XLINKS' MOROCCO-UK POWER PROJECT

Offshore Water Framework Directive Assessment

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Acronyms

Acronym	Meaning
AA	Appropriate Assessment
CBRA	Cable Burial Risk Assessment
CEMP	Construction Environment Management Plan
CLV	Cable laying vessel
COLREG	International Regulations for the Prevention of Collisions at Sea
DAS	Distributed Acoustic Sensing
DML	Deemed Marine Licence
DTS	Distributed Temperature Sensing
EEZ	Exclusive economic zone
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EQS	Environmental Quality Standard
ES	Environmental Statement
FOC	Fibre optic cables
GB	Great Britain
HDD	Horizontal Directional Drilling
HVDC	High Voltage Direct Current
INNS	Invasive non-native species
JNCC	Joint Nature Conservation Committee
LAT	Lowest Astronomical Tide
MCZ	Marine Conservation Zone
MFE	Mass flow excavation
MINNS	Marine Invasive Non-Native Species
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MPCP	Marine Pollution Contingency Plan
NSVMP	Navigational Safety and Vessel Management Plan
OCC	Offshore Cable Corridor
OOS	Out of Service
OS	Ordnance Survey
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PLONOR	Pose Little Or No Risk
RIAA	Report to Inform Appropriate Assessment
ROV	Remotely operated vehicle
SAC	Special Area of Conservation
SOLAS	International Convention for the Safety of Life at Sea
SOPEP	Shipboard Oil Pollution Emergency Plan
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TCE	The Crown Estate

Acronym	Meaning
UK	United Kingdom
UXO	Unexploded Ordnance
VMP	Vessel Management Plan
WFD	Water Framework Directive

Units

Units	Meaning
m	Metre
m^2	Square metre
m^3	Cubic metre
GW	Gigawatt
GWh	Gigawatt hour
GWp	Gigawatts peak
ha	Hectares
km	Kilometre
km^2	Square kilometre
kV	Kilovolt

1 INTRODUCTION

1.1 Overview

1.1.1 This report presents the Water Framework Directive (WFD) Assessment for the UK offshore elements of Xlinks' Morocco-UK Power Project. For ease of reference, the UK elements of the Project are referred to in this report as the 'Proposed Development'. The report accompanies the application to the Planning Inspectorate for development consent for the Proposed Development.

1.1.2 The proposed works are within the Barnstaple Bay coastal water body (ID: GB610807680003) and are in the vicinity of the Taw / Torridge transitional water body (ID: GB540805015500), Lundy coastal water body (ID: GB610878040000) and the Cornwall North coastal water body (ID: GB610807680002).

1.1.3 This WFD Assessment presents an assessment of the potential for the Proposed Development to have any non-temporary effects on WFD quality elements for these water bodies, and any potential to prevent the water bodies from meeting their WFD objectives.

1.1.4 A separate WFD Assessment has been prepared in relation to the UK onshore elements of the Proposed Development (Volume 2, Appendix 3.2 of the ES). The offshore and the onshore WFD assessments have been prepared separately due to the distinct footprints and activities for the onshore and offshore aspects of the Proposed Development, and the fact that specific offshore (transitional and coastal) WFD assessment guidance has been followed for this assessment.

1.2 Proposed Development Details

1.2.1 The Proposed Development forms part of the wider Project proposed by Xlinks 1 Limited (the 'Applicant') to develop a sub-sea electricity supply project from Morocco to the UK. The Project includes an electricity generation facility entirely powered by solar and wind energy combined with a battery storage facility. Located in Morocco's renewable energy rich region of Guelmim Oued Noun, the Applicant proposes to install approximately 11.5 Gigawatts peak (GWp) of renewable energy capacity that would cover an approximate area of 1,500 km^2 and connect exclusively to Great Britain (GB) via four high voltage direct current (HVDC) sub-sea cables, with a total offshore route between Morocco and the UK of approximately 4,000 km.

1.2.2 The offshore elements of the Proposed Development in UK waters that are the subject of this assessment will be undertaken within the Offshore Cable Corridor (OCC).

1.2.3 The extent of the OCC is from the UK Exclusive Economic Zone (EEZ) boundary to the landfall site at Cornborough Range on the north Devon coast. The total length of the OCC in UK waters is approximately 370 km.

1.2.1 The OCC has a nominal width of 500 m extending up to 1,500 m at some crossing locations (where the cable needs to cross existing power and telecoms cables for example) to provide the cables with sufficient space to

cross the existing assets as close to 90 degrees as possible (and thus reduce the footprint of the crossing on the seabed). The OCC width is also extended to 1,500 m at the western edge of The Crown Estate's (TCE's) Project Development Area 3 (Offshore Wind Leasing Round 5) to ensure this area can be avoided if necessary.

1.2.2 Route optimisation studies have informed the routing of the OCC; these studies have included multiple desktop studies and marine investigation surveys. Route optimisation has considered e.g. depth, seabed features, metocean influences, external stakeholders (e.g. seabed leaseholders, fishing activities, shipping etc) and environmental constraints such as marine protected areas including Special Areas of Conservation (SACs), Special Protection Areas (SPAs), and MCZs.

1.2.3 The width of the OCC will allow some flexibility for micro-routing of the cables within it. Flexibility for micro routing within the OCC will be retained until cable installation, to:

- allow for the final precise cable route to adapt to the conditions encountered during pre-construction surveys and selection of specific installation methods (noting that extensive seabed characterisation surveys and an Outline Cable Burial Risk Assessment (CBRA) - Volume 1, Appendix 3.4 of the ES - have been undertaken);
- allow potential micro-routing comments from relevant stakeholders to be addressed, including e.g. Historic England inputs via the Archaeological Outline Offshore Written Scheme of Investigation; and
- allow the flexibility to avoid currently unforeseen hazards (such as potential unexploded ordnance (UXO) identified during the pre-cable lay geophysical survey).

1.2.4 The offshore cables would consist of four 525 kV HVDC marine power cables which would be installed for the majority of the cable route as two bundled pairs (Bipole 1 and Bipole 2). The bundled pairs would be separated into four individual cables a short distance before the landfall HDD entry points, to allow each cable to be pulled onshore through individual HDD ducts.

1.2.5 Each offshore HVDC cable would have a diameter of approximately 175 mm and an approximate weight of 70 kg/m in air. Each cable pair (forming a bipole) would facilitate the transfer of 1.8 GW to the national grid, resulting in a total of 3.6 GW power supply into the UK.

1.2.6 In addition to the four HVDC marine power cables, two fibre optic cables (FOC) would provide a cable monitoring fibre system (Distributed Acoustic Sensing and/or Distributed Temperature Sensing). Each FOC would be approximately 35-40 mm in diameter and laid together with the marine cables within a shared trench (one FOC per cable bundle). FOC repeaters would be required approximately every 70 km along the OCC (four to five repeaters per bipole). At each repeater location, there would likely be a spur of FOC installed adjacent to the cables for the installation of the repeaters and ongoing maintenance purposes. The spur of FOC at each repeater location would be equal in length to the water depth at the repeater location.

1.2.7 The FOC spurs and repeaters would be buried to the same depth as the HVDC Cables in accordance with the outline CBRA (Volume 1, Appendix 3.4 of the ES). It is assumed that the FOC spurs would be buried using the

same, or less intrusive, methods as the HVDC Cables (lesser trench width required for FOC burial). The FOC repeaters would be buried broadly parallel to the HVDC Cables, within the boundary of the OCC taking place soon after the HVDC cable protection works.

1.2.8 At the landfall, the FOCs would be installed alongside an HVDC cable within an HDD duct, i.e. adjacent to one of the power cables within the same HDD duct.

1.3 Location and Context of the Works

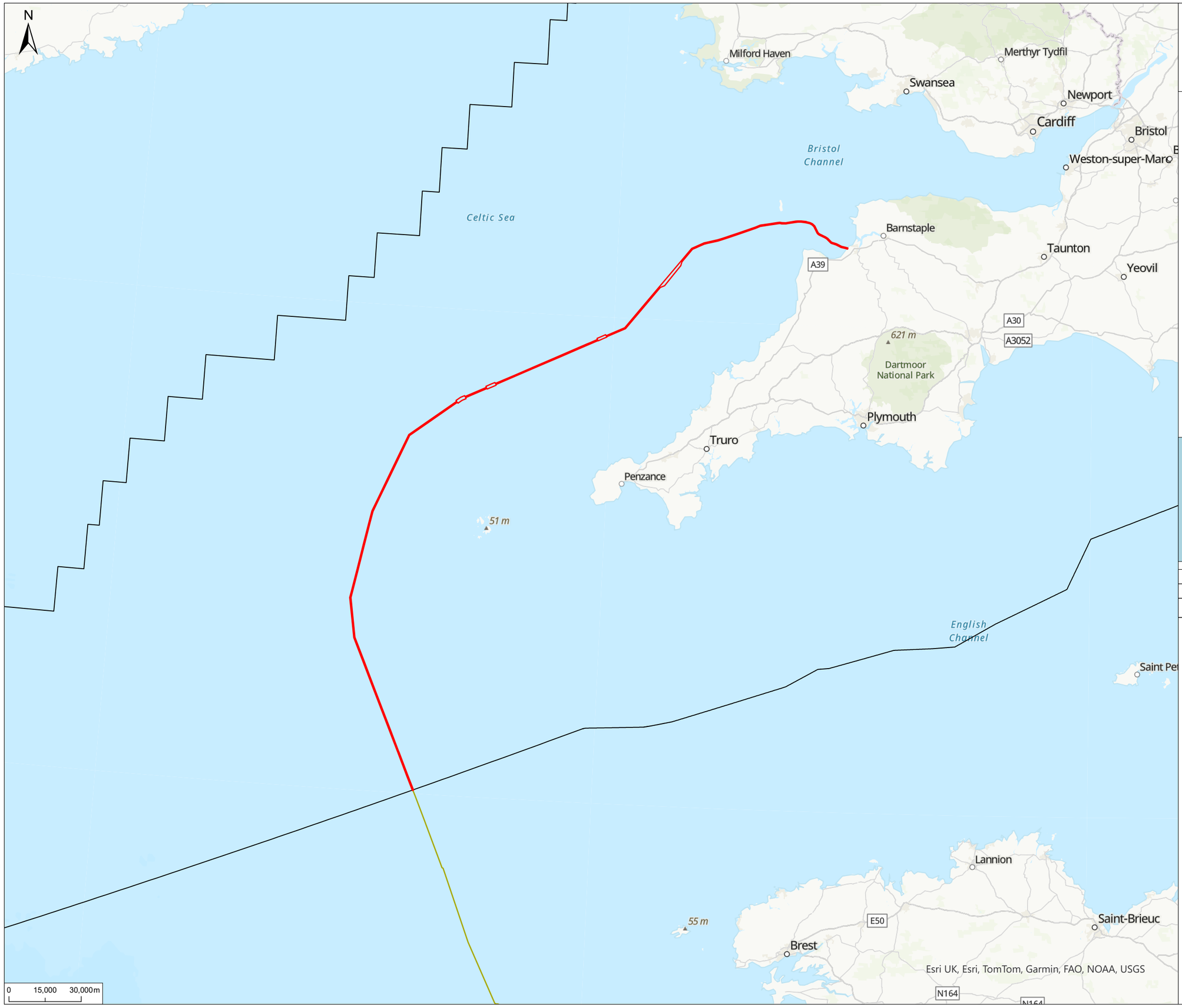
1.3.1 The full OCC in UK waters is indicated in **Figure 1.**

1.3.2 The only activities associated with the Proposed Development that are of relevance to this WFD Assessment are those which will take place within 15.2 km of Transitional and Coastal waters (TraC) water bodies. This is discussed further in **Section 5.2**. The location of the OCC in relation to local TraC water bodies is presented in **Figure 2** and **Figure 3.**

1.3.3 A habitats (and wider environmental conditions) assessment survey was carried out along the OCC (Volume 3, Appendix 8.4: GEOxyz Environmental Report of the ES). Seabed habitats were identified primarily using a combination of benthic grab data and Particle Size Analysis (PSA) data from 48 stations (there were 51 target stations, however, benthic grab data and PSA could not be collected at three stations during the survey due to repeated failed attempts and the presence of large cobbles and boulders). The stations at which grabs could not be collected were not in the vicinity of Bideford Bay and additional video assessment ground-truthing from a number of stations and geophysical data for the cable route was available to supplement any unsuccessful grab stations.

1.3.4 Close to the coast (0 to 6 km along the OCC), stations were assigned the habitat '*Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment' (EUNIS: MC5215 / JNCC: SS.SSa.CMuSa.AalbNuc) (Volume 3, Figure 1.7 of the ES, reproduced here as **Figure 4;** and **Figure 5**). This habitat characterised all stations sampled within the Barnstaple Bay coastal water body.

1.3.5 From approximately 6 to 15 km along the OCC (from the Devon coast), the predominant recorded habitat was 'Sparse fauna in Atlantic infralittoral mobile clean sand' (EUNIS: MB5231 / JNCC: SS.SSa.IFiSa.IMoSa) (Volume 3, Figure 1.7 of the ES, reproduced here as **Figure 4;** and **Figure 5**).



Notes
1. This plan is scaled at paper size A3. If received electronically it is the recipients responsibility to print to the correct scale. Only written dimensions should be used.

Legend

- UK Offshore Cable Corridor
- Indicative Cable Centreline
- UK Exclusive Economic Zone (EEZ)

Rev	Description	By	CB	Date
P01	FINAL	RM	RW	Nov 2024

Client: Xlinks 1 Limited

Project: Xlinks' Morocco-UK Power Project

Title: Offshore Cable Corridor (UK waters)

Status	Scale @ A3	Date Created
FINAL	1:1,500,000	Nov 2024

Figure Number: **1**

Rev: **P01**

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N

143 m

Ilfracombe
Combe Martin
Woolacombe
A39
Braunton
Barnstaple
Bideford
Hartland
Umberleigh
B3227
A39
B3227
Bradworthy
Kilkhampton
A386
Winkleigh
A3072
Holsworthy
Beaworthy
Dizzard
Okehampton
A3079
B3254
Tintagel
621 m
603 m
A395
Lifton
Camelford
Tregadillett
A386
B3267
420 m
Bodmin Moor
Dartmoor National Park
B3257
River Tavy
Padstow
Tavistock
Wadebridge
River Camel
Gunnislake

Esri UK, Esri, TomTom, Garmin, Foursquare, FAO, METI/NASA, USGS

0 3,500 7,000 m

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Notes
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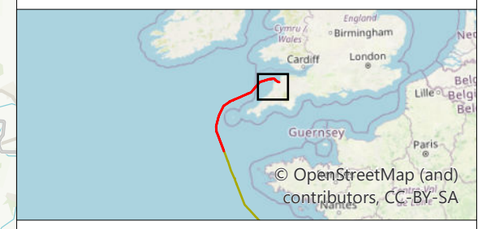
Legend

- UK Offshore Cable Corridor

WFD coastal and transitional waterbodies

- Barnstaple Bay
- Cornwall North
- Lundy
- Taw / Torridge



P01	FINAL	RM	RW	Nov 2024
Rev	Description	By	CB	Date

Client: Xlinks 1 Limited

Project: Xlinks' Morocco-UK Power Project

Title: Section of Offshore Cable Corridor in vicinity of WFD coastal and transitional water bodies

Status	Scale @ A3	Date Created
FINAL	1:300,000	Nov 2024

Figure Number: **2**

Rev: **P01**

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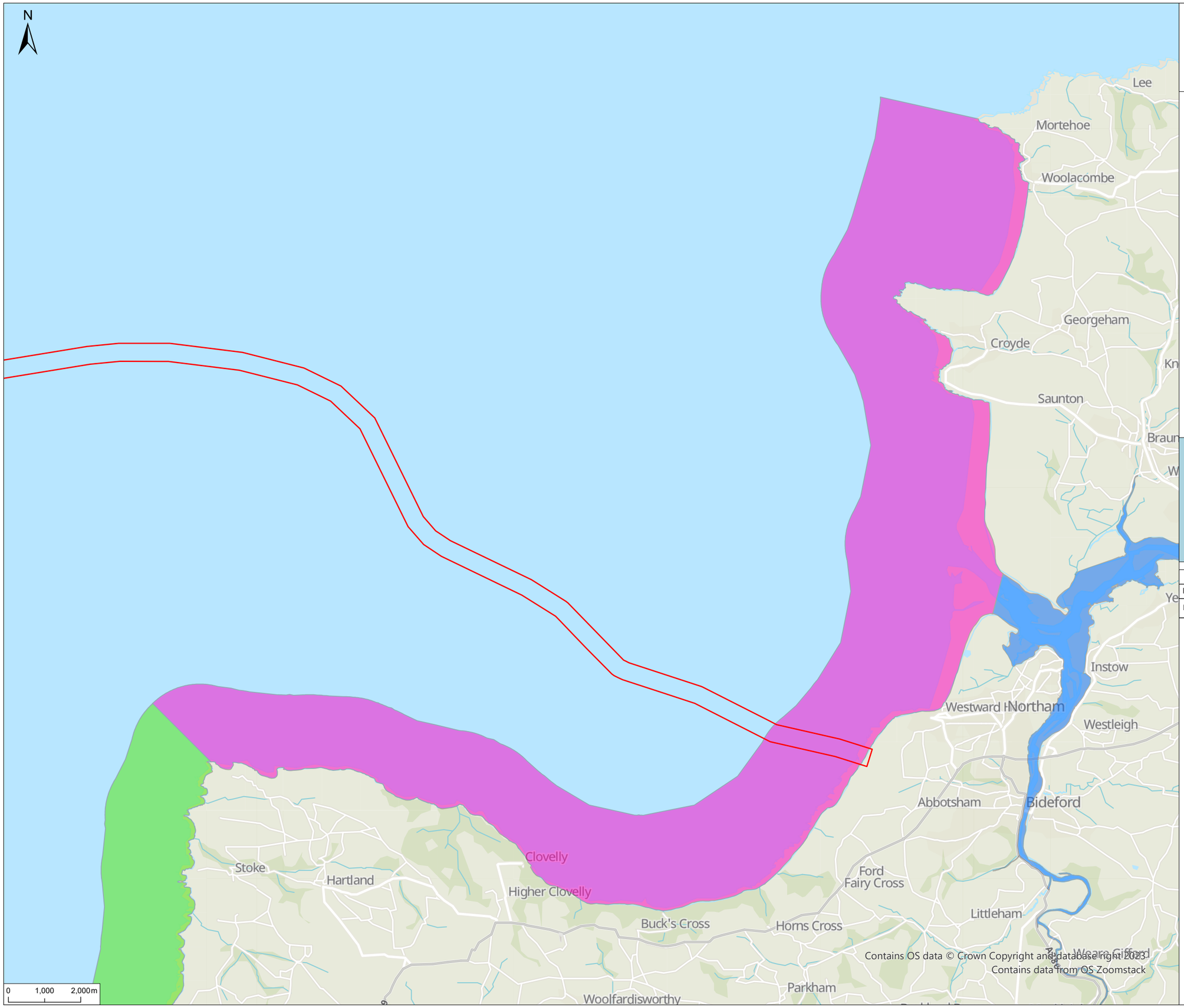

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Notes
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Legend

- UK Offshore Cable Corridor

WFD coastal and transitional waterbodies

- Barnstaple Bay
- Cornwall North
- Taw / Torridge

Rev	Description	By	CB	Date
P01	FINAL	RM	RW	Nov 2024

Client: Xlinks 1 Limited

Project: Xlinks' Morocco-UK Power Project

Title: Zoomed in figure indicating the location of Landfall in relation to WFD coastal and transitional water bodies

Status	Scale @ A3	Date Created
FINAL	1:100,000	Nov 2024

Figure Number: **3**

Rev: **P01**

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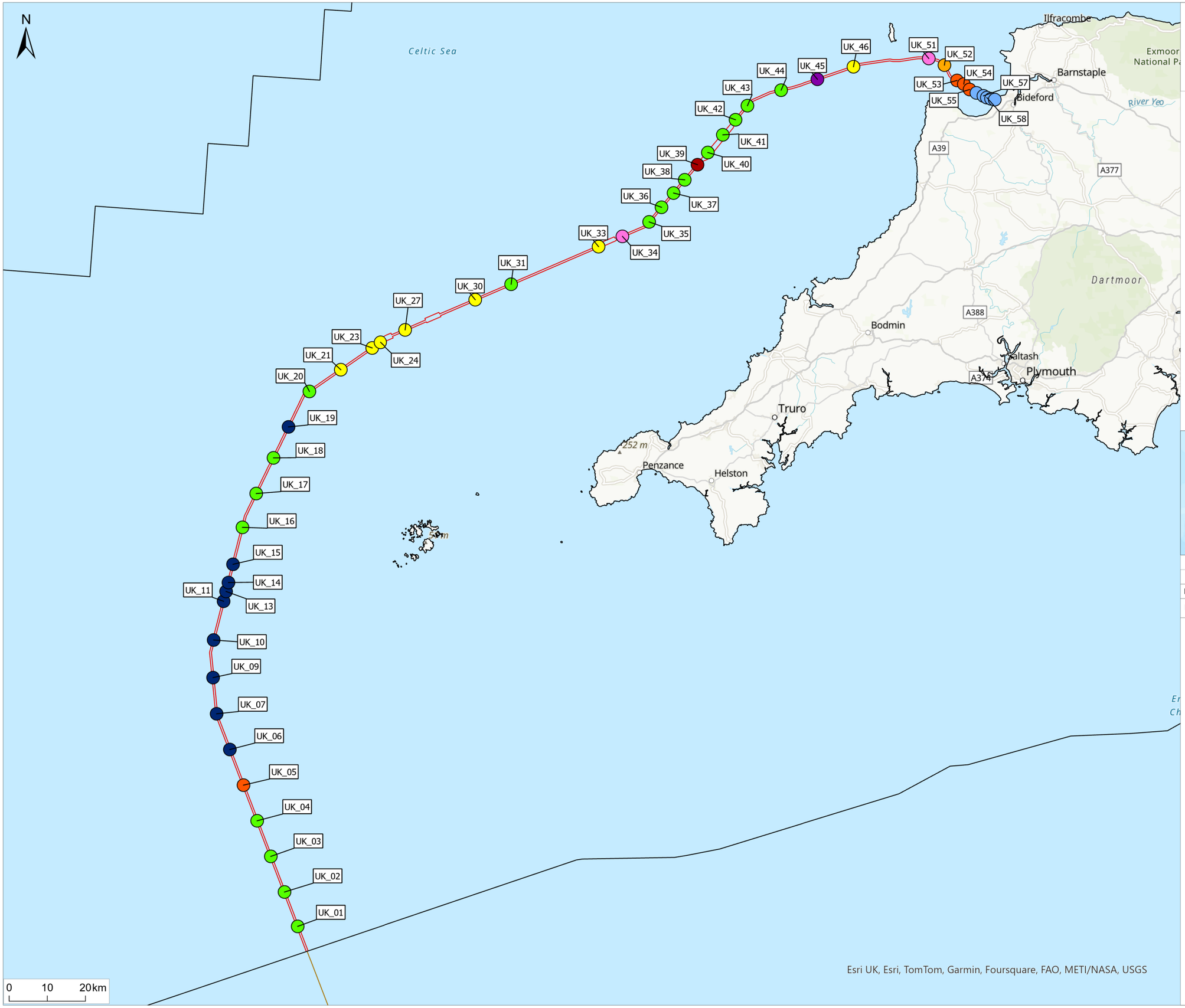

Notes
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Legend

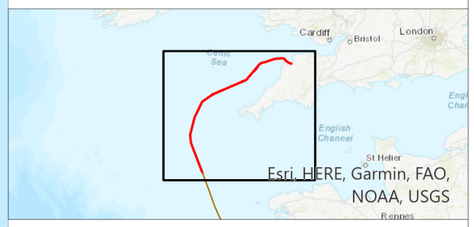
- UK Offshore Cable Corridor
- Indicative Cable Centreline
- UK Exclusive Economic Zone (EEZ)

EUNIS (L5)

- Abra alba and Nucula nitidosa in circalittoral muddy sand or slightly mixed sediment (MC5215)
- Echinocyamus pusillus, Ophelia borealis and Abra prismatica in circalittoral fine sand (MC5211)
- Echinocyamus pusillus, Ophelia borealis and Abra prismatica in circalittoral fine sand (MC5211)*
- Owenia fusiformis and Amphiura filiformis in deep circalittoral sand or muddy sand (MD5212)
- Polychaete-rich deep Venus community in offshore circalittoral mixed sediment (MD4211)
- Protodorvillea kefersteini and other polychaetes in impoverished Atlantic circalittoral mixed gravelly sand (MC3213)
- Sabellaria spinulosa on stable Atlantic circalittoral mixed sediment (MC2211)
- Sparse fauna in Atlantic infralittoral mobile clean sand (MB5231)

EUNIS (L4 as L5 could not be assigned)

- Atlantic circalittoral coarse sediment (MC32)



Rev	Description	By	CB	Date
P01	FINAL	MP	TM	Nov 2024

Client: Xlinks 1 Limited

Project: Xlinks' Morocco-UK Power Project

Title: Level 5 Biotope Classifications from Preliminary Survey Results

Status	Scale @ A3	Date Created
FINAL	1:950,000	Nov 2024

Figure Number: **4**

Rev: **P01**

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N

UK_51
UK_52
UK_53
UK_54
UK_55
UK_56
UK_57
UK_58
UK_59
UK_61

Lee
Mortehoe
Woolacombe
Georgeham
Croyde
Saunton
Braun
Instow
Westward Ho!
Northam
Westleigh
Abbotsham
Bideford
Clovelly
Stoke
Hartland
Higher Clovelly
Ford
Fairy Cross
Buck's Cross
Horns Cross
Littleham
Parkham
Woolfardisworthy

0 1,000 2,000m

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Notes
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Legend

- UK Offshore Cable Corridor

WFD coastal and transitional waterbodies

- Barnstaple Bay
- Cornwall North
- Taw / Torridge

EUNIS Level 5 habitat

- Abra alba and Nucula nitidosa in circalittoral muddy sand or slightly mixed sediment (MC5215)
- Sabellaria spinulosa on stable Atlantic circalittoral mixed sediment (MC2211)
- Sparse fauna in Atlantic infralittoral mobile clean sand (MB5231)

EUNIS Level 4 habitat

- Atlantic circalittoral coarse sediment (MC32)

Rev	Description	By	CB	Date
P01	FINAL	RM	RW	Nov 2024

Xlinks

Client: Xlinks 1 Limited

Project: Xlinks' Morocco-UK Power Project

Title: Zoomed in figure indicating EUNIS habitat allocations for grab stations within and in the vicinity of the Barnstaple Bay coastal water body

Status	Scale @ A3	Date Created
FINAL	1:100,000	Nov 2024

Figure Number: **5**

Rev: **P01**

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1.4 WFD Assessment Objectives

1.4.1 The objectives of this assessment are to consider the Proposed Development in the context of available data for WFD supporting elements in relevant water bodies and the Environment Agency's (EA) 'Clearing the Waters for All' guidance (EA 2023a). The assessment will consider the potential effects of the Proposed Development on the status / potential of the following WFD parameters:

- Ecological potential
  - Biological supporting elements
  - Physicochemical supporting elements (and Specific Pollutants[1])
  - Hydromorphological considerations
- Chemical status
  - Priority substances[1]
  - Other pollutants[1]
  - Priority hazardous substances[1]

1.4.2 Consideration of potential for impact on / deterioration to individual supporting elements allows an assessment of the potential for any non-temporary effects on WFD status / potential, and any potential to prevent the water bodies from meeting their WFD objectives.

[1] Limited to chemicals on Environmental Quality Standards Directive (EQSD) list for WFD (as provided in EA, 2017). Environmental thresholds are summarised in Defra (2015).

2 PROPOSED DEVELOPMENT

2.1 Summary of Marine Works

Programme and Installation Schedule

2.1.1 The following dates are indicative at this time (subject to the consent of the DCO) and may be influenced by e.g. weather limitations of the Cable Laying Vessel (CLV).

- **2027:**
  - Horizontal Directional Drilling (HDD) at the proposed Landfall is scheduled to commence in Q1 of 2027.
  - Pre-lay works for Bipole 1 (first cable bundle) such as route clearance and boulder removal are anticipated to take place in 2027 ahead of cable lay and protection works.
- **2027-2028:** Cable lay works for Bipole 1 are scheduled to begin in 2027. It is anticipated that these works would be completed in three sections each taking approximately one month. It is currently envisaged that one section will be laid in Q3 2027 and two sections will be laid in 2028.
- **2029:** For Bipole 2 (second cable bundle), offshore works would begin with pre-lay works in 2029.
- **2030:** The three sections of bipole 2 are currently scheduled to be laid in 2030.

2.1.2 Burial and protection activities would progress broadly in parallel with the expectation that cable lay and the start of burial would be just a few days apart (noting that burial and protection activities would take longer to complete than the cable lay).

2.1.3 Guard vessels would be provisioned for any periods after the cable has been laid, but has not yet been buried or protected, to minimise the risk of interactions with other marine traffic.

Offshore Construction Works

Horizontal Directional Drilling – Marine Works

2.1.4 The cables would be installed at the Landfall using a HDD technique to avoid disturbance of the intertidal zone, the beach and the coastal cliffs. This section provides a summary of the marine elements of the HDD works.

2.1.5 The HDD drill direction would be started on land and directed out to sea. For each borehole, a pilot hole would be drilled (at c. 20 m below seabed level) to within approximately 50 m of the seabed exit points. The drilled bore would then be widened to its full intended diameter before the remainder of the bore is drilled. Redundant drilling fluid and cuttings would be removed and disposed of responsibly, in accordance with waste regulations, from the land-based works.

2.1.6 The primary HDD activity that interacts with the marine environment is the breakthrough, or 'punchout', of the drill from underneath the seabed.

2.1.7 During breakthrough, drilling fluid and cuttings would be released into the immediate marine environment. The use of drilling fluids that are on the OSPAR PLONOR list (Pose Little Or No Risk to the environment) would be prioritised to minimise the risk to the marine environment during breakthrough. The volume of drilling fluid and cuttings lost during breakthrough is minimised by the adopted construction approach (i.e. the boreholes having already been drilled to their full diameter prior to breakthrough of the seabed and the continuous removal of drilling fluid and cuttings during this operation). Lower drilling fluid flow rates are also used during breakthrough to minimise the loss of drilling fluid.

2.1.8 There will be no requirement for any wet concrete pours associated with the Landfall HDD or any of the offshore works.

2.1.9 An excavated 'exit pit' may be required at HDD exit points on the seabed to clear unconsolidated sediment layers (sand and pebbles) that may jam HDD equipment on breakthrough or prevent subsequent duct installation once the boreholes have been drilled. Localised clearance of unconsolidated sediments are expected to be undertaken by either a back-hoe dredger (long arm barge mounted excavator), or mass flow excavation (MFE). Sediment will be cleared from an area of approximately 15 m x 15 m around the exit points.

2.1.10 Sediments will be cleared, rather than removed offsite (as was proposed at PEIR stage). Thus, sediments will not be removed from Bideford Bay, with exit pits refilled via a combination of manual infilling (long arm barge mounted excavator) and by natural infilling of sediments (which would be expected to be rapid given the extensive mobility of surface sediments in Bideford Bay).

2.1.11 Exit points in the marine environment for the four drills are currently being considered between approx. 5 m water depth (approximately 500 m offshore) and 10 m water depth (approximately 1,800 m offshore). Volume 1, Figure 3.9 of the ES presents a plan of the landfall HDD that shows this enveloped area.

2.1.12 Following installation, cable ducts at the exit pits will be protected using the material excavated from the 'exit pit'. If concrete mattresses or rock protection are needed at the final duct exits this will be highly localised and all such protection would be below seabed level. Away from the exit pits, cables will be protected and buried in trenches, as elsewhere. The sandy sediments of Bideford Bay mean that target depth burial is highly likely and thus cable rock protection is highly unlikely to be required elsewhere in Bideford Bay (c.f. e.g. Volume 1, Figure 3.15 of the ES: Indicative rock placement along the Offshore Cable Corridor).

2.1.13 Dependant on the contractor's final design and depth of the boreholes, there would be up to a 40 m separation between adjacent drill exit points for cables on the same circuit, and approximately a 50 m separation between circuits (i.e., all four exit points would be within an area of the seabed of approximately 130 to 150 m width).

2.1.14 The HDD installation would be undertaken ahead of cable lay, likely commencing in Q1 2027 (avoiding the winter period). Active working on

HDD exit pits would also be avoided during peak Spring tides; this is embedded mitigation to minimise the disturbance of suspended sediments (see Volume 3, Chapter 8: Physical Processes of the ES).

HDD Duct Installation

2.1.15 Following drilling of the four boreholes, ducting would be installed in each bore. Three methods are being considered for the installation of ducting: pulling the ducting from either onshore or offshore or pushing the ducting through the boreholes from onshore.

2.1.16 A pulled installation with a pulling winch onshore requires a complete string of duct to be towed (afloat) from offshore to the HDD exit points and pulled onshore through the boreholes. If the pulling winch is located offshore, then the string of duct can be fabricated at the HDD onshore site as the duct is pulled offshore.

2.1.17 A pushed installation involves the fabrication of the ducts at the HDD onshore site with the ducts fed into the entry points and driven through the boreholes using a pipe thruster. The project design team have rejected any option of moving ducting across the beach, which would effectively be isolated from the HDD works. The choice of the HDD installation method avoids potential impacts to designated sites and the intertidal zone.

2.1.18 All methods of duct installation require marine vessels; however, the pull method would require additional vessels relative to the push method (as described in Volume 3, Chapter 5: Shipping and Navigation of the ES).

Pre-Lay Marine Surveys

2.1.19 The baseline UK marine investigation surveys, that included geophysical surveys, subtidal drop-down video (DDV) surveys and subtidal grab surveys have been completed and have informed the environmental baseline for the ES (see e.g. Appendix 8.4 GEOxyz Environmental Report of the ES).

2.1.20 Prior to cable installation (commencing in 2027), additional ground condition surveys may be required by the Contractor. These are unlikely to be required to further characterise the environmental baseline (given the high resolution baseline data collection already compiled for the OCC within UK waters), but may be required for micro-routing purposes or to identify any UXO within the OCC that may need to be avoided or cleared. If required, UXO clearance (removal or detonation) would be undertaken by a specialist contractor and any such works would be subject to a separate consenting process at the time such need is identified. The approach to consenting of UXO has been discussed with the MMO, following Scoping Opinion responses, and the MMO confirmed their preference and expectation for separate licensing of UXO survey and any UXO removal, separate to the DCO/deemed Marine Licence. As such, consideration of effects from activities associated with UXO clearance have been excluded from this WFD assessment.

Route Preparation

2.1.21 The marine baseline investigation surveys (see e.g. Volume 3, Appendix 8.4 GEOxyz Environmental Report of the ES) and any pre cable laying ground

condition survey would inform the requirements for, and extent of, seabed preparation and clearance along the OCC in UK waters. Types of seabed preparation that could be required prior to cable installation include:

- Clearance of debris and some local seabed features e.g. boulders;
- Clearance of Out of Service (OOS) cables; and
- Construction of crossing structures over existing in-service cables.

2.1.22 Seabed preparations will not remove bed materials from the local area i.e. there will be no dredge arisings or similar. Any seabed preparations will be limited to immediate clearance / highly localised flattening only.

Seabed Debris

2.1.23 Where deemed necessary, marine debris such as abandoned, lost or discarded fishing gear that may impede the cable installation operations, would be cleared from the cable route prior to installation. This would require a pre-lay grapnel run involving towing a heavy grapnel hook of circa 1 m total width, at a max penetration depth of circa 1 m, along the centre line of each bundled cable pair route to clear debris. It is anticipated that the pre-lay grapnel run would extend along the entire OCC apart from at live cable crossings (the locations of which are shown on Volume 1, Figure 3.11 of the ES). The only exception will be if the cable is installed by pre-cut trenching by plough whereby a pre-lay grapnel run is not required, but this is currently not known.

2.1.24 Debris collected during the grapnel run would be recovered on board the vessel for onshore disposal at appropriately licensed disposal facilities.

Out of Service Cables

2.1.25 There are currently 27 anticipated crossings of OOS cables along the UK OCC. A section of the OOS cables would be cut and removed where possible, which is consistent with Natural England's preference (Natural England, 2022) i.e. prevents the need for mandatory external cable protection at these OOS crossings. Liaison with the asset owners for the OOS cables is underway, with the expectation that agreements for cable removal will be in place for the majority.

2.1.26 As a worst case, it is assumed for WFD assessment purposes that x5 of the OOS cables will require crossings (5 OOS cables x 2 Bipoles = 10 OOS cable crossing protection structures in total). Should any OOS cable crossings be required, this will be confirmed to the MMO (and Natural England) post DCO approval, prior to construction.

Sandwaves and Large Ripples

2.1.27 The Outline CBRA (Volume 1, Appendix 3.4 of the ES) has determined that there are no sandwaves or large sand ripples in UK waters that would require pre-sweeping / large-scale flattening. The scale of sandwaves and ripples is such that cable burial below mobile sediment layers is expected to be achieved during normal installation procedures i.e. using MFE and/or 'surface plough'/leveller.

2.1.28 MFE utilises a jetting tool that uses high flow water jets to temporarily displace and suspend sediments for localised seabed excavation and levelling. Based on the provisional assessment of the geophysical survey data, the MFE is anticipated to be deployed infrequently (based on seabed type), potentially most appropriate to the seabed conditions in Bideford Bay.

2.1.29 Localised seabed levelling, where required, would be more likely undertaken by a pre-lay trench plough, with a swath width of 10-15 m (per trench). For the purpose of this WFD, the entire 370 km UK OCC (OCC) length is assumed to require deployment of the pre-lay trench plough. The assumed (worst case) area for pre-lay trench clearance is 11,100,000 m^2 (15 [width] x 370,000 [length] x 2 [number]).

Boulder Clearance

2.1.1 Areas of boulder fields have been identified along the route (as presented on Volume 1, Figure 3.12: boulder densities along OCC of the ES), which will prevent burial of the cable bundles where they cannot be avoided by micro-routing. In these areas, a pre-lay plough and / or boulder grab may be deployed for boulder clearance purposes, to increase the likelihood of successful burial. It is anticipated that boulder clearance would be carried out by boulder grab in areas of low boulder density and by pre-lay plough in areas of high boulder density, however this is not prescriptive as the use of tools may be swapped due to operational requirements (for example a small area of low density boulders may be cleared by plough if between areas of high density boulder fields or vice versa).

2.1.2 The pre-lay plough has a boulder clearance swath width of 10-15 m. It is anticipated that up to approximately 200 km of the route may need deployment of the pre-lay plough for boulder removal. Any moved boulders would remain within the limits of the OCC.

2.1.3 For either method, as part of embedded mitigation for the boulder clearance design, debris and boulders, there will be a buffer of at least 20 m between disturbance activities and any MCZ boundary and it will be ensured that no boulders will be deposited within any MCZ.

Trench Ploughing

2.1.4 The pre-lay plough can also perform pre-cut trenching, to produce an initial trench to enable subsequent cable burial. The pre-lay plough has capability to perform boulder clearance, pre-cut trenching and backfill services (after cable lay). The pre-lay plough can operate in each mode independently or carry out the boulder clearance and pre-cut trenching activities simultaneously. During boulder clearance surface boulders are unearthed and relocated to an outer spoil berm. Siphoned soil from pre-lay plough trenching is relocated to an inner spoil berm to be used to backfill the trench after cable lay.

2.1.5 The profile of the pre-lay plough trench would be 500 mm (width) x 700 mm (depth) at its base, with a further 'Y' shaped profile where the cut depth is >700 mm. Where ground conditions allow the pre-lay plough can trench down to the target cable burial depth of approximately 1.5 m.

2.1.6 The disturbance width (swath) of the pre-lay plough in pre-cut trenching and backfill modes is 15 m.

2.1.7 There will be a buffer of at least 20 m between trench ploughing activity and any MCZ boundary and it will be ensured that no boulders will be deposited within any MCZ.

Cable Installation Methods

2.1.8 The HVDC cables would be installed as two bundled pairs from a CLV. The specific CLV(s) that would install the HVDC cables is unknown at this stage and would be determined by the selected Cable Contractor. Based on CLV(s) currently in operation, it is anticipated that two turntables would be mounted on the CLV(s), each holding up to approximately 160 km of HVDC cable. As the CLV travels along the route, the two turntables release cable at the same rate and the two cables are bundled together at the stern of the vessel and fed overboard. An additional cable tank would contain the fibre optic cables, which would be installed as part of the bundle. Tensioners control the cable tension and cameras monitor the cable to ensure it is laid safely on target.

2.1.9 Based on the initial assessment of the geotechnical and geophysical survey data as part of the CBRA (outline CBRA presented as Volume 1, Appendix 3.4 of the ES: Outline Cable Burial Risk Assessment) the cables will be buried along the entire route. For 220 km of the route it is anticipated that the cables will be protected by trenching and covered by natural sediments. It is anticipated that additional protection would be required along approximately 150 km of the route. Further details are provided in the following sections.

Cable Burial Method

2.1.10 Burying the cables would provide protection and avoid damage and future entanglement with fishing equipment or other marine users. Burial techniques available include trench ploughing (above), trench jetting, or mechanical trench excavation. Ground conditions suggest that trench jetting is unsuitable for the majority of the OCC, with potential exception of shallow coastal areas in Bideford Bay, or used as a remedial measure to be applied following mechanical trenching. Mechanical trenching (mechanical cutter mounted on a remotely operated vehicle (ROV)) is expected to be the main burial method in UK waters. The burial risk (as determined by the CBRA) along the OCC associated with trench jetting, mechanical trench excavation, and ploughing is shown on Volume 1, Figures 3.12 to 3.14 of the ES.

2.1.11 Once the cables have been laid on the seabed (by the CLV), the ROV is lowered to the seabed until it straddles the cable bundle lying on the seabed. Where the mechanical cutter is deployed, the tool would lift the cables up above the seabed safely out of the way of the burial tool and would then feed the cables into the trench behind the tool. Where the water jetting ROV is deployed, two jetting legs (also known as swords) would extend down either side of the cable bundle and fluidise the seabed immediately below the cable bundle enabling it to sink under its own weight.

2.1.12 Cable burial depth would be monitored as the burial tool progresses. Where the target burial depth is not achieved on first pass of the tool, a second pass may be required using e.g. the water jet.

2.1.13 The footprint of the mechanical cutter ROV on the seabed is up to 126 m^2 (10 m width and 12.6 m in length) and the water jet ROV up to 55.2 m^2 (6 m width and 9.2 m length). The average rate of trenching is typically 150 m per hour.

Additional Cable Protection

2.1.14 Preliminary investigations (outline CBRA, Volume 1, Appendix 3.4: Outline Cable Burial Risk Assessment of the ES) indicates that there is significant burial risk (due to e.g. hard seabed and / or boulder fields, the locations of which are shown on Volume 1, Figure 3.12 of the ES) that may reduce the ability to protect the cables using the ROV tools for approximately 150 km of the total length of the OCC. In these areas, the pre-lay plough may pass through prior to cable lay to determine if a trench can be produced, followed by at least one pass of the mechanical cutter after the cable bundles had been surface laid with the aim of producing a trench that can be backfilled back to / close to the seabed surface. In areas where this is not possible, the final option would be for the cable to be covered with a layer of rock protection that extends above the level of the surrounding seabed (a rock berm). Indicative / estimated rock placement across the OCC is shown on Volume 1, Figure 3.15 of the ES, as interpreted from burial assessment considerations; see e.g. the Outline CBRA (Volume 1, Appendix 3.4of the ES).

2.1.15 Where required, rock protection would consist of rock ranging from coarse gravel to cobbles and be up to approximately 1 m high above the seabed. The rock source is currently not known but is highly probable to be either basaltic or granitic in origin (this will be dependent on selected rock placement contractor). Where possible rock placement would be limited to within trench and level with the existing seabed. Where rock berms are required (rock placement above sea bed level up to 1 m height), these would be constructed according to industry standards (including International Cable Protection Committee (ICPC) recommendations). Rock berms are only anticipated to be required in areas of shallow rock and boulder fields where the introduction of gravel/cobbles would not be a highly significant change of habitat i.e. rock placement will be least likely to be required where the baseline sea bed substrates are e.g. fine sands.

Cable Crossings

2.1.16 Where the cables cross other in-service cables, the cable would not be buried in a trench. The trench depth would taper to seabed level at a suitable distance from the in-service cable to be crossed and the Proposed Development cable would cross above the in-service cable. The Proposed Development cable would then be buried again on the other side of the in-service cable.

2.1.17 Where the Proposed Development cable crosses in-service cables, whether buried or surface laid, a layer of separation in the form of a pre-lay rock berm or pre-lay concrete mattress may be installed over the crossed asset. The Proposed Development cable would then also require protection in the form of a post-lay rock berm. The height of the concrete mattress and rock berm would be approximately 1.4 m above the seabed. The use of mattresses is anticipated to be very limited. Where they are necessary

mattresses would be pre-formed, marine-grade concrete mattresses designed for very long-term deployment. Most of these specialist mattresses have integrated plastic handles / ropes for ease of deployment and installation. Given the specific design of these mattresses for long-term marine deployment, the potential for plastic degradation over time is assumed negligible, and due to the fact that mattresses will be covered with a rock berm / overlying sediments, any risk of degradation into the marine environment of plastics is further reduced. All crossings and crossing agreements would be in line with industry standards (including ICPC recommendations).

2.1.18 There are x20 active or planned cable crossings, the locations of which are shown on Volume 1, Figure 3.10 of the ES. There are 18 planned crossings of active fibre optic cables (15 cables but three are crossed twice), one crossing of a fibre optic cable where installation is currently under way and one crossing of a planned power cable. (Thus, 20 in-service assets x 2 bipoles = 40 in-service asset crossing protection structures in total.)

2.1.19 There are also x27 OOS cables that cross the Offshore Cable Corridor which will have a short section removed where possible. As a worst case (given removal conversations with historical asset owners are ongoing), it is assumed that x5 of the OOS cables will require crossings (5 OOS cables x 2 bipoles = 10 OOS cable crossing protection structures in total).

2.1.20 The total asset crossing protection structures (across both bipoles) = 50 (40 in-service asset crossing protection structures and 10 OOS cable crossing protection structures). Precautionary dimensions for these crossings are assumed in this WFD assessment - a crossing approach length of 250m either side of an existing asset is assumed. The crossing footprint for WFD assessment purposes is 3500 m^2 per crossing which is considered a precautionary/worst case overall area estimate based on 500 m length x 7 m width (recognising that width may extend out to c.9.5m width in the immediate vicinity of the other asset). The total crossing footprint is assumed to be (3500 x 50) 175,000 m2 (taken to be representative of a worst case footprint area). As suggested above the dimensions are considered precautionary and it is likely that the length of most crossings would be less than the maximum suggested here.

Cable Burial Depth, Width and Spacing

2.1.21 The intended depth at which the cables would be buried is up to a depth of 1.6 m, as detailed in the outline CBRA (Volume 1, Appendix 3.4: Outline Cable Burial Risk Assessment of the ES). The outline CBRA finds an average target depth of 1.5 m, and average minimum depth of 0.8 m (n=42).

2.1.22 The width of the trench in which the cable bundles would be buried typically ranges from 0.5 to 1.5 m. The infrequent cable joints and FOC repeaters would require a short additional trench laid broadly parallel to the main cable. The trench width required for these infrequent FOC repeater cables would be narrower than the main trench (<50 cm).

Installation Vessels

2.1.23 Cable installation activities would be undertaken on a 24 hour / 7 day basis, unless interrupted by weather or other disruptions. This would maximise the

available operational weather windows, vessel and equipment time, and minimise navigational impacts on other users of the sea.

2.1.24 A description of likely vessel groups to be utilised during the installation activities of the Proposed Development is provided below:

- Vessels for pre and post-installation survey works;
- Workboats/construction vessels and tugs for all works including route clearance/preparation, trenching, installation of rock protection/concrete mattresses, duct installation, cable pull and floating in, and dive support, depending on requirements. These workboats often deploy ROVs and would utilise geophysical survey and positioning equipment to monitor the progress of the works, and for positioning of any ROVs or other underwater equipment needed to complete the works;
- CLVs for cable laying;
- Guard vessels – as necessary, these would accompany the CLV to maintain surveillance around the worksite ensuring other vessels are kept clear i.e. reducing the risk of collision: guard vessels would also be deployed to protect the cable prior to burial;
- Rock placement vessel – where rock placement is required for additional cable protection (e.g. at cable crossings), a rock placement vessel may be used. Such vessels feature a rock storage hopper and equipment by which rock can be placed in-situ on the seabed, such as fall pipes; and
- Jack up vessel / multi-cat vessel – for the HDD works (breakthrough, duct push/pull and duct sealing works) near the landfall, jack up vessels would be deployed to enable stable and safe marine works in the subtidal environment.

2.1.25 The precise number of vessels to be used is to be determined by the Cable Contractor, however, indicative vessel types and numbers are presented in **Table 1**.

Table 1. Indicative construction phase vessel numbers

Vessel Type	Anticipated Total Number	Key Construction Activities	Indicative Total Number of Days	Comments
Cable lay vessel	2	Cable installation	144	Maximum of 2 at crossover, but only one laying at a time
Construction support vessel e.g. trenching support	5	Pre-lay trenching Cable protection	457	5 construction support vessels in total (cable protection + pre-lay trenching)
Rock protection vessel	2	Rock placement/ protection	352	
Jack-up barge	2	Landfall/HDD works Cable pull-through	120	
Guard vessel	20	Guard	3500	Up to 20, but likely much less on account of phased works

Vessel Type	Anticipated Total Number	Key Construction Activities	Indicative Total Number of Days	Comments
Survey vessel	2	e.g. Boulder clearance	90	2 survey vessels in total (e.g. boulder clearance)
Small tug	1	Pre-lay grapnel run	51	Included in the 20 'Guard vessel' numbers above, as will be complete ahead of any lay/ protection

Operational Phase

Inspection Surveys

2.1.26 The preferred installation methods are designed to minimise the number of cable inspection surveys that would be required. However, some cable inspection surveys are expected during the operational lifetime of the Proposed Development.

2.1.27 Following the installation of each Bipole an 'as-built' survey shall be conducted along the entirety of the subsea cable route. This survey shall involve the use of a single survey vessel equipped with an inspection ROV and geophysical survey equipment including Multibeam Echo Sounder (MBES) and Side Scan Sonar (SSS) and check:

- Status of the cable within its buried sections of the route,
- Status of rock protection and rock berms
- Condition of the seabed around the cable, include sandwaves and scars
- Fishing gear

2.1.28 Following the 'as-built' surveys, routine inspection surveys would be required under the following survey schedule:

- Routine surveys of the offshore submarine cables shall commence two years from the commissioning of the first Bipole.
- If no issues are found, the next follow up survey would be in three years, with the interval increasing by one year each time, until the period between surveys reaches five years.
- If no issues are found, routine surveying is likely to be conducted on a five-year basis.
- If an issue is found, it will be flagged for further investigation, mobilisation of repair or remediation, as appropriate.
- Following this, subject to the identified issue, associated risk and mitigation, the surveys might remain at this interval or reduce to an appropriate level (this could mean that the next survey is undertaken just one or two years from the last one).

Maintenance and Repair

2.1.29 There may be a requirement to undertake unplanned maintenance works in the event of failure of components of the system or if a cable becomes exposed due to changes in seabed morphology or the activities of third parties.

2.1.30 Repair works for cable failure would require the exposure of the cable at the point of failure, which would require de-burial of the cable from the trench. The cable would then be cut, recovered to the surface, repaired using a section of spare cable and redeployed for reburial using similar methods to those used for installation.

2.1.31 Given additional cable length would need to be added to join the cut ends at the surface, the relayed cable would take up a greater footprint than the original cable through incorporation of a 'repair loop'. Any additional footprint associated with repaired sections would be anticipated to fall within the Offshore Cable Corridor.

Decommissioning Phase

2.1.32 The current anticipated lifetime of the Proposed Development (operational phase) is 50 years, following which the Proposed Development may be decommissioned. The Applicant is not seeking consent for decommissioning and any consent required for decommissioning would be sought at the appropriate time.

2.1.33 If decommissioning is required, the options for decommissioning the cables would be evaluated at the time of decommissioning, with the available technologies of the time reviewed fully (in recognition that engineering technologies are ever evolving). The least environmentally damaging decommissioning option, is (in general) to de-energise the cable, disconnect it from any wider system, and secure it in place to be left in-situ, thereby avoiding unnecessary seabed disturbance.

2.1.34 However, other options may include the requirement for full or partial removal of the cables. The methods for removal would be broadly similar to those used during the construction phase with the potential for the cables to be removed by direct pulling, rather than de-burial. The requirement for any removal could also apply to other infrastructure installed as part of the project i.e. cable protection. The footprint of decommissioning activities (disturbance footprint at the sea bed) is anticipated to be less than that of the construction phase.

2.1.35 The framework of environmental permitting and all applicable UK and International legislation at the time of decommissioning (and the preparation of the decommissioning plans) would be adhered to.

2.1.36 Once the final decommissioning timescales and measures are known, an environmental assessment (EIA or similar) would be performed prior to the decommissioning phase (i.e. in approximately 50 years' time) to assess the potential impacts that may arise. This would inform any licence applications for decommissioning (separate to this application for DCO).

2.1.37 An Outline Decommissioning Strategy containing the anticipated approach to, and methods associated with decommissioning has been prepared in

parallel to this WFD assessment (PINS document reference 7.17; and summarised in Volume 1, Chapter 3: Project Description of the ES).

2.2 Mitigation Measures Adopted as part of the Proposed Development

2.2.1 For the purposes of the EIA process, the term 'measures adopted as part of the Proposed Development' is used to include the following types of mitigation measures (adapted from IEMA, 2016). These measures have been developed across the Proposed Development's environmental assessments i.e. they apply to EIA studies as well as this WFD assessment. Full details are set out in Volume 1, Appendix 3.1: Commitments Register of the ES, including confirmation of the relevant securing mechanisms.

- Embedded mitigation. This includes the following.
  - Primary (inherent) mitigation - measures included as part of the Proposed Development design. IEMA describes these as 'modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project and do not require additional action to be taken'. This includes modifications arising through the iterative design process.
  - Tertiary (inexorable) mitigation. IEMA describes these as '*actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects'*.
- Secondary (foreseeable) mitigation. IEMA describes these as 'actions that will require further activity in order to achieve the anticipated outcome'. These include measures required to reduce the significance of environmental effects (such as lighting limits) and may be secured through an environmental management plan (EMP).

2.2.2 In addition, where relevant, measures have been identified that may result in enhancement of environmental conditions. Such measures are clearly identified within Volume 1, Appendix 3.1: Commitments Register of the ES. The measures relevant to this WFD assessment are summarised in **Table 2.**

2.2.3 Embedded measures that will form part of the final design (and/or are established legislative requirements/good practice) have been taken into account as required, as part of the assessment presented. This ensures that the measures to which the Applicant is committed are taken into account in the assessment of effects.

Table 2. Mitigation measures adopted as part of the Proposed Development.

Commitment Number	Measure Adopted	How the Measure Will be Secured
Embedded Measures		
OFF01	Cables will be buried (where possible) up to a maximum of approximately 1.6 m below the seabed, as informed by detailed Cable Burial Risk Assessment (CBRA). The average target depth is 1.5 m. Only when full burial is not possible will additional protection be installed.	Design parameters set out in the Outline Offshore CEMP (application document ref. 7.9).
OFF02	Cable protection measures - Where possible introduced cable protection i.e. rock placement (and potentially concrete mattresses), would be kept level with the seabed, and if above the seabed would be kept to a maximum of c.1 m above seabed level (excluding crossings).	Design parameters set out in the Outline Offshore CEMP (application document ref. 7.9).
OFF04	All ships subject to the Ballast Water Management Convention (2017) requirements will be obliged to conduct ballast water management in accordance with the Merchant Shipping (Control and Management of Ships' Ballast Water and Sediments) Regulations 2022.	Regulatory requirement. Also pre-requisite of the Outline Offshore CEMP (document ref. 7.9).
OFF05	An Offshore CEMP will set out the detailed approach to offshore construction activities and would implement those measures and environmental commitments identified in the EIA. The following measures will be included in the Offshore CEMP: marine pollution prevention; waste management; marine invasive species (via the Offshore Biosecurity Plan); and dropped object procedures. An Outline Offshore CEMP (document reference 7.9) forms part of the application for DCO (with a final Offshore CEMP finalised by the offshore contractor).	The Offshore CEMP is a requirement of the Deemed Marine License.
OFF06	An Offshore Biosecurity Plan will be implemented, which will incorporate a biosecurity risk assessment (to assess the likelihood of introducing Marine Invasive Non-Native Species during all phases of the Proposed Development). An outline Offshore Biosecurity Plan (document reference 7.19) forms part of the application for DCO (with a final Offshore Biosecurity Plan finalised by the offshore contractor).	The Offshore Biosecurity Plan is a requirement of the Offshore CEMP (outline provided at application stage, as document ref. 7.9).
OFF07	A Marine Pollution Contingency Plan (MPCP) will form part of the final Offshore CEMP and will include measures to minimise the impact of any pollution events arising from the Proposed Development, and will comply with the International Convention for the Prevention of Pollution from Ships (MARPOL).	Requirement of the Outline Offshore CEMP (document ref. 7.9).

Commitment Number	Measure Adopted	How the Measure Will be Secured
OFF08	For compliance with the requirements of MARPOL, all Project vessels with a gross tonnage (GT) above 400 tonnes will require a Shipboard Oil Pollution Emergency Plan (SOPEP) detailing the emergency actions to be taken in the event of an oil spill.	Requirement of the Outline Offshore CEMP (document ref. 7.9).
OFF10	The HDD drill system will be designed to allow for the monitoring of pressure loss and therefore provision for the rapid identification of potential break out.	Outline Bentonite Breakout Plan requirement of the Offshore CEMP (outline provided at application stage, as document ref. 7.9)
OFF11	The Navigational Safety and Vessel Management Plan (NSVMP) will confirm the types and numbers of vessels that would be engaged on the Proposed Development and consider vessel coordination including indicative transit route planning. The NSVMP will include protocols for vessel communications, lighting and maintenance of "safe" distances (which will be monitored by guard vessels during the construction period). An outline NSVMP is provided as Volume 3, Appendix 5.2 Navigational Safety and Vessel Management Plan of the ES; the NSVMP will be updated to final by the offshore construction contractor.	Requirement of the Outline Offshore CEMP (document ref. 7.9).
OFF34	All potential sediment disturbance activities in Bideford Bay to avoid peak spring tides and significant wave activity, to limit any potential for sediment mobilisation. These activities would include the excavation / sediment clearance at the x4 (no) HDD exit pits and trenching works.	Requirement of the Outline Offshore CEMP (document ref. 7.9).
Secondary (Further) Measures		
OFF03	Micro-routing of the offshore cables, within the defined Order Limits, will be undertaken to minimise any potential damage to Annex I habitats.	Set out as 'Further Commitments' in the Outline Offshore CEMP (document ref. 7.9).

3 CONSULTATION

3.1.1 A number of consultations have been undertaken with statutory regulators to discuss the Proposed Development.

3.1.2 A draft WFD assessment was submitted to the EA in April 2024. Comments received from the EA specific to this WFD assessment, and how they have been addressed are indicated in **Table 3**.

Table 3. Consultation comments and responses.

Relevant Body	Comments	Response / Action
Environment Agency	We are satisfied that at water body scale, the risk of deterioration to WFD quality elements in the Barnstaple Bay coastal water and the Taw/Torridge transitional water from the proposed project is low.	Noted
Environment Agency	The impact assessment does not yet reflect the findings of the HRA. Potential impacts to European sites / species may be overlooked. The impact assessment of protected areas should be updated in the final WFD assessment to reflect the findings of the HRA.	The results of the assessment in the Report to Inform Appropriate Assessment (RIAA) submitted with the ES have been indicated in the protected area assessment sections of this final WFD assessment (**Section 6.3**).
Environment Agency	Lack of detailed maps to show the part of the study area that intercepts with WFD waterbodies. Include figures at a more localised scale to show the proposed landfall location, cable route, and the results of the benthic surveys in relation to the WFD water bodies.	**Figure 2** and **Figure 3** (of this final WFD assessment) indicate the area of landfall for the Proposed Development and the cable route in relation to the Barnstaple Bay and Taw/Torridge WFD water bodies. Figures have been added to indicate the results of the benthic ecology surveys along the OCC (**Figure 4** and **Figure 5**). Additional figures have been added to show the extent of sediment plumes on a peak spring tide and on a mean neap tide (**Figure 8** and **Figure 9**).

4 WFD REQUIREMENTS

4.1 Overview of Water Framework Directive

4.1.1 The WFD establishes a framework for the management and protection of Europe's water resources. It is implemented in England and Wales through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (the Water Framework Regulations)[2]. Central to the WFD is the philosophy to make water bodies better through sustainable development for the joint benefits of aquatic habitats and the human environment.

4.1.2 Ecological status is an expression of the quality of the structure and functioning of surface water ecosystems as indicated by the condition of a number of 'quality elements'. These include biological and chemical indicators. Where a water body is defined as a Heavily Modified Water Body (HMWB), ecological status is replaced by ecological potential.

4.1.3 The development and implementation of strategic long-term River Basin Management Plans (RBMPs) is a key requirement of the WFD. They include a programme of measures outlining the on-going monitoring and management actions required for water bodies to achieve future objectives.

4.1.4 Proposed developments or activities that have the potential to affect the water environment require a WFD Assessment. In this context, compliance with the WFD means prevention of deterioration (of ecological status, chemical status and supporting element status) and avoiding prevention of ability to achieve future targets. However, WFD Article 4.7 provides a legislative framework for exemption conditions that allow implementation of schemes that cause deterioration in ecological status, for example for imperative reasons of overriding public interest (IROPI).

4.1.5 The subsequent Priority Substances Directive (2008/105/EC) to the WFD sets out Environmental Quality Standards (EQSs) for priority substances which is known as the Environmental Quality Standards (EQS) Directive and there have been subsequent amendments (2013/39/EU) and implementation directives (Defra, 2015). The environmental objectives of the WFD and its associated directives include the following:

- to prevent deterioration of aquatic ecosystems;
- to protect, enhance and restore water bodies to 'good' status; based on ecology (with its supporting hydromorphological and physico-chemical factors) and chemical factors for surface waters; and
- to progressively reduce pollution from priority substances and cease or phase out discharges of priority hazardous substances.

4.1.6 The (current) default objective of the WFD is for all rivers, lakes, estuaries, groundwater and coastal water bodies to achieve 'good' status by 2027 at the latest. Where it is not possible to achieve this, alternative objectives can

[2] Following Brexit, existing EU environmental legislation continue to operate under the policy of "roll-over", however, decisions made by the EU will no longer be binding for courts in the UK.

be set. The existing status, and measures required to achieve the 2027 status objective, are set out for each water body in the relevant RBMPs. The plans set out the current baseline condition of the water environment at the time of publication and provide details on the measures needed and timescales required to attain their target status.

4.1.7 For the following surface water bodies: rivers, lakes, estuaries and coastal waters, the overall water body status has both an ecological and a chemical component. Good 'ecological status' is defined as a 'slight variation from undisturbed natural conditions, with minimal distortion arising from human activity'. The ecological status of water bodies is determined by examining biological elements (e.g. benthic invertebrates, fish (but not in coastal water bodies) and a number of supporting elements and conditions, including physico-chemical factors (e.g. metals and organic compounds), and hydromorphological factors (e.g. depth, width, flow and 'structure'). These are all WFD quality elements, also referred to as receptors for the purposes of this assessment.

4.1.8 A flow chart illustrating how quality elements are combined (Cycle 3) to provide an overall water body status/potential is provided in **Figure 6**.

4.1.9 The classification hierarchy for surface waters is illustrated in **Figure 7.**

4.1.10 Only biological supporting elements have classification boundaries defined as 'High' to 'Bad' (**Figure 6**). Chemicals supporting 'chemical status' that do not meet EQS concentrations are classified as 'Failing to achieve Good' (**Figure 6**).

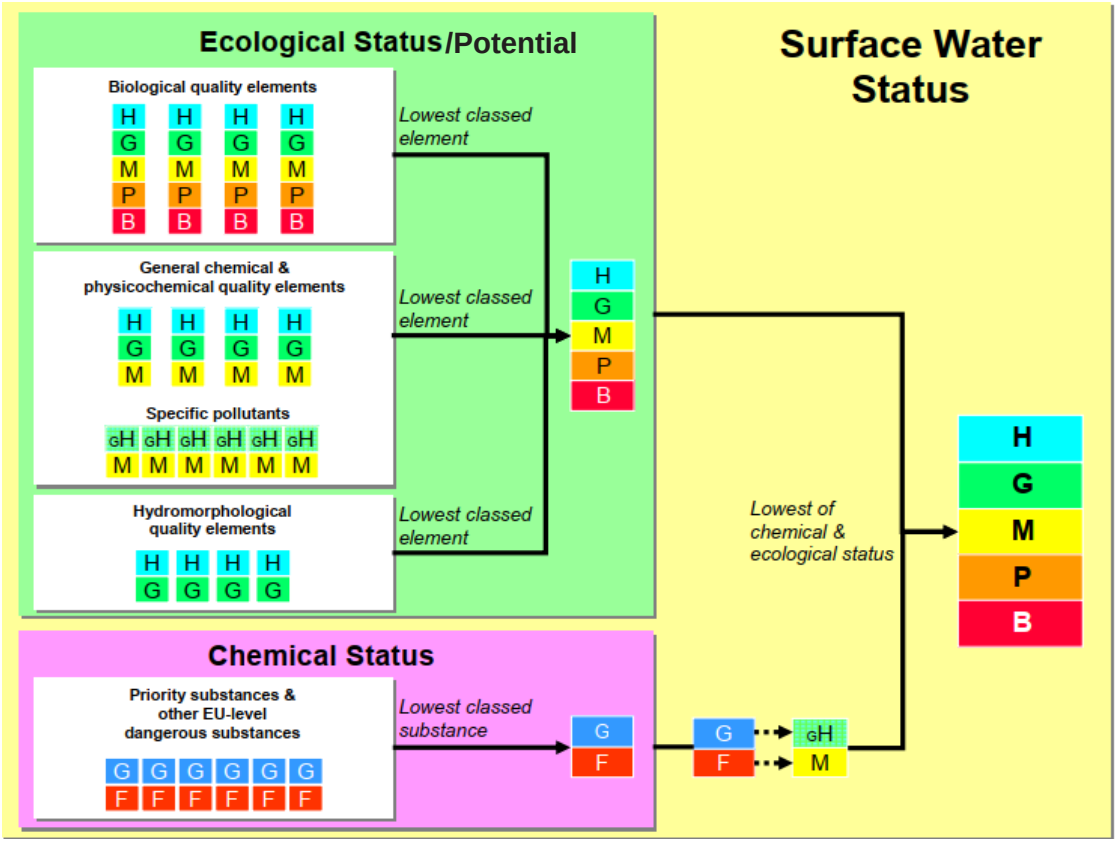

Figure 6. WFD quality elements – Bringing all the strands of evidence together (Environment Agency, 2015).

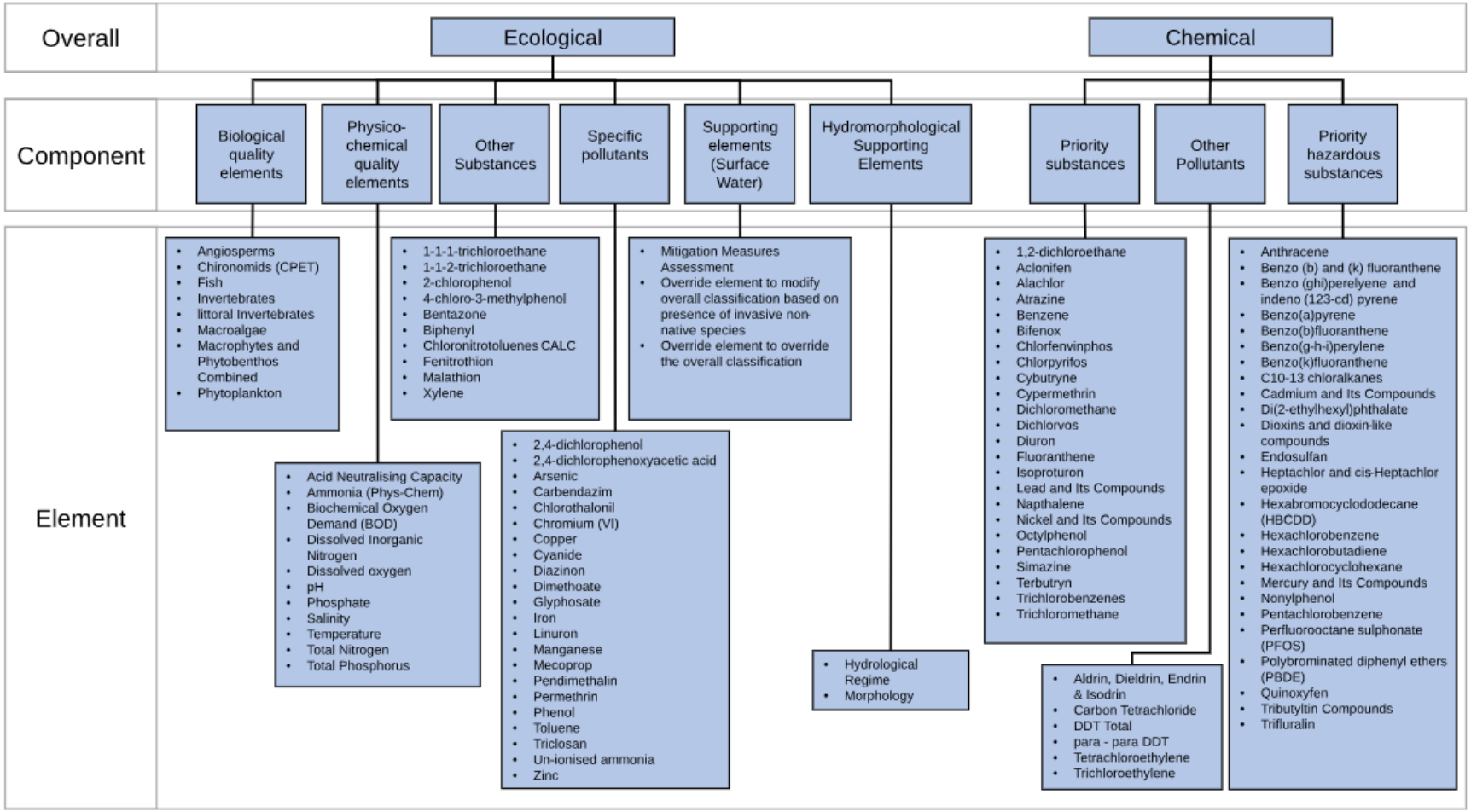

Figure 7. Classification hierarchy for surface waters (from Environment Agency, 2023b).

4.2 Coastal Water Bodies

4.2.1 Article 2, clause 7 of the WFD defines coastal waterbodies as 'a surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters'.

4.2.2 The WFD quality elements for coastal WFD water bodies are as follows:

- Hydromorphological:
  - tidal regime:
    - direction of dominant currents; and
    - wave exposure
  - morphological conditions:
    - depth variation;
    - quantity, structure, and substrate of the bed;
    - dominant currents;
    - wave exposure; and
    - structure of the intertidal zone.
- Biological:
  - phytoplankton;
  - other aquatic flora; and
  - benthic invertebrates.
- Physico-chemical and chemical:
  - transparency;
  - thermal conditions;
  - dissolved oxygen;
  - nutrients;
  - salinity; and
  - pollution by substances being discharged (e.g. chemicals, metals, pesticides).

4.3 Transitional Water Bodies

4.3.1 Transitional water bodies include bodies of surface water in the vicinity of river mouths that typically correspond to estuaries. Therefore, they are influenced by tides and are characterised both by saline water due to their proximity to coastal waters and by freshwater due to inputs of river flows.

4.3.2 The WFD quality elements for transitional WFD water bodies such as the Taw / Torridge water body are as follows:

- Hydromorphological:
  - tidal regime:
    - freshwater flow; and
    - wave exposure.
  - morphological conditions:
    - depth variation;
    - quantity, structure, and substrate of the bed; and
    - structure of the intertidal zone.
- Biological:
  - phytoplankton;
  - other aquatic flora;
  - benthic invertebrates; and
  - fish.
- Physico-chemical and chemical:
  - transparency;
  - thermal conditions;
  - dissolved oxygen;
  - nutrients;
  - salinity; and
  - pollution by substances being discharged (e.g. chemicals, metals, pesticides)

5 METHODOLOGY

5.1.1 The assessment has followed the EA's 'Clearing the Waters for All' guidance (EA, 2023a), which is guidance developed specifically to assess the effects of activities in transitional and coastal WFD water bodies. The assessment approach is based on the following three stages:

- Screening;
- Scoping; and
- (Impact) Assessment.

5.2 Screening

5.2.1 The screening stage is used to determine if the activities for the proposed works are classed as low risk activities. The EA guidance (EA, 2023a) indicates that the following activities qualify as low risk activities:

- A self-service marine licence activity or an accelerated marine licence activity that meets specific conditions;
- Maintaining pumps at pumping stations;
- Removing blockages or obstacles like litter or debris within 10 m of an existing structure to maintain flow;
- Replacing or removing existing pipes, cables or services crossing over a water body – but not including any new structure or supports, or new bed or bank reinforcement; and
- 'Over water' replacement or repairs to, for example, bridge, pier, and jetty surfaces, if you minimise bank or bed disturbance.

5.2.2 Where the proposed works do not fulfil criteria for a low-risk activity, the assessment continues to the Scoping stage.

5.3 Scoping

5.3.1 The Scoping stage is used to determine if the proposed activities pose potential risks to the following receptors based on the quality elements of the water body of concern. The EA guidance (EA, 2023a) specifies consideration of the following quality elements:

- Hydromorphology;
- Biology – habitats;
- Biology – fish (not for coastal water bodies);
- Water quality;
- Protected areas; and
- Invasive non-native species (INNS)

5.3.2 Scoping for coastal and transitional water bodies has been undertaken by using the Scoping template provided in the EA guidance (EA, 2023a). The Scoping template identifies a range of criteria against which proposed

activities can be considered to determine whether they pose potential risks to receptors and whether there is a requirement to carry out an impact assessment for those receptors.

5.4 WFD Impact Assessment

5.4.1 The impact assessment stage involves determination of the potential impacts of the proposed activities on the specific parameters that are taken forward from Scoping (EA, 2023a).

5.4.2 The assessment involved consideration of whether the proposed activities (as set out in **Section 2**) will have a non-temporary impact on the status of WFD quality elements in the WFD water bodies potentially affected by the Proposed Development (EA, 2023a). The impact assessment was carried out following the steps in the impact assessment section of the EA guidance (EA, 2023a).

5.4.3 The WFD assessment has also followed principles of EIA guidance (e.g. CIEEM, 2018) where applicable, in that the following aspects have been considered when assessing the potential for a change in WFD status due to impacts on WFD quality elements. Although these aspects have been considered, they are not necessarily referred to directly in the assessment text:

- Nature of effect i.e. beneficial / adverse; direct / indirect;
- Extent of the effect (geographical area e.g. site-wide, local, district, regional, and the size of the population affected);
- Likelihood of effect occurring;
- Value and sensitivity of receptor;
- Magnitude of effect;
- Duration; and
- Temporary or permanent effect. If the effect occurs on all of, or a proportion of, a community/population on a continual basis it can be considered to be permanent (e.g. a continual cooling water discharge). If it is not on a continual basis when considering the community / assemblage / population or habitat level, it can be described as temporary.

5.4.4 If it was considered that the activity would not affect the potential / status of a given WFD receptor (taking account of any embedded mitigation measures) then no further evaluation or mitigation was required for the WFD assessment for that receptor (WFD supporting element). If possible adverse effects were identified, then the next step would be to identify suitable mitigation measures to address the potential effect (EA, 2023a).

6 WFD ASSESSMENT

6.1 Screening

Screening of Activities

6.1.1 The proposed activities were considered against the list of low-risk activities identified under the EA guidance (EA, 2023a). It was concluded that they do not qualify as low risk activities and, accordingly, they were taken forward to the Scoping stage.

Screening of Water Bodies

6.1.2 A semi-empirical assessment of sediment transport (taking into account of the influence of currents, waves and sediment resuspension) has been conducted for the Proposed Development (Volume 3, Chapter 8: Physical Processes; Volume 3, Appendix 8.1: Sediment Dispersion Technical Note of the ES). These calculations have indicated that the distribution of resuspended sediment is anticipated to be highly limited for the majority of the OCC (disturbed sediment is expected to drop out of suspension immediately i.e. within tens of metres), but could reach up to 15.2 km in an east northeast and west southwest direction within Bideford Bay (Volume 3, Chapter 8: Physical Processes; Volume 3, Appendix 8.1: Sediment Dispersion Technical Note of the ES). This 15.2 km dispersal is only reached on a peak spring tide and on a mean neap tide the distance is approximately 5 km (see **Figure 8** & **Figure 9**, reproduced from Volume 3, Appendix 8.1: Sediment Dispersion Technical Note of the ES; and **Figure 2** (indicating the location of the WFD water bodies).

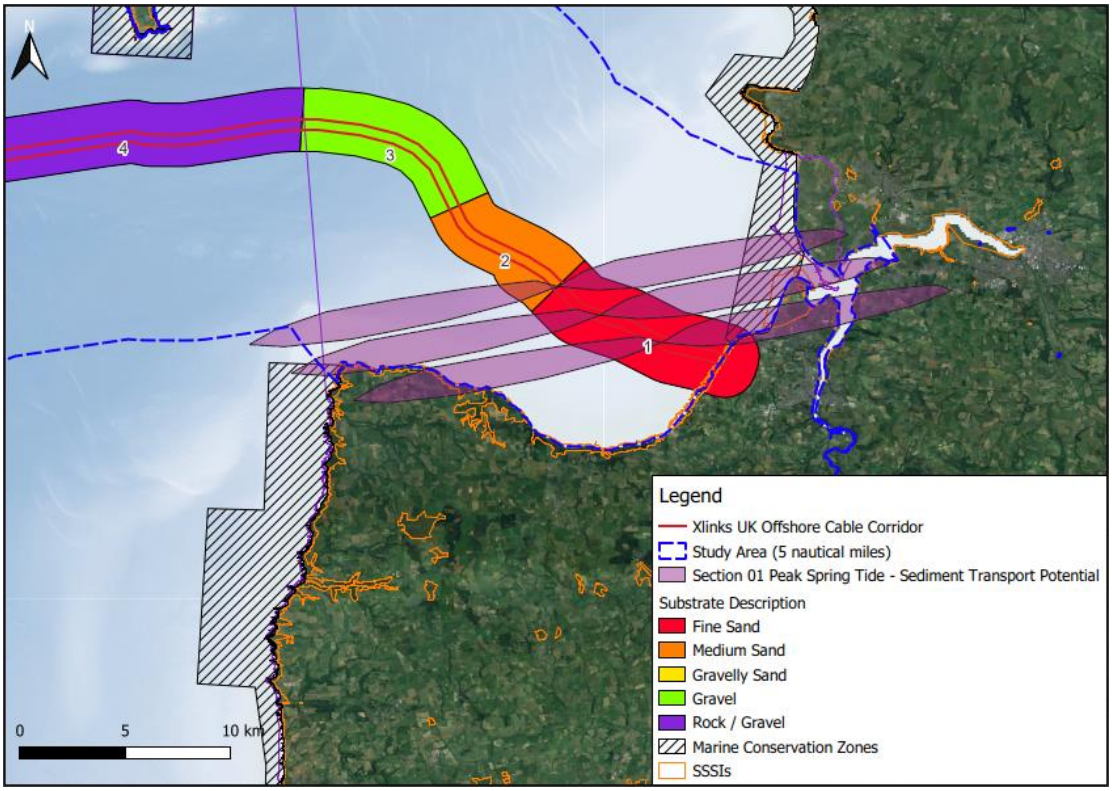

Figure 8. Peak spring tidal excursion ellipse at Location 1.

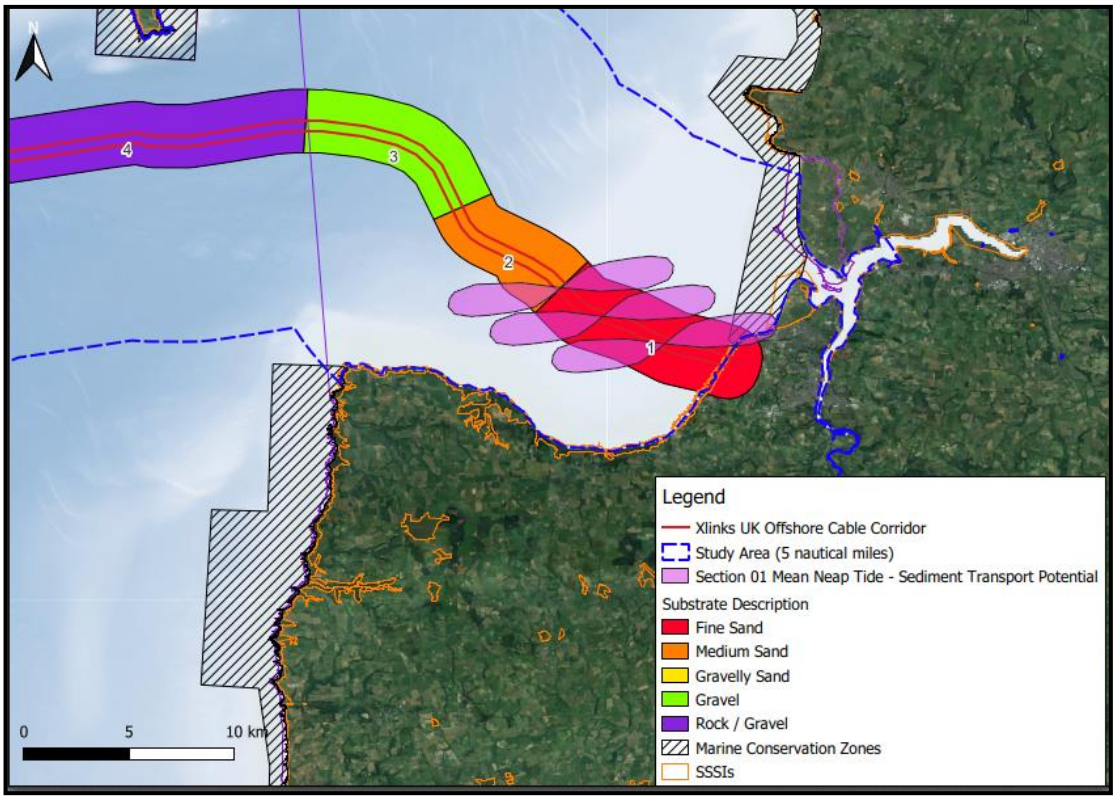

Figure 9. Mean neap tidal excursion ellipse at Location 1.

6.1.3 Consequently, all transitional and coastal water bodies located within 15.2 km of the Proposed Development in an east northeast and west southwest direction were initially identified. A 15.2 km search distance in these directions is equivalent to the benthic ecology EIA study area that is applied within the ES for the Bideford Bay section of the OCC (Volume 3, Chapter 1: Benthic Ecology of the ES). This screening distance is considered suitably precautionary as it covers the maximum calculated sediment dispersal distance (15.2 km to the east and west of the OCC) predicted under maximum bed current velocities for this section of the OCC. The water bodies initially identified within 15.2 km were:

- 'Barnstaple Bay' coastal water body (ID: GB610807680003);
- 'Cornwall North' coastal water body (ID: GB610807680002);
- 'Lundy' coastal water body (ID: GB610878040000); and
- 'Taw / Torridge' transitional water body (ID: GB540805015500).

6.1.4 The Proposed Development is within the Barnstaple Bay WFD coastal water body, which was consequently screened in for further assessment.

6.1.5 The Taw / Torridge transitional water body is located 5 km from the Proposed Development and is within the ZoI of the worst case sediment plume potentially generated by the Proposed Development (**Figure 8**). In addition, fish from the Taw / Torridge transitional water body could swim to, or past, the OCC. Consequently, the Taw / Torridge transitional water body has been screened in for further assessment.

6.1.6 The 15.2 km sediment plume only just interacts with the Cornwall North water body (by approximately 1 km). However, it should be noted that suspended sediment concentrations are expected to continually decrease with increasing distance from any source of sediment disturbance and at a distance of approximately 14 km from source it would be anticipated to be negligible in relation to natural fluctuations in background levels of suspended sediment concentrations. In addition, part of the embedded mitigation for the Proposed Development is to avoid peak spring tides when conducting any works in Bideford Bay i.e. avoid potential sediment disturbing works within OCC Section 1 above during periods when peak dispersion would be anticipated (**Table 2**). Taking this into account, and the extent of the Cornwall North WFD water body, there is no anticipated pathway for impact on supporting elements for the Cornwall North WFD coastal water body. Consequently, the Cornwall North WFD coastal water body was screened out of the assessment.

6.1.7 The Lundy WFD coastal water body is 3.5 km from the Proposed Development. The semi-empirical assessment of sediment transport for the Proposed Development found that for the section of the OCC near Lundy, suspended sediment is anticipated to fall out of suspension in the immediate vicinity of the OCC (within tens of metres) and would not reach the Lundy WFD coastal water body (Volume 3, Chapter 8: Physical Processes; Volume 3, Appendix 8.1: Sediment Dispersion Technical Note of the ES). In addition, fish are not an ecological element considered for coastal water bodies (unless affecting fish entering an estuary), consequently there are not anticipated to be mobile WFD receptors that could reach the Proposed Development from the Lundy WFD coastal water body. Thus, there is no anticipated pathway for any impacts on Lundy WFD coastal water body

supporting elements. For these reasons the Lundy WFD coastal water body was screened out of the assessment and is not considered further within this WFD assessment.

Current water body status

6.1.8 The Proposed Development is within the Barnstaple Bay WFD coastal water body. The status of the Barnstaple Bay WFD coastal water body (screened in) is indicated in

6.1.9 **Table** 4.

6.1.10 At the landfall, the OCC is approximately 5 km from the Taw / Torridge transitional water body (**Figure 2**) and the status of this water body is indicated in **Table 5**.

Table 4. Cycle 3 classifications for the Barnstaple Bay coastal water body.

Summary			
Water Body ID		**GB610807680003**	
Water Body Area		**11,114.15 ha**	
Water Body Type		**Coastal Water**	
Hydromorphological designation		**Not heavily modified**	
Overall Status		**Moderate**	
Parameter		**Year**	
		2019	**2022**
Chemical Status		**Fail**	**Does not require assessment**
Priority Substances		**Good**	**Does not require assessment**
Priority Hazardous Substances		**Fail** (due to Mercury and PBDE)	**Does not require assessment**
Ecological Status		**Good**	**Moderate**
Biological Quality Elements	Angiosperms	**Not Available**	**Not Available**
	Fish	**Not Applicable**	**Not Applicable**
	Invertebrates	**Not Available**	**Moderate**
	Macroalgae	**Good**	**Good**
	Phytoplankton	**Good**	**Good**
Physico-chemical Quality Elements	Dissolved Inorganic Nitrogen	**Good**	**High**
	Dissolved Oxygen	**High**	**High**

Specific Pollutants	Various	**High**	**High**
Hydromorphological supporting elements	Morphology	**High**	**High**

Table 5. Cycle 3 classifications for the Taw / Torridge transitional water body.

Summary			
Water Body ID		**GB540805015500**	
Water Body Area		**1,458.70 ha**	
Water Body Type		**Transitional**	
Hydromorphological designation		**Heavily modified water body – Flood protection**	
Overall Potential		**Moderate**	
Parameter		**Year**	
		2019	**2022**
Chemical Status		**Fail**	**Does not require assessment**
Priority Substances		**Good**	**Does not require assessment**
Priority Hazardous Substances		**Fail** (due to Mercury, PBDE and Benzo(g-h-i) perylene)	**Does not require assessment**
Ecological Potential		**Moderate**	**Moderate**
Biological Quality Elements	Angiosperms	**Good**	**Good**
	Fish	**Good**	**Good**
	Invertebrates	**Good**	**Good**
	Macroalgae	**High**	**High**
	Phytoplankton	**Good**	**Good**
Physico-chemical Quality Elements	Dissolved Inorganic Nitrogen	**Moderate**	**Moderate**
	Dissolved Oxygen	**High**	**High**
Specific Pollutants	Various	**High**	**High**
Hydromorphological supporting elements	Hydrological regime	**Supports Good**	**Supports Good**

6.2 Scoping

6.2.1 The completed Scoping templates for the Barnstaple Bay WFD coastal water body and the Taw / Torridge transitional water body are provided in **Annex A.1** and **Annex A.2**.

Barnstaple Bay WFD coastal water body

6.2.2 As indicated in the Scoping template, the following WFD quality elements were **scoped in** to the requirement for more detailed assessment:

- Hydromorphology:
  - The proposed works may have potential direct effects on hydromorphology within the Barnstaple Bay WFD coastal water body.
- Biology – Habitats (Lower sensitivity):
  - The footprint area of the Proposed Development in the Barnstaple Bay coastal water body covers more than 1% of the area of a number of lower sensitivity habitats within the water body.
- Biology – Habitats (Higher sensitivity):
  - The physical footprint of the proposed works is not within 500 m of a higher sensitivity habitat. The closest higher sensitivity habitat is polychaete reef, which is approximately 700 m from the proposed works. This is within the zone of influence of the potential sediment plume generated by the Proposed Development and it has consequently been scoped in on a precautionary basis.
- Fish:
  - Although fish are not usually considered for a coastal water body, it is considered the Proposed Development could potentially affect movement of fish in and out of the Taw / Torridge Estuary via the Barnstaple Bay water body, so it has been included taking a precautionary approach.
- Water Quality:
  - Activities associated with the Proposed Development may have potential effects on the water quality of the Barnstaple Bay coastal water body.
- WFD Protected Areas:
  - The Proposed Development intersects with the Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC.
- Invasive Non-Native Species:
  - There is potential for introduction and spread of marine INNS to the Barnstaple Bay coastal water body due to vessel activity, interactions between equipment and the seabed, introduction of structures to the seabed during construction, and potential colonisation of introduced hard structures by INNS during operation and beyond.

6.2.3 No WFD quality elements were **scoped out** of the impact assessment.

Taw / Torridge transitional water body

6.2.4 As indicated in the Scoping template, the following WFD quality elements were **scoped in** to the requirement for more detailed assessment:

- Biology – Habitats (Lower sensitivity):
  - If considering the maximum potential footprint of the sediment plume which is on peak spring tides, the footprint area of the Proposed Development in the Taw/Torridge transitional water body covers more than 1% of the area of a number of lower sensitivity habitats within the water body.
- Biology – Habitats (Higher sensitivity):
  - If considering the maximum potential footprint of the sediment plume which is on peak spring tides, the footprint area of the Proposed Development in the Taw/Torridge transitional water body is within 500 m of saltmarsh and mussel beds.
- Fish:
  - Activities associated with the Proposed Development could potentially affect normal fish behaviour like movement, migration or spawning and could affect movement of fish in and out of the Taw / Torridge Estuary.

6.2.5 The following WFD quality elements were **scoped out** of the impact assessment:

- Hydromorphology; Water Quality; Protected Areas; Invasive Non-Native Species:
  - These were all scoped out as the proposed works are not in the Taw / Torridge water body, with no clear identified pathway to affect these supporting elements in the Taw / Torridge water body. Due to the distance from the potential location of any sediment released due to the Proposed Development, and dilution of any chemicals released, any effects on water quality in the Taw / Torridge water body are anticipated to be negligible. The Proposed Development is thus not anticipated to result in a deterioration in the status of these elements or prevent the Taw / Torridge water body from meeting its WFD objectives in relation to these elements.

6.3 Impact Assessment

Barnstaple Bay coastal water body

Hydromorphology

6.3.1 There is potential for localised changes to seabed morphology due to the creation of trenches to install the cable and placement of any cable protection – thus potential to have localised effects on current speeds, localised seabed scour and associated sediment transport mechanisms.

There is expected to be very little, if any, requirement for cable protection (rock placement) in the Barnstaple Bay water body (Volume 1, Appendix 3.4: Outline CBRA of the ES), with the exception of potentially a small, localised area of rock protection (or concrete mattresses) at the HDD exit pits to cover and protect ducts. All such protection would be buried beneath layers of the existing baseline unconsolidated sediments - there is anticipated to be approximately 5 m of unconsolidated sediments, principally fine sands, at the HDD exit pit locations. The assessment of potential impacts on physical processes (c.f. Volume 3 Chapter 8: Physical Processes of the ES) confirms the scale of magnitude associated with any effects on metocean processes to be negligible, and the resultant EIA significance to be negligible or minor in relation to all EIA receptors.

6.3.2 As indicated in **Table 2**, where possible, cables will be buried up to 1.5 m below the seabed, as detailed in the Outline CBRA (Volume 1, Appendix 3.4 of the ES). Only when full burial is not possible will additional protection be installed. In addition, where possible (and if required) any rock placement would be kept level with the seabed, and if above the seabed it would be kept to a maximum of 1 m above seabed level.

6.3.3 The sediment type within the part of the OCC that intersects the Barnstaple Bay coastal water body is soft sediment (muddy sand) (see Volume 3, Chapter 1: Benthic Ecology of the ES and **Figure 5**). Consequently, as stated above, it is likely that no rock placement will be required in this section of the OCC and should rock placement be required there is high confidence (based on the outline CBRA (Volume 1, Appendix 3.4 of the ES)) that this would only be required within trench (i.e. it would not extend above existing sea bed level).

6.3.4 The HDD exit points will be in water depths of between 5 and 10 m where frequent reworking of sediments is likely to be a feature of the baseline environment.

Assessment

6.3.5 Overall, the area in which a trench would be created, and cable protection or concrete mattresses potentially installed, is very small in relation to the area of the Barnstaple Bay coastal water body (the width of any trench would be 0.5 to 1.5 m and the area of concrete mattresses would be very small (disturbance area at each exit pit would be 15 x 15 m)). The low profile of any cable protection or mattresses (which are highly likely to have no profile extending above the existing sea bed level), will minimise any effects on local hydrodynamics and thereby any associated changes in seabed morphology. Areas of rock protection/mattresses may experience some initial periods of scour in the immediate vicinity following installation, however, this would be very localised in the immediate vicinity of the rock protection/mattresses (order of metres) and would reduce in scale over time and any associated seabed morphology changes are anticipated to be very small. Any cable/duct protection at the HDD exits is expected to be below sea bed level and the c.5 m unconsolidated sediments across the potential exit pit area will provide an extensive layer of cover. Measurable scour is most likely negligible given the likelihood of no above sea bed rock placement in the OCC within the Barnstaple Bay water body.

6.3.6 Given the nature of the proposed works, it is considered that operation and maintenance activities would likely result in negligible or minor effects only on seabed morphology (noting the anticipated negligible scour above).

6.3.7 Overall, taking account of the scale of the potential effects during construction and operation and maintenance in relation to the area of the water body, it is considered that the Proposed Development would not result in a deterioration in the status of the hydromorphology of the water body or prevent the Barnstaple Bay coastal water body from meeting its WFD objectives in relation to hydromorphology.

Biology – Lower Sensitivity Habitats

6.3.8 The justification for inclusion of lower sensitivity habitats in the impact assessment, as outlined in the Scoping Template in Appendix 1, is that the proposed activities:

- coincide with 1% or more of at least one lower sensitivity habitat.

6.3.9 Magic Maps (MAGIC, 2024) indicates that the lower sensitivity habitat 'subtidal soft sediments like sand and mud' intersects with approximately 127.4 ha of the proposed area of works (entire coincident OCC area) within the Barnstaple Bay coastal water body. The area of 'subtidal soft sediments like sand and mud' within the water body is 9,280.57 ha. The proposed works are therefore in 1.3% of the lower sensitivity habitat 'subtidal soft sediments like sand and mud', within the Barnstaple Bay coastal water body.

6.3.10 Works associated with cable installation within the Barnstaple Bay coastal water body includes seabed preparation, cable laying activities and potential installation of localised cable protection and concrete mattresses at the HDD exit pits. During operation and maintenance, if cables need to be repaired, they will be exposed and replaced. Cables may also be removed during decommissioning. Potential impacts to biological habitats include temporary habitat loss/disturbance and long-term habitat loss/change (should any in-trench rock protection be required).

Assessment

6.3.11 A detailed characterisation of the benthic habitats which may be directly or indirectly impacted by the Proposed Development is provided in Volume 3, Chapter 1: Benthic Ecology of the ES. The assessment within the ES concluded that there would be no adverse significant effects on benthic receptors (including within Barnstaple Bay) from temporary habitat loss/disturbance and long-term habitat loss/change associated with the Proposed Development.

6.3.12 Given that the benthic habitats that characterise the OCC are common and widespread throughout the wider region (as described within Volume 3, Chapter 1: Benthic Ecology of the ES), it is considered that activities resulting in temporary habitat loss/disturbance and long-term habitat loss/change during construction would only affect a very small area compared to their overall extent in the wider region, including in the Barnstaple Bay coastal water body.

6.3.13 The sensitivity of habitats that are known to characterise the OCC to temporary habitat loss/disturbance and long-term habitat loss/change have

been assessed according to the detailed Marine Evidence-based Sensitivity Assessment (MarESA) information (Volume 3, Chapter 1: Benthic Ecology of the ES). The Barnstaple Bay coastal water body is predominantly characterised by '*Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment' (EUNIS: MC5215 / JNCC: SS.SSa.CMuSa.AalbNuc) and further offshore beyond the Barnstaple Bay water body boundary 'Sparse fauna in Atlantic infralittoral mobile clean sand' (EUNIS: MB5231 / JNCC: SS.SSa.IFiSa.IMoSa)' was present (**Section 1.3**, **Figure 5**). The MarESA assessment determined that both of these habitats had low to medium sensitivity to temporary habitat loss/disturbance (based on assessments for 'Habitat structure changes – removal of substratum (extraction)', 'Abrasion/disturbance of the surface of the substratum or seabed', 'Penetration or disturbance of the substratum subsurface' and 'Smothering and siltation rate changes (heavy)'). The MarESA assessment also determined that both of these habitats had high sensitivity to long-term habitat loss/change (based on assessment for 'Physical change (to another seabed type)'). However, these habitat types are not rare or geographically restricted. As detailed within the ES baseline characterisation, comparable habitats are distributed within the wider region and in the area extending further seawards from the boundary of the Barnstaple Bay coastal water body (**Figure 5**). Therefore, given the relatively small spatial scales for any habitat loss/disturbance outlined above, this loss is not expected to undermine regional ecosystem functions or diminish biodiversity.

6.3.14 The impact of temporary habitat loss/disturbance on benthic habitats is predicted to be of local spatial extent (i.e. restricted to constrained disturbance areas along the cable trenches and not across the entire OCC). In addition, it would be of short-term duration (limited to the duration of construction, operation and decommissioning activities), intermittent and with high reversibility. The impact of long-term habitat loss/change on benthic habitats is predicted to be of long-term duration (as a worst case it is assumed to occur throughout the operational phase) but would be of localised spatial extent. Within-trench rock protection is unlikely to be required within Barnstaple Bay (benthic sediments (sand) are amenable to effective trenching and refill) and if this is necessary in some locations it is highly unlikely to be required above seabed level - given findings of the CBRA (an outline CBRA is presented as Volume 1, Appendix 3.4 of the ES). In addition, any concrete mattresses or local rock protection installed at the HDD exits are anticipated to be below bed level. Consequently, normal surface movements of sands (and connectivity of habitats) are expected to continue unimpeded and trenches will tend to cover rapidly. Since the loss of subtidal habitat will largely be temporary and recovery will occur, any effects are predicted to be on a small scale and only for a limited period of time.

6.3.15 Consequently, in terms of potential effects on lower sensitivity habitats, it is considered that the Proposed Development would not result in a deterioration in the status of the biological supporting elements of the Barnstaple Bay coastal water body or prevent this water body from meeting its WFD objectives in relation to benthic invertebrates (currently listed as Moderate ecological status).

Biology – Higher Sensitivity Habitats

6.3.16 The justification for inclusion of higher sensitivity habitats in the impact assessment, as outlined in the Scoping Template in Appendix 1, is that the proposed activities:

- Are not within 500 m of any higher sensitivity habitat in terms of physical footprint. However, the sediment plume generated by the Proposed Development could interact with an area of polychaete reef at a distance of 700 m from the Proposed Development. Consequently, it has been included on a precautionary basis.

6.3.17 The area of polychaete reef indicated on Magic Maps (MAGIC, 2024) is extremely small and is located within the intertidal zone.

Assessment

6.3.18 The polychaete reef referred to is intertidal *Sabellaria* reef. No *Sabellaria* reef was recorded during the intertidal survey at the Landfall location. The sediment plume generated by the Proposed Development could potentially extend to areas of intertidal *Sabellaria* reef. However, a supply of suspended sediment is a requirement for the development of *Sabellaria* reefs and *Sabellaria alveolata* reef biotopes are indicated to be 'Not sensitive' to increases in peak suspended sediment concentration to the medium turbidity level (100-300 mg/l) in the short term (Tillin *et al*., 2024). Increases in turbidity are anticipated to be a lot lower than this at the areas of *Sabellaria* reef based on anticipated suspended sediment levels at source for different construction options (Volume 3, Chapter 8: Physical Processes; Volume 3, Appendix 8.1: Sediment Dispersion Technical Note of the ES).

6.3.19 Consequently, in terms of potential effects on higher sensitivity habitats, it is considered that the Proposed Development would not result in a deterioration in the status of the biological supporting elements of the Barnstaple Bay coastal water body or prevent this water body from meeting its WFD objectives in relation to benthic invertebrates (currently listed as Moderate ecological status).

Biology – Fish

6.3.20 Information relating to the fish assemblage of the Rivers Taw and Torridge (5 km from the Landfall location) is provided in the 'Biology – Fish' text at **paragraph 6.3.56**. The conclusion of the assessment for the Taw / Torridge water body is that the Proposed Development would not result in a deterioration in the status of the fish element of the Taw / Torridge transitional water body or prevent this water body from meeting its WFD objectives in relation to fish.

6.3.21 Fish is not a Biological Quality element usually considered for coastal water bodies and there is no ecological status for fish for the Barnstaple Bay coastal water body. Consequently, high level consideration has been provided below in relation to fish transiting from the Barnstaple Bay coastal water body to the Taw / Torridge transitional water body.

Assessment

6.3.22 Migratory fish species which could transit between the Barnstaple Bay coastal water body and the Taw / Torridge transitional water body are

Atlantic salmon, European eel, brown/sea trout, river lamprey and twaite shad (Davies *et al*., 2020; EA, 2024).

6.3.23 The proposed works in the Barnstaple Bay coastal water body would be short-term. The levels of underwater noise and vibration generated would be very low (c.f. noise and vibration assessment for fish undertaken as part of ES Volume 3, Chapter 2: Fish and Shellfish of the ES) and fish would be able to swim away from the source of noise if required and still have a clear route of passage to the Taw-Torridge Estuary. Similarly, any increased levels of turbidity (temporary increases) that could be generated by the Proposed Development are not deemed significant in the context of background variability - migratory fish species transiting to the Taw-Torridge Estuary are well adapted to short term increases in suspended solid levels. It should also be noted that an aspect of embedded mitigation for the Proposed Development is to avoid peak spring tides when conducting any works in Bideford Bay which could disturb sediment (**Table 2**). The key consideration is that fish from the Barnstaple Bay coastal water body would be able to find clear passage to the Taw-Torridge Estuary avoiding any levels of potential impacts generated by the Proposed Development which could affect behaviour or have physiological effects.

6.3.24 Overall, the effect of works on fish in the Barnstaple Bay coastal water body is not anticipated to subsequently result in a deterioration in the status of the fish element of the Taw / Torridge transitional water body or prevent this water body from meeting its WFD objectives in relation to fish.

Water Quality

6.3.25 The proposed works do not involve the intentional release or discharge of chemical substances to the marine environment. Accidental spillages of oil and other chemical substances has the potential to occur during the proposed works (as with any activities within the marine environment). However, best practice pollution prevention guidelines will be followed to minimise the risk of accidental spillages and the risk of introduction of contaminants throughout the construction works. Bentonite will be used during HDD as a best practice drill lubricant. Bentonite breakout management will be included within the 'Outline Bentonite Breakout Plan' (document reference 7.21) which will be finalised by the HDD Principal contractor (**Table 2**).

6.3.26 Activities which disturb the seabed have the potential to remobilise contaminants that are bound in the sediment back into the water environment. The total area that is likely to be disturbed, and therefore the potential volume of material disturbed, resulting in the potential release of sediment bound contaminants, is localised in extent and small in the context of the water body. A high-level estimate of the total area of potential disturbance in the Barnstaple Bay water body is 0.69 ha, compared to the overall Barnstaple Bay WFD water body area of 175 ha (<0.4% of water body area). This area estimate is based on 900 m^2 associated with HDD exit pit excavations, and up to 6,000 m^2 associated with trench excavations (c. 2,000 m [l] x 1.5 m [max. trench width] x 2 [no.] =6000 m^2; noting that cables will split prior to HDD but HDD is planned to at least 500 m offshore)).

6.3.27 In addition, the nature of the subtidal sediments is predominantly coarse (which tend to have lower levels of adsorbed contaminants, compared to finer sediment fractions).

Assessment

6.3.28 Following any sediment disturbance and resuspension, on account of construction activities, the majority of sediments are expected to be deposited in the immediate vicinity of the works. The release of contaminants such as arsenic and Polycyclic Aromatic Hydrocarbons (PAHs) from the small proportion of fine sediments is likely to be rapidly dispersed with the tide and/ or currents and any increased bioavailability resulting in adverse eco-toxicological effects is not expected (any associated water quality concentration change of these parameters would be very short-term and likely negligible/not measurable above background).

6.3.29 Sediment chemistry testing has been undertaken as part of the background characterisation studies and compared against available threshold levels. The use of Cefas Guideline Action Levels is undertaken as part of a 'weight of evidence' approach, usually to assess material suitability for disposal at sea. In general, contaminant concentrations below Cefas Action Level 1 (cAL1) are typically of no concern and are unlikely to influence marine licence decision-making; concentrations above cAL2 are not normally suitable for disposal at sea. Site-specific sediment grab samples collected for the Proposed Development were analysed for metals, organotins and PAHs. The results of the analysis are presented in Volume 3, Appendix 8.3 Sediment Sample Chemistry Results of the ES. Analysis of the sediment concentrations against cAL1 and cAL2 revealed arsenic concentrations above the cAL1 threshold at three locations sampled within the Barnstaple Bay coastal water body but concentrations were lower than the Probable Effect Level (PEL) under the Canadian Marine Sediment Quality Guidelines (CCME 1999).

6.3.30 Project specific high-level assessment was undertaken to understand potential sediment dispersion. The key findings of the assessment are presented in Volume 3, Appendix 8.1: Sediment Dispersion Technical Note of the ES. The results of the high-level assessment indicated that suspended sediment within the Barnstaple Bay coastal water body could travel a maximum distance of approximately 15.2 km in an east northeast and west southwest direction (estimated to settle within no more than 6 hours) under peak spring tide current velocities, however it is also recognised that bed sediments in this area will routinely be mobilised into suspension under these peak current events – consequently, there will tend to be a degree of baseline disturbance (and potential release/reabsorption) of chemicals associated with sediments. As above, any associated water quality chemical concentration change (e.g. associated with arsenic) would be very short-term and likely negligible/not measurable above background and would approximate similar conditions during regular tidal events (or other routine disturbance events).

6.3.31 A characterisation of the physical processes and water quality which may be directly or indirectly impacted by the Proposed Development is provided in the ES within Volume 3, Chapter 8: Physical Processes. The assessment within the ES concluded that there would be no adverse significant effects on physical processes receptors from sediment disturbance or seabed change and changes to water quality as a result of suspended sediment and

release of chemicals from sediment associated with the Proposed Development. In response to the recognition that sediment dispersion will be greatest at times of peak current flows (spring tides), excavation works associated with the HDD pits and other activities with potential for sediment disturbance will avoid peak spring tide working in Bideford Bay and any predicted periods of high wave activity (**Table 2**). As indicated above, any risk of bentonite break out will be managed via measures in the 'Outline Bentonite Breakout Plan' (document reference 7.21).

6.3.32 Overall, the impact on water quality is predicted to be of local spatial extent and very short-term duration, and low volumes of sediment would be disturbed. Any sediment disturbance is also considered in the context of a baseline high energy system which will routinely experience periods of elevated suspended sediment concentration and suspension of bed sediments. As such, the proposed works are not expected to lead to a deterioration of water quality within the Barnstaple Bay coastal water body, nor prevent this water body from meeting its WFD objectives in relation to elements associated with water quality.

WFD Protected Areas

6.3.33 There is one WFD Protected Area within 2 km of the Proposed Development. This site is the Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC, which intersects with the OCC. The site is only designated for the feature harbour porpoise *Phocoena phocoena*, and the site supports an estimated 4.7 % of the UK Celtic and Irish Sea (CIS) Management Unit (MU) harbour porpoise population. This site is recognised as being particularly important for porpoises during the winter when high densities persistently occur throughout the site.

6.3.34 There are no Shellfish Water Protected Areas, Nutrient Sensitive Areas, or Bathing Waters within 2 km of the proposed works.

Assessment

6.3.35 The Bristol Channel Approaches SAC and potential effects on harbour porpoise have been considered within the Report to Inform Appropriate Assessment (RIAA) that has been prepared alongside the ES and this WFD assessment.

6.3.36 Specific consideration was also given in the RIAA to Conservation Objective 3 for the site which is 'The condition of supporting habitats and processes, and the availability of prey for harbour porpoise is maintained' which involved determining potential effects on harbour porpoise due to changes in benthic habitats and prey availability.

6.3.37 The following potential adverse effects were identified that could impact on harbour porpoise, and supporting habitats:

- Underwater noise and vibration;
- Collision risk;
- Changes to water quality due to pollution;
- Physical change to another seabed/sediment type;
- Reduction in prey availability;

- Abrasion / disturbance of the substrate on the surface of the seabed;
- Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion; and
- Habitat structure changes - removal of substratum (extraction).

6.3.38 At the Screening stage it was considered that only underwater noise and vibration and collision risk could have Likely Significant Effects (LSE), and only these potential impacts were taken through to Stage 2 Appropriate Assessment.

6.3.39 The RIAA concluded that for both of these impacts, based on the assessment provided (including the Proposed Development's site specific underwater noise modelling; presented as Volume 3, Appendix 4.1 Underwater Noise Technical Assessment of the ES), effects were unlikely to alter the population trajectory of harbour porpoises, or significantly disturb the species, its habitat or prey species within the SAC throughout all project phases. It was therefore considered not likely to result in any adverse effect on site integrity (AEoI) of the Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC.

6.3.40 Overall, any potential effects on the harbour porpoise feature of the Bristol Channel Approaches SAC are not expected to lead to a deterioration of any WFD protected areas or prevent the Barnstaple Bay coastal water body from meeting its WFD objectives.

Invasive Non-Native Species

6.3.41 There is potential for the introduction/spread of marine INNS due to vessel activity in relation to the proposed development, and interactions between equipment and introduced infrastructure materials (rock placement) within the marine environment.

6.3.42 In addition, the placement of any materials within the Barnstaple Bay coastal water body, such as cable protection (placed rock), provides an opportunity for colonisation by a range of marine species, which could include INNS.

6.3.43 The precise number of vessels to be used and vessel return trips is yet to be determined. However, indicative vessel types and numbers have been assessed within Volume 3, Chapter 5: Shipping & Navigation of the ES and the Outline Navigational Safety and Vessel Management Plan (Volume 3, Appendix 5.2 of the ES), for the construction and the maintenance and operational phases of the Proposed Development. Overall, construction vessel numbers are considered small in the context of background vessel movements across the area (which are described and characterised). The operational phase would see very few vessel movements, associated only with ad-hoc repairs (if needed) and operational phase surveys (approx. once per year over the first c.5 years, then approximately every 5 years thereafter).

6.3.44 The project will follow and adopt relevant best practice guidelines at all stages of the project (construction, operation and maintenance, and decommissioning) through the implementation of a Biosecurity Plan to minimise the introduction/spread of INNS (a project-specific Outline Offshore Biosecurity Plan is included as part of the application for development consent (document reference 7.19)). Any vessels used for the

delivery of materials to site will adhere to industry legislation, codes of conduct and/or best practice to reduce the risk of introduction or spread of invasive non-native species.

Assessment

6.3.45 A characterisation of the benthic ecology and biodiversity which may be directly or indirectly impacted by the Proposed Development is provided in the ES within Volume 3, Chapter 1: Benthic Ecology. The assessment within the ES concluded that there would be no adverse significant effects on benthic receptors from introduction and spread of INNS associated with the Proposed Development.

6.3.46 The sensitivity of all habitat types that are known to characterise the OCC have been assessed according to the detailed Marine Evidence based Sensitivity Assessment (MarESA) sensitivity assessments (Volume 3, Chapter 1: Benthic Ecology of the ES). The Barnstaple Bay coastal water body is predominantly characterised by '*Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment' (EUNIS: MC5215 / JNCC: SS.SSa.CMuSa.AalbNuc) and further offshore beyond the Barnstaple Bay water body boundary 'Sparse fauna in Atlantic infralittoral mobile clean sand' (EUNIS: MB5231 / JNCC: SS.SSa.IFiSa.IMoSa)' was present (**Section 1.3**). The MarESA assessment for '*Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment' indicated that this habitat type had medium sensitivity to the introduction and spread of INNS, and 'Sparse fauna in Atlantic infralittoral mobile clean sand' (MB5231) was not sensitive to the introduction and spread of INNS. The impact of the introduction and spread of INNS is considered to be of regional spatial extent and long-term duration.

6.3.47 As indicated above, a project-specific Biosecurity Plan will be in place and best practice measures will be applied to minimise the risk of introduction and spread of INNS. With this embedded mitigation in place any effects associated with the potential introduction and spread of INNS are not expected to lead to a deterioration of the Barnstaple Bay coastal water body (or any of the relevant ecological supporting elements) or prevent this water body from meeting its WFD objectives.

Taw / Torridge transitional water body

Biology – Lower Sensitivity Habitats

6.3.48 The justification for inclusion of lower sensitivity habitats in the impact assessment, as outlined in the Scoping Template in Appendix 1, is that the proposed activities:

- Would not have any direct physical footprint in the water body, however, the footprint of the sediment plume generated by the Proposed Development on peak spring tides could cover more than 1% of a number of lower sensitivity habitats.

Assessment

6.3.49 As indicated in **Figure 8** & **Figure 9**, the sediment plume from the Proposed Development would reach the Tor / Torridge water body on peak spring tides, but not on mean neap tides. Consequently, any impact would be short

term and intermittent. Although the extent of the sediment plume is indicated to reach the Taw / Torridge water body, suspended sediment concentrations would be expected to rapidly decrease with increased distance from source and the concentrations reaching the Taw / Torridge water body are anticipated to be minimal. Sediment that is released from cable trenching activities in Bideford Bay is estimated to be deposited with a thickness of up to <1.5 mm depending on the timing of the trenching activities within the tidal cycle and subsequent distance of transport in suspension (Volume 3, Appendix 8.1: Sediment Dispersion Technical Note of the ES).

6.3.50 In addition, the lower sensitivity habitats in the Taw / Torridge water body are expected to be well adapted to short term increases in suspended sediment concentrations, and very low levels of sediment deposition.

6.3.51 A key consideration is that as part of embedded mitigation for the Proposed Development, peak spring tides would be avoided when conducting any works in Bideford Bay with potential to disturb sediments (**Table 2**).

6.3.52 Overall, in terms of potential effects on lower sensitivity habitats, it is considered that the Proposed Development would not result in a deterioration in the status of the biological supporting elements of the Taw / Torridge transitional water body or prevent this water body from meeting its WFD objectives in relation to benthic invertebrates (currently listed as Good ecological potential).

Biology – Higher Sensitivity Habitats

6.3.53 The justification for inclusion of higher sensitivity habitats in the impact assessment, as outlined in the Scoping Template in Appendix 1, is that the proposed activities:

- Are not within 500 m of any higher sensitivity habitat in terms of physical footprint. However, the sediment plume generated by the Proposed Development could be within 500 m of areas of saltmarsh and mussel beds.

Assessment

6.3.54 The text above for lower sensitivity habitats is applicable here. Saltmash and mussel beds in estuarine environments are routinely subject to short term increases in suspended sediment concentrations, and would not be affected by the short-term and very low levels of sediment deposition (<1.5 mm) calculated for the Proposed Development.

6.3.55 Consequently, in terms of potential effects on higher sensitivity habitats, it is considered that the Proposed Development would not result in a deterioration in the status of the biological supporting elements of the Taw / Torridge transitional water body or prevent this water body from meeting its WFD objectives in relation to benthic invertebrates (currently listed as Good ecological potential).

Biology – Fish

6.3.56 Beam trawl, otter trawl and seine net surveys conducted within the estuarine regions of the Rivers Taw and Torridge (5 km from landfall) between 2007 and 2023 recorded high numbers of sea bass *Dicentrarchus labrax*, sand

smelt *Atherina presbyter*, lesser sand eel *Ammodytes tobianus,* thicklip grey mullet *Chelon labrosus* and goby (*Pomatoschistus microps* and *Pomatoschistus minutus*). Additionally, numerous Atlantic herring *Clupea harengus*, sprat *Sprattus sprattus* and whiting *Merlangius merlangus* were caught in otter trawls, and high numbers of plaice *Pleuronectes platessa* were caught in beam trawls. Other species of note included flounder *Platichthys flesus*, horse mackerel *Trachurus trachurus*, greater sand eel *Hyperplus lanceolatus* and pollack *Pollachius pollachius* (EA, 2024).

6.3.57 Atlantic salmon, European eel, brown/sea trout, river lamprey and twaite shad occur within the Taw-Torridge Estuary and connected tributaries (Davies *et al*., 2020; EA, 2024) and European eel, Atlantic salmon and sea trout are listed features of the Taw-Torridge Estuary SSSI. All of these migratory diadromous species could interact with the Proposed Development.

6.3.58 Fish fauna is assessed as a quality element in WFD transitional water bodies, and this quality element is classified using the Transitional Fish Classification Index (TFCI) (WFD-UKTAG, 2014). The Taw / Torridge transitional water body is classified as being at good potential for fish, based on the 2022 assessment (**Table 5**).

6.3.59 The TFCI is a multi-metric index composed of ten metrics, and each one is assessed by comparing the observed metric values with those expected metric values under reference conditions. The ten metrics are:

- species composition;
- presence of indicator species;
- species relative abundance;
- number of taxa that make up 90% of the abundance;
- number of estuarine resident taxa;
- number of estuarine-dependent marine taxa;
- functional guild composition;
- number of benthic invertebrate feeding taxa;
- number of piscivorous taxa; and
- feeding guild composition.

6.3.60 The species relevant to the calculation of the TFCI are predominantly marine/estuarine residents. Consideration is specifically given to diadromous species within one metric of the TFCI (presence of indicator species), but only as an indicative presence/absence measure.

6.3.61 Normative definitions set out in Annex V of the WFD describe the aspects of the fish fauna biological quality element in transitional waters that must be included in the ecological status assessment of transitional waters, namely:

- species composition;
- abundance; and
- disturbance-sensitive species.

6.3.62 The WFD normative definitions of 'high', 'good', and 'moderate' status for transitional water body fish as described in Annex V of the Directive are set out in **Table 6.**

Table 6. Normative definitions of 'high', 'good' and 'moderate' status/potential for transitional fish.

High Status/Potential	Good Status/Potential	Moderate Status/Potential
Species composition and abundance is consistent with undisturbed conditions.	The abundance of the disturbance-sensitive species shows slight signs of distortion from type-specific conditions attributable to anthropogenic impacts on physico-chemical or hydromorphological quality elements.	A moderate proportion of the type-specific disturbance-sensitive species are absent as a result of anthropogenic impacts on physicochemical or hydromorphological quality elements.

6.3.63 The main potential effect on fish receptors associated with the Taw / Torridge transitional water body is considered to be the generation of underwater noise and vibration, primarily during the construction phase for the proposed development. It is also considered that any noise generated by the works would not reach the water body, so only fish swimming to the OCC from the water body or passing the OCC on the way to the water body, could potentially be affected. It should be noted that there is no pile driving associated with the works and the activities involved are anticipated to generate relatively low levels of noise and vibration (c.f. Volume 3, Appendix 4.1 Underwater Noise Technical Assessment of the ES).

6.3.64 Although noise interactions are considered the most likely pathway for potential effect on the Taw / Torridge fish supporting element, there are other potential interactions. Fish migrating past the OCC also have the potential to be affected by temporary and long-term habitat loss, temporary increases in suspended sediments, changes in water quality and electromagnetic field effects.

Assessment

6.3.65 A detailed characterisation of the fish receptors which may be directly or indirectly impacted by the Proposed Development is provided in the ES within Volume 3, Chapter 2: Fish and Shellfish Ecology. The assessment within the ES concluded that there would be no adverse significant effects on fish receptors throughout the construction, operation and maintenance, and decommissioning phases of the project (applying to all local fish receptors). Given the scale and nature of the proposed works, it is considered unlikely that activities will result in significant impacts to fish within the Taw / Torridge transitional water body. As a specific consideration for WFD assessment there would be no effects which could influence the metrics indicated above for calculation of the TFCI.

6.3.66 Consequently, it is considered that the Proposed Development would not result in a deterioration in the status of the fish element of the Taw / Torridge transitional water body or prevent this water body from meeting its WFD objectives in relation to fish.

WFD Protected Areas

6.3.67 There are no WFD protected areas in or near the Taw / Torridge WFD water body which are within 2 km of the physical footprint of the Proposed Development. However, the sediment plume generated by the Proposed Development could potentially interact with Braunton Burrows SAC, Taw estuary shellfish waters, Instow bathing waters, and the Taw Estuary coastal sensitive area during peak spring tides.

Assessment

6.3.68 Although the extent of the sediment plume is indicated to potentially reach these protected areas, suspended sediment concentrations would rapidly decrease with increased distance from source and the concentrations reaching the Taw / Torridge water body are anticipated to be minimal (approaching background concentrations). Sediment that is released from cable trenching activities in Bideford Bay is estimated to be deposited with a thickness of up to <1.5 mm depending on the timing of the trenching activities within the tidal cycle and subsequent distance of transport in suspension (Volume 3, Appendix 8.1: Sediment Dispersion Technical Note of the ES).

6.3.69 It is proposed that any Proposed Development works which could disturb sediment in Bideford Bay will avoid peak spring tide periods (**Table 2**), further minimising the potential for suspended sediments to have an effect on the Taw / Torridge water body.

6.3.70 Considering the extent of the protected areas, and the fact that they are anticipated to be subject to naturally occurring and frequent elevated suspended sediment concentration events across the tidal cycle, any effects are considered to be negligible. Effects on Braunton Burrows SAC were screened out at the AA screening stage (RIAA submitted with ES).

6.3.71 Overall, effects of the Proposed Development are not expected to lead to a deterioration of any WFD protected areas within or in close proximity to the Taw / Torridge WFD water body, or prevent them from meeting WFD objectives.

7 CUMULATIVE EFFECTS ASSESSMENT

7.1.1 The Cumulative Effects Assessment (CEA) takes into account the impact associated with the Proposed Development together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this WFD assessment are based upon the results of a screening exercise undertaken initially for the ES (Volume 1, Appendix 5.3: Cumulative Effects Assessment Screening Matrix of the ES). Each project has been considered on a case-by-case basis for screening in or out of assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

7.1.2 All projects and plans identified have been allocated into 'tiers' reflecting their current stage within the planning and development process (as advocated under the Planning Act, 2008 and for consistency with the Proposed Development's EIA).

- Tier 1
  - Under construction
  - Permitted application
  - Submitted application
  - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact
- Tier 2
  - Scoping report has been submitted
- Tier 3
  - Scoping report has not been submitted
  - Identified in the relevant Development Plan
  - Identified in other plans and programmes.

7.1.3 The specific projects, plans and activities scoped into the CEA, along with distances to relevant WFD water bodies are outlined in **Table 7.** The locations of such projects, plans and activities are presented on Figure 1.2 of Volume 1, Appendix 5.3: CEA Screening Matrix of the ES.

7.1.4 Note for consistency with the ES, all schemes / projects identified within 30 km of the OCC are presented with distances to the relevant WFD water bodies included in **Table 7** below. A search radius of 30 km is considered highly precautionary in the context of this WFD assessment.

7.1.5 Further to the radial search around the OCC, consideration of other projects and plans with potential for water body connectivity associated with mobile species of relevance have been considered. This consideration identified the Hinkley Point C development which has potential to impact migratory fish species, which are a WFD supporting element of the Taw / Torridge WFD water body. For information, inclusion of Hinkley Point C also ensures consistency with the Proposed Development RIAA.

7.1.6 All of the identified projects, plans and activities are currently at the Tier 1 or Tier 3 stage.

Table 7. Projects identified within 30 km of the Offshore Cable Corridor

Project Title	Application Reference	Location	Distance from the Barnstaple Bay coastal water body (km)	Distance from the Taw / Torridge transitional water body (km)	Description	Overlap with the Proposed Development?	Potential for cumulative effect on water body status / potential (including at individual WFD element level)
Tier 1							
New dwelling and flood defence wall flanking River Torridge	EIA/2024/00012	River Torridge	3.9	0	4.5 km from the Proposed Development. It is proposed to construct a new four bedroom, three-storey residential dwelling with ground floor parking, driveway, and landscaped border. As part of the proposed development, it is proposed to modify and extend the existing flood defence wall which runs for a 40 metre (m) length along the eastern site boundary. These works are required to provide necessary flood protection to the proposed dwelling. The works are proposed to	No overlap with Proposed Development construction phase. Operational overlap (temporal).	Based on the scale and the type of operational activities for the project it is considered that there is no potential for cumulative effects on the Barnstaple Bay or Taw/Torridge water bodies which would result in a deterioration in the status of either of these water bodies or prevent these water bodies from meeting their WFD objectives in relation to any WFD quality elements.

Project Title	Application Reference	Location	Distance from the Barnstaple Bay coastal water body (km)	Distance from the Taw / Torridge transitional water body (km)	Description	Overlap with the Proposed Development?	Potential for cumulative effect on water body status / potential (including at individual WFD element level)
					take place from August 2024 - March 2025.		
Shellfish cultivation pilot at seaweed farm	EXE/2024/00123	Bideford Bay	4.3	9.2	1 km from the Proposed Development. Algapelago Marine Limited intend to trial a shellfish cultivation pilot to establish the commercial feasibility of shellfish cultivation at their existing site in Bideford Bay. The shellfish pilot study will last four years, to enable species to reach full market size. Two species are in scope for the cultivation pilot trials: i) blue mussel - spat sourced from natural settlement and ii) king scallop - spat sourced from Scallop Ranch Ltd. The pilot trial is anticipated to run from	No overlap with construction, however there will be operational overlap with the Proposed Development.	Based on the scale, the operational activities for the project and the distance to the water bodies it is considered that there is no potential for cumulative effects with the Proposed Development on the Barnstaple Bay or Taw/Torridge water bodies which would result in a deterioration in the status of either of these water bodies or prevent these water bodies from meeting their WFD objectives in relation to any WFD quality elements.

Project Title	Application Reference	Location	Distance from the Barnstaple Bay coastal water body (km)	Distance from the Taw / Torridge transitional water body (km)	Description	Overlap with the Proposed Development?	Potential for cumulative effect on water body status / potential (including at individual WFD element level)
					August 2024 - August 2028. Infrastructure: Algapelago intend to install 4 x 200 m submerged longlines for the propagation of shellfish. All infrastructure will be deployed within Algapelago's existing licenced area.		
Aqua Botanika - nearshore seaweed cultivation of native species	MLA/2023/00227	North Devon, off coast near Illfracombe	12.8	16.2	Kelp farm with buoys anchored to the seabed or to blocks in roughly 50 m frequencies, with the main ropes connecting the buoys in each direction creating a grid. Growing ropes will be connected to main ropes to run parallel at 10 m centres. Proposal is for multiple bays	No overlap with construction, however there will be operational overlap (temporal) with the Proposed Development.	Based on the scale, the operational activities for the project and the distance to the water bodies it is considered that there is no potential for cumulative effects with the Proposed Development on the Barnstaple Bay or Taw/Torridge water bodies which would

Project Title	Application Reference	Location	Distance from the Barnstaple Bay coastal water body (km)	Distance from the Taw / Torridge transitional water body (km)	Description	Overlap with the Proposed Development?	Potential for cumulative effect on water body status / potential (including at individual WFD element level)
					which equate to an area of 100 hectares. Aim to install the seeded lines, seabed anchors, buoys etc during the autumn of 2024 in order to grow the first crop during the winter and harvest in spring 2025.		result in a deterioration in the status of either of these water bodies or prevent these water bodies from meeting their WFD objectives in relation to any WFD quality elements.
White Cross Floating Offshore Windfarm	EIA/2022/00002	52km off the North Cornwall and North Devon coast (west-north-west of Hartland Point).	51.6	74.8	"Proposed offshore windfarm located in the Celtic Sea with a capacity of up to 100MW. The Windfarm Site is located over 52km off the North Cornwall and North Devon coast (west-north-west of Hartland Point), in a water depth of 60m – 80m. The Windfarm Site covers 50km2. The current wind turbine design envelope for the	There is a potential temporal overlap during the operation phase of the proposed development. There are potential cumulative effects with benthic ecology, fish and shellfish, shipping and navigation, other marine users, and commercial fisheries receptors. Any cumulative effects will be focussed on the area where the White Cross export cable is located in	Based on the operational activities for the project and the distance to the water bodies it is considered that there is no potential for cumulative effects with the Proposed Development on the Barnstaple Bay or Taw/Torridge water bodies which would result in a deterioration in the status of either of these water bodies or prevent these water

Project Title	Application Reference	Location	Distance from the Barnstaple Bay coastal water body (km)	Distance from the Taw / Torridge transitional water body (km)	Description	Overlap with the Proposed Development?	Potential for cumulative effect on water body status / potential (including at individual WFD element level)
					project is a WTG capacity of 12-24 MW, 6-8 three bladed horizontal axis turbines with a rotor diameter of 220-300 m. Construction is anticipated to commence in mid 2024 with the site anticipated to be operational by 2026."	close proximity to the Proposed Development (which is outside of all WFD water bodies).	bodies from meeting their WFD objectives in relation to any WFD quality elements.
Hinkley Point C (HPC)	EN010001	8 km north of Bridgwater	75.5	65.3	The Hinkley Point C project involves the construction of two new nuclear reactors, the first in a new generation of nuclear power stations in Britain. In 2024 the first reactor, pipes cables and equipment are planned to be fitted onsite. In	There are ongoing proposals to remove the HPC Acoustic Fish Deterrent (AFD) and the Environment Agency's latest determination finds that they are unable to conclude that these scheme changes would have no adverse effect on some of the protected	The only WFD quality element with potential for interaction with the Proposed Development is fish. The pathways for potential effect on migratory fish from the Proposed Development are different to those that could arise from Hinkley Point C, and the scale of

Project Title	Application Reference	Location	Distance from the Barnstaple Bay coastal water body (km)	Distance from the Taw / Torridge transitional water body (km)	Description	Overlap with the Proposed Development?	Potential for cumulative effect on water body status / potential (including at individual WFD element level)
					the next few years the second reactor will be built, with the first power generation (forecast) by 2030. Notable HPC construction and operation activities include: - an alteration to the alignment of the sea wall to avoid an existing dry dock; - the erection of additional pipework along the underside of the temporary jetty to enable discharges of water from the site; - Commissioning phase discharges to the Bristol Channel; - Cooling water abstraction (operational phase) from the Bristol	fish species in the Severn Estuary Special Area of Conservation (SAC) i.e. migratory species which are also a supporting element of the Taw / Torridge WFD water body.	potential effect from the Proposed Development is negligible. When taken together with the distance (of Hinkley Point C) to the water bodies it is considered that there is no potential for cumulative effects with the Proposed Development on the Barnstaple Bay or Taw/Torridge water bodies which would result in a deterioration in the status of either of these water bodies or prevent these water bodies from meeting their WFD objectives in relation to fish or any other WFD quality elements.

Project Title	Application Reference	Location	Distance from the Barnstaple Bay coastal water body (km)	Distance from the Taw / Torridge transitional water body (km)	Description	Overlap with the Proposed Development?	Potential for cumulative effect on water body status / potential (including at individual WFD element level)
					Channel of 134 m3/s (with anticipated impingement and entrainment); and - Operational phase discharges to the Bristol Channel (including Total Residual Oxidants (TROs) and chlorination by-products (CBPs) discharges, and the associated temperature rise).		
The TwinHub Floating Offshore Wind Demonstration Project	MLA/2021/00324	Off coast near St Ives	104.0	119.7	Wave Hub Limited is seeking consent to construct and deploy two semisubmersible platforms with two turbines each in order to generate up to 32MW power from renewable floating offshore wind	There is a potential temporal overlap during the operation phase of the proposed development. There are potential cumulative effects with fish and shellfish receptors, noting that the project is	Based on the operational activities for the project and the distance to the water bodies it is considered that there is no potential for cumulative effects with the Proposed Development on the

Project Title	Application Reference	Location	Distance from the Barnstaple Bay coastal water body (km)	Distance from the Taw / Torridge transitional water body (km)	Description	Overlap with the Proposed Development?	Potential for cumulative effect on water body status / potential (including at individual WFD element level)
					energy. The Site already consists of existing cables and onshore infrastructure which was originally granted consent in 2007. No further work to existing infrastructure is anticipated. Assembly is planned to be completed and both platforms will be sequentially floated to site to the anchors and mooring lines during Q4 2024. Commissioning will take place during Q1 2025 with a commercial operation date in Q2 2025.	located considerable distance from relevant WFD water bodies.	Barnstaple Bay or Taw/Torridge water bodies which would result in a deterioration in the status of either of these water bodies or prevent these water bodies from meeting their WFD objectives in relation to any WFD quality elements.
Celtic Interconnector	MLA/2021/00323	UK Territorial Waters	198.2	219.7	700 MW high-voltage direct current submarine power cable under construction between the southern coast of	The Celtic Interconnector is a planned cable project that will cross the Proposed Development. The potential for	No potential for cumulative impact on the Barnstaple Bay or Taw/Torridge WFD water bodies given distance

Project Title	Application Reference	Location	Distance from the Barnstaple Bay coastal water body (km)	Distance from the Taw / Torridge transitional water body (km)	Description	Overlap with the Proposed Development?	Potential for cumulative effect on water body status / potential (including at individual WFD element level)
					Ireland and the north-west coast of France. The UK elements of the Celtic Interconnector comprise: • A submarine cable within the UK EEZ approximately 211 km in length placed on or beneath the seabed. It passes approximately 30 km west of the Isles of Scilly and approximately 75 km west of Land's End, but does not enter UK Territorial Waters. • Secondary rock protection using rock placement (if required), where target depth of cable lowering is not fully achieved or at cable crossings, with a linear extent of	cumulative effects on EIA receptors is assessed within individual technical chapters of the ES, noting that this is a planned crossing for the Proposed Development.	offshore i.e. there is no pathway for cumulative effect on WFD supporting elements. There will be no deterioration in the status of either of these water bodies or means to prevent these water bodies from meeting their WFD objectives in relation to any WFD quality elements.

Project Title	Application Reference	Location	Distance from the Barnstaple Bay coastal water body (km)	Distance from the Taw / Torridge transitional water body (km)	Description	Overlap with the Proposed Development?	Potential for cumulative effect on water body status / potential (including at individual WFD element level)
					between 0 km and 80 km or 0 to 270 tonnes. • A fibre optic link will be laid along the cable route for operational control, communication and telemetry purposes. Construction expected to take place 2025-2026 (commencement of offshore marine cable installation), with operational by 2027.		
Tier 2							
None identified							
Tier 3							
The Crown Estate's Celtic Sea Floating Offshore Wind Leasing	n/a	Celtic Sea	50.5	73.1	Project Development Area (PDA) 3 sits within English Governance and is one of three suitable PDAs identified within the Celtic Sea for	There is a potential temporal overlap during the construction and operation phase of the proposed development. There are potential	Based on the distance to the water bodies it is considered that there is no potential for cumulative effects with the Proposed

Project Title	Application Reference	Location	Distance from the Barnstaple Bay coastal water body (km)	Distance from the Taw / Torridge transitional water body (km)	Description	Overlap with the Proposed Development?	Potential for cumulative effect on water body status / potential (including at individual WFD element level)
Round 5 - Project Development Area 3 (PDA3)					floating offshore wind development, each of which having a potential capacity of up to 1.5 GW. Currently in the early stages of the project, the schedule for PDA 3 is unknown, however, pre-consent metocean surveys are planned for early 2024 and geotechnical investigations are planned for summer 2024.	cumulative effects with benthic ecology, fish and shellfish, marine mammals and sea turtles, physical processes, marine archaeology and cultural heritage, shipping and navigation, other marine users, and commercial fisheries receptors.	Development on the Barnstaple Bay or Taw/Torridge water bodies which would result in a deterioration in the status of either of these water bodies or prevent these water bodies from meeting their WFD objectives in relation to any WFD quality elements.
The Crown Estate's Celtic Sea Floating Offshore Wind Leasing Round 5 - Project Development	n/a	Celtic Sea	75.1	98.1	Project Development Area (PDA) 2 sits within Welsh and English Governance and is one of three suitable PDAs identified within the Celtic Sea for floating offshore wind development, each of which having a potential	There is a potential temporal overlap during the construction and operation phase of the proposed development. There are potential cumulative effects with fish and shellfish receptors.	Based on the distance to the water bodies it is considered that there is no potential for cumulative effects with the Proposed Development on the Barnstaple Bay or Taw/Torridge water bodies which would result in a deterioration

Project Title	Application Reference	Location	Distance from the Barnstaple Bay coastal water body (km)	Distance from the Taw / Torridge transitional water body (km)	Description	Overlap with the Proposed Development?	Potential for cumulative effect on water body status / potential (including at individual WFD element level)
Area 2 (PDA2)					capacity of up to 1.5 GW. Currently in the early stages of the project, the schedule for PDA 2 is unknown, however, pre-consent metocean surveys are planned for early 2024 and geotechnical investigations are planned for summer 2024.		in the status of either of these water bodies or prevent these water bodies from meeting their WFD objectives in relation to any WFD quality elements.

8 SUMMARY

8.1 Water bodies considered

8.1.1 This assessment has considered the potential effects of the Proposed Development on WFD quality elements (WFD supporting elements) in the WFD water bodies in proximity to the OCC. The assessment has considered potential effects of the proposed activities on the hydromorphological, biological and chemical quality elements for these water bodies.

8.1.2 The Scoping stage identified that the following receptors for the Barnstaple Bay coastal water body could potentially be affected by the works and were scoped in for further assessment:

- Hydromorphology
- Biology - Lower sensitivity habitats
- Biology - Higher sensitivity habitats
- Biology – Fish
- Water quality
- WFD protected areas
- Invasive non-native species

8.1.3 The Scoping stage also identified that the following receptors for the Taw / Torridge transitional water body could potentially be affected by the works and were scoped in for further assessment:

- Biology - Lower sensitivity habitats
- Biology - Higher sensitivity habitats
- Biology – Fish
- WFD protected areas

8.1.4 Proposed construction activities will disturb bed sediments causing a temporary increase in suspended sediment concentrations. The potential for sediment plumes to interact with the Cornwall North water body were considered. The largest spatial extent of this plume is predicted during peak spring tides and this only just interacts with the Cornwall North water body (overlap of approximately 1 km). It is predicted that suspended sediment concentrations would rapidly decrease with increasing distance from source i.e. that concentrations would always be approaching background in the vicinity of the Cornwall North water body. Furthermore works activities with potential to cause disturbance of sediment would not be undertaken during peak spring tide periods (which is the only tidal state when sediments would be predicted to reach the Cornwall North water body). Therefore there is no anticipated pathway for impact on supporting elements for the Cornwall North WFD coastal water body. Consequently, the Cornwall North WFD coastal water body was screened out of the assessment.

8.1.5 The Lundy coastal water body is located 3.5 km from the Proposed Development and within the initial consideration zone for suspended sediment dispersion. However, review of sediment dispersal calculations for

the sections nearest to the Lundy coastal water body confirmed that any disturbed sediment is anticipated to fall out of suspension in the immediate vicinity of the OCC (within tens of metres) and would not reach the Lundy WFD coastal water body (Volume 3, Appendix 8.1, High Level Assessment of Sediment Dispersion of the ES). Additionally, fish are not an ecological element considered for coastal water bodies (unless affecting fish entering an estuary), consequently there are not anticipated to be mobile WFD receptors that could be affected by the Proposed Development. For these reasons, the Lundy WFD coastal water body was screened out of the full assessment.

8.2 Barnstaple Bay coastal water body

Hydromorphology

8.2.1 Based on the small area of trenching and possible cable protection rock placement/concrete mattresses potentially required within the Barnstaple Bay coastal water body, relative to the total area of the water body, effects on local hydrodynamics and associated changes in seabed morphology are anticipated to be negligible. Additionally, any initial period of scour surrounding introduced structures will be localised in the immediate vicinity and would reduce in scale over time. Any associated seabed morphology changes are anticipated to be very small (and highly unlikely given the favourable trenching and therefore burial conditions in this area). Therefore, it is considered that the Proposed Development would not result in a deterioration in the status of the Barnstaple Bay coastal water body or prevent the water body from meeting its WFD objectives in relation to hydromorphology.

Biology – Lower Sensitivity Habitats

8.2.2 Given that the benthic habitats which characterise the OCC within the Barnstaple Bay coastal water body, are common and widespread throughout the region, the spatial extent of temporary habitat loss/disturbance and long-term habitat loss as a result of the Proposed Development will be limited relative to the available habitat. Additionally, based on the low sensitivity of the habitats affected by the Proposed Development, and the high recoverability of those habitats and associated communities, any effects of temporary habitat loss/disturbance will be temporary and reversible. Therefore, it is considered that the Proposed Development would not result in a deterioration in the status of the benthic invertebrate element of the Barnstaple Bay coastal water body or prevent the water body from meeting its WFD objectives in relation to benthic invertebrates (currently listed as Moderate ecological status).

Biology – Higher Sensitivity Habitats

8.2.3 This was scoped in as although the physical footprint of the Proposed Development was not within 500 m of any higher sensitivity habitat, any suspended sediment plume could interact with an area of polychaete reef (intertidal *Sabellaria* reef). However, a supply of suspended sediment is a

requirement for the development of *Sabellaria* reefs and Tillin *et al*. (2024) indicated that *Sabellaria alveolata* reef biotopes are 'Not sensitive' to increases in peak suspended sediment concentration at the levels anticipated from the Proposed Development.

8.2.4 Consequently, in terms of potential effects on higher sensitivity habitats, it is considered that the Proposed Development would not result in a deterioration in the status of the biological supporting elements of the Barnstaple Bay coastal water body or prevent this water body from meeting its WFD objectives in relation to benthic invertebrates (currently listed as Moderate ecological status).

Biology – Fish

8.2.5 Fish is not a Biological Quality element usually considered for coastal water bodies and there is no ecological status for fish for the Barnstaple Bay coastal water body. Consequently, high level consideration was provided in relation to fish transiting from the Barnstaple Bay coastal water body to the Taw / Torridge transitional water body.

8.2.6 It was concluded that migratory fish from the Barnstaple Bay coastal water body would be able to find clear passage to the Taw-Torridge Estuary avoiding any levels of potential impacts generated by the Proposed Development which could affect behaviour or have physiological effects.

8.2.7 Overall, the effect of works on fish in the Barnstaple Bay coastal water body is not anticipated to subsequently result in a deterioration in the status of the fish element of the Taw / Torridge transitional water body or prevent this water body from meeting its WFD objectives in relation to fish.

Water Quality

8.2.8 The results of sediment contamination analyses show that arsenic concentrations in samples from within the water body are above cAL1 at some locations. Based on the nature and duration of the works, and the sediment characteristics within the water body, it is anticipated that any sediment bound contaminants remobilised into the water column would be rapidly diluted and dispersed. The scale of any such release would be comparable to routine background disturbance events. Any such temporary release is not anticipated to result in a deterioration in the status of the Barnstaple Bay WFD water body or prevent the water body from meeting its WFD objectives. Additionally, any changes to water quality as a result of increased suspended sediment within the Barnstaple Bay coastal water body will be highly localised in extent and of short-term duration, with very low volumes of sediment likely to be disturbed. Therefore, it is considered that the Proposed Development would not result in a deterioration in the status of the water quality element of the Barnstaple Bay coastal water body or prevent the water body from meeting its WFD objectives in relation to water quality.

WFD Protected Areas

8.2.9 For WFD Protected Areas the main consideration was that the Proposed Development is within 2 km of the Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC, which intersects with the OCC. There are no Shellfish Water Protected Areas, Nutrient Sensitive Areas, or Bathing Waters within 2 km of the proposed works. The Bristol Channel Approaches SAC is designated for the feature harbour porpoise. Specific consideration was also given to Conservation Objective 3 for the site which is 'The condition of supporting habitats and processes, and the availability of prey for harbour porpoise is maintained' which involved determining potential effects on harbour porpoise due to changes in benthic habitats and prey availability.

8.2.10 The Screening in the RIAA concluded that there was only potential for LSE due to the potential effects of underwater noise and vibration on harbour porpoise and due to collision risk.

8.2.11 The RIAA concluded that for both of these impacts (based on assessments that include site specific underwater noise modelling; presented as Volume 3, Appendix 4.1 Underwater Noise Technical Assessment of the ES), effects were unlikely to alter the population trajectory of harbour porpoises, or significantly disturb the species, its habitat or prey species within the SAC throughout all project phases. It was therefore considered not likely to result in any adverse effect on site integrity (AEoI) of the Bristol Channel Approaches SAC. This RIAA conclusion provides confidence in a conclusion of no potential for deterioration with respect to WFD Protected Areas.

Invasive Non-Native Species

8.2.12 Based on the nature and duration of the works, there is potential for the introduction/spread of marine INNS due to vessel activity and introduced infrastructure materials within the marine environment. However, the introduction and presence of infrastructure materials (i.e. rock placement if required) within the Barnstaple Bay coastal water body will have a limited footprint – the provisional Burial Assessment Study confirms low risk to standard burial and backfill with existing sediments. The project will follow and adopt relevant best practice guidelines at all stages of the project through the implementation of a Biosecurity Plan to minimise the introduction/spread of INNS. Any vessels used for the delivery of materials to site will adhere to industry legislation, codes of conduct and/or best practice to reduce the risk of introduction or spread of invasive non-native species. Therefore, it is considered that the Proposed Development would not result in a deterioration in the status of the INNS element of the Barnstaple Bay coastal water body or prevent the Barnstaple Bay coastal water body from meeting its WFD objectives in relation to INNS.

8.2.13 Overall, it was concluded that the proposed works are not expected to produce non-temporary effects on the biological, hydromorphological and chemical quality elements of the Barnstaple Bay coastal water body and is not expected to prevent the Barnstaple Bay coastal water body from meeting its WFD objectives.

8.3 Taw / Torridge transitional water body

Biology – Lower Sensitivity Habitats

8.3.1 This was included as the footprint of potential worst case sediment plumes generated by the Proposed Development on peak spring tides could cover more than 1% of a number of lower sensitivity habitats.

8.3.2 It was concluded that although the extent of the sediment plume is indicated to reach the Taw / Torridge water body on peak spring tides, as works would not be conducted on peak spring tides, and as suspended sediment concentrations would rapidly decrease with increased distance from source, the concentrations reaching the Taw / Torridge water body would be minimal. In addition, the potential levels of sediment deposition are expected to be very low (up to <1.5 mm).

8.3.3 Furthermore, the lower sensitivity habitats in the Taw / Torridge water body are expected to be well adapted to short term increases in suspended sediment concentrations, and very low levels of sediment deposition.

8.3.4 Overall, in terms of potential effects on lower sensitivity habitats, it is considered that the Proposed Development would not result in a deterioration in the status of the biological supporting elements of the Taw / Torridge transitional water body or prevent this water body from meeting its WFD objectives in relation to benthic invertebrates (currently listed as Good ecological potential).

Biology – Higher Sensitivity Habitats

8.3.5 This was included as the footprint of potential worst case sediment plumes generated by the Proposed Development on peak spring tides could be within 500 m of areas of saltmarsh and mussel beds.

8.3.6 As indicated above, it was considered that potential increases in suspended sediment concentrations in the Taw/Torridge water body would be minimal. It was considered that saltmarsh and mussel beds in estuarine environments are routinely subject to short term increases in suspended sediment concentrations, and would not be affected by the very low levels of sediment deposition (<1.5 mm) calculated for the Proposed Development.

8.3.7 Consequently, in terms of potential effects on higher sensitivity habitats, it is considered that the Proposed Development would not result in a deterioration in the status of the biological supporting elements of the Taw / Torridge transitional water body or prevent this water body from meeting its WFD objectives in relation to benthic invertebrates (currently listed as Good ecological potential).

Biology – Fish

8.3.8 Based on the nature and the duration of the works, there is potential for impacts on fish due to underwater noise and vibration, primarily during the construction phase of the Proposed Development. However, no noise generated by the works would reach the Taw / Torridge water body. Fish swimming through the OCC from the Taw / Torridge transitional water body

or passing the OCC on the way to the water body, could still potentially be affected. However, there is no pile driving associated with the works and the activities involved are anticipated to generate relatively low levels of noise and vibration. Therefore, it is considered that the Proposed Development would not result in a deterioration in the status of the fish element of the Taw / Torridge transitional water body or prevent the Taw / Torridge transitional water body from meeting its WFD objectives in relation to fish.

8.3.9 Overall, it is concluded that the proposed works are not expected to produce non-temporary effects on the biological, hydromorphological and chemical quality elements of the Taw / Torridge transitional water body and are not expected to prevent the Taw / Torridge transitional water body from meeting its WFD objectives.

WFD Protected Areas

8.3.10 There are no WFD protected areas in or near the Taw/Torridge WFD water body which are within 2 km of the physical footprint of the Proposed Development. However, the worst case sediment plume generated by the Proposed Development could potentially interact with Braunton Burrows SAC, Taw estuary shellfish waters, Instow bathing waters, and the Taw Estuary coastal sensitive area during peak spring tides.

8.3.11 It was considered that changes in suspended sediment concentrations in these protected sites due to the Proposed Development would be minimal in relation to natural baseline suspended sediment variability, and would not reach these areas on a mean neap tide (with no works potentially disturbing sediment being conducted on a peak spring tide). In addition, sediment that is released from cable trenching activities in Bideford Bay is estimated to be deposited with a thickness of up to <1.5 mm depending on the timing of the trenching activities within the tidal cycle and subsequent distance of transport in suspension (Volume 3, Appendix 8.1: Sediment Dispersion Technical Note of the ES).

8.3.12 Overall, effects of the Proposed Development are not expected to lead to a deterioration of any WFD protected areas within or in close proximity to the Taw / Torridge WFD water body, or prevent them from meeting WFD objectives.

8.4 Cumulative effects assessment

8.4.1 The projects and plans selected as relevant to the CEA presented within this WFD assessment are based upon the results of a screening exercise undertaken initially for the ES (Volume 1, Appendix 5.3: Cumulative Effects Assessment Screening Matrix of the ES) and also for the RIAA (document ref. 7.16). The locations of such projects, plans and activities are presented on Figure 1.2 of Volume 1, Appendix 5.3: CEA Screening Matrix of the ES.

8.4.2 For consistency with the ES, all schemes / projects identified within 30 km of the OCC have been presented with distances to the relevant WFD water bodies indicated. Hinkley Point C is further identified given potential to affect migratory species which are a supporting element to the Taw / Torridge water body.

8.4.3 Taking account of the scale of projects, the activities involved which could overlap with the Proposed Development, and the distance to WFD water bodies it was concluded that there is no potential for cumulative effects on the Barnstaple Bay or Taw/Torridge water bodies which would result in a deterioration in the status of either of these water bodies or prevent these water bodies from meeting their WFD objectives in relation to any WFD quality elements.

9 REFERENCES

CCME 1999. Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines and chemical factsheets.

CIEEM (Chartered Institute of Ecology and Environmental Management). 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Updated April 2022. Chartered Institute of Ecology and Environmental Management, Winchester.

Davies, P., Britton, R.J., Nunn, A.D., Dodd, J.R., Crundwell, C., Velterop, R., Ó'Maoiléidigh, N., O'Neill, R., Sheehan, E.V., Stamp, T. & Bolland, J.D. 2020. Novel insights into the marine phase and river fidelity of anadromous twaite shad *Alosa fallax* in the UK and Ireland. Aquatic Conservation: Marine and Freshwater Ecosystems, 30(7), 1291–1298. (Chapter 4) https://doi.org/10.1002/aqc.3343

Defra 2015. The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

Environment Agency. 2015. Rules for assessing surface water body ecological status and potential. Decision document for 2015 new building block (cycle 2) Water Framework Directive classifications Version 2.0 (updated October 2015)

Environment Agency. 2017. Environmental Quality Standards Directive (EQSD) list for WFD assessments. Available at: https://www.gov.uk/government/publications/list-of-chemicals-for-water-framework-directive-assessments/environmental-quality-standards-directive-eqsd-list-for-wfd-assessments Accessed: April 2024.

Environment Agency. 2023a. Water Framework Directive: Estuarine and Coastal Waters 'Clearing the waters for all' https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters

Environment Agency. 2023b. https://environment.data.gov.uk/catchment-planning/help/usage Accessed March 2024.

Environment Agency. 2024. Transitional & coastal water fish surveys. National Fish Populations Database.

GEOxyz 2024. Geotech, Env and Reconnaissance surveys. Environmental Report - UK. Ref: 6050H-837-RR-05

MAGIC. 2024. Available at: https://magic.defra.gov.uk/magicmap.aspx

Natural England 2022. Natural England and Joint Nature Conservation Committee: Nature conservation considerations and environmental best practice for subsea cables for English Inshore and UK offshore waters.

Tillin, H.M., Jackson, A., Garrard, S.L., & Watson, A. 2024. *Sabellaria alveolata* reefs on sand-abraded eulittoral rock. In Tyler-Walters H. and Hiscock K. (eds) *Marine Life Information Network: Biology and Sensitivity Key Information Reviews*, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 19-10-2024]. Available from: https://www.marlin.ac.uk/habitat/detail/351

WFD-UKTAG 2014. UKTAG Transitional and Coastal Water Assessment Method: Fish Fauna Transitional Fish Classification Index.

A.1 SCOPING TEMPLATE – BARNSTAPLE BAY WFD COASTAL WATER BODY

Your activity	Description, notes or more information
Applicant name	Xlinks Ltd
Application reference number (where applicable)	Not applicable
Name of activity	Xlinks' Morocco UK Power Project – UK Proposed Development
Brief description of activity	The Proposed Development would comprise the following offshore elements: • Approximately 370 km of subsea buried HVDC cable in UK waters, which would be routed from the landfall location at Cornborough Range to the UK Exclusive Economic Zone (EEZ) boundary. The offshore cable infrastructure would continue beyond the UK EEZ, however, this does not form part of the Proposed Development. • The Offshore Cable Corridor has a nominal width of 500 m, extending up to 1500 m at some crossing locations (where the cable needs to cross existing power and telecoms cables for example). • Landfall HDD works (beneath the entire intertidal) are provisionally scheduled to be undertaken in advance of cable laying (2027).
Location of activity (central point XY coordinates or national grid reference)	Landfall location - Cornborough, UK. Latitude: 51°38.8115'N. Longitude: 004°49.5932'W
Footprint of activity (ha)	20,483 ha (area of Offshore Cable Corridor, OCC within UK waters); approx. 175 ha in the Barnstaple Bay WFD water body. Note disturbance activities associated with burial of x2 bundled cables only i.e. not disturbance footprint across the entire OCC.
Timings of activity (including start and finish dates)	The following dates are indicative at this time, and may be influenced by e.g. weather limitations of the Cable Laying Vessel (CLV):

Your activity	Description, notes or more information
	•2027: – Horizontal Directional Drilling (HDD) at the proposed Landfall is scheduled to commence in Q1 of 2027. – Pre-lay works for Bipole 1 (first cable bundle) such as route clearance and boulder removal are anticipated to take place in 2027 ahead of cable lay and protection works. •2027-2028: Cable lay works for Bipole 1 are scheduled to begin in 2027. It is anticipated that these works would be completed in three sections each taking approximately one month. It is currently envisaged that one section will be laid in Q3 2027 and two sections will be laid in 2028. •2029: For Bipole 2 (second cable bundle), offshore works would begin with pre-lay works in 2029. •2030: The three sections of bipole 2 are currently scheduled to be laid in 2030.
Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	Use of jack-up vessels for temporary installation purposes at the HDD exit locations (within Barnstaple Bay). HDD exit pits (15m x 15m x4 in number) excavated using either a back-hoe dredger (long arm barge mounted excavator) or mass flow excavation (MFE). Cable burial techniques may include trench ploughing, trench jetting or mechanical trench excavation. • Mechanical trenching, ROV on seabed with footprint up to 126 m^2 (10 m width and 12.6 m length). • For water jetting ROV, seabed footprint of up to 55.2 m2 (6 m width and 9.2 m length). • Cable spacing 50 – 180 m between the two bundles. • Trench width of 0.5 to 1.5 m. • Target cable burial depth of 1.5 m. Full target depth cable burial is expected across entire length within Barnstaple Bay (based on known substrate types present and outline Cable Burial Risk Assessment). There remains possibility that additional placement of rock protection will be required. Where possible any rock placement would be within trench, with above sea bed level rock placement a last resort. If concrete mattresses / rock placement needs to be installed at the HDD exit points these would

Your activity	Description, notes or more information
	be below bed level. Rock placement (excluding crossings) would be <1 m in height above sea bed in all places. Note there are no crossings of existing cables within the Barnstaple Bay water body.
Release of chemicals	The Proposed Development does not include any direct chemical release activities. There is the potential to temporarily disturb existing sea bed sediments (during trenching and installation activities) and thus the extent of any baseline sediment contamination has been investigated. Bentonite will be used during HDD as the best practice drill lubricant. Bentonite breakout management will be included within the 'Outline Bentonite Breakout Plan' (document reference 7.21) which will be finalised by the final HDD contractor (Table 2). Chemical Action Levels (cALs) (or Cefas Action Levels) and Canadian marine Sediment Quality Guidelines were used to characterise the broad contamination status of sediment samples taken during the subtidal ecology surveys for the Proposed Development as detailed in GEOxyz (2024). Analyses of sediment concentrations of heavy metals conducted for the Proposed Development indicated that arsenic concentrations exceeded cAL1 at eight stations, but they were below cAL2 and the Probable Effects Level (PEL). All of these samples were located within Bideford Bay and off the north coast of Devon. Results from the outline Cable Burial Risk Assessment indicate that there are no identified sand waves and/ or large ripples present and as a result, no seabed preparation will be required in this area. Heavy metal concentrations were found to be below cAL1 at all other stations. Concentrations for hydrocarbon compounds (total PAHs) were found to exceed cAL1 at a number of stations sampled during the survey.

Water body	Description, notes or more information
WFD water body name	Barnstaple Bay
Water body ID	GB610807680003
River basin district name	South West
Water body type (estuarine or coastal)	Coastal
Water body total area (ha)	11114.15
Overall water body status	Moderate
Ecological status	Moderate
Chemical status	Fail (2019)
Target water body status and deadline	Good by 2015
Hydromorphology status of water body	High
Heavily modified water body and for what use	No
Higher sensitivity habitats present	Polychaete reef (0.6 ha)
Lower sensitivity habitats present	Cobbles, gravel and shingle (37.39 ha), Intertidal soft sediment (946.20 ha), Rocky shore (167.05 ha), Subtidal rocky reef (184.95 ha), and Subtidal soft sediments (9280.57 ha)
Phytoplankton status	Good
History of harmful algae	Not monitored

Water body	Description, notes or more information
WFD protected areas within 2km	Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC

Section 1: Hydromorphology

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status	✓		Activities associated with the Proposed Development may have potential direct effects on the hydromorphology within the water body.
Could significantly impact the hydromorphology of any water body	✓		Activities associated with the Proposed Development may have potential direct effects on the hydromorphology within the water body.
Is in a water body that is heavily modified for the same use as your activity		✓	The water body is not heavily modified

Section 2: Biology – Habitats

Higher sensitivity habitats to be considered for WFD	Lower sensitivity habitats
chalk reef	cobbles, gravel and shingle
clam, cockle and oyster beds	intertidal soft sediments like sand and mud
intertidal seagrass	rocky shore
maerl	subtidal boulder fields
mussel beds, including blue and horse mussel	subtidal rocky reef
polychaete reef	subtidal soft sediments like sand and mud

saltmarsh	
subtidal kelp beds	
subtidal seagrass	

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5 km^2 or larger	✓		Yes (1.75 km^2) in the WFD water body
1% or more of the water body's area	✓		Yes
Within 500 m of any higher sensitivity habitat	✓		Closest distance to the physical footprint is polychaete reef (distance of 700 m); potential sediment plumes generated by the Proposed Development could interact with this area, so it has been scoped in on a precautionary basis
1% or more of any lower sensitivity habitat	✓		Yes – more than 1% of cobbles, gravel and shingle; intertidal soft sediment; rocky shore; subtidal rocky reef; and subtidal soft sediments like sand and mud

Section 2: Biology – Fish

Consider if fish are at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary.

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	✓		Although the Barnstaple Bay WFD water body is a coastal water body, there is potential for the Proposed Development to affect fish entering the Taw / Torridge Estuary. Consequently, taking a precautionary approach fish have been considered for the water body.

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	✓		Although the Barnstaple Bay WFD water body is a coastal water body, there is potential for the Proposed Development to affect fish entering the Taw / Torridge Estuary. Consequently, taking a precautionary approach fish have been considered for the water body. A range of activities associated with the Proposed Development could impact on normal fish behaviour like movement, migration or spawning. This includes noise, chemical changes, sediment disturbance, changes to water quality, EMF effects, and habitat loss.
Could cause entrainment or impingement of fish		✓	Not applicable to the proposed development.

Section 3: Water Quality

Consider if water quality is at risk from your activity.

Use the water body summary table to find information on phytoplankton status and harmful algae.

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)	✓		Activities associated with the Proposed Development may have potential direct effects on the water quality of waterbodies within the vicinity of the Proposed Development – increase in suspended solids concentrations (SSC); albeit temporary. HDD at the landfall has the potential to release drilling fluids (e.g. 'breakout' of HDD drill slurry; albeit temporary - bentonite breakout management will be included within the 'Outline Bentonite Breakout Plan' (document reference 7.21) which will be finalised by the final HDD contractor (Table 2). There is also

Consider if your activity:	Yes	No	Water quality risk issue(s)
			a risk of accidental spillages from vessels of oil and other hazardous substances.
Is in a water body with a phytoplankton status of moderate, poor or bad		✓	The status for phytoplankton is Good
Is in a water body with a history of harmful algae		✓	This has not been monitored

Consider if water quality is at risk from your activity through the use, release or disturbance of chemicals.

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	✓		Yes (potential for sediments to be disturbed). Requires impact assessment
It disturbs sediment with contaminants above Cefas Action Level 1	✓		Yes (potential for sediments to be disturbed). Requires impact assessment
If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	**Yes**	**No**	**Water quality risk issue(s)**
The chemicals released are on the Environmental Quality Standards Directive (EQSD) list		✓	The Proposed Development has no active discharges and does not have a mixing zone

Section 4: WFD Protected Areas

Consider if WFD protected areas are at risk from your activity. These include:

- Special areas of conservation (SAC)
- Special protected areas (SPA)
- Shellfish waters
- Bathing waters
- Nutrient sensitive areas

Use Magic maps to find information on the location of protected areas in your water body (and adjacent water bodies) within 2km of your activity

Consider if your activity is:		Yes	No	Protected areas risk issue(s)
Within 2 km of any WFD protected area		✓		Proposed Development overlaps with the Bristol Channel Approaches / Dynesfeydd Môr Hafren. There are no other WFD protected areas within 2 km of the Proposed Development.

Section 5: Invasive Non-native Species

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS	✓		The installation of the cables will require various vessels. These vessels present the opportunity for the introduction and spread of marine INNS. There is also the potential for INNS to be spread and introduced via the use of equipment/materials introduced to the water column, and INNS could potentially colonise introduced structures e.g. cable protection.

Summary

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	Yes	*Activities associated with the Proposed Development may have potential direct effects on the hydromorphology within the water body.*
Biology: habitats	Yes	*The activity has a footprint larger than 0.5 km^2 in the water body, covers more than 1% of the water body's area, and is in more than 1% of a number of lower sensitivity habitats. Sediment plume generated by the Proposed Development may be within 500 m of higher sensitivity habitat.*
Biology: fish	Yes	*A range of activities associated with the proposed development could impact on normal fish behaviour like movement, migration or spawning. This includes noise, chemical changes, sediment disturbance, changes to water quality, EMF effects, and direct habitat loss. Although fish are not usually considered for coastal water bodies there is potential for the Proposed Development to affect fish entering the Taw / Torridge Estuary which is why they have been included here.*
Water quality	Yes	*Activities associated with the Proposed Development may have potential direct effects on the water quality of water bodies within the vicinity of the Proposed Development*
Protected areas	Yes	*The proposed development intersects with the Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC.*
Invasive non-native species	Yes	*Required vessels, equipment, and colonisation of hard structures introduced to the marine environment could potentially present the opportunity for the introduction and spread of marine INNS.*

A.2 SCOPING TEMPLATE – TAW / TORRIDGE WFD TRANSITIONAL WATER BODY

Your activity	Description, notes or more information
Applicant name	Xlinks Ltd
Application reference number (where applicable)	Not applicable
Name of activity	Xlinks' Morocco UK Power Project – UK Proposed Development
Brief description of activity	The Proposed Development would comprise the following offshore elements: • Approximately 370 km of subsea buried HVDC cable in UK waters, which would be routed from the landfall location at Cornborough Range to the UK Exclusive Economic Zone (EEZ) boundary. The offshore cable infrastructure would continue beyond the UK EEZ, however, this does not form part of the Proposed Development. • The Offshore Cable Corridor has a nominal width of 500 m, extending up to 1500 m at some crossing locations (where the cable needs to cross existing power and telecoms cables for example). • Landfall HDD works (beneath the entire intertidal) are provisionally scheduled to be undertaken in advance of cable laying (2027).
Location of activity (central point XY coordinates or national grid reference)	Landfall location - Cornborough, UK. Latitude: 51°38.8115'N. Longitude: 004°49.5932'W
Footprint of activity (ha)	20,483 ha (area of Offshore Cable Corridor, OCC within UK waters); approx. 175 ha in the Barnstaple Bay WFD water body. Note disturbance activities associated with burial of x2 bundled cables only i.e. not disturbance footprint across the entire OCC.
Timings of activity (including start and finish dates)	The following dates are indicative at this time, and may be influenced by e.g. weather limitations of the Cable Laying Vessel (CLV):

Your activity	Description, notes or more information
	•2027: – Horizontal Directional Drilling (HDD) at the proposed Landfall is scheduled to commence in Q1 of 2027. – Pre-lay works for Bipole 1 (first cable bundle) such as route clearance and boulder removal are anticipated to take place in 2027 ahead of cable lay and protection works. •2027-2028: Cable lay works for Bipole 1 are scheduled to begin in 2027. It is anticipated that these works would be completed in three sections each taking approximately one month. It is currently envisaged that one section will be laid in Q3 2027 and two sections will be laid in 2028. •2029: For Bipole 2 (second cable bundle), offshore works would begin with pre-lay works in 2029. •2030: The three sections of bipole 2 are currently scheduled to be laid in 2030.
Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	Use of jack-up vessels for temporary installation purposes at the HDD exit locations (within Barnstaple Bay). HDD exit pits (15m x 15m x4 in number) excavated using either a back-hoe dredger (long arm barge mounted excavator) or mass flow excavation (MFE). Cable burial techniques may include trench ploughing, trench jetting or mechanical trench excavation. • Mechanical trenching, ROV on seabed with footprint up to 126 m^2 (10 m width and 12.6 m length). • For water jetting ROV, seabed footprint of up to 55.2 m^2 (6 m width and 9.2 m length). • Cable spacing 50 – 180 m between the two bundles. • Trench width of 0.5 to 1.5 m. • Target cable burial depth of 1.5 m. Full target depth cable burial is expected across entire length within Barnstaple Bay (based on known sandy substrates and provisional Burial Assessment Study). There remains a possibility that additional placement of rock protection will be required. Where possible any rock placement would be within trench, with above sea bed level rock placement a last resort. If concrete mattresses need to be installed at the HDD exit points they would be below bed level. Rock placement (excluding crossings) would be <1 m in height above sea bed in all places.

Your activity	Description, notes or more information
	There would be no direct physical footprint of any aspects of the works in the Taw / Torridge transitional water body. The only potential interaction with the Taw / Torridge water body is via the dispersal of suspended sediment released during works for the Proposed Development.
Release of chemicals	The Proposed Development does not include any direct chemical release activities. There is the potential to temporarily disturb existing sea bed sediments (during trenching and installation activities) and thus the extent of any baseline sediment contamination has been investigated. Bentonite will be used during HDD as the best practice drill lubricant. Bentonite breakout management will be included within the 'Outline Bentonite Breakout Plan' (document reference 7.21) which will be completed by the final HDD contractor (Table 2). Chemical Action Levels (cALs) (or Cefas Action Levels) and Canadian marine Sediment Quality Guidelines were used to characterise the broad contamination status of sediment samples taken during the subtidal ecology surveys for the Proposed Development as detailed in GEOxyz (2024). Analyses of sediment concentrations of heavy metals conducted for the Proposed Development indicated that arsenic concentrations exceeded cAL1 at eight stations, but they were below cAL2 and the Probable Effects Level (PEL). All of these samples were located within Bideford Bay and off the north coast of Devon. Results from the outline Cable Burial Risk Assessment indicated that there are no identified sand waves and/ or large ripples present and as a result, no seabed preparation will be required in this area. Heavy metal concentrations were found to be below cAL1 at all other stations. Concentrations for hydrocarbon compounds (total PAHs) were found to exceed cAL1 at a number of stations sampled during the survey.

Water body	Description, notes or more information
WFD water body name	Taw / Torridge
Water body ID	GB540805015500
River basin district name	South West
Water body type (estuarine or coastal)	Estuarine
Water body total area (ha)	1458.6998
Overall water body status	Moderate
Ecological status	Moderate
Chemical status	Fail
Target water body status and deadline	Moderate by 2015
Hydromorphology status of water body	Supports Good
Heavily modified water body and for what use	Yes (Flood Protection)
Higher sensitivity habitats present	Mussel beds, Saltmarsh
Lower sensitivity habitats present	Intertidal soft sediment, rocky shore, subtidal rocky reef, subtidal soft sediments
Phytoplankton status	Good
History of harmful algae	Yes

Water body	Description, notes or more information
WFD protected areas within 2km	Braunton Burrows SAC, Taw estuary shellfish waters, Instow bathing waters, Taw Estuary coastal sensitive area (none of these are within 2 km of the Proposed Development, however, the sediment plume from works for the Proposed Development could potentially interact with these sites)

Section 1: Hydromorphology

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		✓	Activities associated with the Proposed Development will not have potential direct effects on the hydromorphology within the water body.
Could significantly impact the hydromorphology of any water body		✓	Activities associated with the Proposed Development will not have potential direct effects on the hydromorphology within the water body.
Is in a water body that is heavily modified for the same use as your activity		✓	Activity is not in the water body

Section 2: Biology – Habitats

Higher sensitivity habitats	Lower sensitivity habitats
chalk reef	cobbles, gravel and shingle
clam, cockle and oyster beds	intertidal soft sediments like sand and mud
intertidal seagrass	rocky shore
maerl	subtidal boulder fields
mussel beds, including blue and horse mussel	subtidal rocky reef
polychaete reef	subtidal soft sediments like sand and mud
saltmarsh	
subtidal kelp beds	
subtidal seagrass	

Consider if the footprint[4] of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5 km^2 or larger	✓		If considering the maximum potential footprint of the sediment plume which would be on peak spring tides.
1% or more of the water body's area	✓		If considering the maximum potential footprint of the sediment plume which would be on peak spring tides.
Within 500 m of any higher sensitivity habitat	✓		When considering the maximum potential footprint of the sediment plume on peak spring tides it is within 500 m of saltmarsh and mussel beds.
1% or more of any lower sensitivity habitat	✓		If considering the maximum potential footprint of the sediment plume on peak spring tides it covers more than 1% of a number of lower sensitivity habitats.

Section 2: Biology – Fish

Consider if fish are at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	✓		Areas of work for the Proposed Development will occur in an estuary, or could affect fish in the estuary. Work will also occur outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	✓		A range of activities associated with the proposed development could impact on normal fish behaviour like movement, migration or spawning. This includes noise, chemical changes, sediment disturbance, changes to water quality, EMF effects, and direct habitat loss.
Could cause entrainment or impingement of fish		✓	Not applicable to the proposed development.

Section 3: Water Quality

Consider if water quality is at risk from your activity.

Use the water body summary table to find information on phytoplankton status and harmful algae.

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)		✓	No. Any water quality changes from the Proposed Development would be associated with disturbance of sediment and the Taw / Torridge is within the zone of influence associated with sediment disturbance during peak spring tides (as described by sediment dispersion calculations, see Volume 3, Chapter 8: Physical Processes; Volume 3, Appendix 8.1: Sediment Dispersion Technical Note of the ES). No works which could disturb sediment would be conducted on peak spring tides (Table 2).
Is in a water body with a phytoplankton status of moderate, poor or bad		✓	The status for phytoplankton is Good
Is in a water body with a history of harmful algae		✓	No – the Taw / Torridge water body does have history of harmful algae, but the Proposed Development is not located in the Taw / Torridge water body or with a pathway for influence on the Taw / Torridge water body.

Consider if water quality is at risk from your activity through the use, release or disturbance of chemicals.

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the Environmental Quality Standards Directive (EQSD) list		✓	No – the Proposed Development is not in the Taw / Torridge water body. Although sediment disturbed by the Proposed Development could reach the Taw / Torridge water body during peak spring tides (Volume 3, Chapter 8: Physical Processes; Volume 3, Appendix 8.1: Sediment Dispersion Technical Note of the ES), no works which could disturb sediment would be conducted on peak spring tides (Table 2). Suspended sediment concentrations and any released chemical concentrations would decrease rapidly with increased distance from source and any effects on water chemistry are anticipated to be negligible. Consequently, it is considered that there is no pathway for influence on the water quality of the Taw / Torridge water body is present.
It disturbs sediment with contaminants above Cefas Action Level 1		✓	No – the Proposed Development is not in the Taw / Torridge water body. The text above applies
If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	**Yes**	**No**	**Water quality risk issue(s)**
The chemicals released are on the Environmental Quality Standards Directive (EQSD) list		✓	The Proposed Development has no active discharges and does not have a mixing zone.

Section 4: WFD Protected Areas

Consider if WFD protected areas are at risk from your activity. These include:

- Special areas of conservation (SAC)
- Special protected areas (SPA)
- Shellfish waters
- Bathing waters
- Nutrient sensitive areas

Use Magic maps to find information on the location of protected areas in your water body (and adjacent water bodies) within 2km of your activity

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2 km of any WFD protected area	✓ (when considering sediment plume on peak spring tides)		In terms of sites near the Taw/Torridge WFD water body, the sediment plume could potentially interact with Braunton Burrows SAC, Taw estuary shellfish waters, Instow bathing waters, Taw Estuary coastal sensitive area

Section 5: Invasive Non-native species

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS		✓	Activity is not within the Taw / Torridge water body.

Summary

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	*Not applicable – Addressed for Barnstaple Bay coastal waterbody*
Biology: habitats	Yes	*If considering the maximum potential footprint of the sediment plume on peak spring tides it covers more than 1% of a number of lower sensitivity habitats and could be within 500 m of saltmarsh and mussel beds (higher sensitivity habitats).*
Biology: fish	Yes	*A range of activities associated with the proposed development could impact on normal fish behaviour like movement, migration or spawning. This includes noise, chemical changes, sediment disturbance, changes to water quality, EMF effects, and direct habitat loss.*
Water quality	No	*Not applicable – Addressed for Barnstaple Bay coastal waterbody*
Protected areas	Yes	*In terms of sites near the Taw/Torridge WFD water body, the sediment plume could potentially interact with Braunton Burrows SAC, Taw estuary shellfish waters, Instow bathing waters, Taw Estuary coastal sensitive area*
Invasive non-native species	No	*Not applicable – Addressed for Barnstaple Bay coastal waterbody*