

# Floating wind in the Celtic Sea

Stakeholder Workshop  
Thursday 10 February 2022

Image credit: ©BW Ideol



# Welcome: Purpose, agenda and housekeeping



Olivia Thomas  
Chair



# Welcome

- The purpose of today's workshop is to:
  - 1) Update and brief participants on our proposals for Floating Wind (FLOW) in the Celtic Sea.
  - 2) Provide an outline scope of the FLOW Programme and plans for related stakeholder engagement.
  - 3) Provide details of our approach and seek views and input on data and information relating to our understanding of constraints associated with the resource characterisation work.
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# Agenda

## 10.00 Welcome, Olivia Thomas, Head of Marine Planning

- Purpose, agenda and house-keeping

## 10.10 Welcome and Introduction, Huub den Rooijen, Managing Director – Marine, The Crown Estate

## 10.15 Floating offshore wind: Overview & policy context, Tim Stiven, Senior Development Manager, Marine, The Crown Estate

- Context and objectives for Celtic Sea Floating Wind Programme

## 10.30 Spatial design & survey response

- Our approach to an integrated spatial design and HRA for FLOW in the Celtic Sea – Joe Smithyman, Marine Resources Manager, The Crown Estate
- Geospatial questionnaire feedback – Adrian Judd, Marine Fisheries Adviser, Cefas
- FLOW technology overview – Rehan Burger, Development Manager, Marine, The Crown Estate

## 11.00 Breakout Session 1 – Group discussion, Olivia Thomas, Head of Marine Planning, The Crown Estate

- Seek opinions using Mentimeter on buffers, coexistence, colocation and displacement
- Seek further feedback using Miro whiteboards on buffer distances and the compatibility of a range of activities with floating offshore wind, including consideration of coexistence, colocation and displacement.

## 11.45 Break (20mins)

# Agenda

## 12.05 Welcome back

- Share key themes from the group discussions – Olivia Thomas, Head of Marine Planning, The Crown Estate
- Presentation on spatial weightings analysis – Michelle Moore, Senior Spatial Planning Manager, The Crown Estate

## 12.30 Breakout Session 2: Dataset weightings discussion, Michelle Moore, Senior Spatial Planning Manager, The Crown Estate

- Using Analytical Hierarchy Process (AHP) we'll guide participants through the scoring process, focussing on facilitated exercises to identify which considerations pose a greater development risk to floating offshore wind (or whether they are of equal importance).
- Building on the questionnaire returns, participants will work in focussed groups (e.g. navigation, nature conservation) to weight a set of parameters.

## 13.15 Group feedback, Olivia Thomas, Head of Marine Planning, The Crown Estate

- Summary of group discussions

## 13.30 What happens next? Michelle Moore, Senior Spatial Planning Manager & Tim Stiven, Senior Development Manager, The Crown Estate

## 13.35 Open forum for Q&A

## 13.55 Summary and thanks, Olivia Thomas, Head of Marine Planning, The Crown Estate

## 14.00 Close

# Welcome and Introduction



**Huub den Rooijen**

Managing Director,  
Marine, The Crown Estate



# Floating offshore wind: Overview & policy context



**Tim Stiven**  
Senior Development Manager,  
Marine, The Crown Estate



# Context: Policy and market environment

Political priorities and private sector interest combine to make Floating Wind (FLOW) in the Celtic Sea a significant opportunity

- The UK government has a range of ambitious targets for offshore wind as part of Net Zero
- FLOW has operational benefits that make it the right solution for the Celtic Sea
- There is strong market and investor interest, but the UK FLOW supply chain is immature



## £60 million boost for floating offshore wind

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More than £31 million of UK government funding, matched by more than £30 million of industry funding, for development of innovative floating offshore wind technologies.

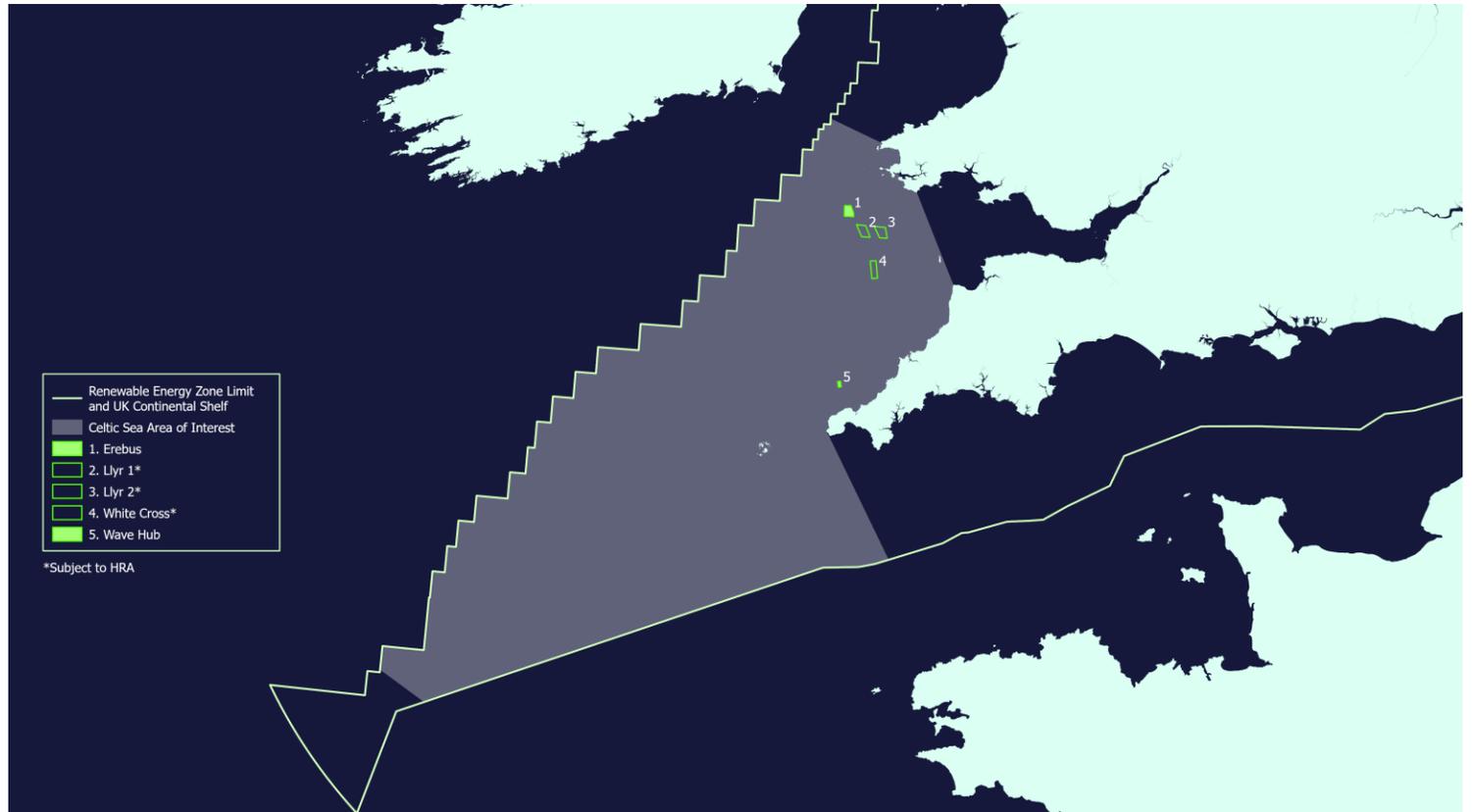
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From: Department for Business, Energy & Industrial Strategy and The Rt Hon Greg Hands MP

# Our response

Creating the foundations for Net Zero by unlocking up to 4GW of FLOW capacity by 2035

- A phased approach to 4GW by 2035
- Potential 350MW pipeline of Test & Development (T&D) projects will:
  - Lay the foundations for future projects
  - Contribute to 1GW FLOW capacity by 2030
- We anticipate being in a position to award Agreements for Lease for successful projects at the end of 2023



# Our broad aims for the Celtic Sea

We are committed to unlocking the clean energy and economic potential of the Celtic Sea whilst balancing the needs of the environment and the communities that depend on it. Subject to engagement, we aim to:

- Help unlock Net Zero
- Help create economic and social value for local communities
- Support the growth of a new UK FLOW market
- Deliver an opportunity that respects the environment and nature
- Incentivise investment in critical infrastructure



Image credit: Mark Richards

# Our approach

Learning lessons from around the UK to create an efficient, strategic and sensitive approach to leasing

- Creating social, environmental, and economic value
- A strategic approach to spatial design and habitats regulations assessment
- Embedding value creation in everything we do



Image credit: MHPA



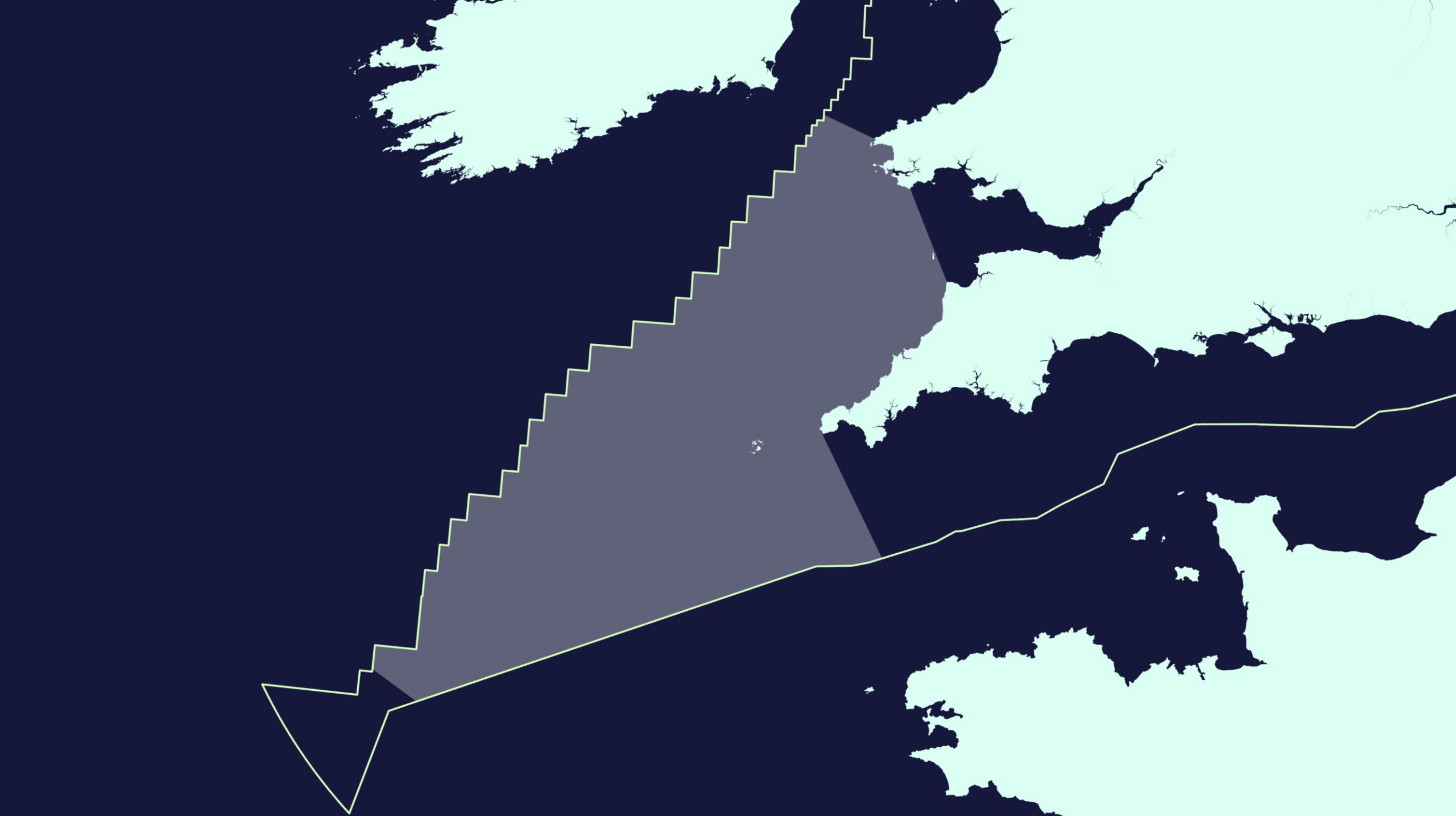
Image credit: Principle Power Inc.

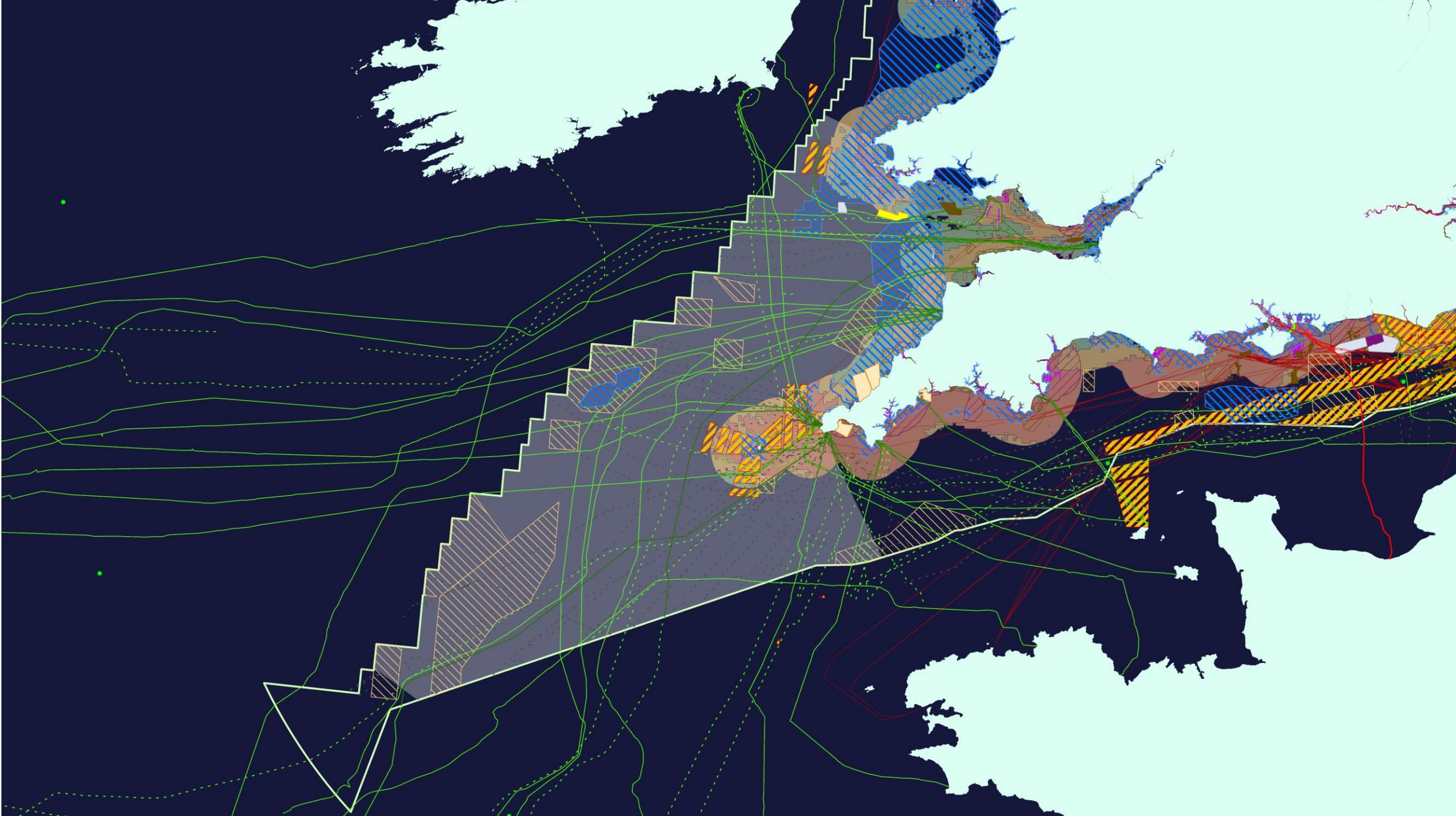
# Our approach to integrated Spatial design and Habitats Regulations Assessment for FLOW in the Celtic Sea



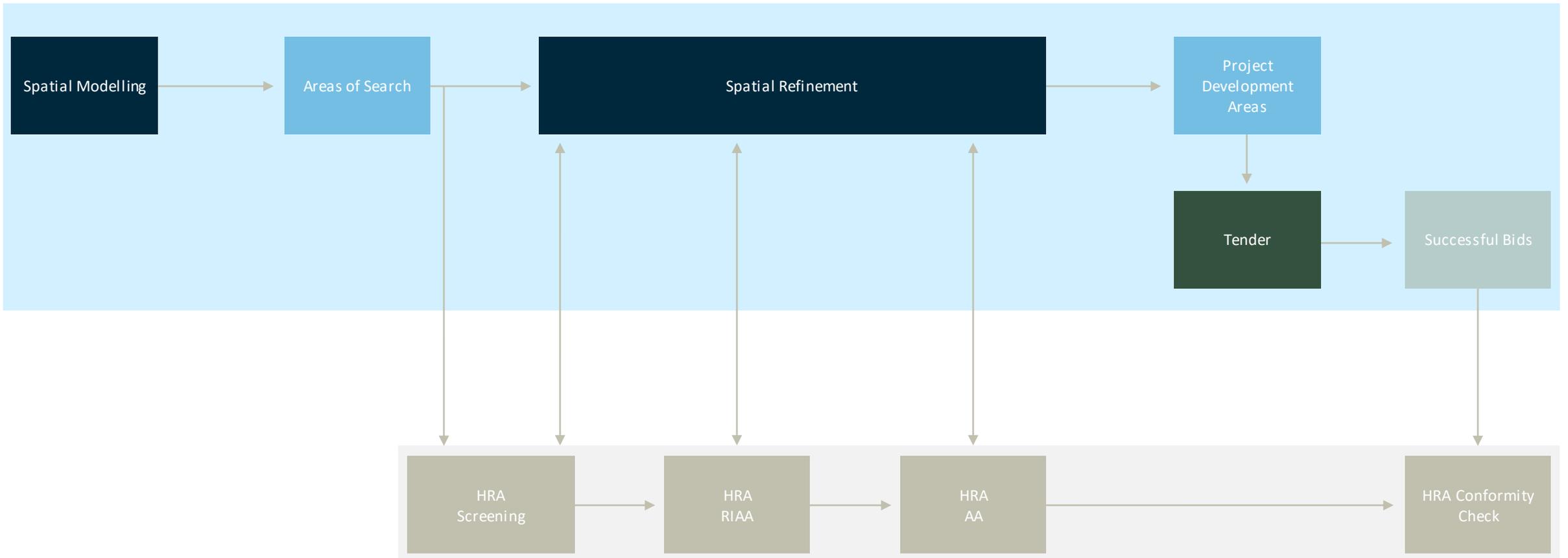
**Joe Smithyman**  
Marine Resources Manager,  
Marine, The Crown Estate







# Spatial Design and HRA Approach



# Plan-Level Habitat Regulations Assessment

- A plan-level HRA requires us to assess the impacts of the plan on protected sites before seabed rights can be awarded
- The Crown Estate is a Competent Authority under the Habitats Regulations\*
- We must conduct a plan-level Habitats Regulations Assessment (HRA) for any leasing/licensing activity that constitutes a 'plan'
- Before being able to award an AfL we must consider whether the Plan is likely to have a significant effect on any protected site<sup>^</sup> (either alone or in combination with other plans or projects) and if the potential for likely significant effects cannot be excluded we must make an appropriate assessment of the implications of the plan for that site, in view of the site's conservation objectives
- If the appropriate assessment cannot rule out the potential for an adverse effect on the integrity of a protected site we may not proceed unless it can be concluded, beyond all reasonable scientific doubt, that the risk can be excluded (inc. through use of mitigation measures)

\*Habitats Regulations:

- [The Conservation of Habitats and Species Regulations 2017 \(as amended\)](#)
- [The Conservation of Offshore Marine Habitats and Species Regulations 2017 \(as amended\)](#)

<sup>^</sup> [Sites in the UK offshore marine area \(up to 200 nautical miles\) and in the UK and its territorial sea](#)

# Environmental designation risk layer

- Consenting risk associated with environmental designations will be further considered, following the modelling, in the refinement of the spatial plan.
- We are developing a spatial layer which will break down the marine space into categories of potential risk to designated sites and their features from the development of offshore wind.
- It will consider:
  - Feature sensitivity
  - Feature distribution/extents
  - Site condition
  - Existing pressures to sites
- The layer will be used as a tool in our decision-making to refine the final areas taken forward to tender.
- Further details will be discussed with the members of our Expert Working Group (date TBC).

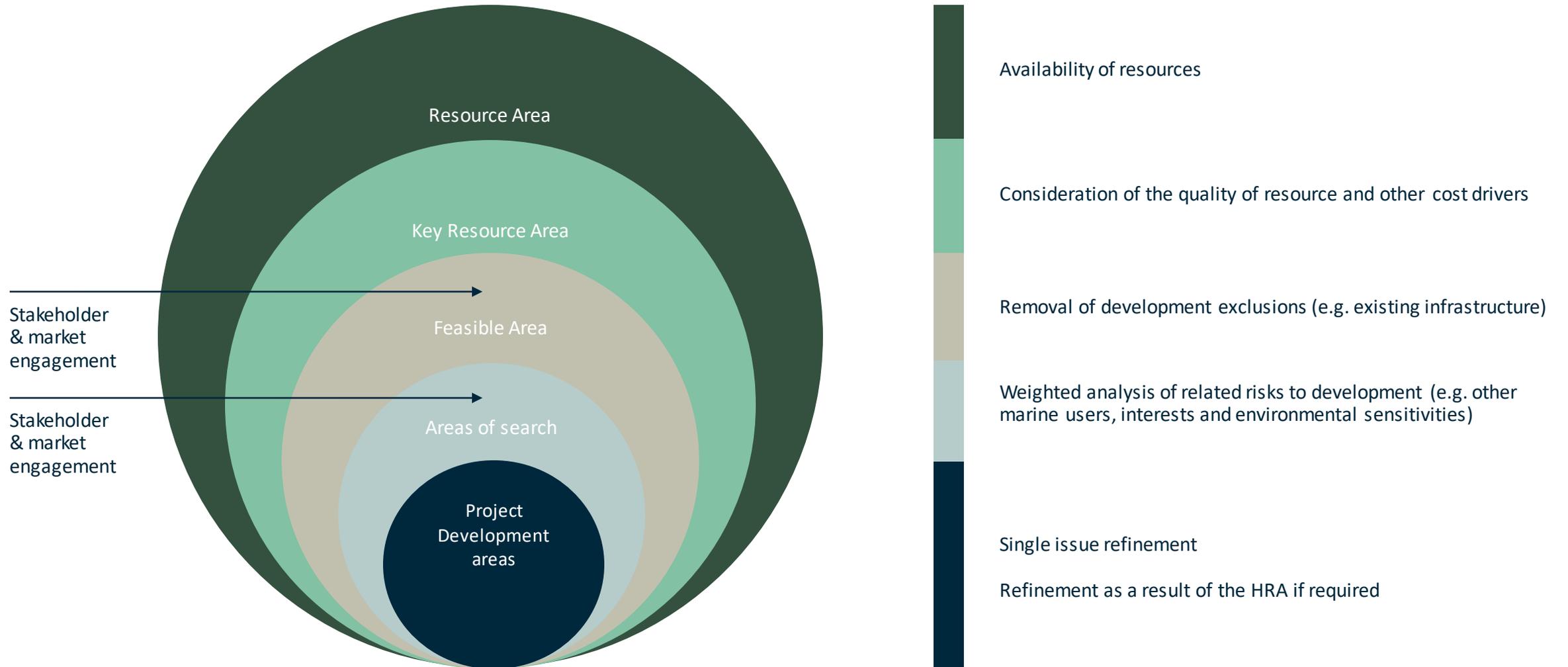
# Spatial analysis and resource planning

- MaRS (Marine Resource System):
  - GIS-based multi-criteria analysis tool, to assess technical and planning constraint;
  - Used for Round 3, Round 4, Scottish Territorial Waters leasing rounds, and Wave & Tidal demonstration zones;
  - Also used to support previous Marine Planning policy development.
- MaRS uses Analytical Hierarchical Processing (AHP) to structure and order constraints into logical models.
- Constraints are grouped into themes, and compared using pairwise analysis – improved rigour and transparency



Image credit: © Grupo Cobra

# Spatial opportunity



# Definitions

## Development Exclusion

Areas where development cannot be considered due to legal, or for physical reasons.

For example – [The Crown Estate agreement for minerals](#)

## Development Risk

A spatial consideration which relates to a particular sector. Development Risks may have a varying degree of relevance to the prospects and nature of floating offshore wind development.

For example – [Special Areas of Conservation](#)

# Geospatial questionnaire feedback



**Adrian Judd**  
Principal Advisor, Cefas



# Stakeholder Questionnaire

The Crown Estate sent a questionnaire to a network of stakeholders for their feedback on criteria to help identify areas suitable for floating offshore windfarm (FLOW) lease areas.



- 238 stakeholders received the questionnaire. A low response rate was recorded (with some partially completed responses, such as to the pairwise comparison questions).
- We will build on the feedback which has already been provided as a foundation for today's breakout sessions.
- A market questionnaire was also sent out to gather market responses.

# Stakeholder & Market Questionnaire Responses

“Designated features should be considered not simply designated sites”

"Consideration should be given to co-location /co-existence, e.g. if aquaculture and FLOW it effects weightings"

“Buffers (e.g. around existing telecoms cables) should be incorporated into any spatial analyses”

“How will cumulative impacts be incorporated into the analyses?”

“Is the Welsh Government’s Strategic Resource Areas (SRA) workstream to safeguard resources accounted for?”

“How will climate change issues be incorporated in the analyses?”

“In general ‘Social’/ ‘Societal’ issues should not be weighted as high as economic and environmental”

"Radar, defence, birds, aviation should be added to the topics covered in the pairwise comparisons”

“Fishing should be weighted as having higher importance in the pairwise analyses”

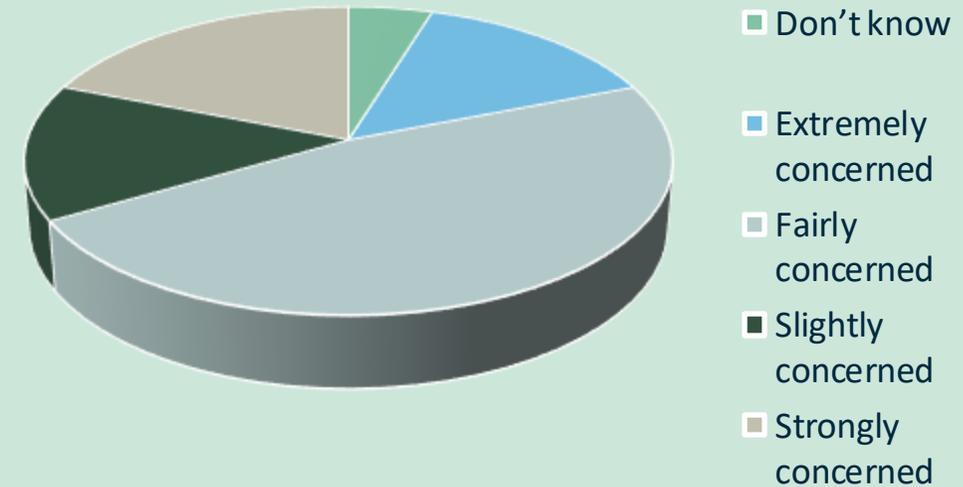
# Stakeholder Feedback – Benefits and Concerns

## Benefits

- Helping towards Net Zero targets
- Helping twin challenges of climate change and nature recovery
- Economic benefits – support other sectors
- Minimising impact to the environment and marine habitats

## Concerns

Level of concern for floating wind



Results highlighted some uncertainties which will be discussed in more depth in the breakout discussions.

# Stakeholder Questionnaire Responses

Stakeholders made suggestions of development exclusions in the following topic areas:

- Shipping and navigation
- Fishing
- MoD interests
- Cultural heritage considerations
- Aviation and radar



These will be discussed in more depth during breakout session 2 later today.

# Questionnaire Feedback

## Development Risks

There was agreement it was appropriate to include a lot of the considerations used for Round 4 for floating offshore windfarms.

### **Risk areas identified by stakeholders as requiring further consideration:**

- MoD interests
- Visibility\* - to include visibility to world heritage sites (Seascape)
- Aviation and radar (in respect of turbines)
- Fishing activity – considering risk of different types of gear and activity

### **Additional items for consideration identified by stakeholders, included:**

- Cumulative impacts
- Capacity for specific fishing vessels to be able to pursue alternative grounds

These will not be addressed by pairwise comparison, but will feed into the discussion around development risks.

Underlines show topics raised in both the Stakeholder and Market Questionnaires

\* Potential disagreement in responses in the Stakeholder and Market Questionnaires

# Questionnaire Feedback - Pairwise Comparisons

Feedback identified the need for a detailed session to understand the workings and application of the pairwise AHP approach. This will be discussed as part of upcoming breakout sessions.

**We received further feedback and observations, including comments that:**

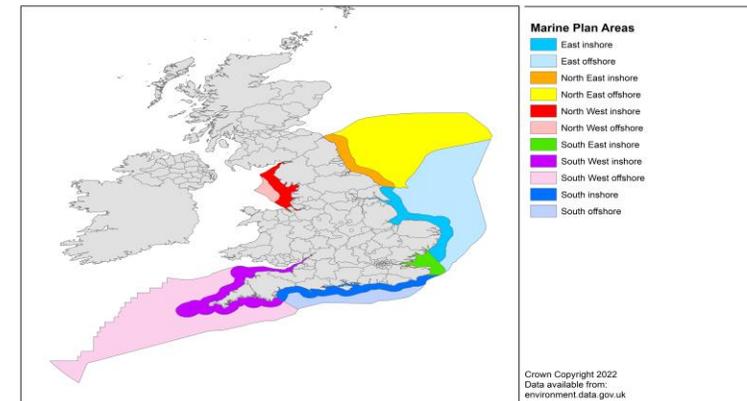
- Disagreed with the weightings attributed to MPAs
- Considered that navigation should be weighted higher (due to costs associated with displacement)
- Considered that shipping should be weighted higher than fishing
- Considered that fishing should be weighted higher

However, there was no clear consensus.

Breakout Session 2 **will seek to discuss these elements in more detail.**

# Suggestions of potential additional datasets for consideration for FLOW

- UK cultural heritage sites held by the UK Hydrographic office
- VMS (Vessel monitoring data) reported to the MMO
- AIS (Automatic Identification System) to identify regular navigational routes for shipping and fishing vessels
- Cornish Fish Producers Organisation interview-based mapping data
- MMO Marine Plans
- Office for National Statistics– Tourism data layer (2015)
- MMO sightings data (vessel surveillance data)
- UK Fishermen’s Information Mapping Project (UKFIM) data



# FLOW technology overview



Rehan Burger

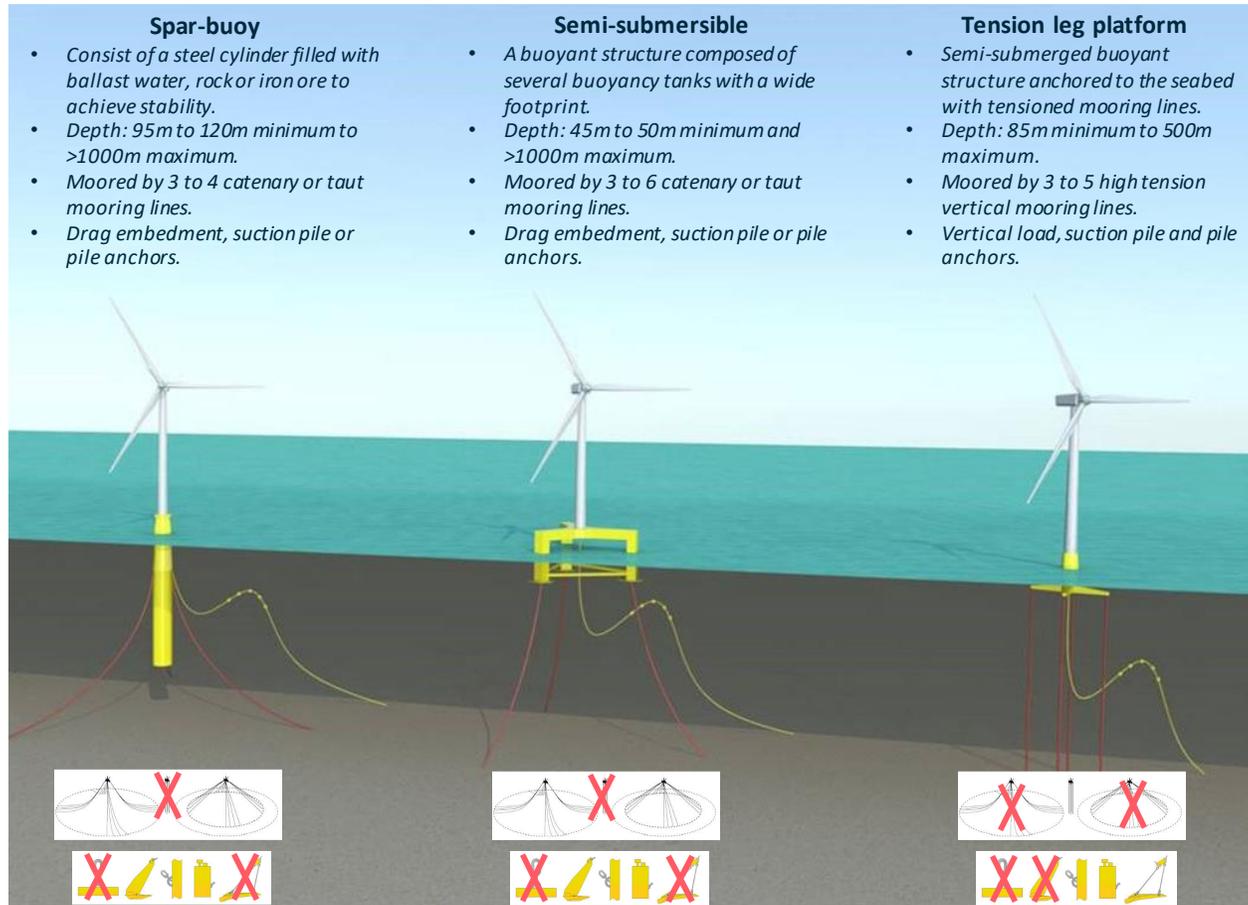
Development Manager,  
Marine, The Crown Estate



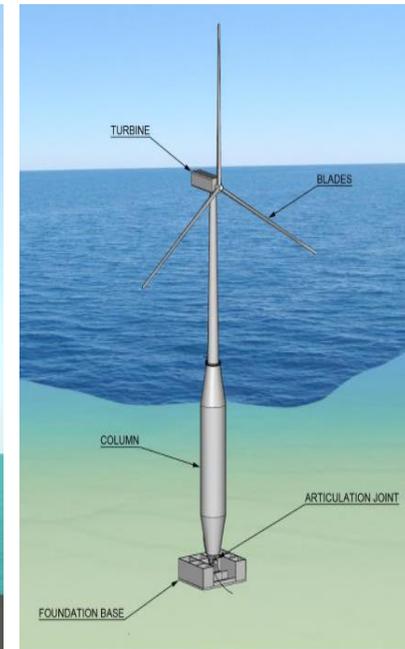
# Key terminology

<b>Floating foundation</b>	<b>A floating structure onto which the wind turbine stands above water</b>
Mooring	Cables, chains or lines used to secure the floating foundation to the seabed
Anchor	Anchoring device used to secure the mooring to the seabed
Water depth	Depth of water from the surface to seafloor
Array cabling	Power cable connecting to a turbine
Radial distance	The distance of a single mooring line from the floating foundation to the anchor viewed from directly above

# Consideration of technology



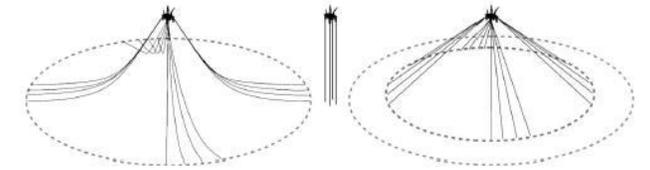
**Figure a:** Three standard type of floating substructures (Image credit: Ramboll)



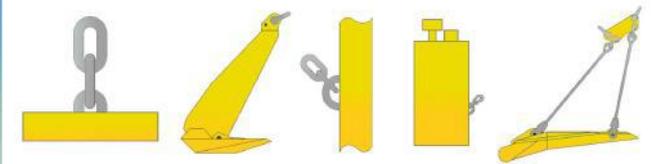
### Articulated wind column

- Comprises a buoyant column attached to a gravity base foundation by an articulated joint.
- Depth: 50m minimum to 200m maximum.

**Figure b:** AWC (Image credit: MEES and DORIS Engineering, 2015)



**Figure c:** Mooring types (from left to right: catenary mooring, vertical mooring and taut leg mooring system) (Everoze, 2020)



**Figure d:** Anchor types (from left to right: Dead Weight, Drag Embedment, Pile, Suction and Vertical load (Image credit: Vryhof) (Everoze, 2020)

Broad Horizons report (Everoze 2020) - <https://www.marinedataexchange.co.uk/details/2117/2020-everoze-characterisation-of-key-resource-areas-for-offshore-wind-a-report-for-the-crown-estate/summary>

# Breakout session 1



Olivia Thomas  
Chair



# Breakout session 1 - Introduction

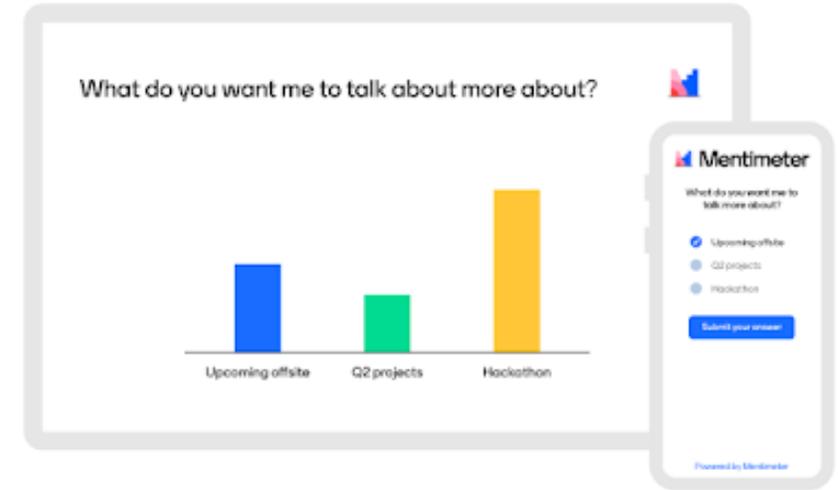
## Purpose

- Seek opinions using mentimeter on buffers, colocation, coexistence and displacement
- Seek further feedback using Miro whiteboards on buffer distances and the compatibility of a range of activities with floating offshore wind, including consideration of coexistence, colocation and displacement.

**Mentimeter – [www.menti.com](http://www.menti.com)**

**Mentimeter Code - 33945844**

**Miro – unique Miro board links have been provided in individual Teams invites for breakout session 1**



# Summary of breakout session 1



Olivia Thomas  
Chair



# Spatial weightings analysis

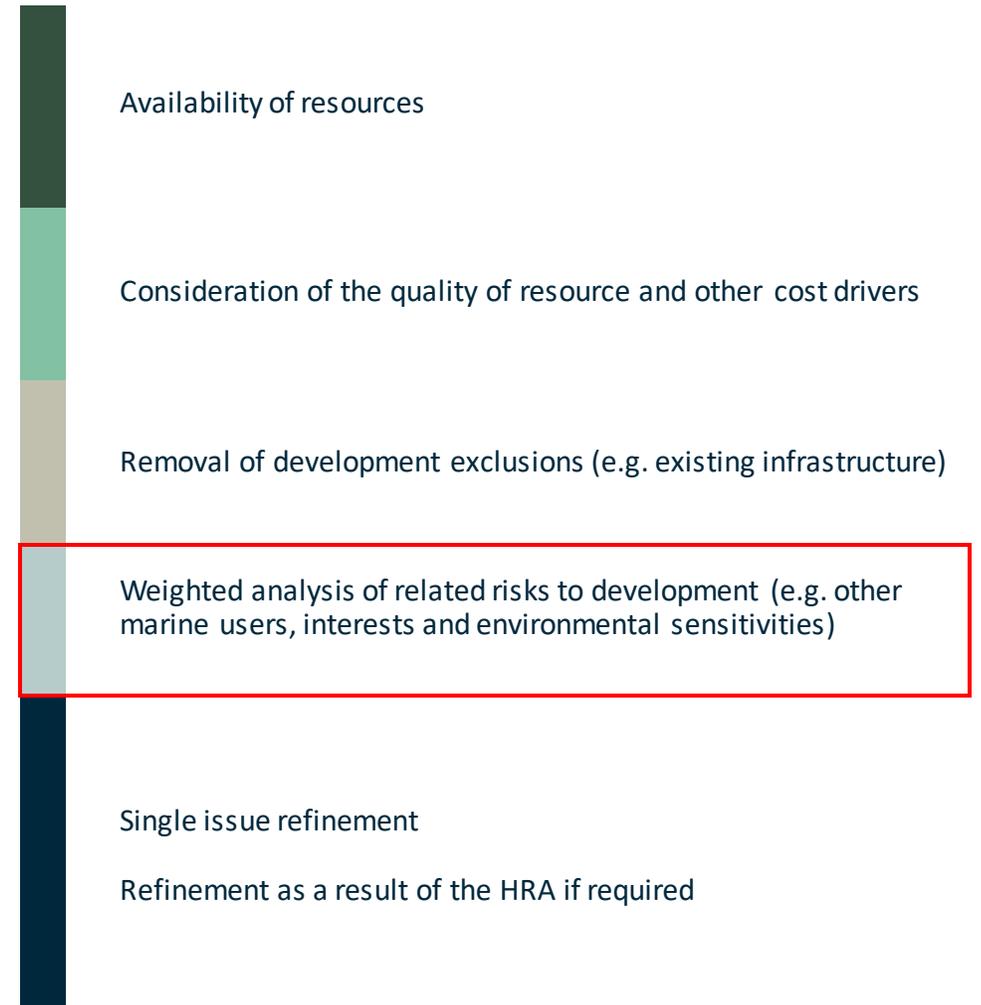
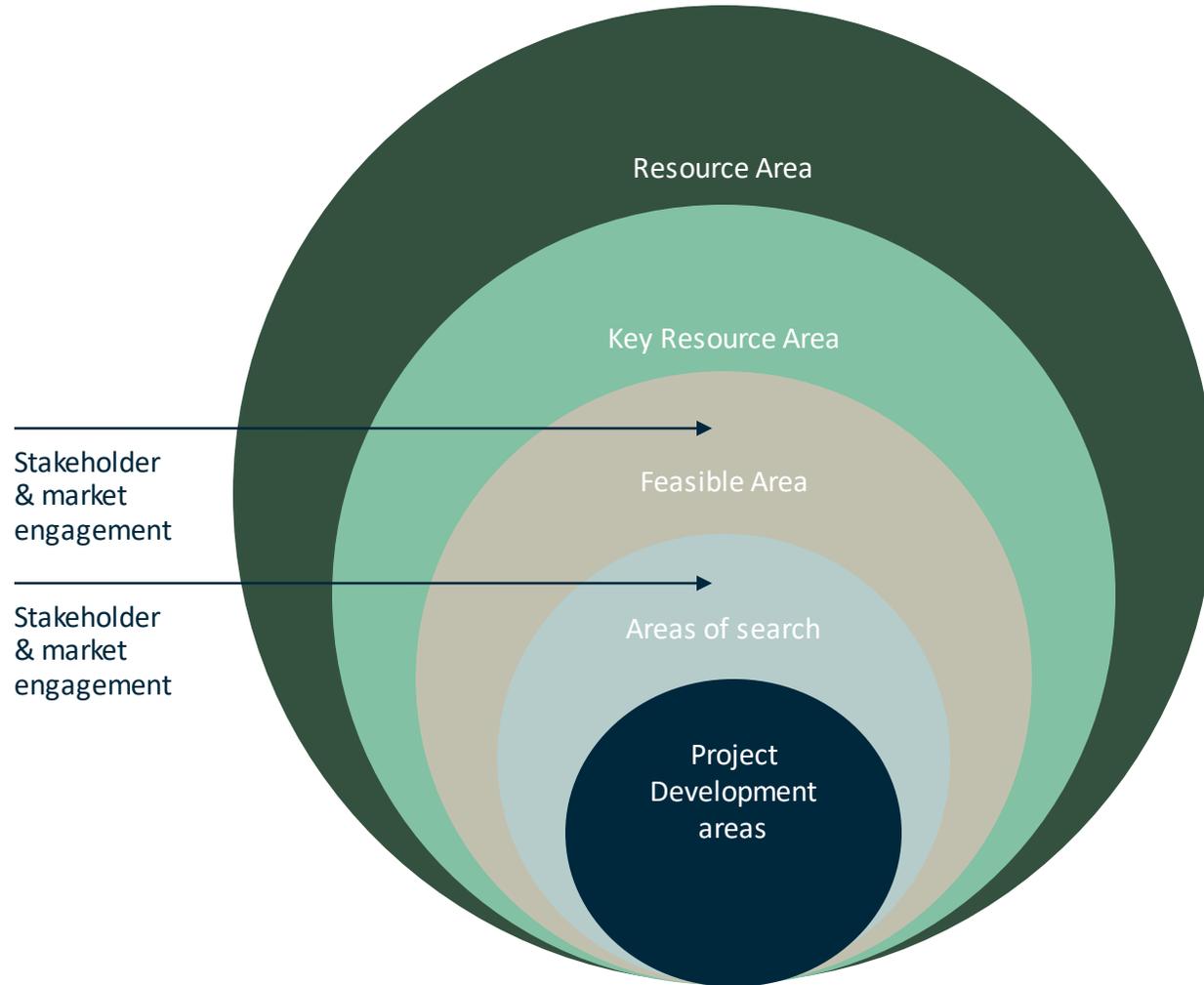


**Michelle Moore**

Senior Spatial Planning Manager,  
Marine, The Crown Estate



# Spatial opportunity

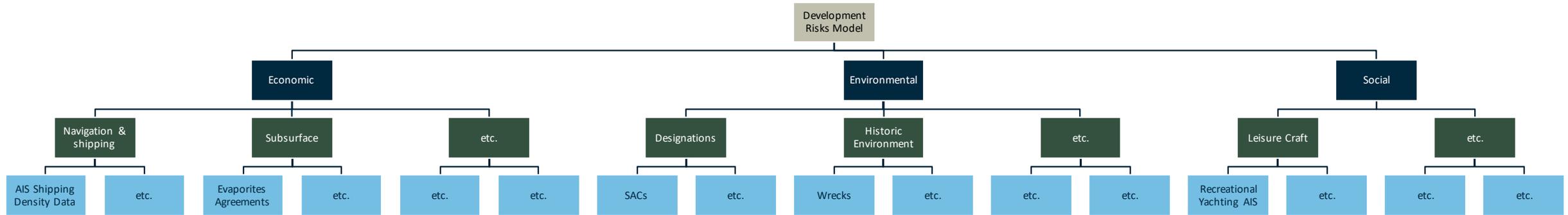
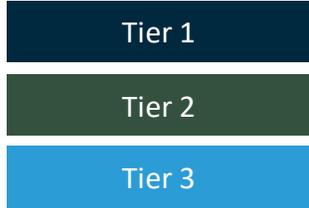


# What is the Analytical Hierarchy Process (AHP)?

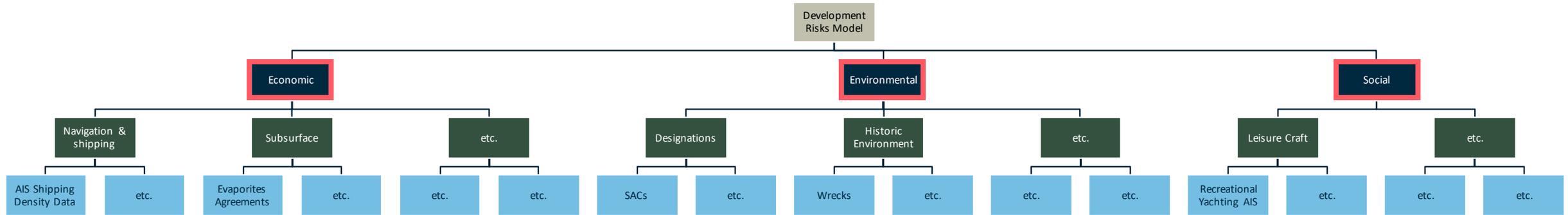
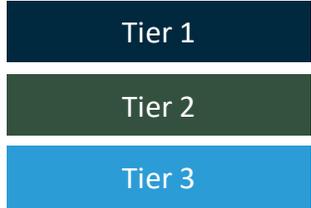
A method to analyse complex decisions through a series of structured comparisons of criteria (called pairwise comparisons).

- Developed by mathematician Thomas L. Saaty in 1977.
- The methodology ensures that a statistically robust, traceable, repeatable and defensible weighting and scoring process can be implemented.
- Uses a tree structure to define mini multi criteria analysis calculations that feed up into a more complex analysis.
- Peer reviewed.
- Most recently implemented during the Round 4 Characterisation process.

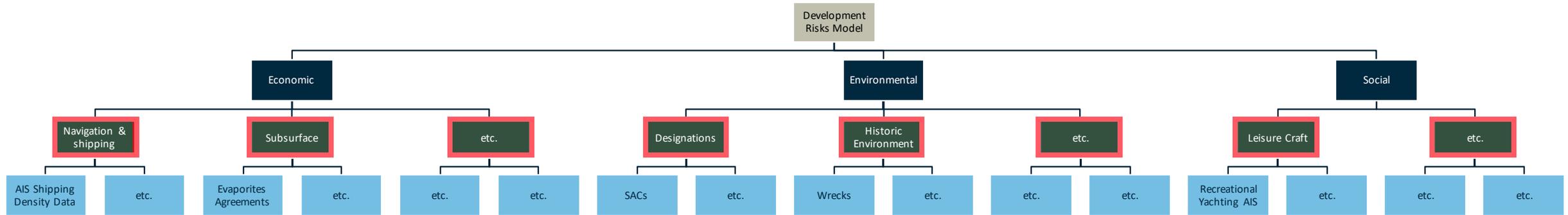
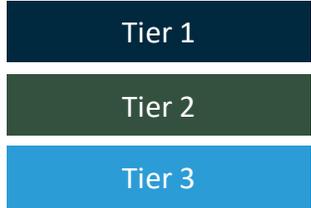
# AHP Model Structure



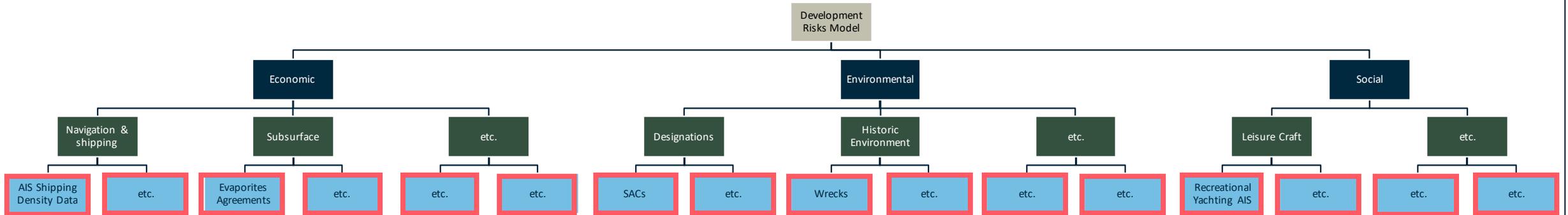
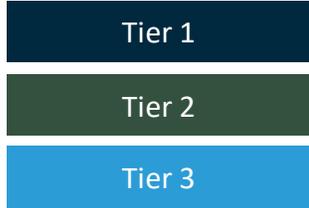
# AHP Model Structure - Tier 1



# AHP Model Structure - Tier 2



# AHP Model Structure - Tier 3



# What are Pairwise comparisons?

The process by which two criteria are compared to establish relative importance to one another

...or in this case whether one criteria poses more, less or equal risk to FLOW development when compared to another criteria.

# Pairwise comparisons - Scale

Equal risk to development



Moderate risk to development



Strong risk to development



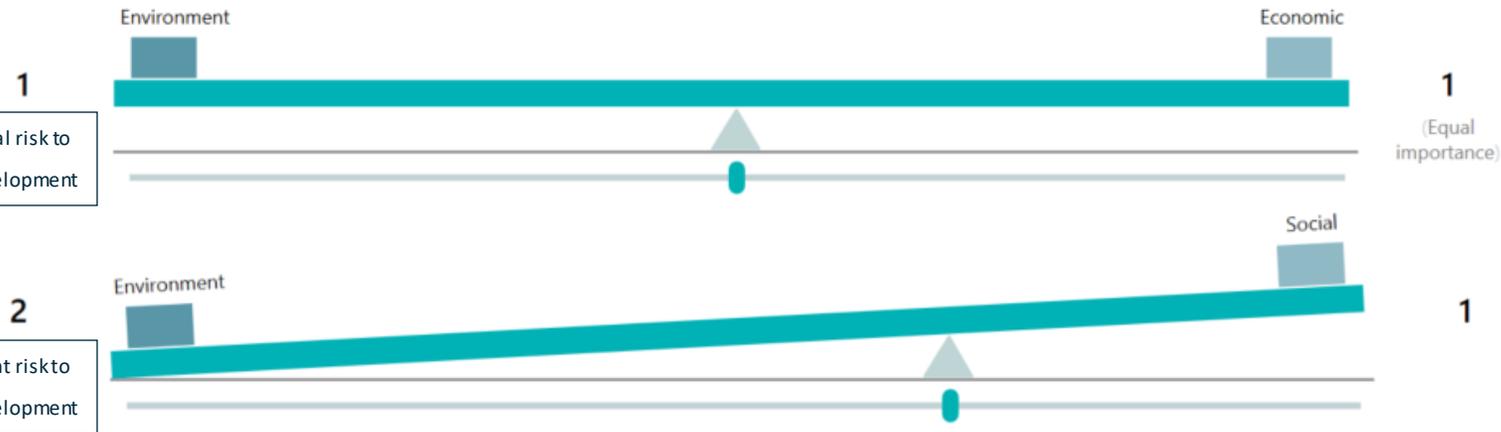
Very strong risk to development



Extreme risk to development

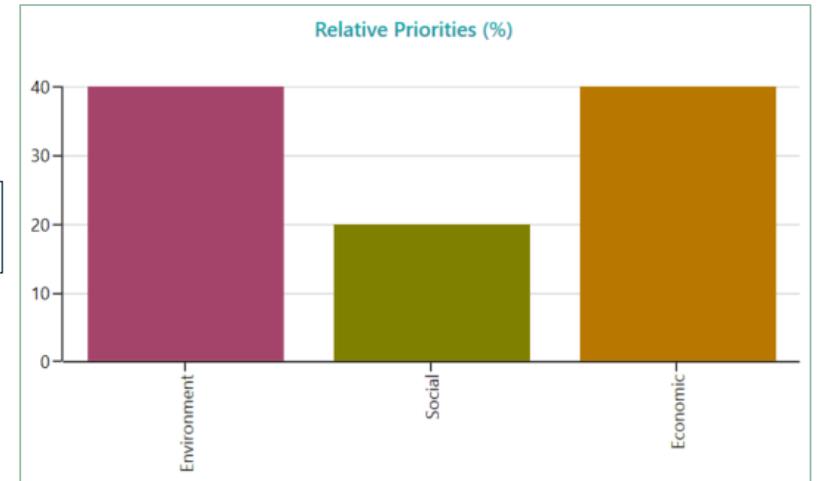


# Pairwise comparisons - Worked example a)

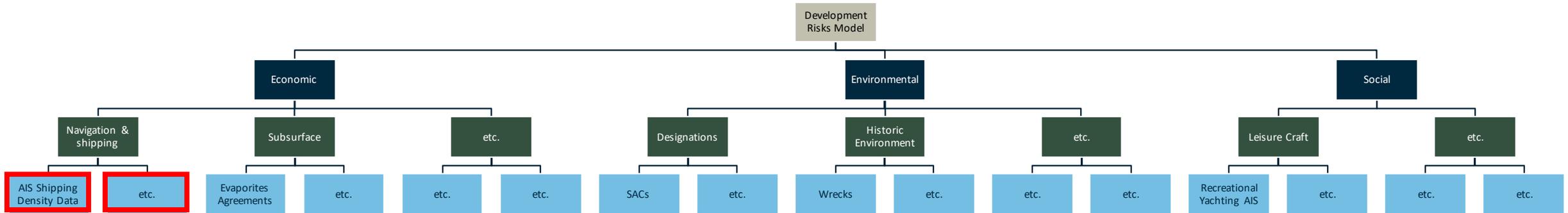
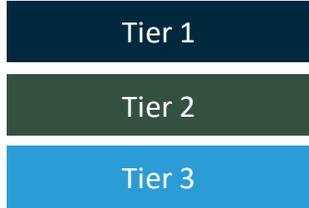


NB. This is an example for demonstration purposes only

Therefore...



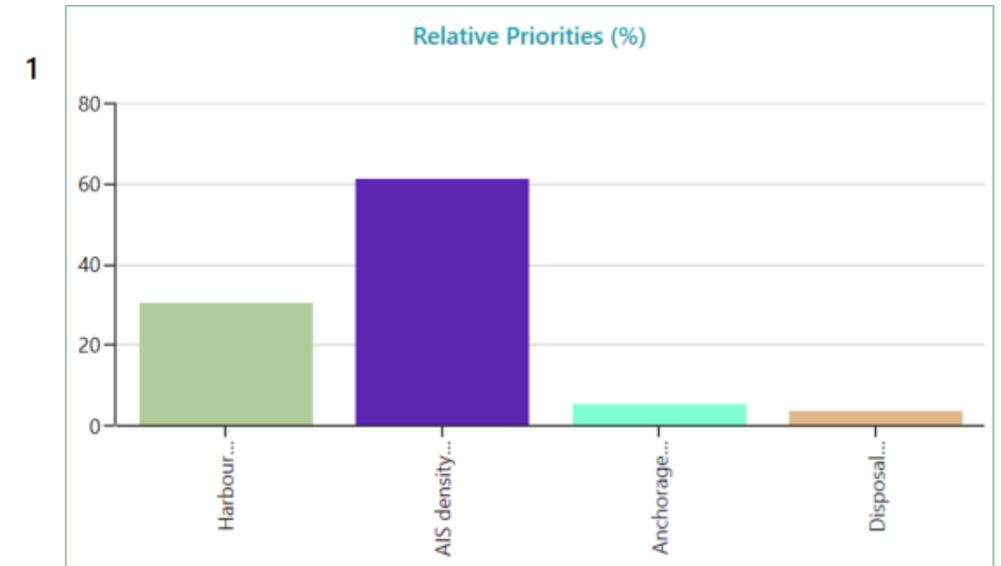
# Pairwise Comparisons - Worked example b) – Navigation & Shipping



# Pairwise Comparisons - Worked example b) – Navigation & Shipping



NB. This is an example for demonstration purposes only



# Breakout session 2



Olivia Thomas  
Chair



## Breakout Session 2 - What to expect

- Utilising software to help visualise and guide through the Pairwise Comparisons.
- Interactive session.
- Structure presented is for engagement purposes:
  - First step to inform the spatial modelling.
  - Built from our experience of offshore wind leasing & spatial analysis, a review by our consultants and considering stakeholder questionnaire feedback.
  - Broad number of considerations included in the structure – please do flag any missing criteria.
- Breakout rooms are targeted at specific considerations related to your expertise.
- Pairwise Comparisons will focus on Tiers 1 to 3.
- Targeted data discussions.
- Miro board for capturing discussions (unique links have been provided in individual Teams invites for breakout session 2).

## Breakout Room 2 - What we need from you



In the context of:

- The Celtic Sea.
- The impact of the different technology groupings presented.

Within your targeted breakout rooms:

1. Reach agreement on whether each spatial consideration discussed within Tiers 1 to 3 is more, less or **of equal risk** to the development of floating offshore wind when compared with other spatial considerations discussed.
2. Discuss why you reached this decision.
3. Flag any missing criteria.
4. Have a targeted discussion related to appropriate datasets & sources.

# Summary of breakout session 2



Olivia Thomas  
Chair



What happens next?



**Michelle Moore**

Senior Spatial Planning Manager,  
Marine, The Crown Estate

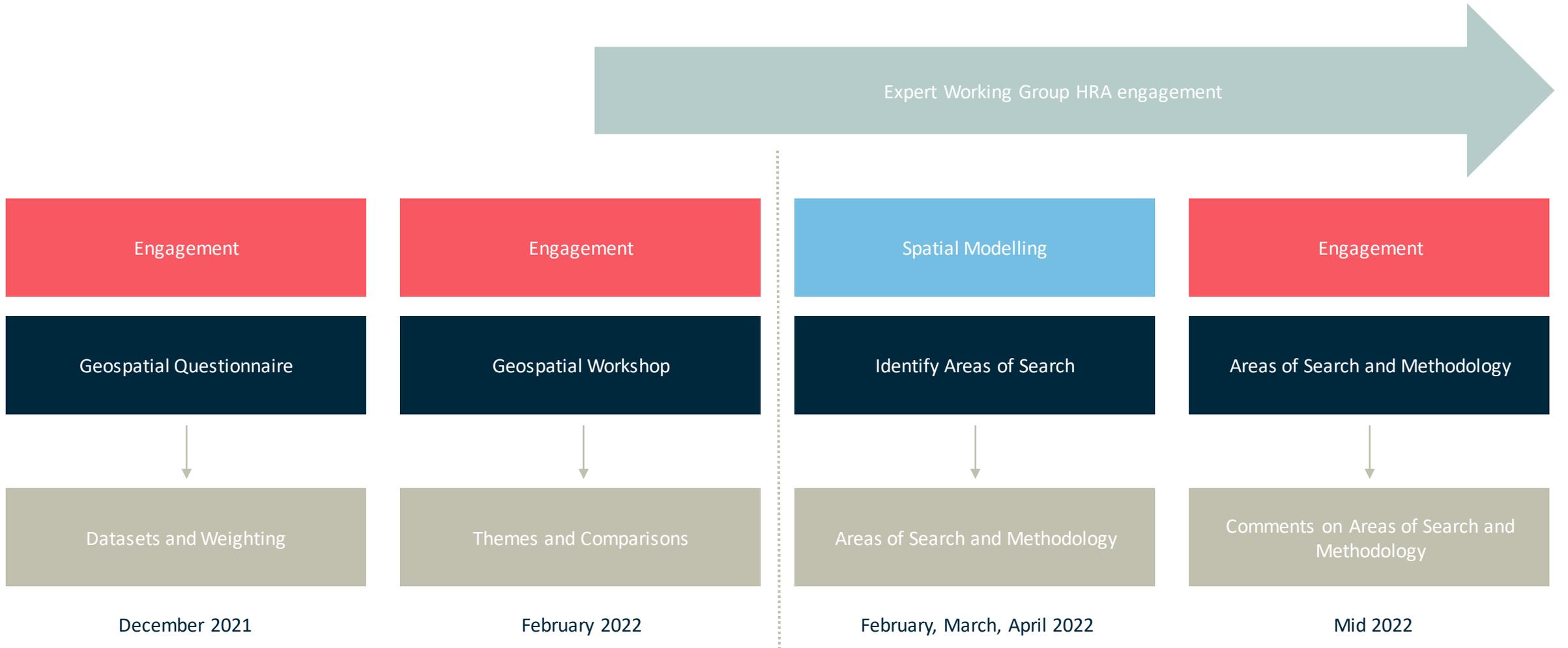


**Tim Stiven**

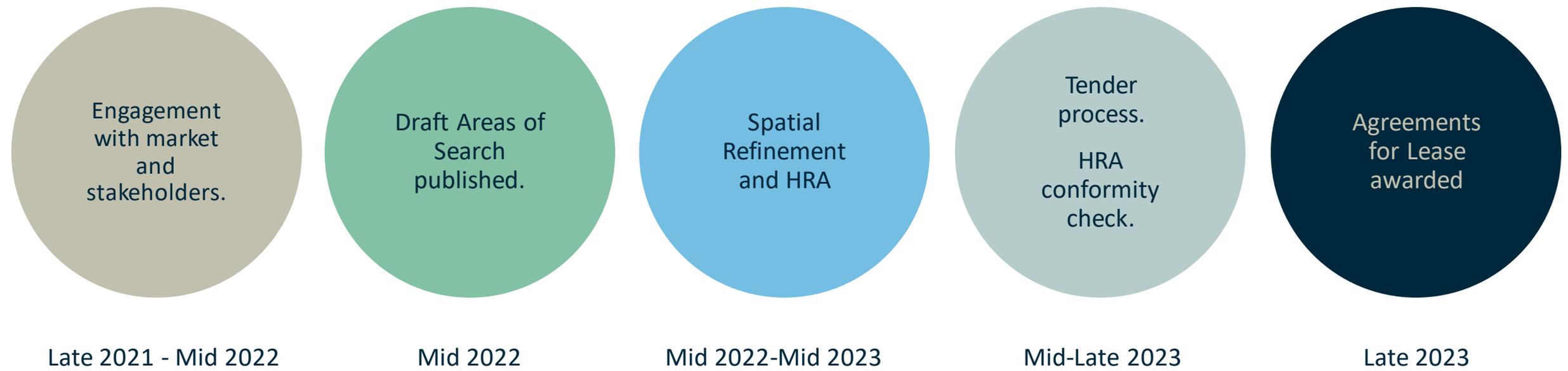
Senior Development Manager,  
Marine, The Crown Estate



# Celtic Sea FLOW: Marine Stakeholder Journey in 2022



# Anticipated programme timeline



Engagement  
with market  
and  
stakeholders.

Late 2021 - Mid 2022

Draft Areas of  
Search  
published.

Mid 2022

Spatial  
Refinement  
and HRA

Mid 2022-Mid 2023

Tender  
process.  
HRA  
conformity  
check.

Mid-Late 2023

Agreements  
for Lease  
awarded

Late 2023

# Q&A Session



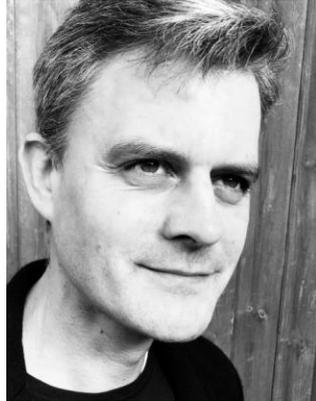
Olivia Thomas  
Chair



# Q&A Session



**Olivia Thomas**  
Head of Marine  
Planning,  
The Crown Estate



**Tim Stiven**  
Senior Development  
Manager,  
The Crown Estate



**Joe Smithyman**  
Marine Resources  
Manager,  
The Crown Estate



**Sion Roberts**  
Marine Consents  
Manager,  
The Crown Estate



**Michelle Moore**  
Senior Spatial Planning  
Manager,  
The Crown Estate

# Final Summary and thanks



Olivia Thomas  
Chair



# Close

Thank you for your participation - if you have any questions, please contact us at:  
[offshorestakeholder@thecrownestate.co.uk](mailto:offshorestakeholder@thecrownestate.co.uk)

