TEAM DEFENCE INFORMATION
www.teamdefence.info

Natural Capital & Infrastructure Community of Practice

30 April 2024

NC&I CoP 30/4/24 – Agenda 13.00 -16.00

TEAM DEFENCE INFORMATION
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#	Agenda Item	mins
1	Welcome and Introductions from participants – Eion Bailey (TD-Info)	10
2	Re-cap and Objectives – Jenny Allen (Mott McDonald)	10
3	Update on ADS, DSF, DASI, DASA innovation call for proposals on sustainability & self sufficiency	10
4	Presentation on Bio-diversity – (Mott McDonald)	20
5	Presentation on Natural Capital Solutions and Sustainability on the MOD estate – Robin Phillips (Severn Trent Services)	20
	Integrating Nature into Babcock's Environmental Programme – Phil Anderson (Babcock)	10
6	Break	20
7	Government Digital Sustainability Alliance (GDSA) brief – Chris Parker (Fortinet)	20
8	Plymouth University Partnership with Royal Navy on Advanced Ocean Observation – Kevin Forshaw (Plymouth University)	20
9	Topics of Interest and Working Groups - Volunteers for supporting and leading (All)	40
10	Proposed Conference - October/November 2024	
11	NC&I COP Co-chair – Thoughts and nominations	
12	AOB	

NC&I COP – Re-Cap and Objectives

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Jenny Allen - Mott McDonald

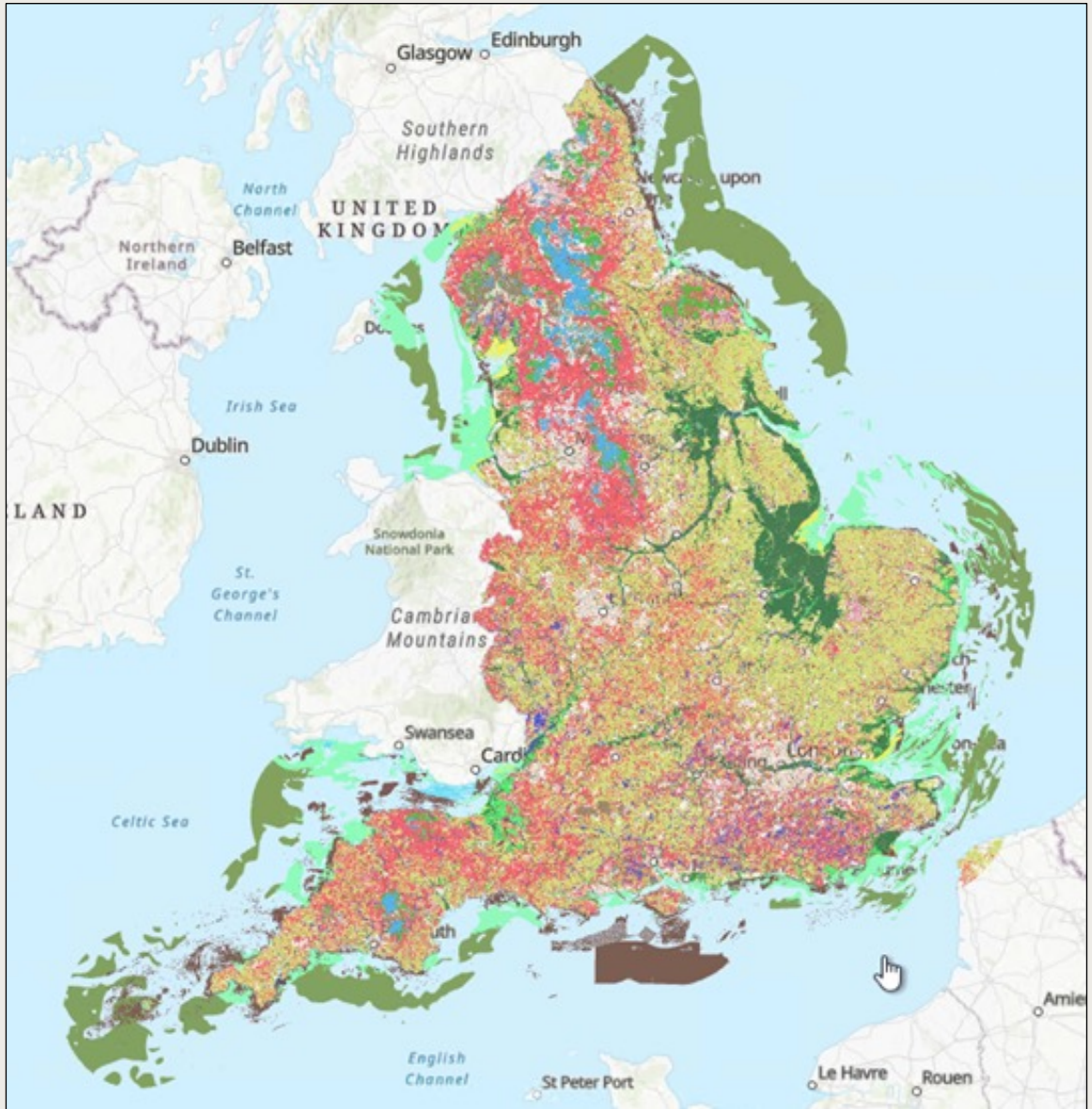
MOTT MACDONALD

Natural Capital and Ecosystem Services

Matthew Beacon
BNG Technical Lead

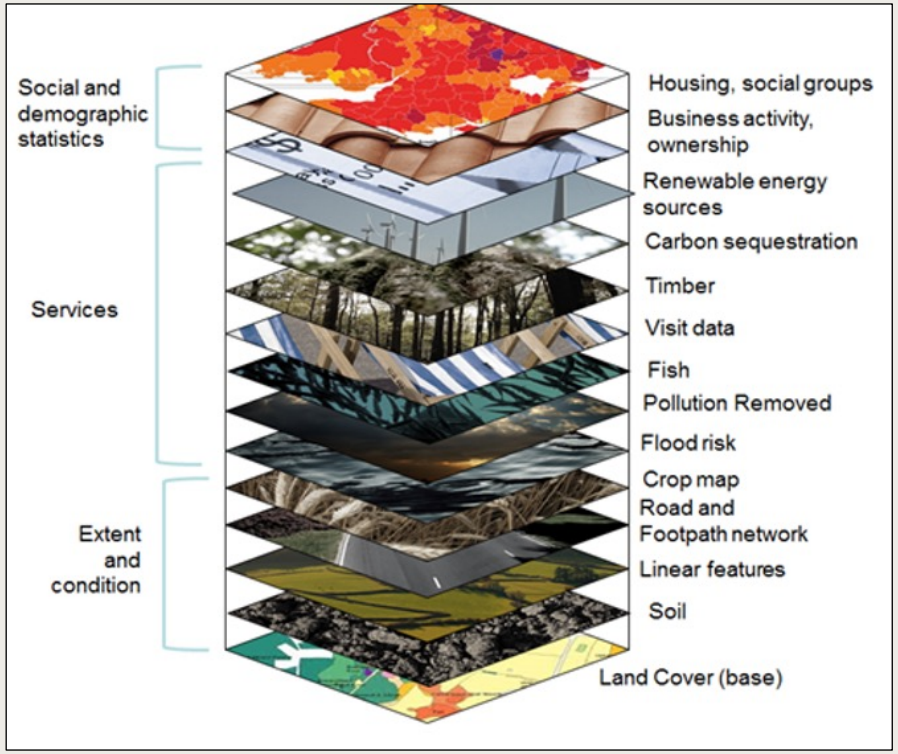
Methods for Assessment and Visualisation

- **Understand the Project and Local Context**
- **Collate the Data and Establish the Baseline**
- **Manage Data using Digital Tools (at each project stage)**



Methods for Assessment and Visualisation

- **Biodiversity Net Gain**
- **Natural Capital Accounting and Ecosystem Service Assessment**



Empowering Land Owners

Our UK Natural Capital Map is a digital reconstruction of natural capital assets, built to enable land owners to secure the most environmental value from their estate.

It highlights opportunities for improvement, investment and development which could be overlooked if the potential benefits from nature are not fully understood.

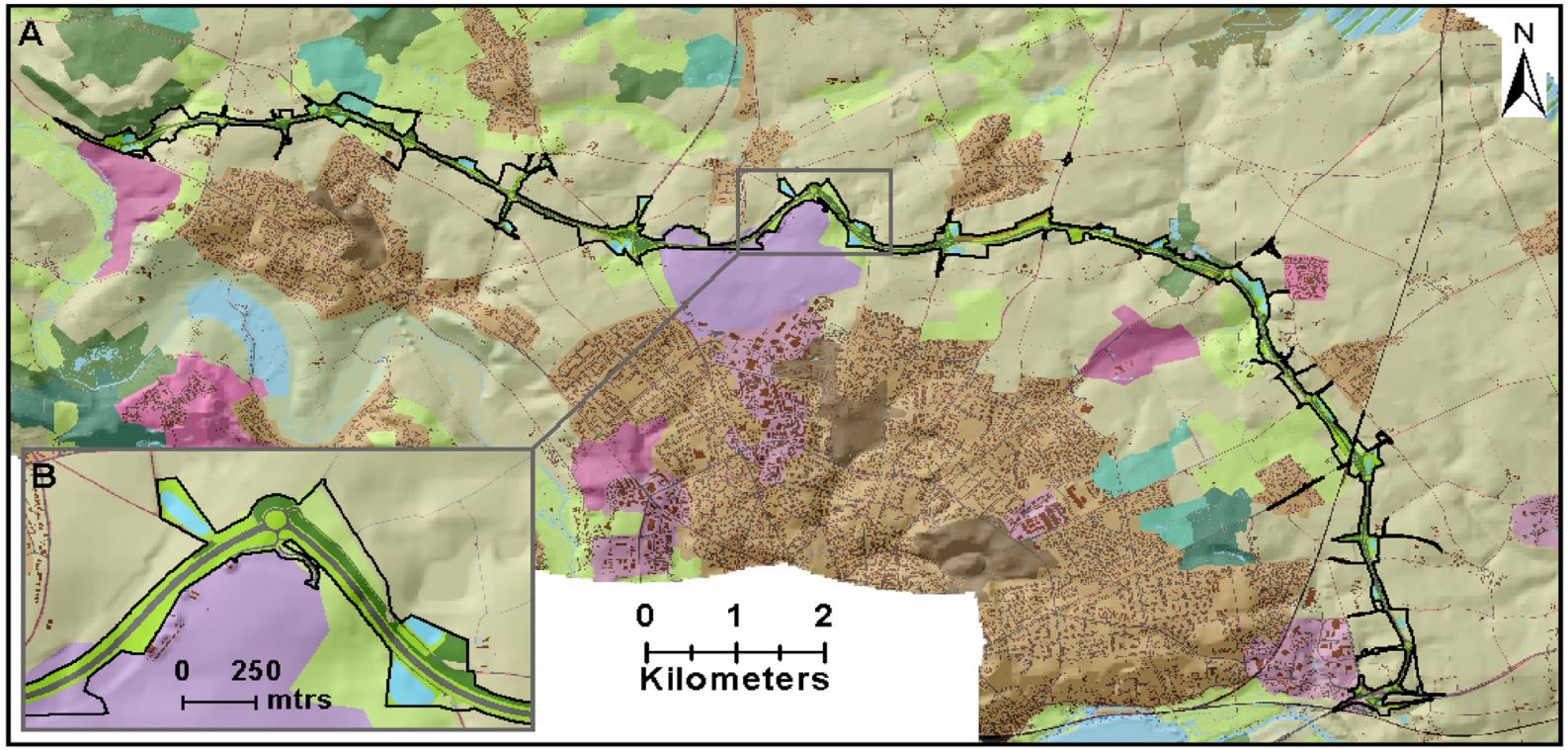
Norwich Northern Distributor Road

Project
Norwich Northern Distributor Road

Client
Norfolk County Council

Location
Norwich, Norfolk

Expertise
Natural Capital Accounting,
Qualitative & InVEST assessment,
GIS Analysis



Development Consent Order Area

Land Use/Land Cover

Added by the NDR

- Grassland
- Scrubland
- Woodland
- Lagoon
- Newt pond

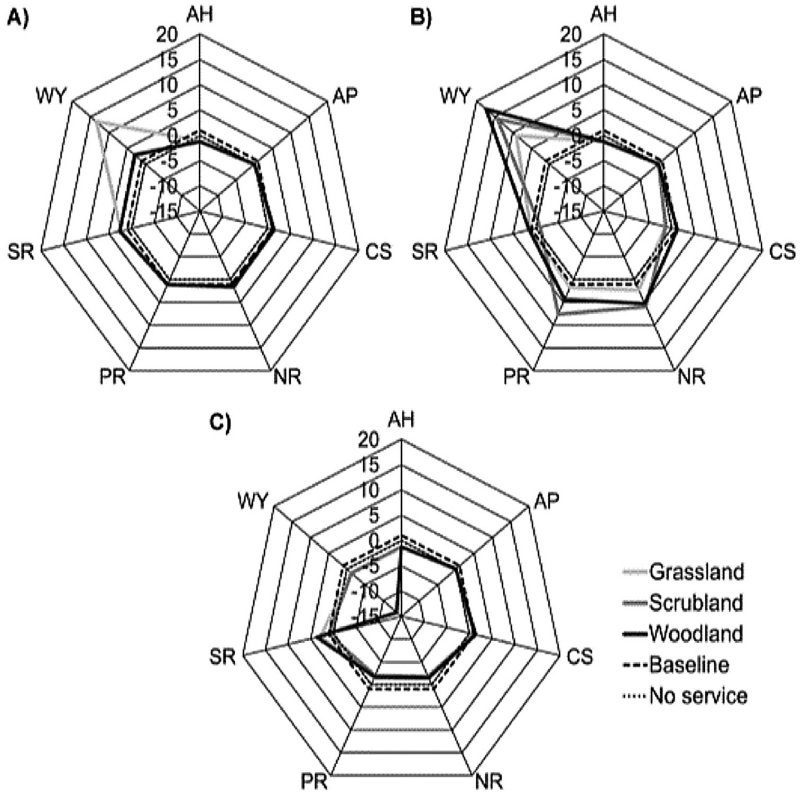
Unaltered land use

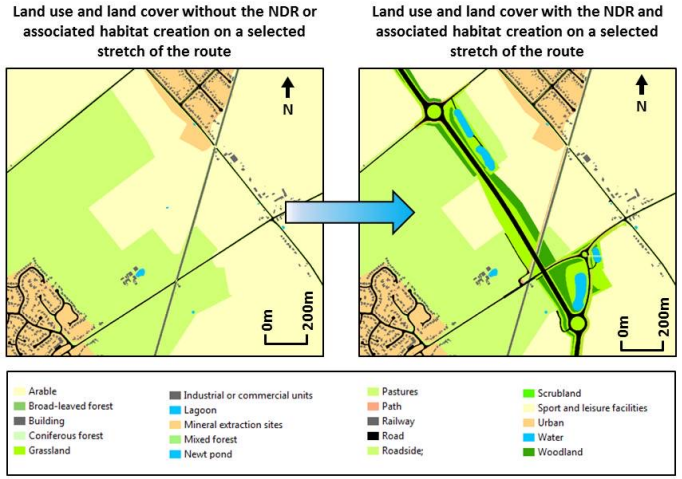
- Arable
- Arable Natural
- Pastures
- Broad-leaved forest
- Coniferous forest
- Mixed forest
- Transitional woodland-shrub
- Inland marshes
- Tidal Water
- Water
- Urban
- Urban greenspace
- Building
- Airports
- Industrial or commercial units
- Mineral extraction sites
- Sport and leisure facilities
- Path
- Road
- Railway
- Roadside
- Roadside_unkn
- Trackside

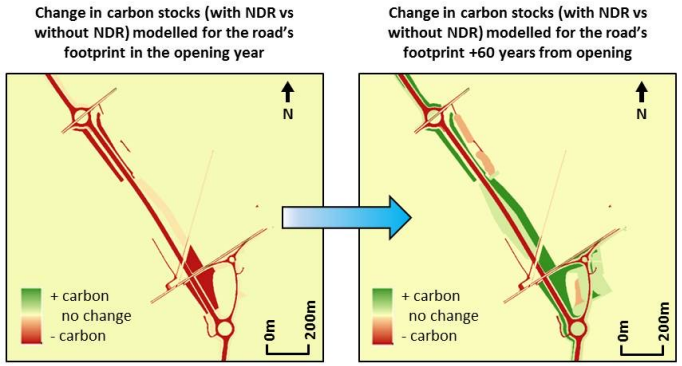
Qualitative assessment and visualisation of trade offs

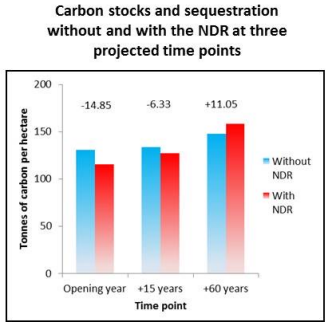
Ecosystem services ratio for all ecosystem services assessed in the NDR study in selected land use transitions from baseline to future land use for the milestone year 2032 and selected initial land uses

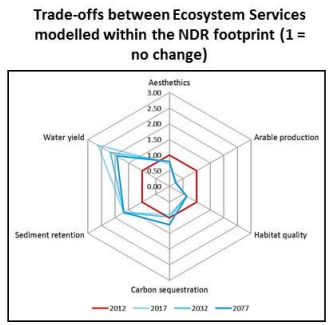
Ecosystem service type	Ecosystem service	Method of estimation	Units	Corresponding topic of the Environmental Statement
Supporting service	Avoided habitat risk	Based on the InVEST 2.5.6 Habitat Risk Model output	Unitless	Nature conservation
Regulating Services	Carbon storage and sequestration, Sediment retention and Nitrogen and Phosphorus retention	InVEST 2.5.6 InVEST 2.5.6 InVEST 2.5.6	Mg ha^{-1} Mg ha^{-1} Kg ha^{-1}	Carbon Geology and soils Road drainage and the water environment
Provisioning services	Arable production Water yield	Literature based estimation InVEST 2.5.6	Mg ha^{-1} mm	Community and private assets Road drainage and the water environment











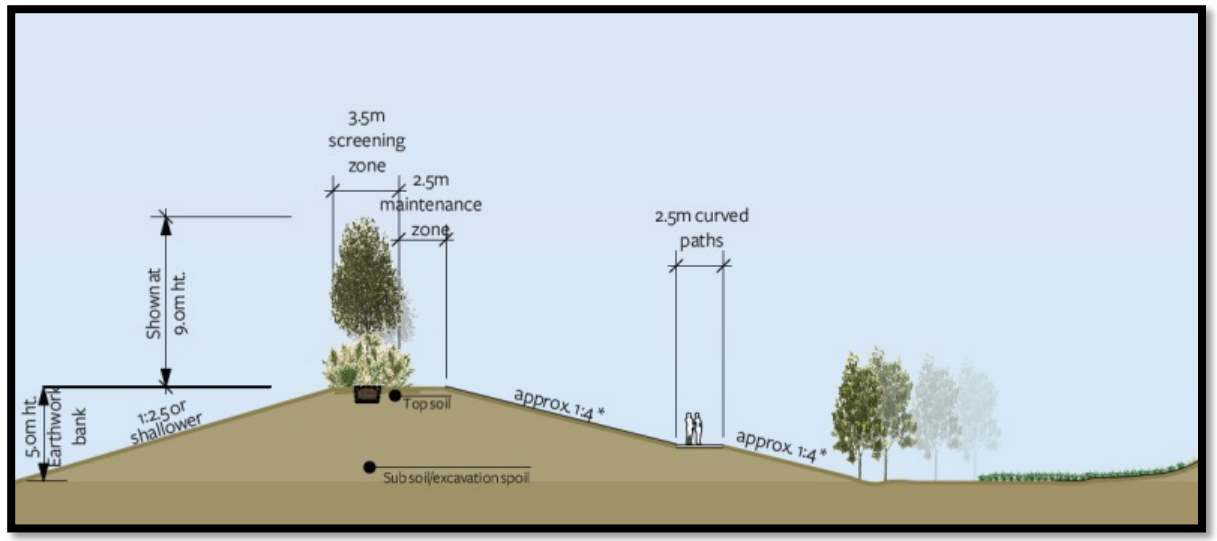
MOTT MACDONALD

Biodiversity Net Gain

Development that leaves biodiversity in a measurably better state than before

Biodiversity Net Gain

Good practice principles for development



The Statutory Biodiversity Metric

Auditing and accounting for biodiversity

Calculation Tool

Open Tool

You should follow up to date industry good practice principles (CIRIA, CIEEM and IEMA) and BS 8683:2021 when using the metric.

BNG in practice?

- ✓ **Apply the mitigation hierarchy**

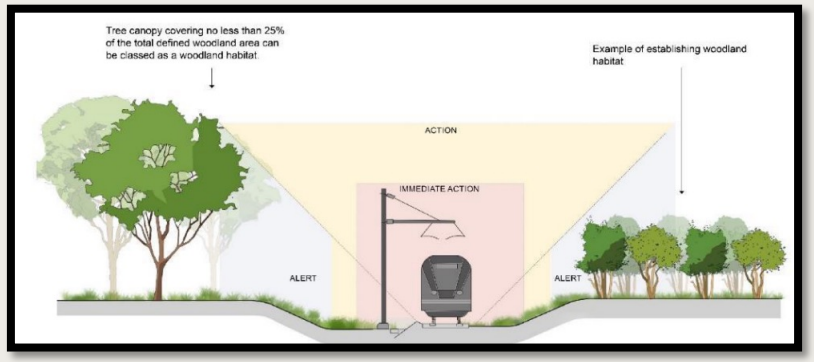
- ✓ **Create wildlife-rich habitats**
- ✓ **Habitat design based on sound ecological principles**
- ✓ **A minimum 10% in ways that meet the Metric trading rules**

Biodiversity Net Gain | CIEEM

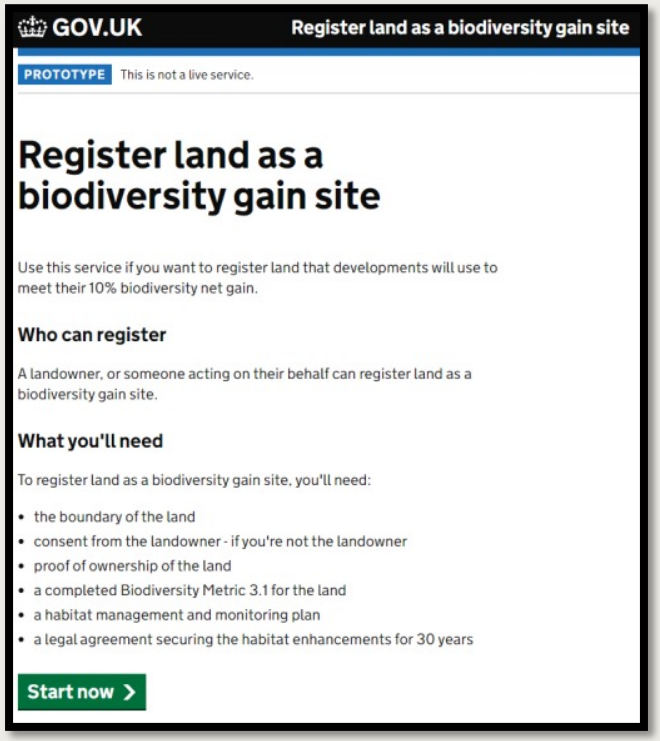
Environment Act 2021

- Biodiversity value is at least +10%
- Measured in ‘habitat units’ by the Statutory Biodiversity Metric
- Secured for at least 30 years
- Achieved on-site or off-site (units)
- As a last resort, purchase statutory credits from Government

Mandatory BNG Delivery



On-site



Off-site

Guidance

Statutory biodiversity credit prices

Medium distinctiveness habitats

Habitat distinctiveness	Broad habitat type	Specific habitat type	Price per credit	Tier
Medium	Heathland and shrub	All	£42,000	A1
Medium	Grassland	All	£42,000	A1
Medium	Individual trees	All	£42,000	A1

Statutory biodiversity credit prices - GOV.UK (www.gov.uk)

Spatial Risk Multiplier

Spatial risk category and score	Area and hedgerow modules	Watercourse modules
Within (1.0)	Compensation is within Local Planning Authority (LPA) boundary or National Character Area (NCA) of impact site Intertidal habitats only: Compensation is within Marine Plan Area of impact site	Compensation is within waterbody catchment
Neighbouring (0.75)	Compensation is outside LPA or NCA of impact site, but within neighbouring LPA or NCA Intertidal habitats only: Compensation is outside Marine Plan Area of impact site, but within neighbouring Marine Plan Area	Compensation is outside waterbody catchment, but within operational catchment
Outside (0.5)	Compensation is outside LPA or NCA of impact site and outside neighbouring LPA or NCA Intertidal habitats only: Compensation is outside Marine Plan Area of impact site and outside neighbouring Marine Plan Area	Compensation is outside operational catchment

Off-site Provision for MoD sites

- Identify sites for off-site provision within the MoD estate
- Create an internal land register for BNG/Natural Capital
- Liaise with stakeholders including Wildlife Trusts to secure off-site provision

MoD Site

Project
PV Off-site BNG

Client
Ministry of Defence

Location
Wiltshire

Expertise
Biodiversity Net Gain


Any
questions?

Natural Capital Solutions and Sustainability

A Water & Environmental Perspective

Team Defence – NC&I COP

30th April 2024

Contents:

- **Background and Context – Climate Change Reality**
- **Our Approach**
- **Practical Examples**
- **Next Steps**

Robin Phillips
Head of Strategy & Sustainability
Severn Trent Services
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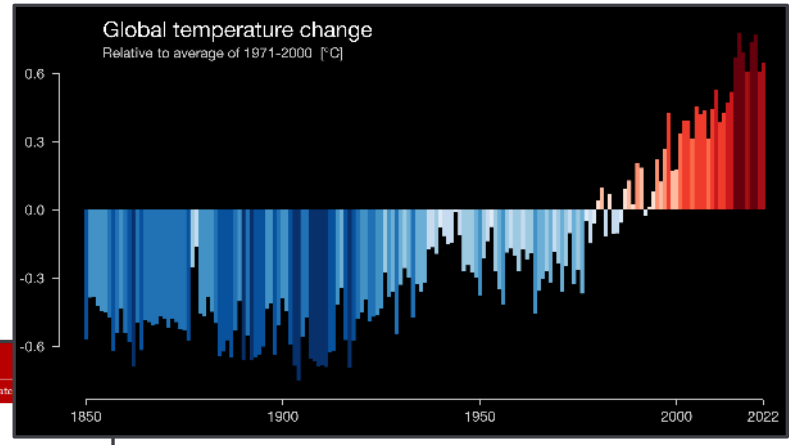
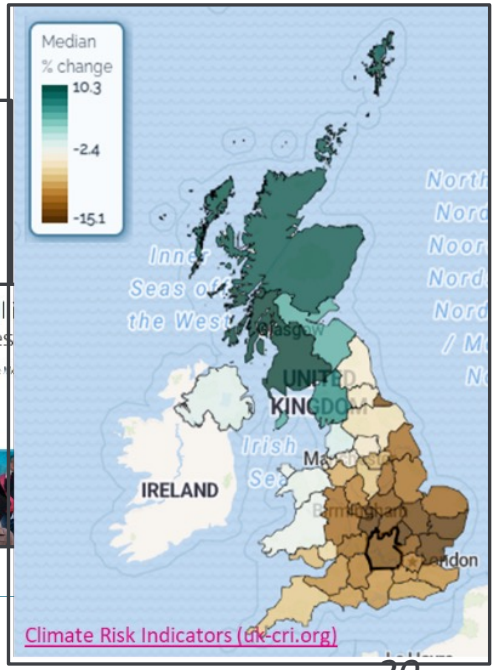
SEVERN TRENT SERVICES a part of SEVERN TRENT

Climate Change – UK Context

- Past 10 years increasingly unpredictable
- Drier summers e.g. 2022 & 2023:
  - 40.3 °C UK Highest Temperature Recorded in July 2022 – at Coningsby, Lincs
  - Drought orders: East Anglia, South-West
  - Prolonged hot weather notices: Cumbria, Lancashire and the West Midlands.
- Wetter winters and extreme weather events, storm intensity increasing
  - For the UK as a whole, the 18 months to March 2024 ranks as the fourth wettest on record, with 2,085mm of rain falling
- Extreme weather events more likely in the future but...





Climate Change – UK Reality

This is a "here and now" issue

- Some MOD sites are already in water stressed areas
- The EA are challenging water usage on borehole sites (abstraction limits)
- Groundwater quality needs to be protected
- External network leakage is below 18% (lower than public systems)
- Current GGC reduction targets are not being met
- Opportunity to reduce internal consumption and wastage
- W&WW Network capacity will restrict future expansion at some sites

Key Point:

- We can see climate change impacts today and they will reduce future operational resilience unless we act now

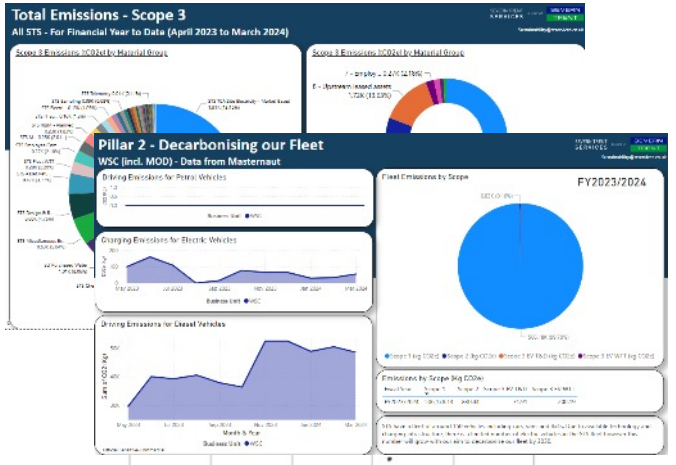
RAF Wattisham
Nov23

Climate Change – Severn Trent Approach

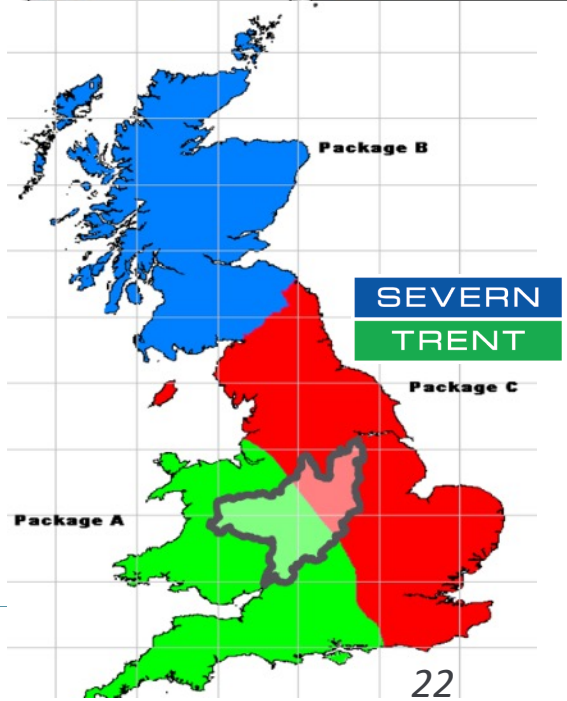
- As a water industry specialist, we're already leaning with a 2030 Operational NZ ambition – Our "Triple Carbon Pledge"

For MOD in the UK:

- Severn Trent's commercial services arm (STS) provides water & wastewater services to 1,200 defence sites
- An average of X.Xm^3 is supplied across the Package C area
- STS Sustainability Plan and Scorecard created for all activities
- We are engaging with our suppliers on Scope 3
- We're keen to meet like-minded Defence stakeholders and suppliers to "deliver actions not words" – see attached



STS Sustainability Scorecard 2024



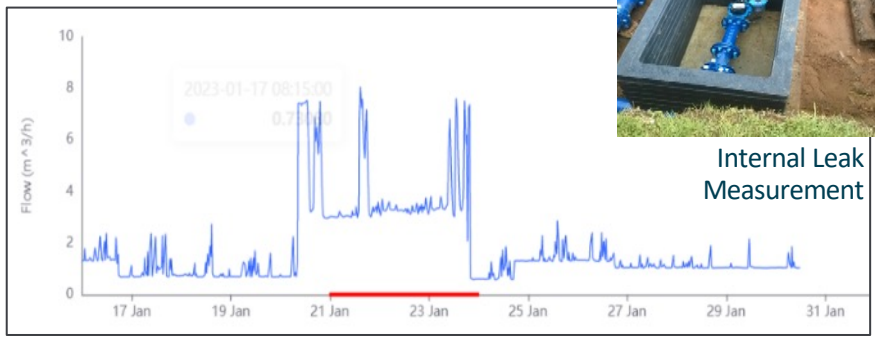
https://www.stservices.co.uk/sustainability/

Water Availability & Consumption

- Some sites have insufficient water today, let alone in the future
- The MOD contract encourages the reduction of water leakage on external networks
- The meter network could be extended to measure consumption and wastage
- Flow data informs spend to save measures and reduces water, carbon & cost

Challenges:

- Some sites/buildings have unmonitored high internal water wastage
- Little or no water conservation if supplied “free of charge” e.g. concrete mixing – can impact Defence ops



Internal Leak Measurement

Defence Benefits and Opportunities:

- Water resources protected by reducing external leakage on some sites from >50% to <18%
- Proactive monitoring of network bursts reduces operational impacts
- Data analysis enables targeted investment to meet Government (GGC) waste reduction targets

SuDS and Nature Based Solutions

- SuDS offer a solution for today and the future
- Innovation changes how we design and build
- Examples:
  - Constructed wetlands to attenuate storm flows
  - Reed Bed solutions to treat wastewater

Challenges:

- Few NBS examples on the Defence estate (yet)
- Poor SuDS standards lead to high maintenance costs
- How to access Biodiversity Net Gain (BNG) funding

Defence Benefits and Opportunities:
- Reduced surface water flooding impacts on Defence operations
- Improved amenity for personnel and communities
- Lower carbon footprint than traditional construction

Constructed Wetlands, Gloucestershire

UK's Largest Reed Beds, Coal Authority

Rainwater Harvesting

- Pilot project designed, built and funded by STS
- Designed to prove the concept and viability of RWH
- Initial Findings:
  - Best suited to very large roof areas with large storage tanks
  - Non-potable uses are ideal – e.g. Vehicle washing
  - Alternative supplies needed during dry periods
- Challenges:
  - Ensuring no cross contamination of potable water quality
  - Ongoing O&M needs to be maintained properly
  - Selecting the right buildings in the right locations

RWH Pilot, Catterick, North Yorkshire

Defence Benefits and Opportunities:
- Reduced usage of drinking water for non-potable uses, especially useful in water stressed areas
- Reduced cost and carbon in the long term
- New builds could/should include water recycling wherever possible

Fleet Decarbonisation

- Many Defence suppliers have made fleet decarbonisation commitments
- STS continues to invest in electric vehicles but charging infrastructure is critical
  - STS adding to the fleet this year – will ramp up to 2030
  - Participated in RAF Leeming's EV charger trial – useful lessons learnt
- PV panel trial installation at Catterick water treatment works

MOD Catterick: EV Rollout and PV Cells

Challenges:

- Power infrastructure on site is at capacity
- Access to charging infrastructure is critical
- MOD support required to lower Scope 3 emissions

Defence Benefits and Opportunities:

- Defence supplier alignment on fleet decarbonisation and engagement to plan for the future
- Reduction of a key component of supplier (Scope 3) emissions on service contracts
- Alignment of standards across Defence suppliers

Sustainability and Innovation

- Commitment to water technology and innovation:
  - Flow measurement, low/zero O&M Carbon solutions
- Calculation and comparison of whole life Carbon cost
- Targeted waste reduction and recycling

Challenges:

- Alignment across Defence – Shared vision
- Geography – Collaboration across suppliers
- We need Practical examples. e.g.:
  - Wetlands and SuDS to reduce flooding
  - Proactive reduction of water wastage – across contracts

Defence Benefits and Opportunities:
- Strength of collaboration across all stakeholder communities
- Implement and showcase sustainable water solutions
- Collaboration on Social Value projects

Reduce, Recycle & Re-use:
- Recycled crushed stone access track
- Recycled plastic valve & hydrant chambers

MOD Shoeburyness: Innovative zero energy sewage treatment

Water Meter Data Analysis

Slip lining innovation for new mains

Suggested Next Steps

- **Water Resources**: Increase awareness of water stress and importance of minimising wastage and increasing recycling
- **SuDS & NBS**: Identify sites and locations for example installations
- **Rainwater Harvesting**: Identify potential trial sites before wider rollout
- **Fleet Decarbonisation**: Bring together interested parties across Defence
- **Sustainability Data**: Develop metrics to encourage the right behaviours
  - Net Zero: Increase engagement with MOD
  - Community: Identify worthwhile joint volunteering events
- **Estate Development**: Vital that plans for future increases in infrastructure footprint and personnel consider water and wastewater requirements

Community Project with e50k
Bramble Woods, Catterick

Q&A

Our Future Customers
STS Education Resources at Family Days

Contact us: sustainability@stservices.co.uk
Web: https://www.stservices.co.uk/sustainability/

SEVERN TRENT SERVICES a part of SEVERN TRENT

Babcock International
Natural Environment

Phil Anderson

Group Environment Manager

April 2024

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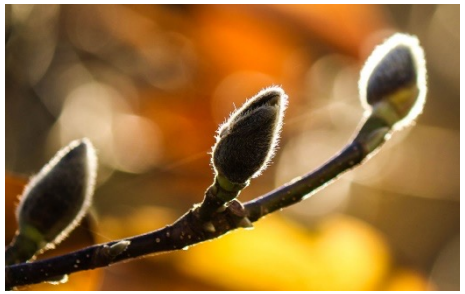
Business and Biodiversity

"Biodiversity loss represents a major risk to economic growth and communities and is a critical issue across operations and supply chains for all business."
UK Business & Biodiversity Forum.

International governments are establishing legal requirements on business to protect and preserve nature….

Emerging priorities for Business:

- International Drivers - COP 15 Global Biodiversity Framework.
- Taskforce for Nature related Financial Disclosures.
- Biodiversity disclosures (inc GRI 101/304).
- Bid and supply chain requirements.
- National legislation – e.g. Environment Act 2021.



2020 UN BIODIVERSITY CONFERENCE
COP 15 - CP/MOP10-NP/MOP4
Ecological Civilization-Building a Shared Future for All Life on Earth
KUNMING – MONTREAL

Babcock's Environmental Commitments

Material issues	Environment
	Biodiversity and ecological impact
	Climate change
	Waste
	Water consumption

1. Carbon Reduction Plans covering all of Babcock's operations by 2023.
2. **Conduct biodiversity assessments across all significant sites by 2024.**
3. Prepare Waste Management Plans across all significant sites by 2024.
4. Prepare Water Management Plans across all significant sites by 2024.
5. All Babcock's operations delivered within an Environmental Management System by 2024.
6. Deliver 42% reduction in emissions by 2030 and work towards Net Zero by 2040.
7. **Delivery a 10% Biodiversity increase across the estate by 2030.**
8. Zero controlled waste to landfill by 2025.
9. Eliminate the use of avoidable single use plastic by 2027.
10. Advanced environmental awareness training will be provided to all appropriate employees by 2025.

Nature Positive

Being Nature Positive means the impact of your activities results in an enhanced natural environment compared to what was there before your activities started.

Nature Positive involves

- **Acting on all components of nature:** nature is made up of all living and non-living components of the natural world, and their interactions. Becoming Nature Positive means positively impacting biodiversity, but also land, freshwater, marine and atmospheric environments.
- **Achieving a measurable net gain from an established baseline.**
- **Achieving systemic change in your activities across the entire value chain:** becoming Nature Positive involves taking action not only in your direct operations and assets, but also in your supply chain (upstream), the services you provide (downstream) and financing activities.

Examples of our work to date

- Nature Positive and TNFD Pilot.
- Climate and **Nature** Transition Plans.
- UK Business and Biodiversity Forum membership.

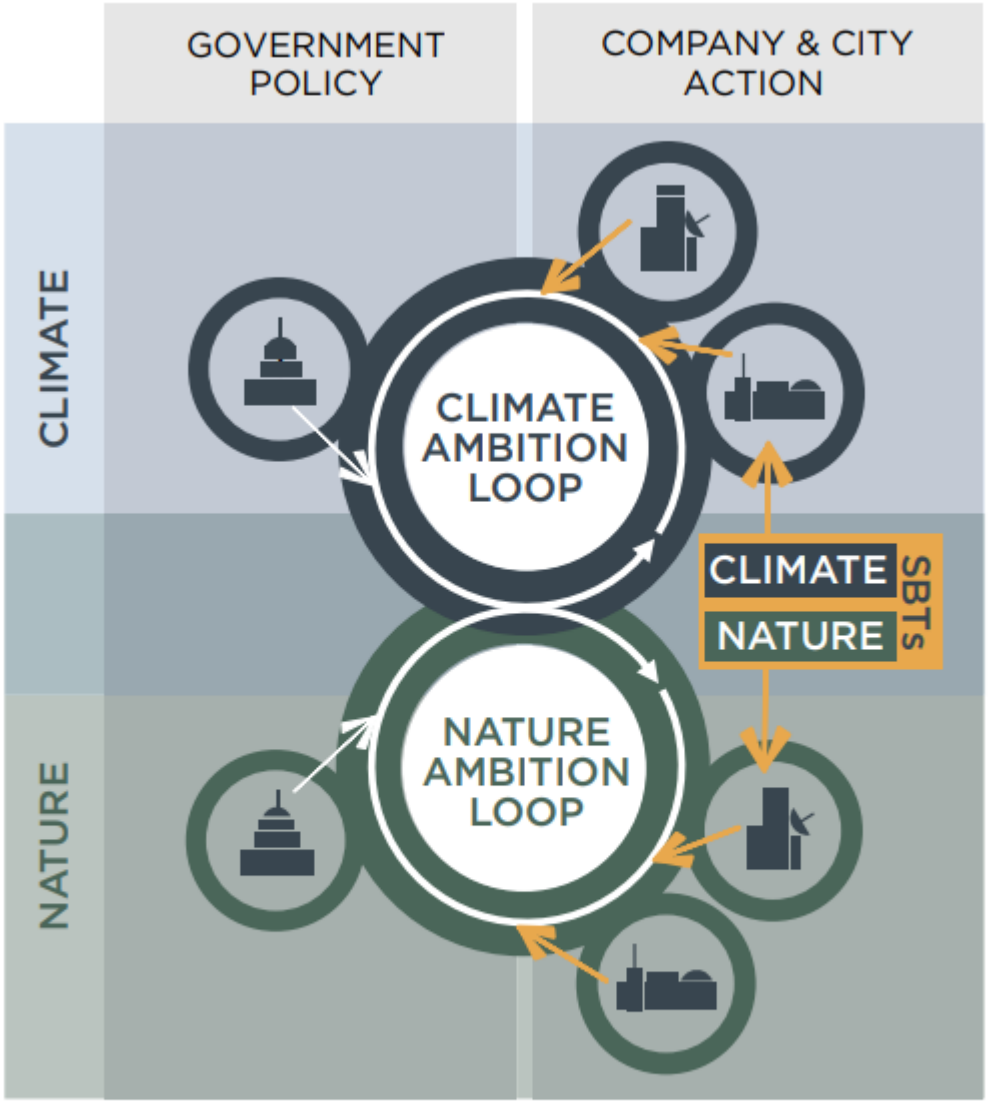


Figure i. Combined 'nature' and 'climate' ambition loops, which collectively create stronger policy and voluntary action for both climate and nature; adapted from the concept of the climate ambition loop, www.ambitionloop.org. Note that although we treat climate and nature as separable issues in this graphic, they are scientifically, politically and economically intertwined.

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Understanding our interaction with Nature across the business….

Estates and Assets

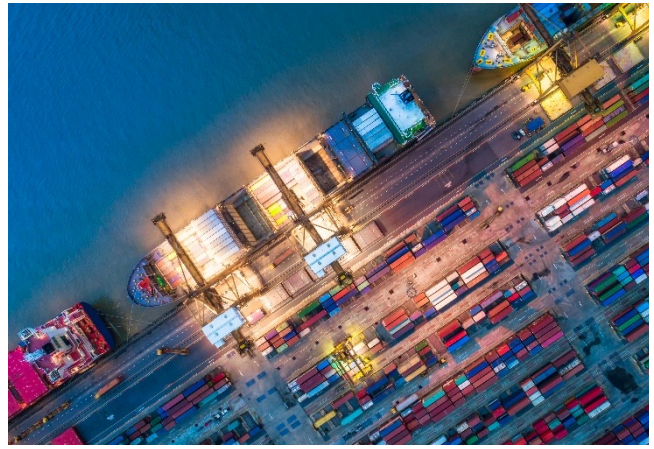
Evidence driven investment in nature-based solutions across our estates and assets.

Products and Services

Consider opportunities for reduced impact on nature from our services and materials.

Value Chain

Understand our nature based risks and dependencies across our supply chains.



Governance and Culture

Encourage volunteering and local engagement.

Strategy and Policy

Data and Information

Developing new metrics and requirements across the above strands, inc GIS data.

Environmental Disclosures

Respond to emerging financial disclosures and business reporting requirements.

ISSB

TNFD

GRI Empowering Sustainable Decisions

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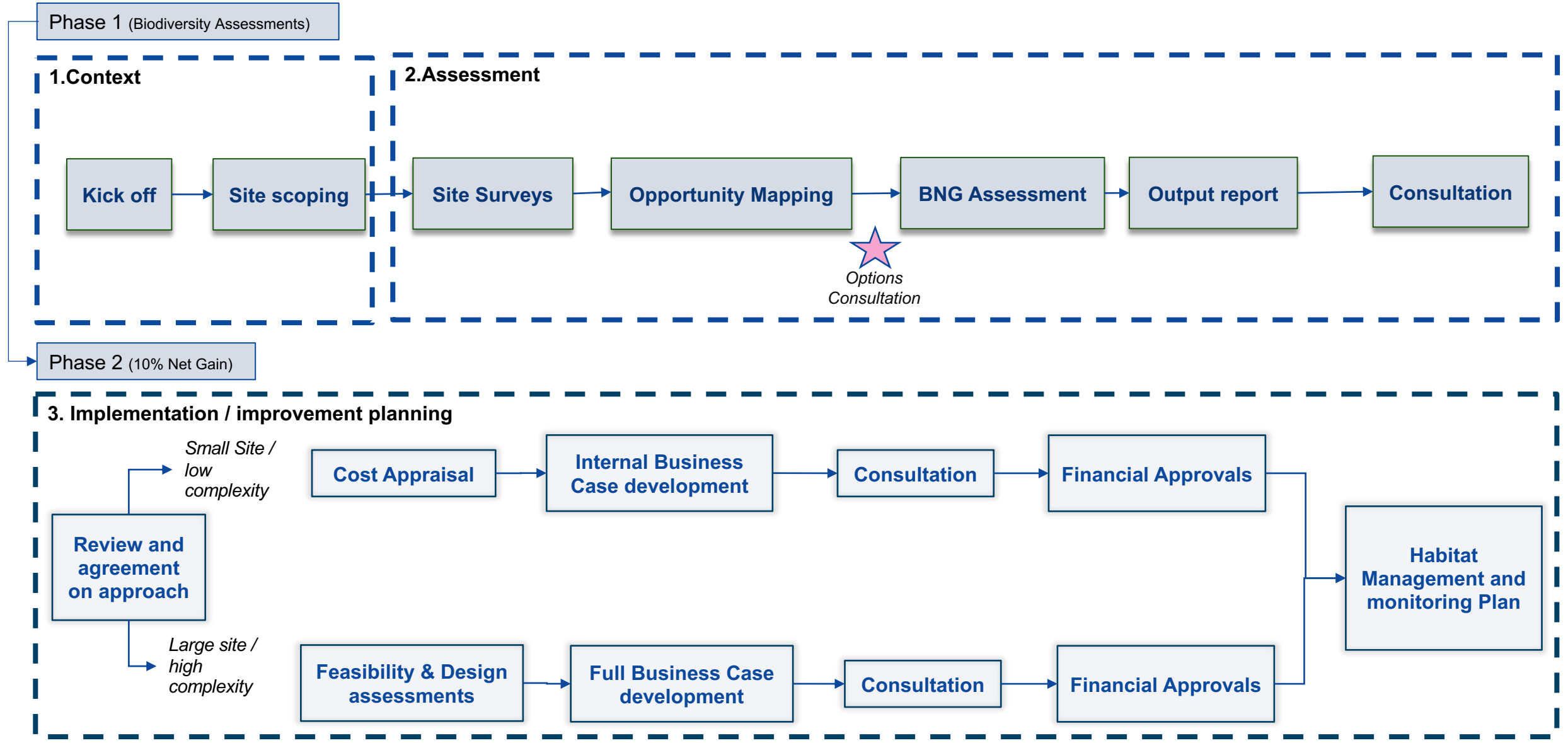
Estates and Assets
Example Biodiversity Net Gain Assessments

- BNG Assessments across 13 significant sites.
- Investment in nature-based solutions.

Introduction and scope → Baseline results → Potential enhancments → Biodiversity Net Gain assessment

FINAL RESULTS		
Total net unit change (Including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	3.31
	Hedgerow units	0.27
	Watercourse units	0.00
Total net % change (Including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	29.31%
	Hedgerow units	100.00%
	Watercourse units	0.00%
Trading rules satisfied?		Yes ✓

Estates and Assets: Biodiversity Assessment Process Map



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Draft Nature Positive Roadmap

2023

- TNFD Pilot and Gap analysis.
- Significant site assessments.

BASELINE

2024

- Risk and Opportunity Assessment.
- Data gap analysis.
- Nature integrated within CNTP programme.

SCOPE AND CONTEXT

Biodiversity assessments across significant sites.

Waste and Water Management plans across significant sites.

2025

- Material issues outlined.
- Nature Positive Target framework agreed.

TARGETED IMPROVEMENTS

Zero Waste to Landfill.

2026

- Capital delivery across at least one significant site.
- Delivery strategy and Action plans approved.

2027

Eliminate Single use plastics.

2030

- Full scope of Nature Positive Programme targets delivered.

NATURE POSITIVE PROGRAMME

10% net gain across significant sites

Broader environmental targets achieved

Note: This is an internal draft document not yet published.

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Identify Shared Drivers

Public and Private Sectors drivers

- **Infrastructure Resilience**
- **Environmental regulations and policy commitments**
- **Requirements of bids and tenders**
- **Product innovations**
- **Corporate and Reputation/Market changes**
- **Business Environmental disclosures**

Example…

- E.g. New directives on public sector bodies from the Environment Act 2021.
- Environment Act 2021
- LNRS and Biodiversity Net Gain

- E.g. Changes to legislation and disclosures for business with more stringent nature-related obligationsss
- UN Global Biodiversity Framework
- Taskforce for Nature related Financial Disclosures

OR – Business commitments made in the annual report e.g. 10% Net gain as a response to emerging reporting requirements

Joint projects on shared estates.

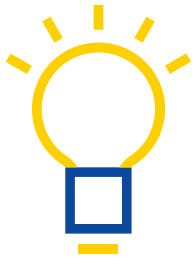
Improved collaboration, data and reporting.

Next Steps / Opportunities

- Map out and understand shared drivers, risks and opportunities.
- Consider key opportunities to collaborate across shared sites.
  - Identify how we can enable an effective discussion.
  - Identify key individuals to support and own the agenda.
- Develop a shared business case.

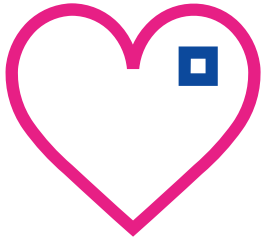
Creating a safe and secure world, together

Our Principles



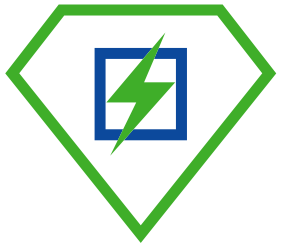
be curious

We believe in positively challenging the status quo and asking ‘how might we?’.



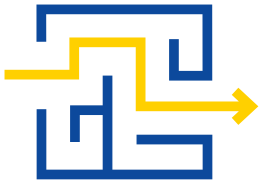
be kind

We believe in being kind to ourselves, kind to each other and kind to the planet.



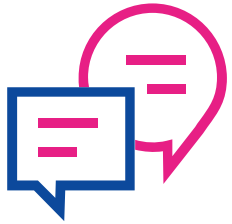
be courageous

We believe in being brave, ambitious and determined.



think : outcomes

We believe in measuring success by the results we deliver and the positive impact we make.



collaborate

We believe Babcock is greater than the sum of its parts.

own and deliver

We believe our collective success depends on individual actions.

NC&I COP – Break

Break

TEAM DEFENCE INFORMATION
www.teamdefence.info

Chris Parker MBE

Director Government, Fortinet UK

GDSA Brief to Natural Capital Group

Government Digital Sustainability Alliance

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- GDSA was founded by Defra 2022.

Government Digital Sustainability Alliance (GDSA) – UK Government Sustainable ICT (blog.gov.uk)

- GDSA members collaborate to develop ideas and solutions to digital sustainability challenges.
- GDSA is made up of 3 new core Working Groups:

1. Circular Economy
2. Scope 3 Emissions
3. Planetary Impact

- Original membership is expanding now.
- Targets/asks are demanding (can be a challenge for committing?).
- MOD useful to be a member – recommendation from our group?

Plymouth University Partnership with Royal Navy on Advanced Ocean Observation

Kevin Forshaw

Director of Industrial & Strategic Partnerships

Faculty of Science & Engineering

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ROYAL NAVY

Links to Natural Capital and Infrastructure Community of Practice in Defence

- Overview of advanced ocean technology to monitor safeguarding Ecological and Biodiversity Net Gain in the Ocean, with a deeper dive into where this might be specially applied to Offshore Renewables.

- The wider context being how Climate Change, and related Resource Scarcity has major implications for the Defence of the UK, and wider global geo-political stability.

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The University of Plymouth

- The first and largest Marine Institute in UK, with over 3000 staff and students looking at the Ocean
- Three-time winner of the Queen's Anniversary Prize for Higher and Further Education, UK Top 25 for Teaching Quality & World Top 25 for Research Citations
- We lead in Marine Science (1st in the world for research towards SDG 14 2021), have the COAST Wave Basin, Navigation Simulation Lab, and extensive fleet of Marine Autonomous Systems
- We apply these facilities to create the thought leadership for a future of safe, efficient and sustainable maritime operations

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14 LIFE BELOW WATER

Pressing need for sustainable exploitation of the ocean environment

- Planet Earth or Planet Ocean? 72% of the world's surface is sea water
- The ocean provides over half of the oxygen we breathe
- And absorbs much of the atmospheric CO_2 emitted from fossil fuel usage

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Growth in the Ocean Economy

- As a species we are increasing exploiting the ocean for resources to sustain a global population heading towards 9bn
- OECD Ocean Economy 2030 report in 2016, that detailed how the ocean economy would double to 3 Trillion USD
- But before we can determine what is sustainable, we need to measure - hence marine autonomy

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Defence Security - Developments with the Royal Navy

- MoU around use of Marine Autonomy for Hydrography and Maritime Cyber Security agreed
- A number of Marine Autonomous platforms on long loan from the RN, with recent further investment into other kit
- Signed off by Admiral Burns (Vice Admiral of the Fleet) in June 2021
- Now an extensive programme of Marine Autonomous deployments engaging the University, Royal Navy and a wider ecosystem of other companies

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ROYAL NAVY

Marine Autonomous Systems Fleet

- Collaboration in pursuit of disruptive technologies and applications
- Long loan of advanced navy assets to drive research, teaching and collaboration with the supply chain
- Elevate the university's solution-focussed approach to collaboration and creating impact

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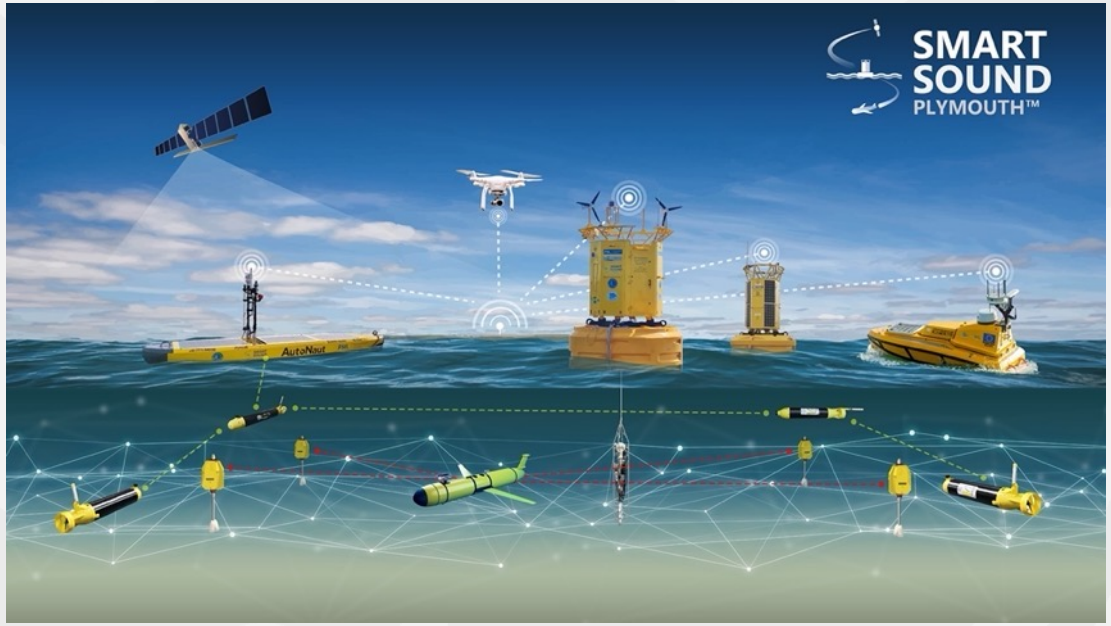
ROYAL NAVY

Smart Sound Plymouth
Unique enabling infrastructure

- The UK's platform for proving, validating and demonstrating advanced marine autonomy, technology and digitalization

- Unique Natural Capital
- Deeply Understood
- Cutting Edge Platform Assets
- Highly Connected Infrastructure
- Accessible



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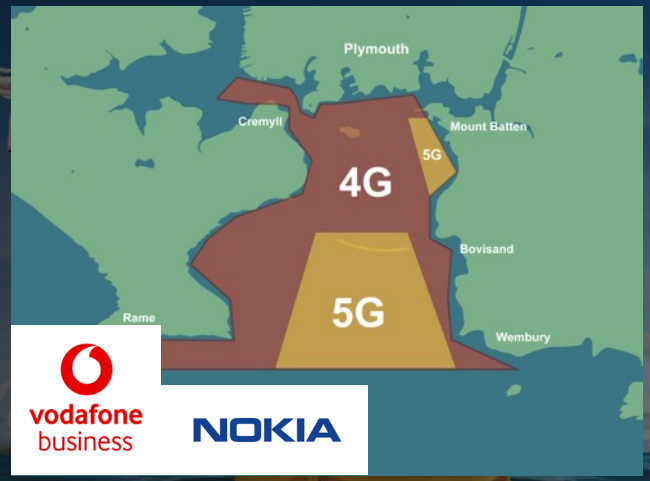
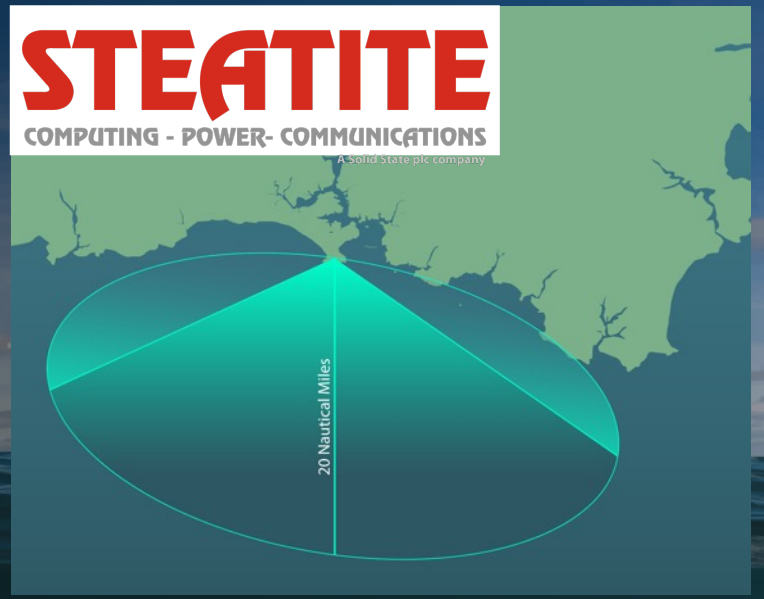
PML | Plymouth Marine Laboratory

Smart Sound Connect

£1.8m investment to deliver an advanced private marine comms network to Smart Sound.





- Vodafone & Nokia deliver the 5G/4G private network across the port.
- 5G coverage in pre-agreed autonomy trials areas.
- Control hubs to be housed at Oceansgate and PML.
- Steatite to provide Wave Relay offshore marine network, coverage over 20 miles offshore.
- Operated by PML and free use of the network until August 2023.
    - SIM cards, modems, vessel support and network engineering support.

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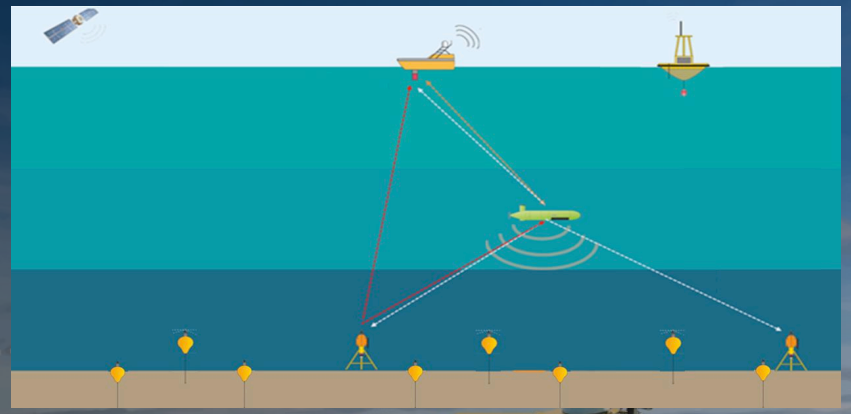
PML | Plymouth Marine Laboratory

Smart Sound Connect – Sub-Surface

£1.2m investment delivering a sub-surface advanced comms & navigation network



- Mobile sub-surface network that can be deployed across the Smart Sound.
- Comms & navigation within 9km^2 area.
- Connected seabed nodes for real-time environmental parameters (currents/waves).
- Interfacing to the surface communications network.
- Linked and accessed through the multiple Remote Operation Centres.
- Integrated networks to facilitate system of system missions.
- Available to industry and academia both within the UK and Internationally.
- Key infrastructure to develop assurance for sub-surface and system of systems.

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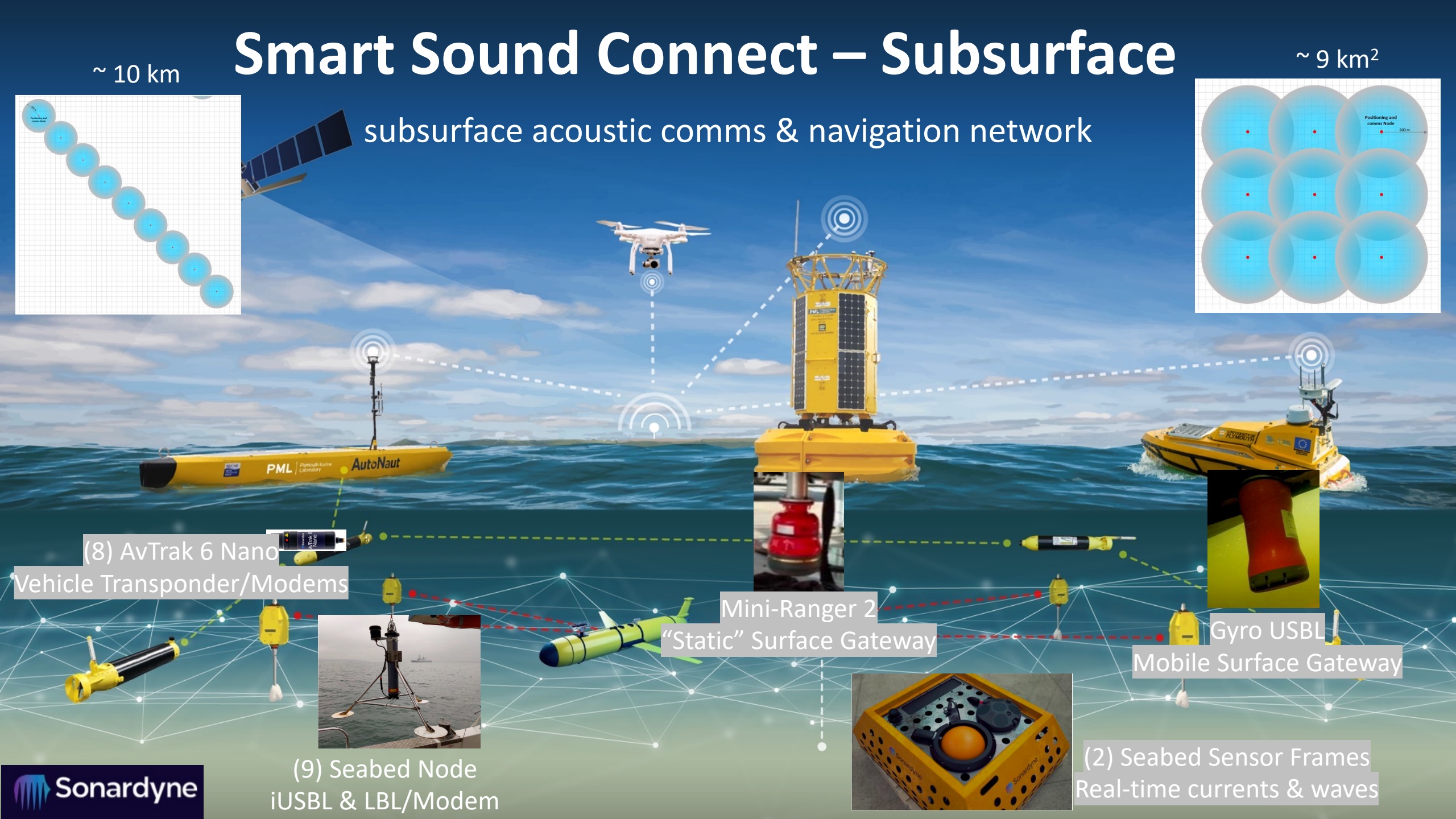
Smart Sound Connect – Subsurface

~ 10 km

subsurface acoustic comms & navigation network

~ 9 km²



(8) AvTrak 6 Nano
Vehicle Transponder/Modems

Mini-Ranger 2
"Static" Surface Gateway

Gyro USBL
Mobile Surface Gateway

(9) Seabed Node
iUSBL & LBL/Modem

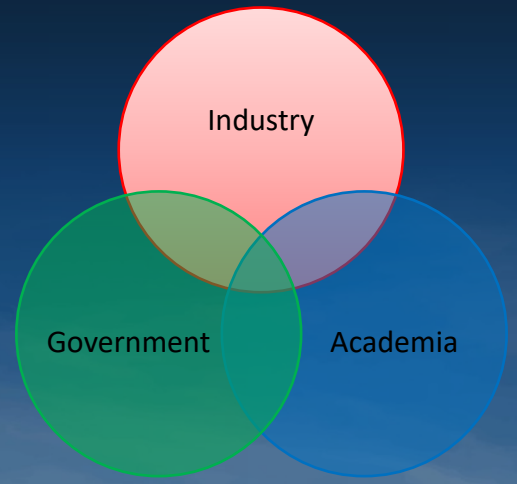
(2) Seabed Sensor Frames
Real-time currents & waves

Sonardyne

Strong Cluster Engagement

- Future Autonomous at Sea Technologies (FAST) Cluster
- Triple Helix cluster (Strong Industry Component)
- Largest Marine Autonomy cluster in the UK

FAST CLUSTER



HydroSurv Unmanned Ingenuity
USS unmanned SURVEY SOLUTIONS
AutoNaut
WITT ENERGY
JET ENGINEERING THE CONNECTED COAST
BlueOcean MONITORING
Sonardyne
Applied Genomics
MSubs Ltd underwater vehicles & equipment
BIT GROUP
UK Hydrographic Office
Métalectrique
FUGRO
VALEPORT
sulmara SUBSEA
eSL
Marine AI Bringing the Power of AI and Machine Learning to the Sea
PLYMOUTH BOAT TRIPS CRUISING · FERRIES · FISHING
FRONTIER TECHNICAL
OCEAN FUTURES
MAYFLOWER AUTONOMOUS SHIP
VOYAGER BOATYARD STORAGE | REPAIRS | BOAT BUILDING
SILICON SENSING SUPERIOR SENSORS

THALES
babcock
BAE SYSTEMS
ATLAS ELEKTRONIK UK A company of the ATLAS ELEKTRONIK Group

ADMIRALTY MARINE DATA PARTNER
MARINE BUSINESS TECHNOLOGY CENTRE PLYMOUTH Where enterprise meets the ocean
PLYMOUTH CITY COUNCIL
Turnchapel Wharf
Oceansgate PLYMOUTH
MARITIME UK SOUTH WEST

PML Plymouth Marine Laboratory
UNIVERSITY OF PLYMOUTH Marine Institute
city college plymouth
UNIVERSITY OF EXETER
THE MARINE BIOLOGICAL ASSOCIATION

Embracing the advantages of Digitisation while managing the risk

Headline Issue

- 68% increase in Maritime Cyber-Attacks in 2021 (US Coast Guard)
- Average cost to operators $180k rising to $1.8m mitigation cost for the top 8% of attacks (Great Disconnect Report)

Shipping is a very soft target

- Platforms operating for 25 years + with legacy systems, and many additions to a network that no one really accepts exists!
- Largescale ignorance throughout the sector
- Current focus on IT, while completely forgetting the Operational Technology

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Cyber-SHIP Lab
SECURING MARITIME

Cyber-SHIP Lab a £3.2m investment for the maritime sector

Research England

Cyber-SHIP Lab
SECURING MARITIME

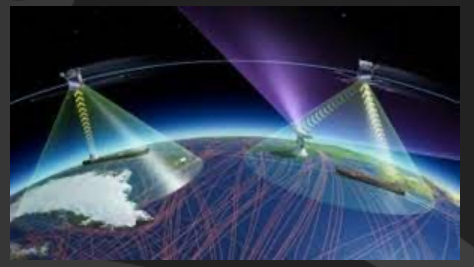
- Maritime cyber-physical research facility
- Physical twin using real hardware
- Unique capabilities for testing systems
- Growth capabilities around Ports and MASS

Management of vulnerabilities (Hardware and Software) from the Lab

- Using the lab we are able to find vulnerabilities in both hardware and software of specific items of equipment
- We can monitor vulnerabilities, and also monitor how people interact with the hardware/software during cyber incident – enabling advanced mariner training
- We can automate vulnerability finding and also asset lists to see what systems are live and determine incidents in real-time
- We can test mitigations in the testbed to reduce vulnerabilities in a safe (but real system) environment before real-world testing to ruggedise systems

Security Implications of a Satellite Communication Device on Wireless Networks

- The notion that ships, marine vessels and off-shore structures are digitally isolated is quickly disappearing.
- Accessible wireless communication technologies (e.g.long-range satellite) are quickly removing any air-gaps these entities have.
- Commercial, defence, and personal ships have a wide range of communication systems to choose from, yet some can weaken the overall ship security.
- While the backbone satellite comms this is often secure, third-party devices may introduce vulnerabilities with a wide range of products now available.
- Our research has looked at the vulnerability of an existing, off-the-shelf products and how a novel attack-chain can compromise the device, to introduce vulnerabilities to the wider network



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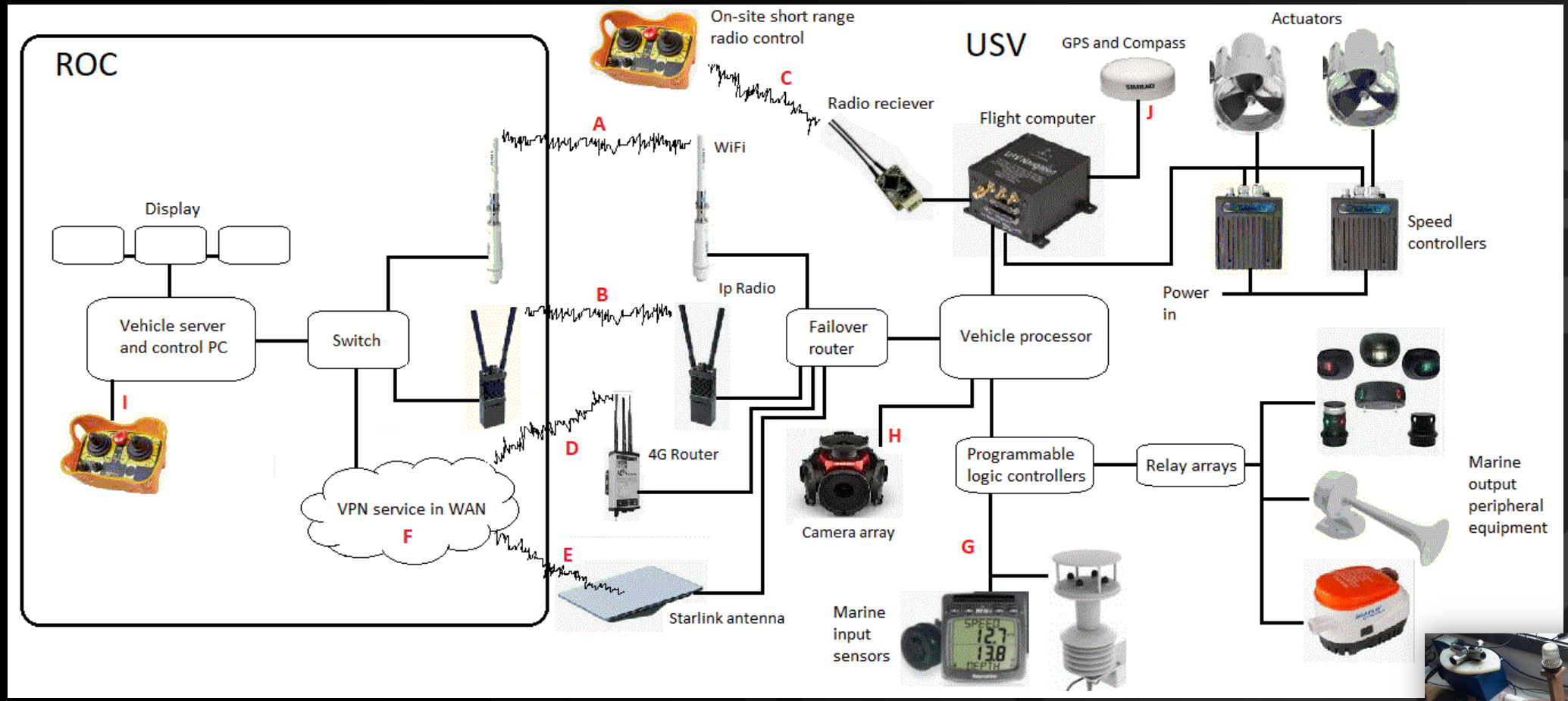
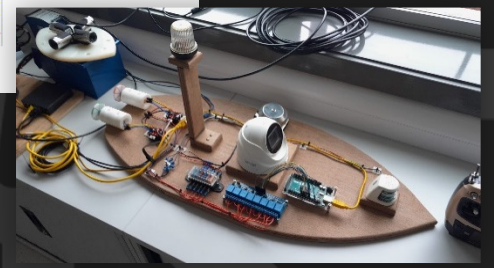
Dry Rack USV Schematic





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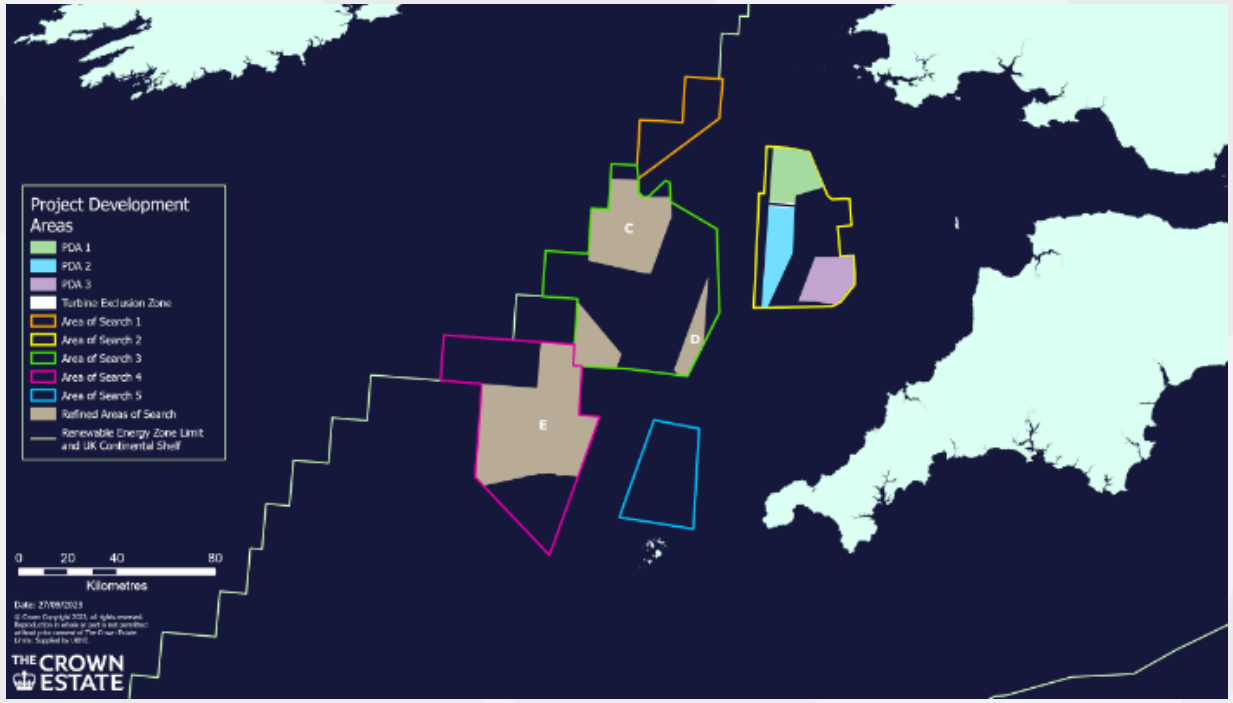
Energy Security and the Celtic Sea FLOW opportunity

The Crown Estate Offshore Wind Leasing Round 5

- Celtic Sea Project Development Areas (Scenario update, October 2023)
- 4.5GW by 2035
- Potential for additional 20GW by 2045
- Estimates that 100GW of FLOW deployment can deliver £43.6bn in UK GVA by 2050



Credit: The Crown Estate

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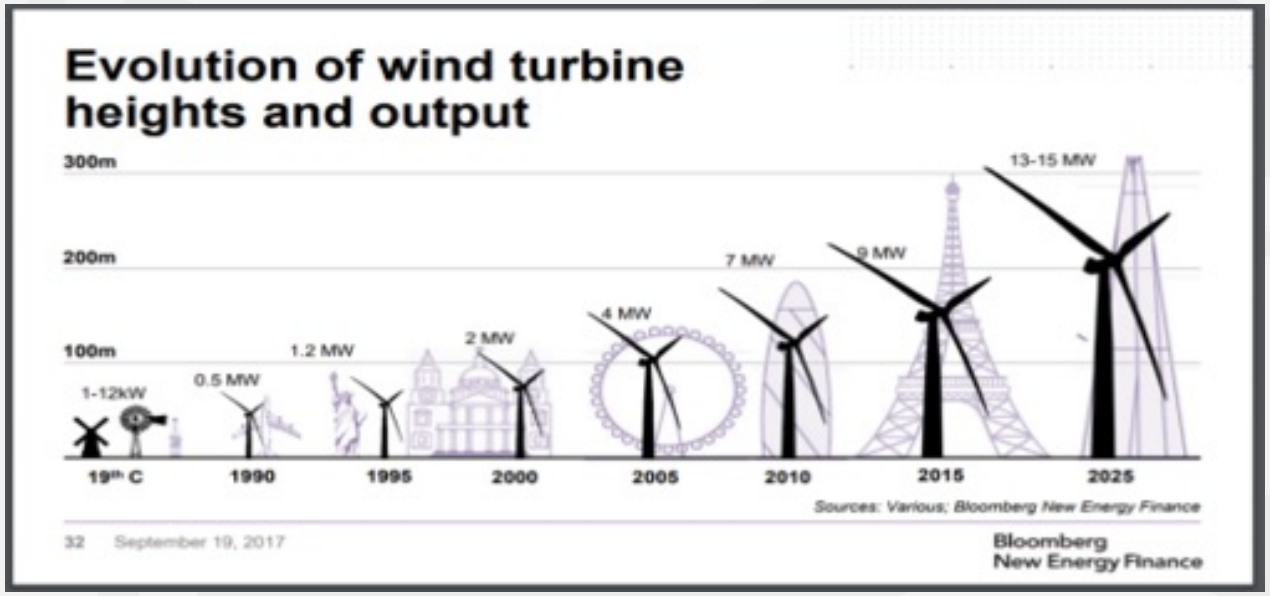

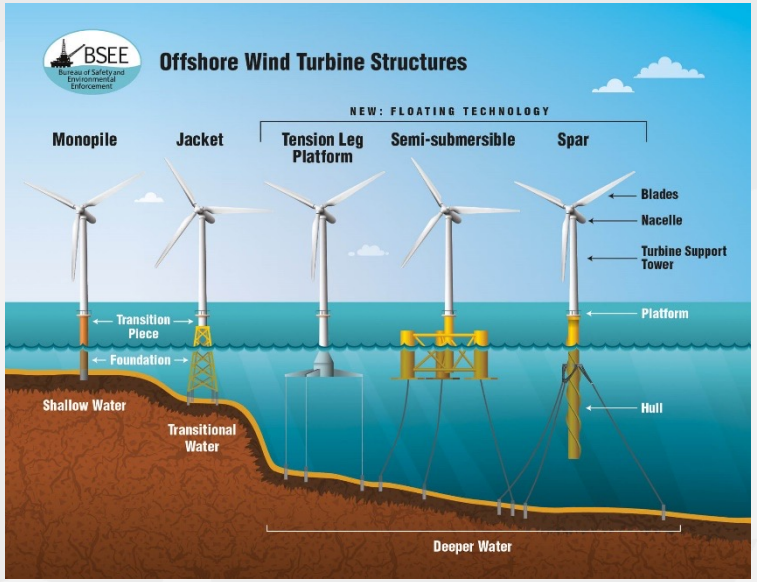

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Cyber-Resilience of Offshore Wind Networks (CROWN)

Facilitating the development of a new maritime cyber cluster

Led by the University of Plymouth, working in collaboration with the Offshore Renewable Energy (ORE) Catapult, the CROWN project will facilitate the ongoing development of a maritime cyber cluster centered in the heart of the South West.

The partners will co-design the world's first dedicated offshore wind cyber security research, test and development facility. This will support the investigation of offshore wind technology and control networks focusing on cyber vulnerability, and develop resilience procedures, security measures, and tools.

Drawing all of this together

- The University continues to lead of development and use of new technology for advanced Ocean Observation
- We apply this for marine science, but defence uses the same thinking for applications including ASW and MCM
- The ocean will increasingly providing resources for a growing global population, but negative impacts on the ocean environment will further exacerbate Climate Change – this a trigger for further conflict
- Although ORE provides opportunities to decarbonize electricity production with long-term benefit for the climate, increasing geo-political tensions will require application of this technology for protection of this Critical National Infrastructure in the short-term

Thank you for listening

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Faculty of Science & Engineering

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+44 (0)7814 288507

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MARITIME UK SOUTH WEST

NC&I COP – Thoughts and Potential WG Topics

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- Investigate how Mod/Industry/Public Sector can better utilise Ecological and Biodiversity Net Gain (BNG) assessments to fund opportunities on projects within shared sites
- Investigate the impact of the circular economy on re-use of assets, resilience and operations
- Investigate how Nature Based Solutions (NBS) benefits (e.g. carbon management (PAS2080), cleaner air, biodiversity, wellbeing etc.) can be quantified and embedded in business cases and outcome-based procurement
- Map the Natural Capital assessment/appraisal methodologies utilised across Defence
- Map the various groups, standards and initiatives involved
- Identify opportunities for MOD to access natural capital finance

NC&I COP – Next Steps and Actions

Confirm co-chair

WG priorities

Proposed next COP meeting

October/November Conference

NC&I COP – Introductions and Objectives

Team Defence has defined this activity as focusing on **Natural capital,** which is the world's stock of natural resources, which includes geology, soils, air, water, and all living organisms. Some natural capital assets provide people with free goods and services, often called ecosystem services and **Infrastructure** - the basic physical and organisational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise.

Community of Practice (COP)

Co-chaired by Industry and MOD. A group of people who share a common concern, a set of problems, or an interest in a topic and who come together to fulfil both individual and group goals.
Communities of practice share best practices creating new knowledge to advance a domain of professional practice. Interaction on an ongoing basis is an important part of this.
The COP relies on face-to-face meetings as well as web-based collaborative environments to communicate, connect and conduct community activities.

NC&I COP – Introductions and Objectives

Why get involved?
Ability to understand the direction of travel from within Defence, shape, influence and assist MOD in its future direction for NC&I. Working as part of a team with equally capable and knowledgeable organisations within Defence and the wider community. This is an opportunity for wider industry experience and best practice to be showcased within the Defence environment.

Todays objectives
Determine issues and challenges
Understand potential focus areas and topics of interest
Define purpose of the group and potential future collaborative working groups
Identify MOD co-chair
Anything else from participants?

NC&I COP – Context, Interest and Scope

Natural capital and infrastructure have a two-way relationship.
Infrastructure can:

- positively or negatively impact NC assets (e.g. water quality)
- deliver NC benefits (e.g. linear infra and biodiversity corridors)
- be hit by increased costs from nature risks e.g. climate resilience costs
- be avoided or new structures minimised by using NC approaches (e.g. NBS)

There is an urgency to change our approach to the built environment and to deliver solutions to address the complex integrated challenges of climate change, biodiversity loss, population growth and contribute to real change through using our sustainability and infrastructure expertise to help navigate a response that leads to positive outcomes across the entire lifecycle – including feasibility, optioneering, design, planning, building and construction, managing the assets, adapting and decommissioning.

This topic needs diverse disciplines within the infrastructure, nature and sustainability communities and innovative approaches to drive solutions forward.

There is a lot going on already...

NC&I COP – Context, Interest and Scope

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Defence requirements, strategies, delivery, networks and groups

UK GOVERNMENT

Greening Government Commitments

The 25 Year Environment Plan

The Agriculture Act 2020

The Environment Act 2021

The Green Book 2022

MOD Strategies

MOD Climate Change & Sustainability Strategic Approach, 2021

DSTL – Sustainability Strategic Direction, 2022

Army – Land Industrial Strategy, 2022

Defence Support – Sustainable Support Strategy, 2022

RAF – Defence Aviation Net Zero Strategy, 2023

Rural Estate Land Use Strategy

Operation Nightingale (Archaeology)

DIO

DIO Sustainability Strategy

DIO – Strategy for Defence Infrastructure, 2022

DASI – Defence Approach to Sustainable Infrastructure (wip)

Peatland Strategy

Defence Nature Recovery Strategy

Defence Woodland Masterplan

DIO Conservation Stewardship and Overseas Stewardship Funds

DIO Environmental Engagement Team

DEFENCE GREEN NETWORK

Platform for sharing knowledge, best practices, and innovative solutions.

Goal to make sustainability BAU within defence.

DEFENCE STANDARDS

JSP850 and BPS - DREAM / SEAT / Sustainability Appraisals

ADS / DSF

ADS Infrastructure Group

ADS working groups on - Sustainable procurement, Sustainability, sustainable aerospace, sustainable materials

DSF Climate Change and Sustainability

DSF Buildings and Construction

TDi

FUTURES: Sustainable defence support (HMT, Digital Twin, Robotics, AI, future energy)

Asset Management COP

DISIC workshops 2022

NC&I COP – Context, Interest and Scope

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Other working groups and communities outside Defence

UK Green Building Council – business network UKGBC - The UK Green Building Council

Architecture 2030 (and the Climate Action Communique) – research Architecture 2030

World Economic Forum – international organisation The World Economic Forum (weforum.org)

Westminster Energy Forum – strategic intelligence Westminster Energy Forum

World Building Council for Sustainable Development – global community World Business Council For Sustainable Development (WBCSD)

Supply Chain Sustainability School – skills and knowledge sharing Home - Supply Chain Sustainability School (supplychainschool.co.uk)

Net Zero Infrastructure Industry Coalition – contractors

UN Global Compact Network

Environment Analyst – business expert network Market Intelligence Service | UK (environment-analyst.com)

Professional Institutes e.g. IEMA, CIWEM, CIEEM, IES, ICE, etc

NC&I COP – Context, Interest and Scope

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Defence Stakeholders

MOD CC&S Directorate

DIO, Army, Navy, RAF, StratCom

Land and Estate managers

Asset operators

Suppliers

Government

Energy and Emissions

Decarbonisation and Net Zero, New Build and Retrofit

Biodiversity, Environmental Conservation and Natural Capital

Compliance and Environmental Planning

Resilience and Adaptation to Climate Change

Waste, Resource Efficiency, Circularity, Food

Water Management

Archaeology and Heritage Assets

Access and Recreation

Data Management and Reporting

Efficiency and Operational Advantage

Sustainable Procurement

Skills and Capability

Social Value, Social Outcomes

NC&I COP – Context, Interest and Scope

What is the vision and purpose of this community?

How will this community align with Defence work or activities, and other groups?

What are the outcomes that this community wants to drive or benefit from?

How do we achieve actions? What working groups do we want within this community (aligned to the outcomes for the community)

Can this community help the MOD with challenges and bandwidth to help accelerate delivery?

How can we draw upon the existing wealth of information and research to support Defence ambition and delivery?

What?

Improve standards / specifications

Optioneering and Risk Assessment

Impact Assessment and Reporting

Optimising Design and Environmental Proposals

Building the Business Case

Stakeholder Engagement and Communications

Improved Asset Operation and Management

Strategies for Improved / Sustainable Land Management

Building competency / addressing skills shortage.