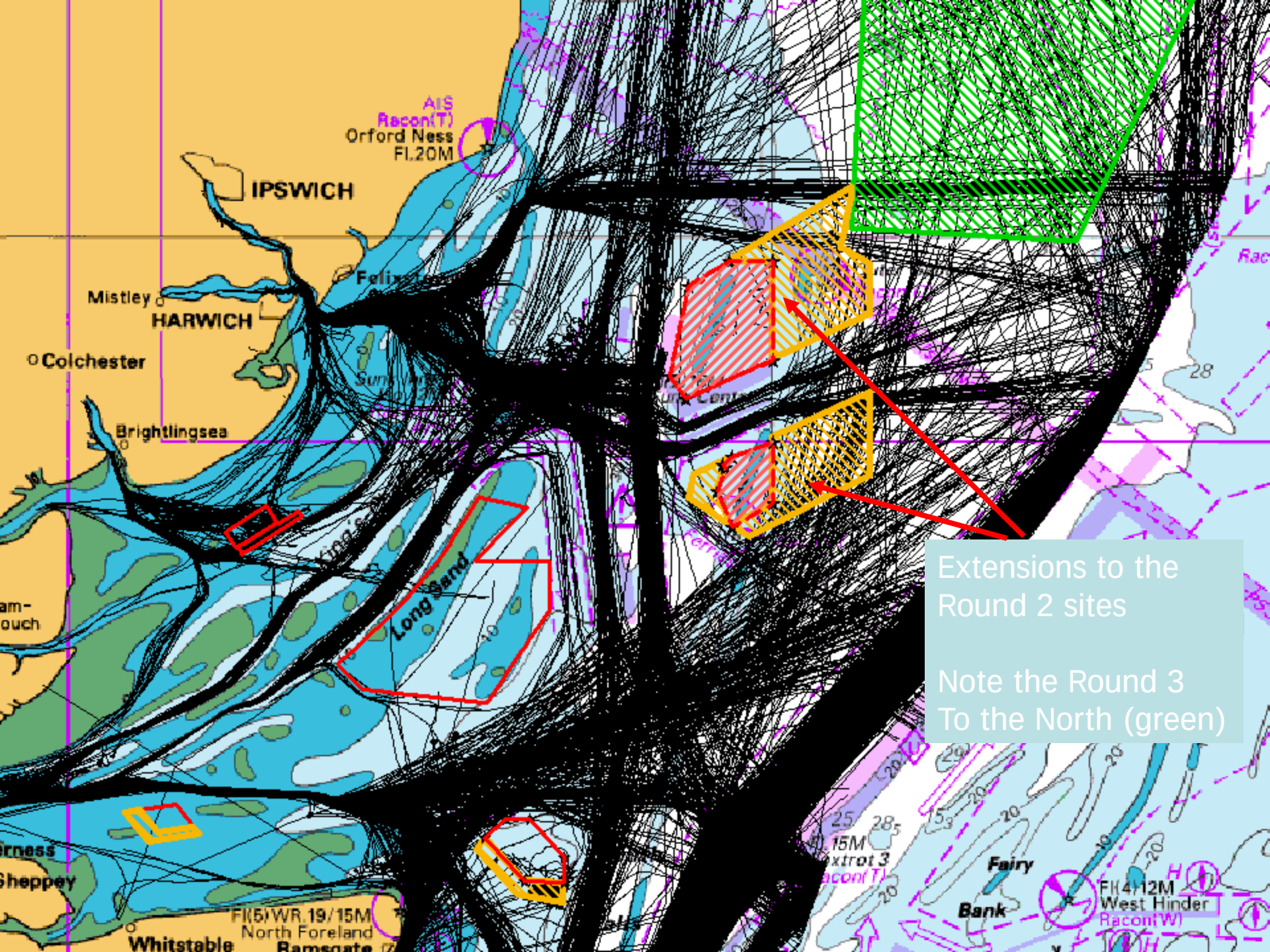
Total requirement
25 GW
About 7000 Turbines



Source: Trinity House


Gabbard and Galloper
AIS
Racon(T)
Orford Ness
Fl.20M
IPSWICH
Felixstowe
Mistley
HARWICH
Colchester
Brightlingsea
Long Sand
Sheppey
Whitstable
Ramsgate
Fl(5)WR.19/15M
North Foreland
Fairy
Bank
Fl(4)12M
West Hinder
Racon(W)
Oost Hinder


AIS
Racon(T)
Orford Ness
Fl.20M
IPSWICH
Felixstowe
Mistley
HARWICH
Colchester
Brightlingsea
Long Sand
Gunfleet, London Array
Kentish Flats, and Thanet
Sheppey
Whitstable
Ramsgate
Fl(5)WR.19/15M
North Foreland
Fairy
Bank
Fl(4)12M
West Hinder
Racon(W)
Oost Hinder


AIS
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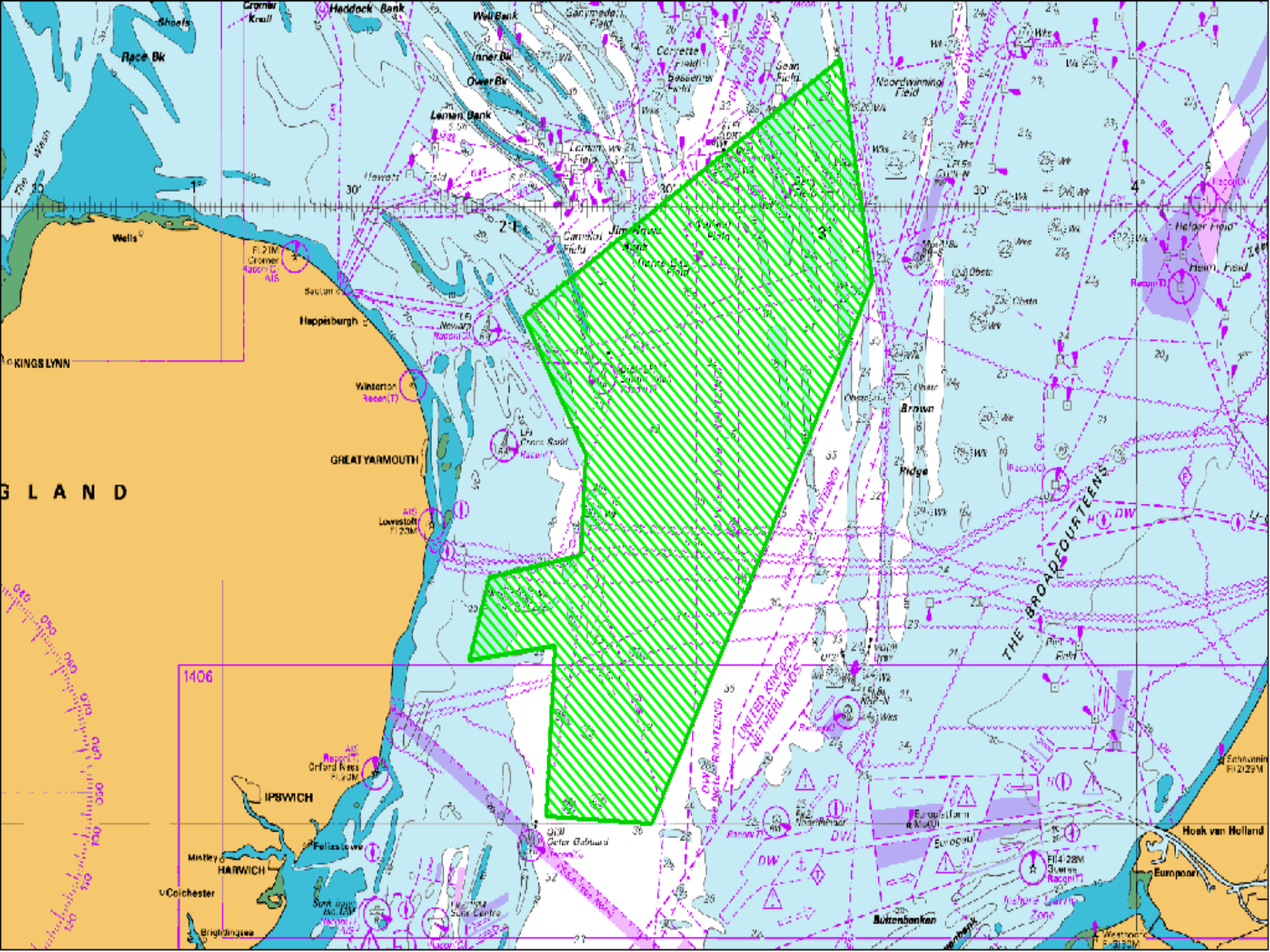
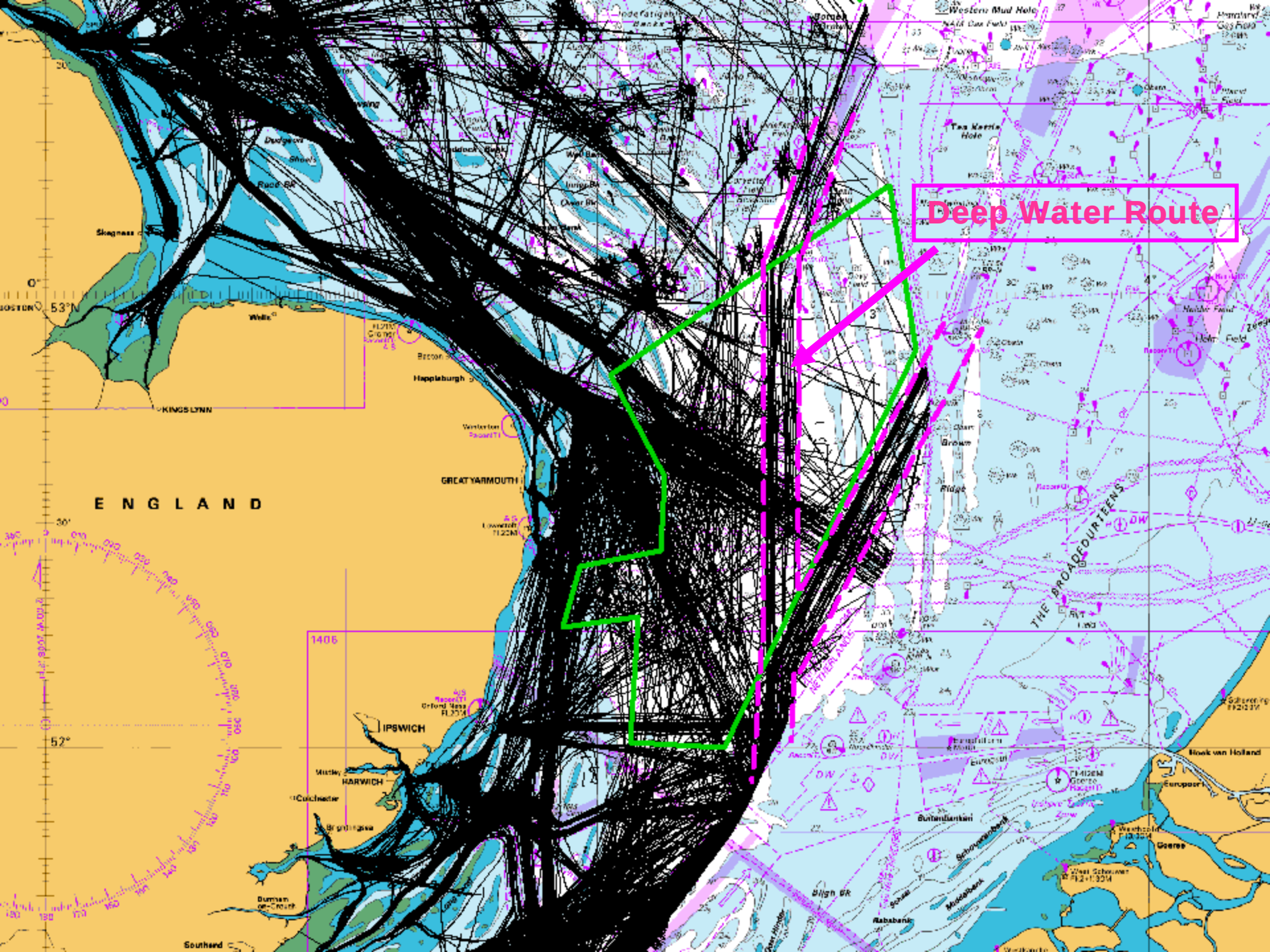
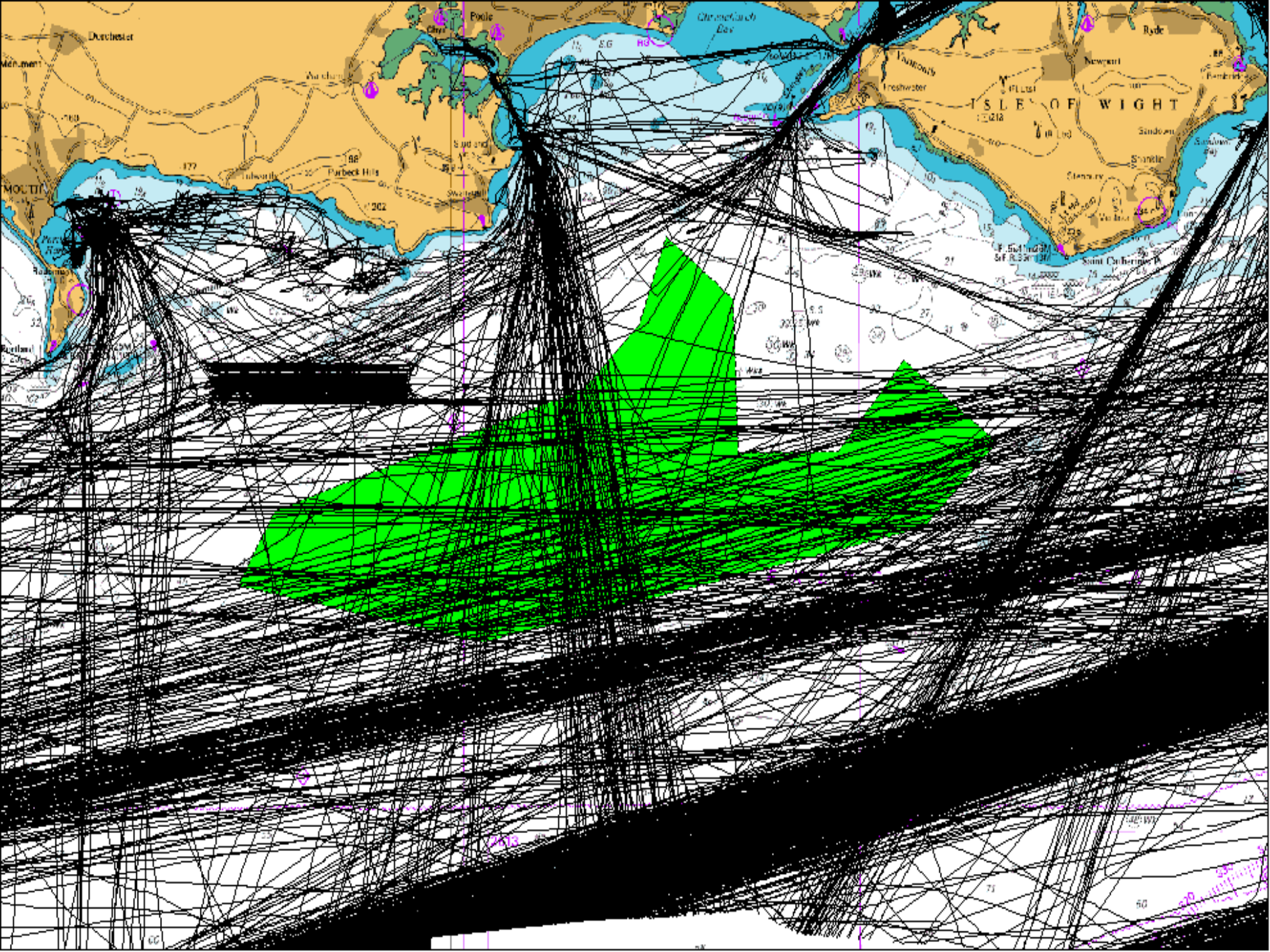
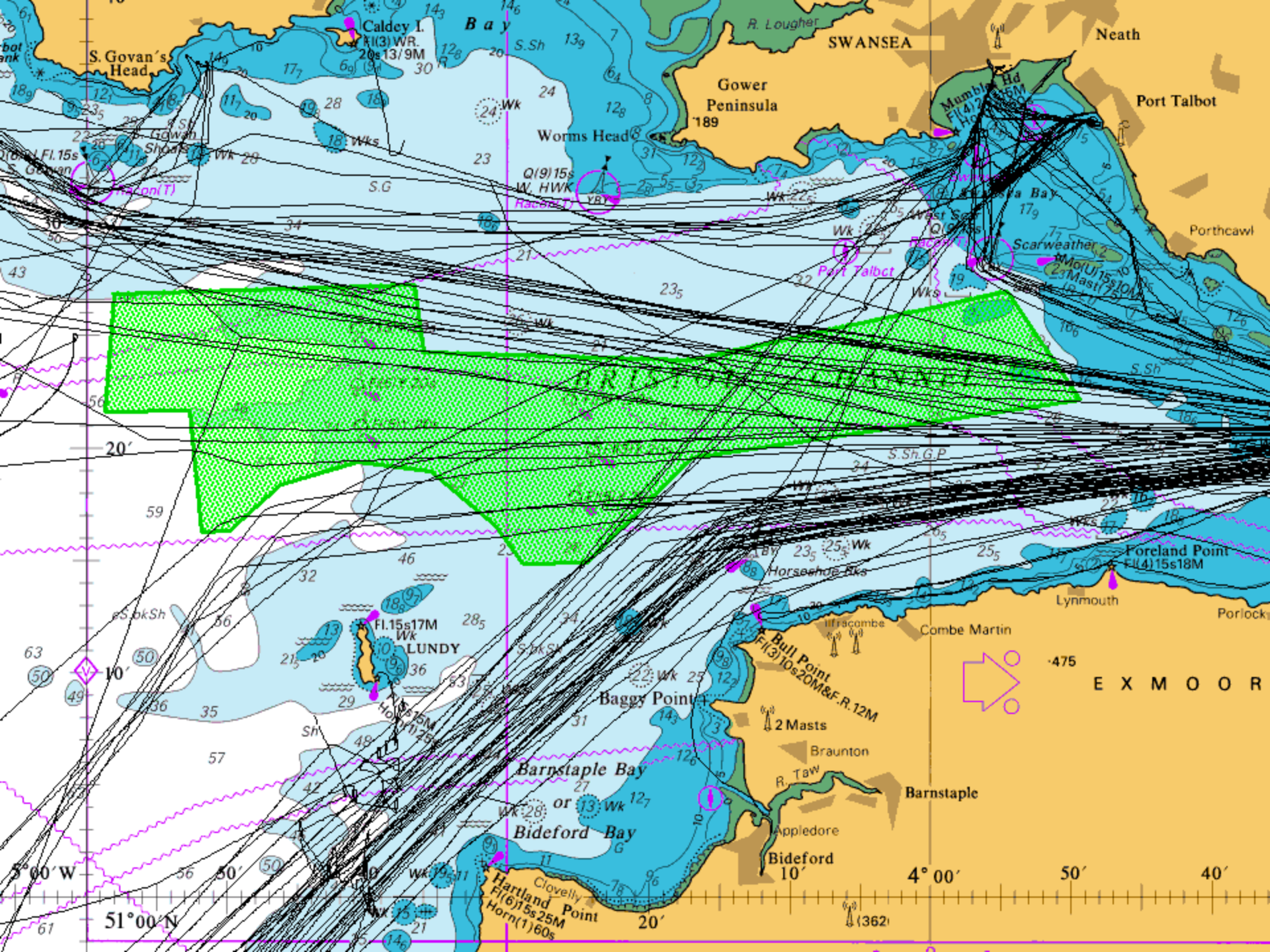
Long Sand
Sheppey
Whitstable
Ramsgate
Fl(5)WR.19/15M
North Foreland
Fairy
Bank
Fl(4)12M
West Hinder
Racon(W)
Extensions to the Round 2 sites
Note the Round 3 To the North (green)



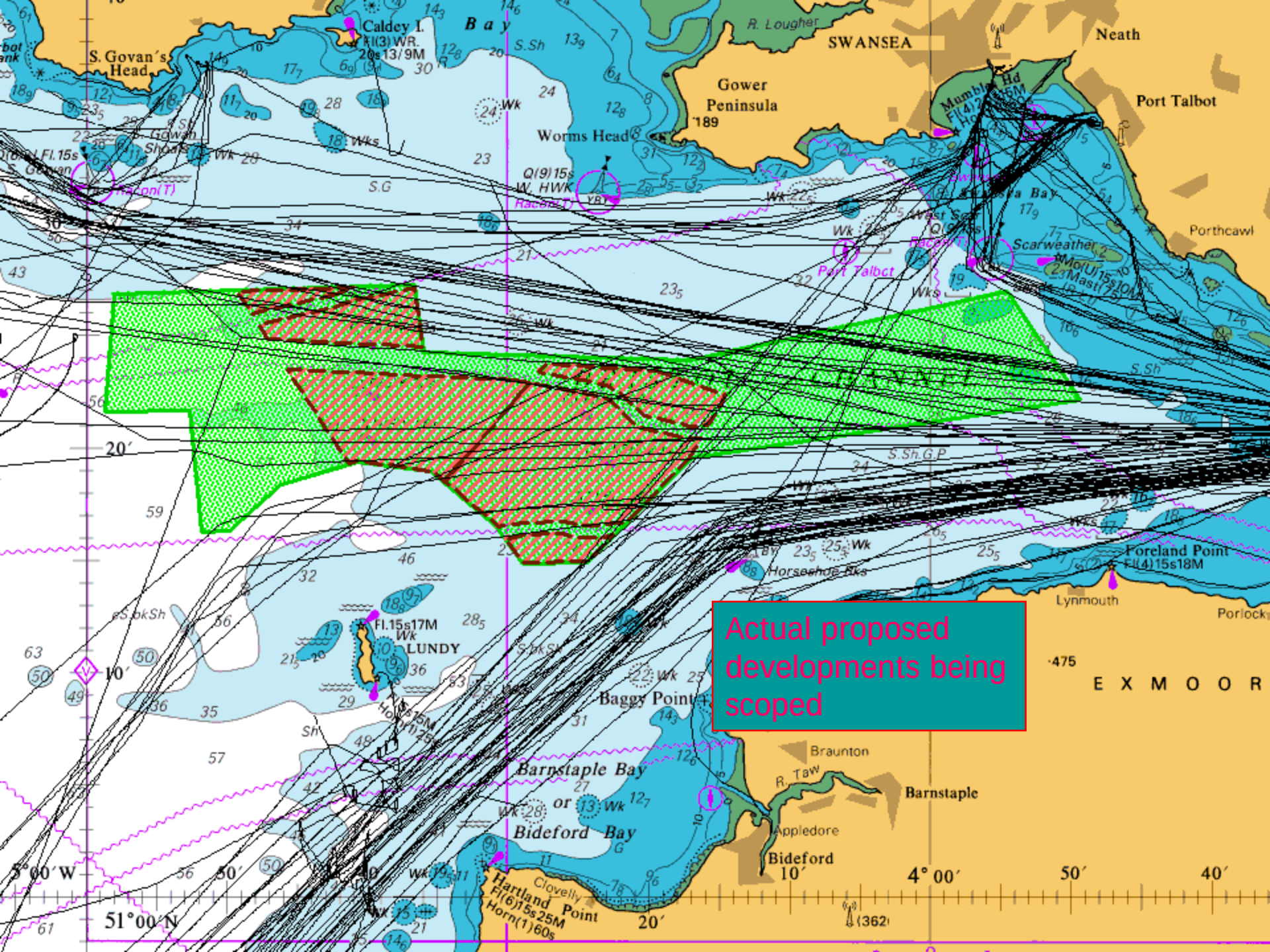
Haddock Bank
Well Bank
Race Bk
Inner Bk
Ower Bk
Leman Bank
Corvette Field
Sean Field
Noordwinning Field
Wells
Happisburgh
KINGS LYNN
Winterton
GREAT YARMOUTH
Lowestoft
G L A N D
Brown Ridge
Helder Field
Helm Field
THE BROADFOURTEENS
UNITED KINGDOM
NETHERLANDS
1406
IPSWICH
Felixstowe
Mistley
HARWICH
Colchester
Brightlingsea
Hoek van Holland
Europoort
Buitenbanken


Deep Water Route
ENGLAND
Skegness
Wells
KINGSLYNN
Happlaburgh
GREAT YARMOUTH
IPSWICH
HARWICH
Southend
Western Mud Hole
Tea Kettle Hole
THE BROADFOURTEENS
Hoek van Holland
Europoort
Goeree
Buitenbanken
Bligh Bk
Rabsbank
Schouwenbank
Middelbank
53°N
52°
1406


Dorchester
Poole
Christchurch Bay
Ryde
Newport
Freshwater
ISLE OF WIGHT
Sandown
Shanklin
Stenbury
Saint Catherine
Purbeck Hills
Tubworth
Swanwell
MOUTH
Radipole
Portland
Bembrick

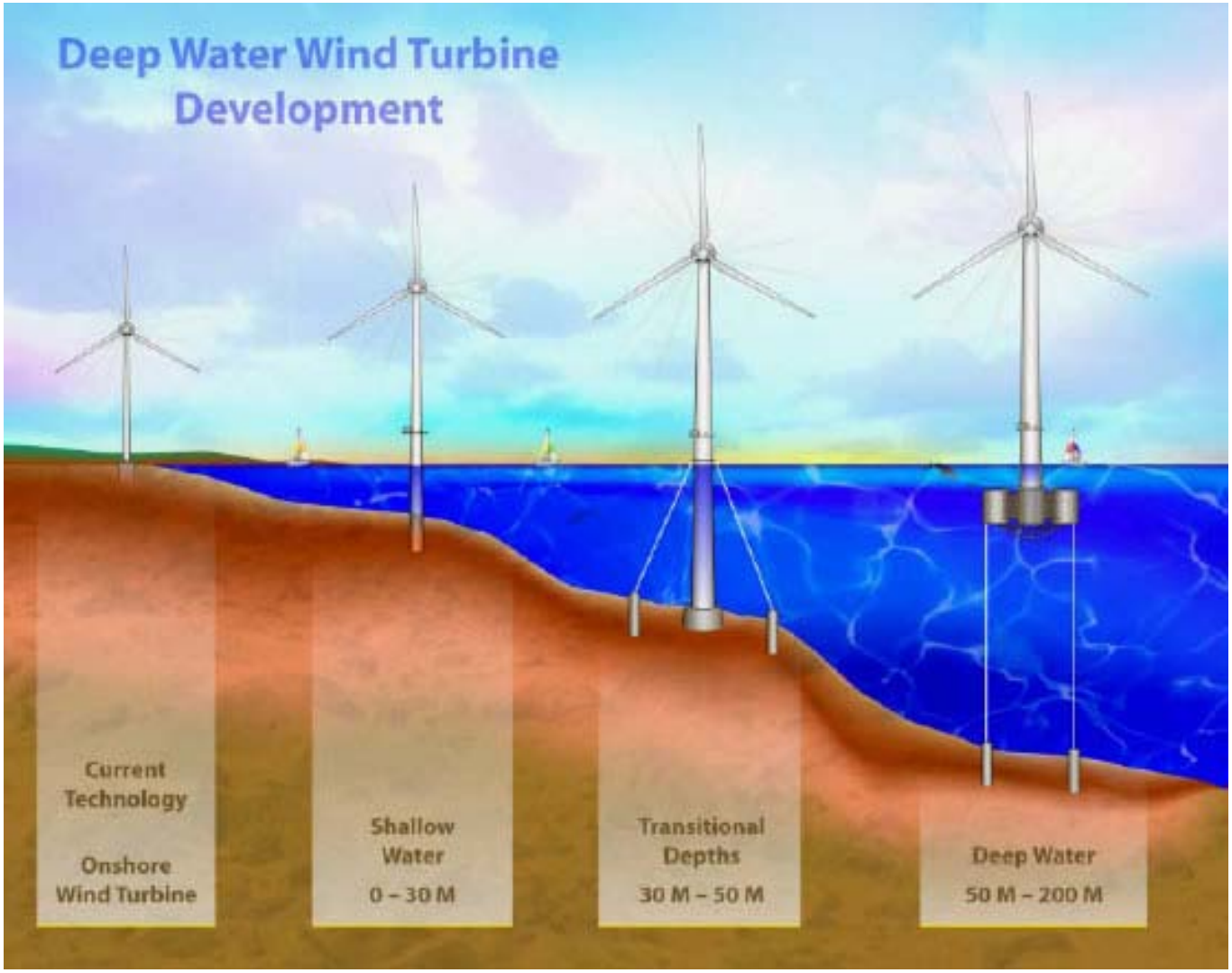


Caldey I.
Fl(3)WR.
20s13/9M
Bay
S. Govan's Head
R. Lougher
SWANSEA
Neath
Gower Peninsula
Port Talbot
Worms Head
Q(9)15s
W. HWK
Racon(T)
Mumbles Hd
Scarweather
Port Talbot
Porthcawl
BRISTOL CHANNEL
Foreland Point
Fl(4)15s18M
Lynmouth
Porlock
Horseshoe Bks
Ilfracombe
Combe Martin
Bull Point
Fl(3)10s20M&F.R.12M
Fl.15s17M
LUNDY
Baggy Point
2 Masts
Braunton
R. Taw
Barnstaple
Barnstaple Bay
or
Bideford Bay
Appledore
Bideford
Hartland Point
Fl(6)15s25M
Horn(1)60s
Clovelly
EXMOOR
5°00′W
51°00′N
4°00′



Actual proposed developments being scoped

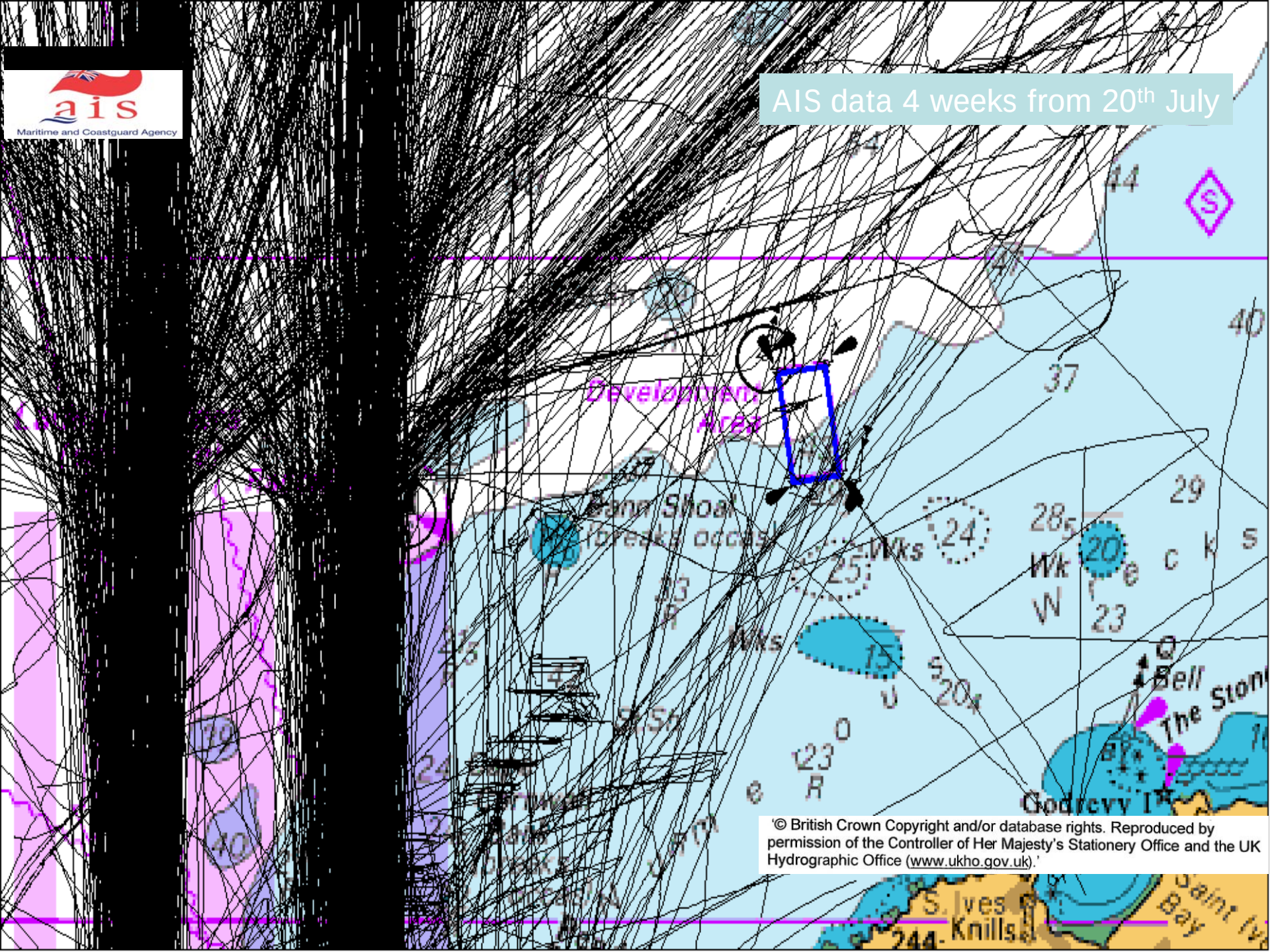
Technology – Offshore Wind



*NREL, 2009

Source: renewableUK

SW Wave Hub
Development site



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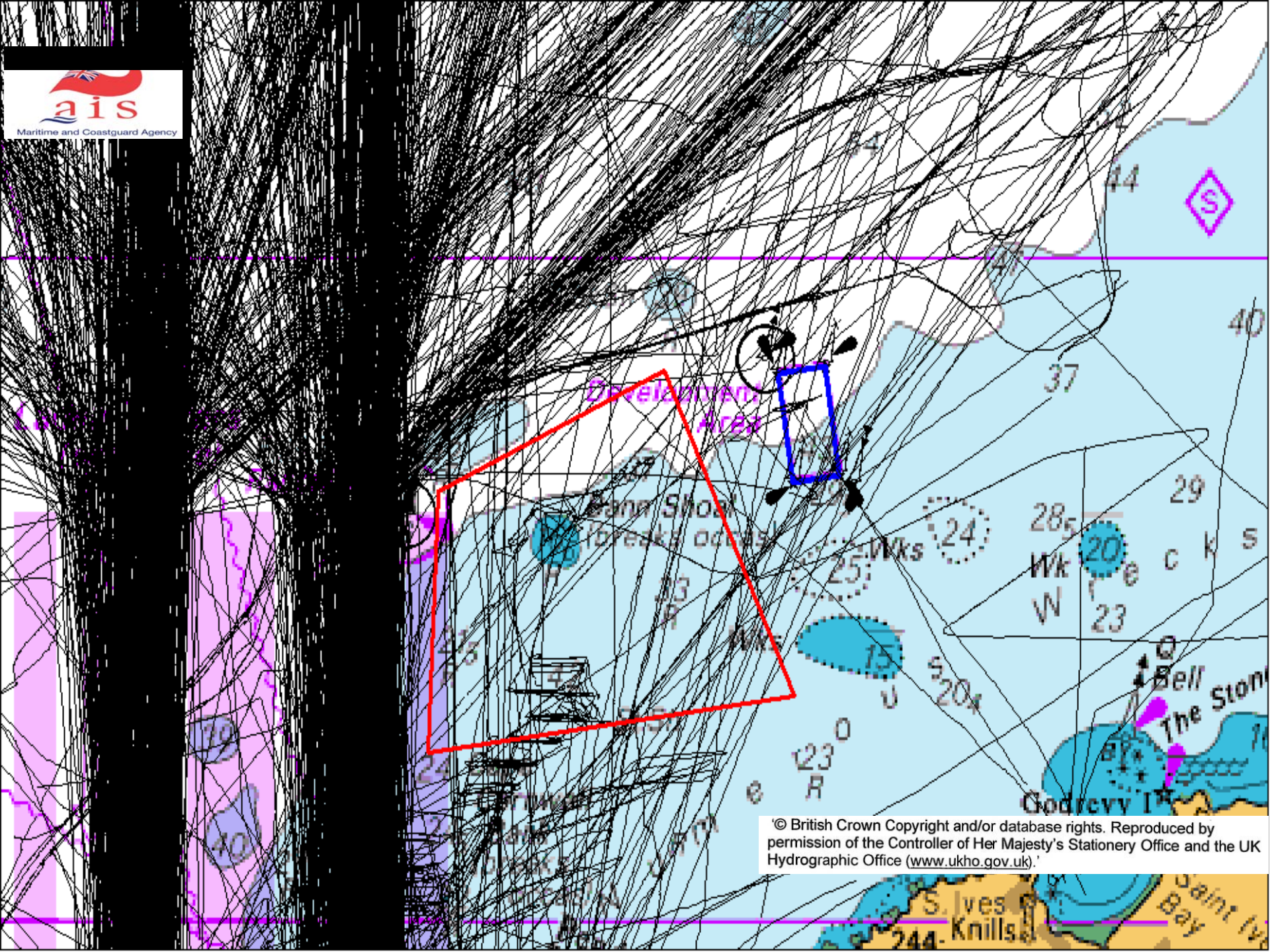

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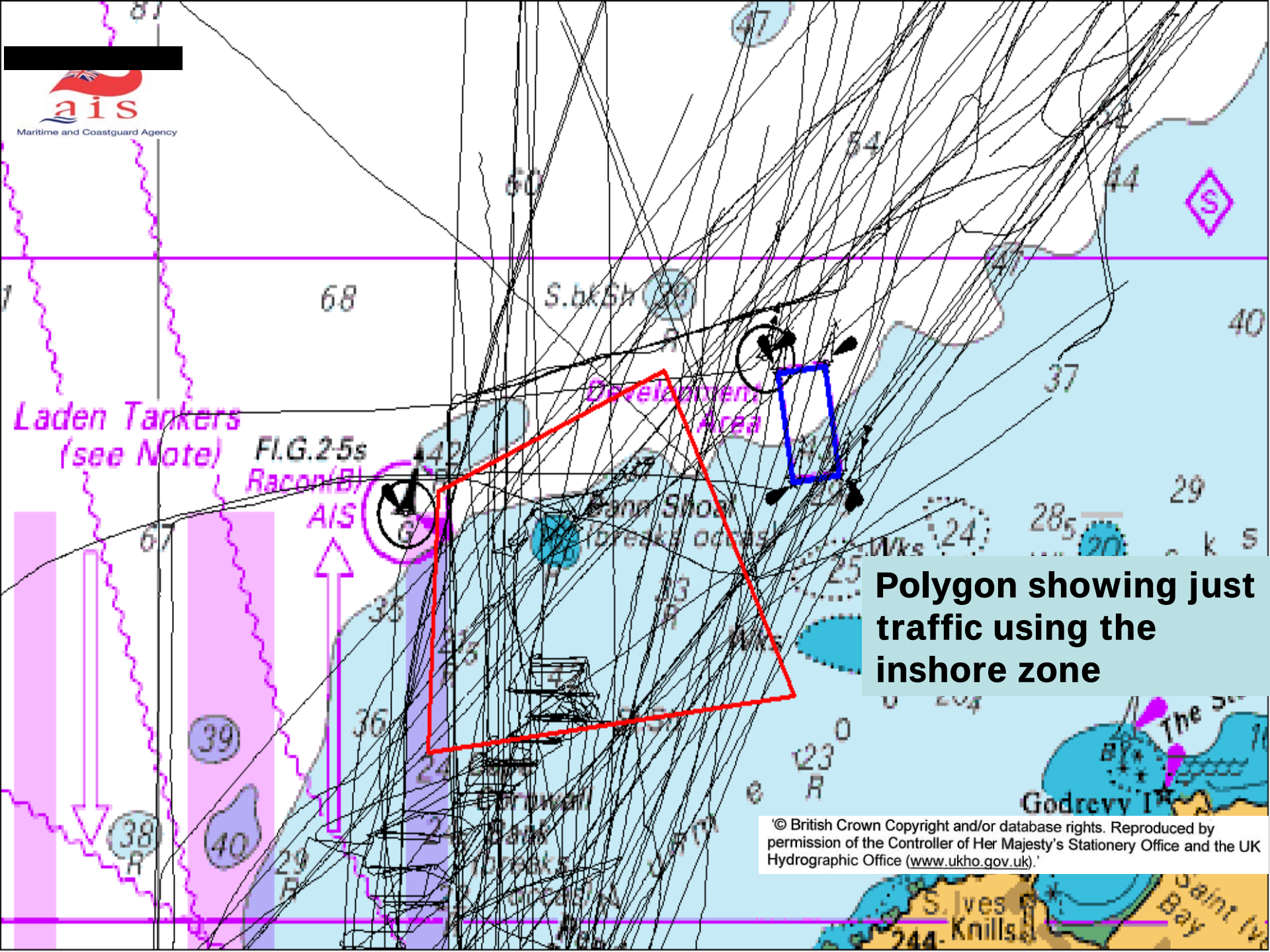
[redacted]



Polygon showing just traffic using the inshore zone

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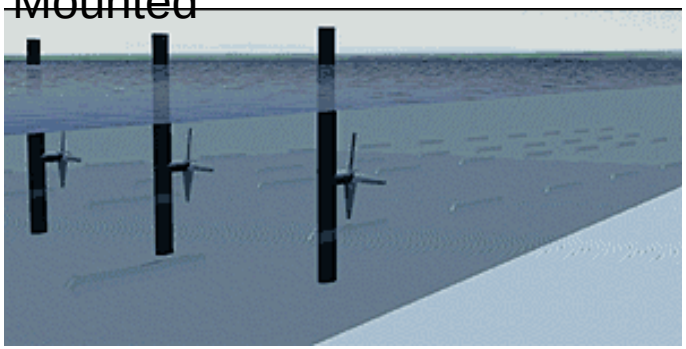
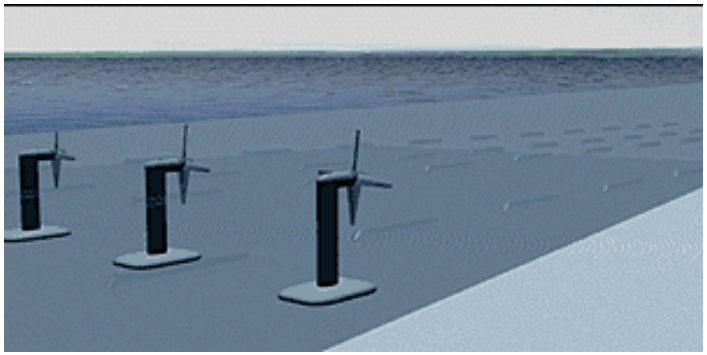
W&T Foundation Types

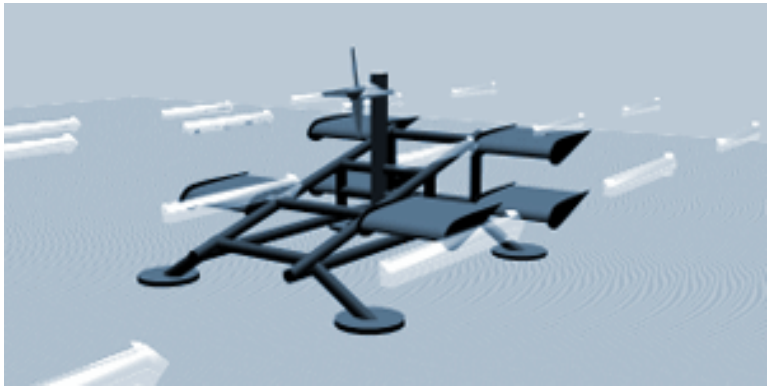
Pile Mounted



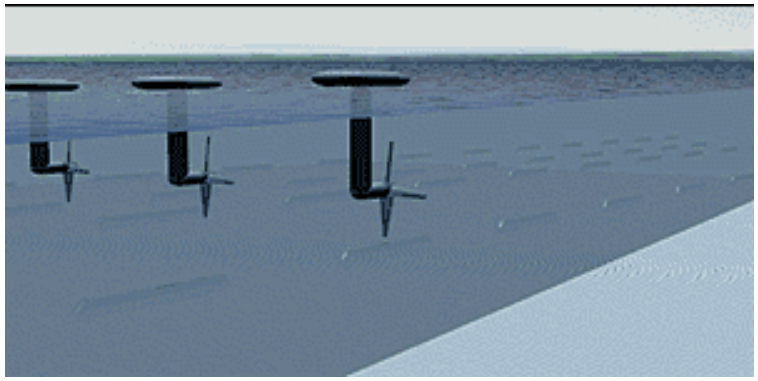
Seabed Mounted or Gravity Base



Hydrofoil Inducing Downforce



Floating

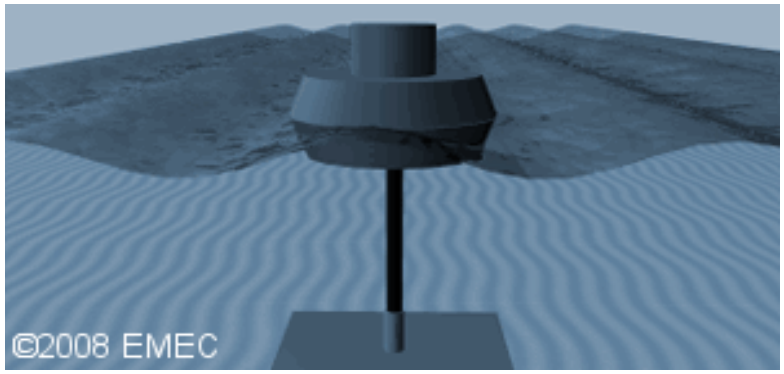


Source: European Marine Energy Centre (EMEC) Ltd and renewableUK

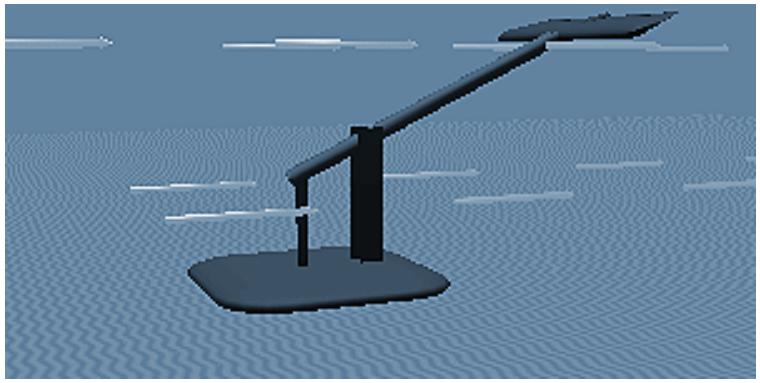
Tidal stream Types & Wave Devices

Horizontal axis turbine (Enclosed Tips)

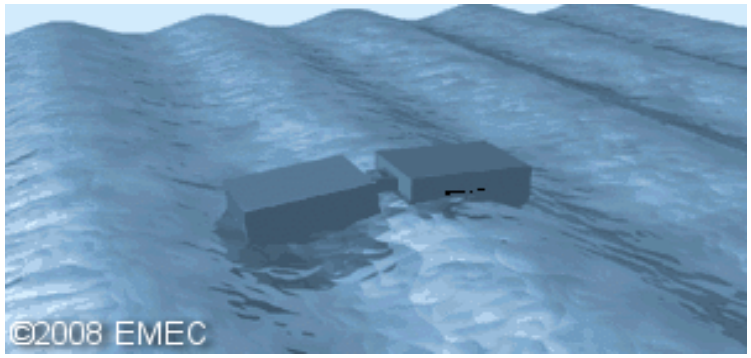
Point absorber



Oscillating Hydrofoil



Attenuator



Source: European Marine Energy Centre (EMEC) Ltd and renewableUK

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Challenges Summary

- Restriction of shipping routes
- Construction phase risks
- Aids to navigation marking and maintenance
- Dissemination of navigational information
- Education of mariners on hazards
- Decommissioning of sites – residual risks