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FALMOUTH DOCKS DEVELOPMENT
HABITATS REGULATIONS ASSESSMENT

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1. Introduction

1.1 Background

1.1.1 Ramboll UK Limited (Ramboll) has been appointed by Falmouth Docks and Engineering Company (FDEC) (the 'Applicant') to provide a report to support Habitats Regulations Assessment (HRA) of the proposed redevelopment and upgrade of facilities (the 'proposed development') at Falmouth Docks, Cornwall (the 'site').

1.1.2 The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 is also known as the Habitats Regulations. HRA applies to plans or projects where there could be a likely significant effect on Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), which are collectively known as National Site Network sites[1], and/or to Ramsar Sites.

1.2 Objective and Scope of Works

1.2.1 This report has been prepared with the aim of supporting decision making by the competent authorities in relation to the potential implications of development on the following designated sites located within a 10 km radius of the site:

- Fal and Helford SAC with marine components;
- Falmouth Bay to St Austell Bay SPA; and
- Carrine Common SAC.

1.2.2 The implications of the proposed development on these designated sites have been considered due to their proximity to the site and the potential existence of impact pathways between them and the proposed development. The locations of these designated sites in relation to the site are shown in Figure 1-1.

1.2.3 This report also considers the following:

- The ecological interest of the designated sites listed above;
- The likely nature and scale of potential effects on these designated sites from the proposed development; and
- Consideration of the need for an Appropriate Assessment.

1.2.4 Where it is considered that an Appropriate Assessment is not likely to be required, the reasons and evidence to support that conclusion are presented.

1.3 Limitations and Constraints

1.3.1 This report has been prepared by Ramboll exclusively for the intended use by the client in accordance with the agreement between Ramboll and the client defining, among others, the purpose, the scope and the terms and conditions for the services. No other warranty, expressed or implied, is made as to the professional advice included in this report or in respect of any matters outside the agreed scope of the services or the purpose for which the report and the associated agreed scope were intended, or any other services provided by Ramboll.

1.3.2 Ramboll has been commissioned to identify potential impacts on relevant designated sites as a consequence of the proposed development. This report does not address any other potential environmental impacts that may result from the proposed development.

1.3.3 In preparation of the report and performance of any other services, Ramboll has relied upon publicly available information, information provided by the client and information provided by third parties. Accordingly, the conclusions in this report are valid only to the extent that the information provided to

[1] Formerly known as European / Natura 2000 Sites.

Ramboll was accurate, complete and available to Ramboll within the reporting schedule. Ramboll does not accept any liability for the accuracy or otherwise of any information derived from secondary sources; however, reasonable endeavours have been made to verify information obtained in this way.

1.3.4 Ramboll's services are not intended as legal advice, nor an exhaustive review of site conditions and/or compliance. This report and accompanying documents are intended solely for the use and benefit of the client for this purpose only and may not be used by or disclosed to, in whole or in part, any other person without the express written consent of Ramboll. Ramboll neither owes nor accepts any duty to any third party, unless formally agreed by Ramboll through that party entering into, at Ramboll's sole discretion, a written reliance agreement.

1.3.5 This report is based on an assessment of the site (the boundaries of which are as shown in Figure 1-2). If the development extends to areas additional to that shown on the drawing, or the proposals alter, the assessment and subsequent recommendations may need to be revised.

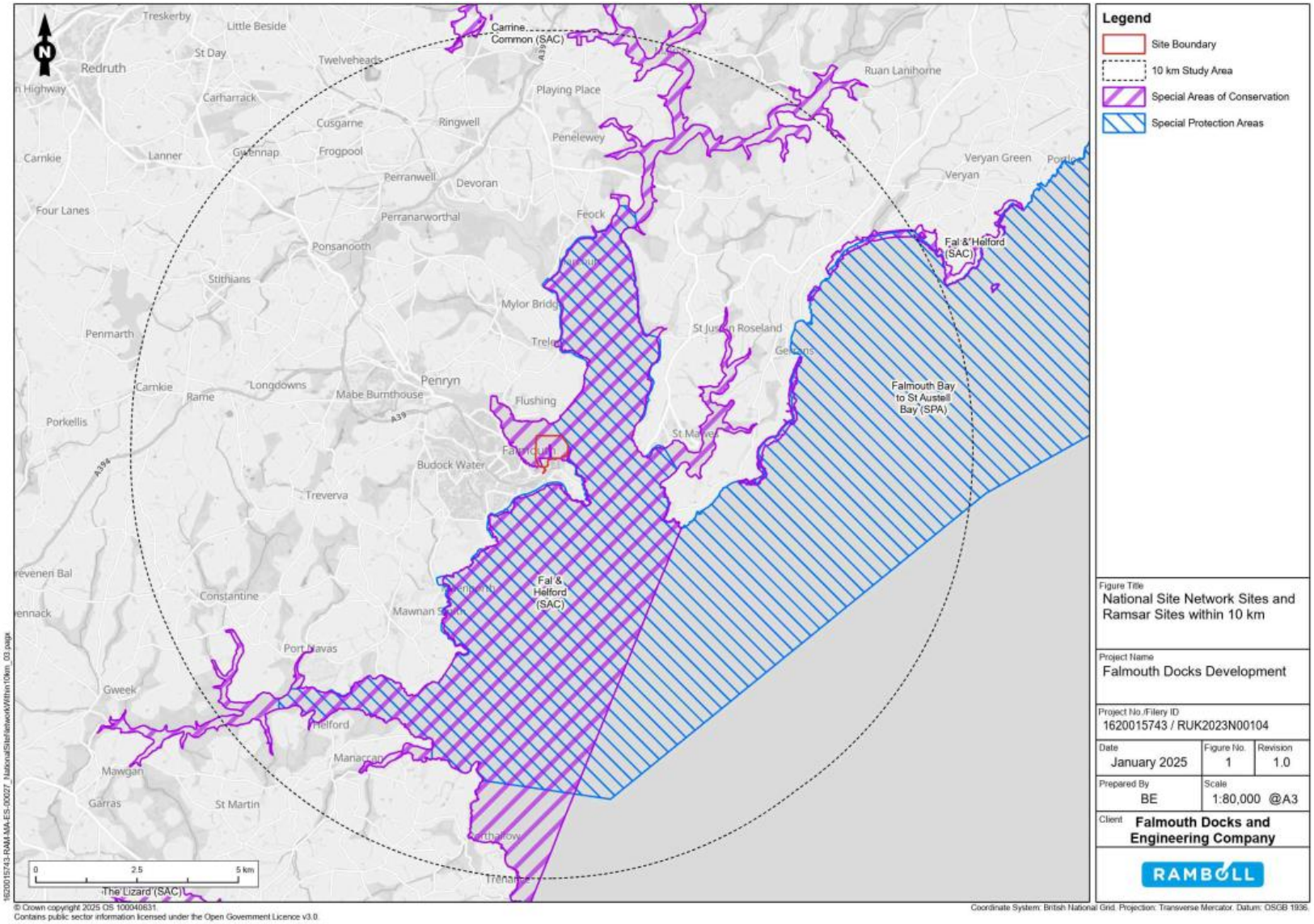


Figure 1-1 National Site Network Sites and Ramsar Sites within 10 km

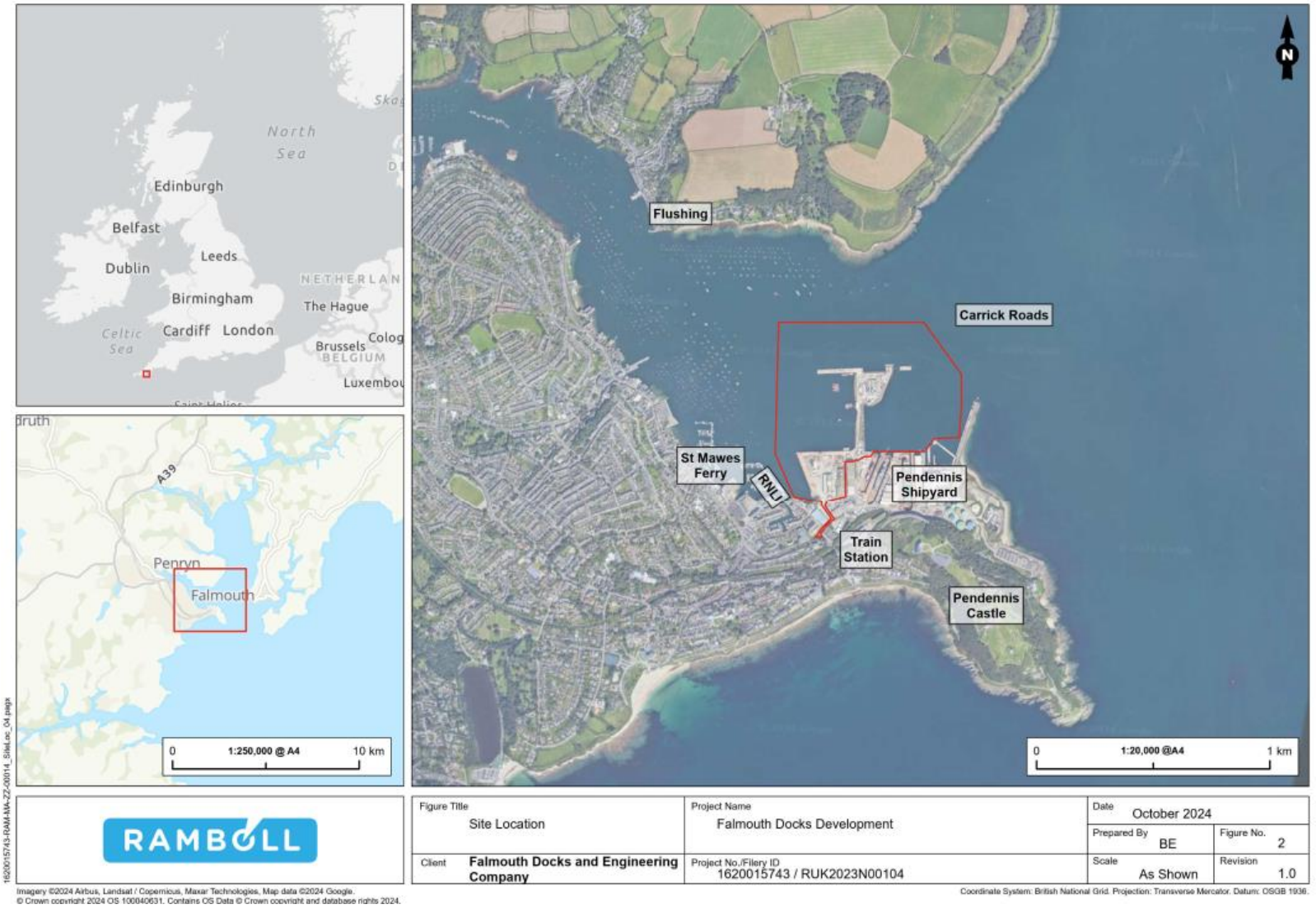


Figure 1-2 Site Location

2. Site Details

2.1 Site Location and Description

2.1.1 As shown in Figure 1-2, the site is located at Falmouth Docks, Falmouth, Cornwall, TR11 4NR, and is centred at National Grid Reference: SW 81765 32796. It is located on the northern shore of Pendennis Point, on the estuary of the River Fal, which is also known as Carrick Roads. The site is owned and operated by FDEC, who are part of the A&P Group. Under the Falmouth Harbour Act and Orders 1870-1991, FDEC is the Statutory Harbour Authority (SHA) for the area.

2.1.2 The site boundary is irregularly shaped, covering a total site area of approximately 47.2 hectares (ha). Approximately 7.6 ha of the site currently comprises hardstanding, building structures and wharf structures. Parts of this site infrastructure are considered to be in poor condition and/or unsafe for operational use. The remaining area within the site boundary consists of the Carrick Roads channel, which is a busy navigational passage. The Carrick Roads channel is the determining factor in vessel movements and vessel size, with a channel depth of 5.4 m Chart Datum (CD) at Mean High Water Spring (MHWS).

2.1.3 The site's surroundings comprise the following:

- The north of the site is surrounded by the Carrick Roads channel, leading to the English Channel. The Flushing headland lies approximately 500 m to the north.
- The A&P dry docks lie immediately to the east of the site, followed by the Pendennis Shipyard. The Eastern Breakwater is located approximately 430 m further east. Pendennis Castle lies approximately 1 km south-east.
- Tinners Walk is located south of the site, beyond which are the Falmouth Docks operational buildings, and further beyond is Falmouth train station.
- Immediately to the south-west of the site lies RNLI Falmouth Lifeboat Station, Cockwells at the Lock House and Port Pendennis Marina, beyond which lies the National Maritime Museum Cornwall. A number of visitor moorings are also present adjacent to the site within the Carrick Roads/Falmouth Bay area. The St Mawes-Falmouth ferry service runs adjacent to the site boundary along a west to north orientation. Falmouth town and residential area lies further west of the site.

2.1.4 The current arrangement of the wharf structures within the site can be summarised as comprising the following principal parts (see Figure 2-1):

- A central causeway from which the docks run, leading from the main dockside to the central part of the site redline boundary, where the hardstanding ends at the operational Queens Wharf and Northern Arm (which is no longer operational due to safety concerns);
- Queens Wharf (190 m, 6.5 m draft) and the Northern Arm area located in the central part of the site, between which lies a section of open revetment;
- A berth to the south of Queens Wharf (135 m, 6 m draft);
- The former Western Wharf situated to the east of the central causeway, which is no longer operational due to safety concerns;
- The Duchy and County Wharfs (202 m, 8.5 m draft and 180 m long, 8.5 m draft, respectively) located to the south-west of the central causeway; and
- Two former wharfs, Empire Wharf and Kings Wharf were removed in 2008, however the footprints of these structures remain as foul ground on the seabed, creating shallow water areas.

Figure 2-1 Existing Site Layout

2.1.5 The landside area of Falmouth Docks consists of hardstanding and a number of buildings. Only small areas of vegetation are present beside access roads, and in disused areas of the site, such as beside older buildings or above the boulders stacked between the sea and the reclaimed land in the north of the site. As such, the existing terrestrial portion of the site is fairly poor ecologically, consisting of primarily developed land, but there are some small areas of vegetation on the site, including modified grassland, vegetated vacant/derelict land and supralittoral rock (boulders above the high tide line).

2.1.6 Falmouth Docks supports a number of industries. Current uses on site include:

- Cargo - glass recycling, granite, bulk cement, road salt, and other bulk products;
- Cruise - off-boarding and on-boarding of cruise vessels for day visits, including alongside berthing and tender calls from ships berthing in Falmouth Harbour;
- Ship Repair - berthing capacity for ship repair vessels;
- Ministry of Defence (MoD) support - whole life support to vessels; and
- Other - towage services, mobilisation and demobilisation works for jackups etc., hosting of international events.

3. Proposed Development Details

3.1 The Proposed Development

3.1.1 The proposed development aims to redevelop and modernise the existing facilities at Falmouth Docks, to reinstate full alongside berth capability and increase berth capacity. The objectives of the proposed development are to repair and update the currently poor condition port infrastructure in order to maintain existing business and future proof the port with respect to cruise capacity, cargo capacity and renewable floating offshore wind (FLOW) (supporting the offshore wind market).

3.1.2 The proposed development comprises the following redevelopment activities within the marine environment:

- Pocket dredge of berth areas to achieve required underkeel clearance for larger cruise vessels (up to Excellence class) and the FLOW renewable energy device underkeel requirements (considered to be -10.5 m CD);
- Removal of foul ground within areas of the former Kings and Empire Wharves;
- Surface skim of seabed on eastern side of the site to maintain -5.5 m CD;
- Demolition of the remaining existing Western Wharf timber piles and above surface infrastructure;
- Construction of a new Western Wharf suspended deck structure with a deck level of +8.36 m CD (5.45 m Above Ordnance Datum (AOD));
- Demolition of the Northern Arm concrete structure and substructure to below seabed level and removal of the gang walkway and old timber piles that are located west of this structure;
- Construction of a suspended deck structure (Northern Wharf) in the existing 90 m gap between Queens Wharf and the Northern Arm to create a longer functional wharf length, with a deck level of +8.36 m CD (5.45 m AOD);
- Upgrades to the existing Queens Wharf structure;
- Extension of the Queens Wharf suspended deck structure 50 m westward with a deck level of +8.4 m CD (5.49 m AOD);
- Installation of a 290 m deck (the 'FLOW Deck') to facilitate a FLOW device with a deck level of +8.36 m CD (5.45 m AOD);
- Upgrades to the existing Duchy Wharf structure to facilitate a FLOW device with a deck level of +8.24 m CD (5.33 m AOD);
- Demolition of on-site buildings and re-configuration of Falmouth Docks activities; and
- Potential strengthening works to Duchy and County Wharf piles.

3.1.3 The proposed development general arrangement is illustrated on Figure 3-1.

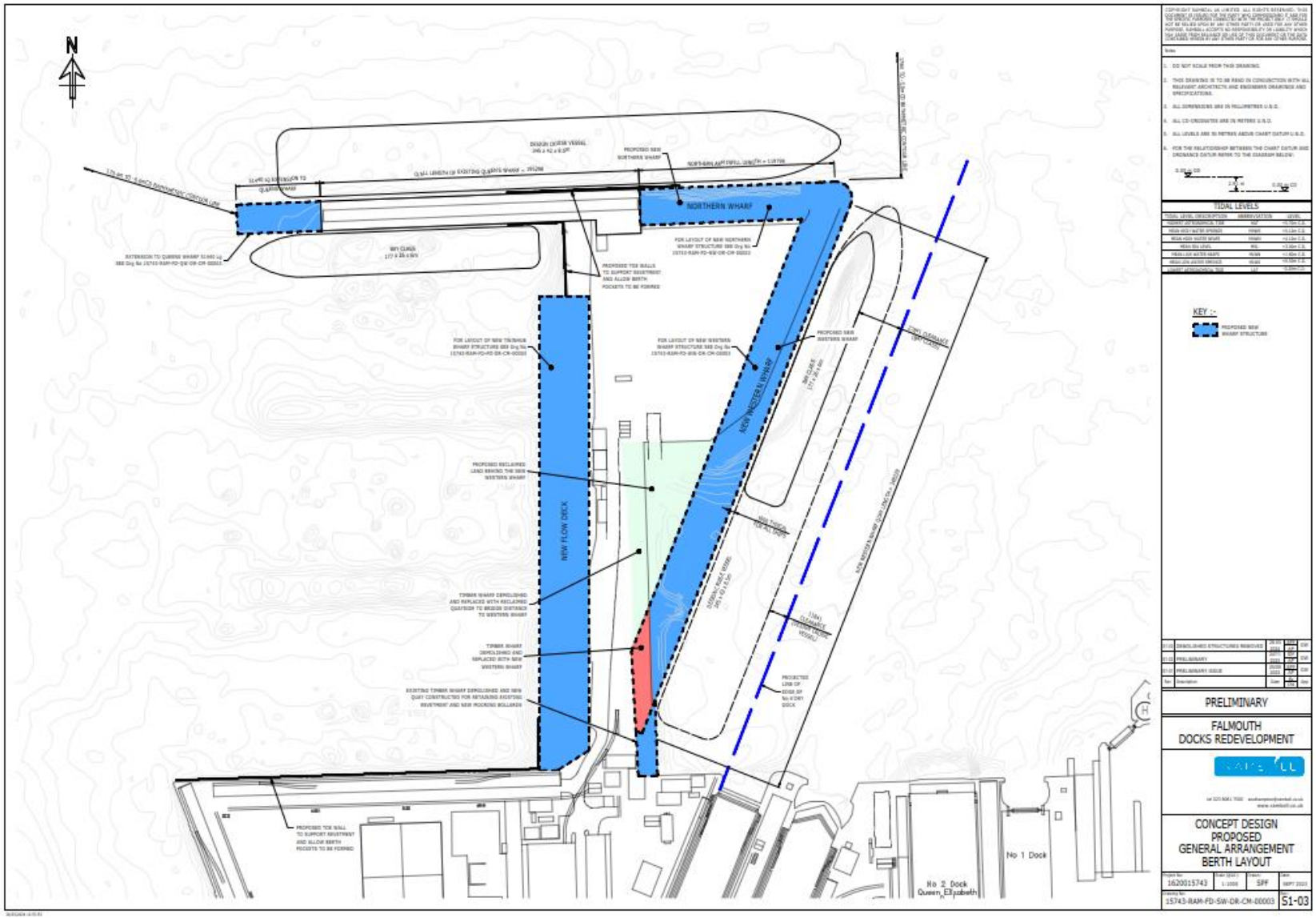


Figure 3-1 Proposed Development General Arrangement Plan

3.2 Demolition and Construction Stage

3.2.1 It is anticipated that the demolition and construction stage would be delivered through five key activities:

- Activity 1: Strengthening and Enabling Works;
- Activity 2: Demolition;
- Activity 3: Dredging;
- Activity 4: Construction; and
- Activity 5: Finishing Works and Upgrades.

3.2.2 A detailed demolition and construction programme has not yet been produced. To enable a worst-case assessment of likely environmental effects, an indicative programme has been developed by the Applicant based on the most efficient and intense use of plant and equipment deemed practicable, whereby the works at each wharf are undertaken in parallel and demolition and construction activities occurring in different areas of the site overlap. As a worst-case, it is also assumed that Falmouth Docks would remain operational while demolition and construction activities are on-going.

3.2.3 To enable a worst-case assessment of likely environmental effects, based on commencement of works in Q4 2025, the demolition and construction stage is anticipated to be undertaken over an approximately 42-month period, finishing in Q1 2029. The majority of the wharfs, however, will be completed after 27 months (in Q4 2027). The indicative demolition and construction programme is shown in Table 3.1. However, it is possible that due to market conditions and funding, as well as the choice of contractor, the demolition and construction stage could occur over a longer duration, or that the wharfs could be constructed discretely and independently of each other, sequentially and in a different order than that shown in Table 3.1.

Table 3.1: Proposed Indicative Demolition and Construction Programme

Activity	Estimated Duration (weeks)	Estimated Commencement Date	Estimated Completion Date
Western Wharf			
Strengthening and Enabling Works	8	Q4 2025	Q4 2025
Demolition (timber Western Wharf and temporary buildings)	12	Q4 2025	Q1 2026
Dredging	20	Q3 2026	Q4 2026
Construction, including Reclamation	48	Q4 2026	Q4 2027
Finishing Works and Upgrades	28	Q3 2027	Q4 2027
Northern Wharf			
Strengthening and Enabling Works	8	Q4 2025	Q1 2026
Demolition (Northern Arm)	12	Q4 2025	Q1 2026
Dredging	18	Q1 2026	Q2 2026
Construction	22	Q2 2027	Q4 2027
Finishing Works and Upgrades	8	Q4 2027	Q4 2027
Queen's Wharf – Existing and Extension			
Strengthening and Enabling	4	Q1 2026	Q1 2026
Dredging	Included in Northern Wharf dredging		

Table 3.1: Proposed Indicative Demolition and Construction Programme			
Activity	**Estimated Duration (weeks)**	**Estimated Commencement Date**	**Estimated Completion Date**
Construction	11	Q3 2027	Q4 2027
Finishing Works and Upgrades	4	Q4 2027	Q4 2027
FLOW Deck			
Strengthening and Enabling	12	Q1 2026	Q1 2026
Dredging	20	Q4 2026	Q1 2027
Construction	40	Q2 2026	Q3 2028
Finishing Works and Upgrades	24	Q4 2028	Q1 2029
Duchy and County Wharf			
Strengthening and Enabling	20	Q2 2026	Q3 2026
Finishing Works and Upgrades	8	Q3 2026	Q3 2026
Dock Quayside Areas			
Building Demolition	4	Q1 2026	Q1 2026
Landscaping (subject to BNG requirements)	12	Q2 2026	Q2 2026

3.2.4 The port currently operates 24 hours per day, 7 days per week, and it is anticipated that the majority of construction works will also be undertaken on this basis, with the exception of the following activities, which would not be undertaken at nighttime:

- Demolition works;
- Piling; and
- Compaction works.

3.2.5 An Outline Construction Environmental Management Plan (OCEMP[2]) and an Outline Site Waste Management Plan (OSWMP[3]) have been produced and accompany the applications for full planning permission and the marine licence. The OCEMP would form the basis of a detailed Construction Environmental Management Plan (CEMP) to be prepared by the main contractor(s) and implemented during the demolition and construction works, which would be secured by means of appropriately worded planning and marine licence conditions.

3.2.6 The demolition and construction activities which require consideration, due to potential impact on or interaction with designated sites and their qualifying features, are described in greater detail in turn below.

Site Mobilisation

3.2.7 The main construction compound would be located in the west of the site (to the south of Duchy Wharf). This will include appropriate welfare facilities for construction workers. Vehicular access to the site would be via the land in the Applicant's ownership, which is itself accessed via the A39, onto Bar Road and then Tinners Walk. Dedicated routes for construction personnel, vehicles, plant and deliveries would be established within the site, and modified and adapted as works progress.

Strengthening and Enabling Works

[2] Ramboll (2024). Falmouth Docks Development. Environmental Statement (ES) Volume 2 Technical Appendix (TA) 5.1: Outline Construction Environment Management Plan (OCEMP).

[3] Ramboll (2024). Falmouth Docks Development. ES Volume 2 TA 5.2: Outline Site Waste Management Plan (OSWMP).

3.2.8 The following strengthening and enabling works are required across the site, to allow dredging and construction activities to occur:

Stabilisation of Existing Causeway

3.2.9 The existing central causeway is required to be stabilised, to enable the demolition and removal of the timber wharf at Western Wharf. Either a cross-tied wall or ground anchored combi-wall is proposed to stabilise the causeway, and would be installed using the following method:

i. Drive steel vibro-driven or impact-driven piles for the wall, with steel sheet piles between to retain fill material or bored and cased concrete piles;
ii. Install cross-ties or ground anchors through boring and grouting;
iii. Construct capping beam over piles;
iv. Backfill with well graded granular material; and
v. Form new revetment and place rock armour.

Excavation of Existing Revetments

3.2.10 Excavation of the existing revetment at Western Wharf is required to allow dredging to be undertaken. This will be undertaken with a long reach excavator, to form a stable slope from bed level to the existing ground level. Excavation of the head of the existing causeway and the existing revetment surrounding Northern Arm is also required prior to the demolition of the Northern Arm, in order to form a stable slope. Temporary rock armour may be required to protect the newly formed slope during the works. Excavation of the existing revetments at the FLOW Deck will also be required.

Toe Walls

3.2.11 Toe walls are required at the toe of revetments across the site. The toe walls would retain the existing revetments and land behind where the proposed dredging will undermine the toe. This is required to accommodate the new proposed dredge depth. Locations requiring toe walls include:

i. Along the quay to the south of Western Wharf and west of the dry docks;
ii. Immediately north of the FLOW Deck;
iii. Along the southern extent of the FLOW Deck;
iv. Beneath Duchy Wharf;
v. Along the existing Queen's Wharf; and
vi. At the interface of Queen's Wharf and Northern Wharf.

3.2.12 Two options for the installation of the toe walls have been developed, to allow for highly weathered or competent rock. If the rock is found to be weathered, sheet piles are proposed to be driven to depth. Alternatively, a cased bored secant wall would allow for the toe walls to be installed into competent rock.

3.2.13 For both options, the area would first be surveyed and seabed obstructions removed on the line of the piled wall, including any rocks that may have slipped out of position from the revetment.

3.2.14 The proposed process for installation of driven sheet piles (in the case of weathered rock) is to vibro-drive steel sheets into position to a 'set', and then to impact-drive sheets to the required toe level.

3.2.15 The proposed process for bored secant piles (in the case of competent rock) is to first install unreinforced piles at approximately 0.8 pile diameters apart, and to then install reinforced concrete piles between the unreinforced piles. The installation of each unreinforced pile would be undertaken using the following methodology:

i. Bore hole for softer 'slow gain' unreinforced piles. Temporary casings will be required from water level to approximately 1 m below bed level to prevent loss of material into the water and may be required to prevent collapse of softer material into the bored hole;
ii. Pour slow gain weak mix concrete into the bored hole and extract casings for reuse. The underwater concrete placement is envisaged to be undertaken by tremie placing concrete from the bottom of the bored hole; and
iii. Compact concrete (or use a self-compacting concrete mix).

3.2.16 The installation of each reinforced pile would then be undertaken to complete the bored secant wall, using the following methodology:

i. Bore holes for reinforced concrete piles. These bored holes will overlap the softer unreinforced piles by approximately 0.1 pile diameters each side, to create a suitable interlock. Casings may be required to prevent collapse of softer material into the bored hole;
ii. Pour structural concrete and extract casings for re-use; and
iii. Place reinforcement cage into pile.

Demolition

Terrestrial Buildings

Figure 3-2 Plan showing Proposed Terrestrial Buildings to be Demolished

3.2.17 The demolition and removal of 8 no. terrestrial buildings, shown in red on Figure 3-2 on the dock quayside area may be required to facilitate the proposed development (buildings shown in grey have been previously demolished under permitted development rights by the Applicant).

3.2.18 The buildings would be demolished down to ground level, with the below ground foundations remaining. However, during demolition there is the potential for minimal below ground disturbance which is assumed to be no greater than -1 m below ground level (BGL).

3.2.19 The hardstanding would remain and would comprise the construction compound during the demolition and construction stage, including space for handling and storage of construction materials and arisings and waste. In addition, to allow the Applicant to continue with day-to-day operations, the hardstanding could be utilised for container storage.

Demolition of Western Wharf Timber Jetty

3.2.20 The existing Western Wharf is a timber jetty, formed from timber piles, beams and deck, in addition to a sheet pile wall driven in front of the jetty and tied by timber piles to the Western Wharf. The timber piles and above surface infrastructure require demolition.

3.2.21 The timber wharf in the southern corner of Western Wharf would be demolished following the construction of the causeway stabilising structure, as follows:

i. Remove timber decking planks and joists;
ii. Backfill between cross tied wall or ground anchored combi-wall and the existing quay wall, burying lower sections of the Western Wharf in a new revetment;
iii. When fill material reaches a suitable height, cut out timber beams and piles above fill material; and
iv. Backfill to final required level.

3.2.22 The remaining Western Wharf deck would then be demolished using the following method:

i. Remove timber decking and joists;
ii. Place revetment material in front of Western Wharf to form a stable slope to retain existing revetment beneath timber wharf. Temporary rock armour may be required to protect the slope during construction. Revetment is to be placed to a suitable level to provide stability to the existing gravity wall; and
iii. Remove timber beams and cut out timber piles above the revetment.

Removal of Western Wharf Temporary Buildings

3.2.23 A number of temporary portacabin type buildings located at the Western Wharf will be temporarily re-located within the site during the construction stage to facilitate the works.

Demolition of Northern Arm

3.2.24 The Northern Arm structure consists of precast blocks placed on a rock outcrop as walls, in-situ concrete walls formed over this, and an interior void with lean mix concrete (6:1), in addition to remaining timber structures. The concrete structure and substructure would be demolished to below seabed level and the gang walkway and old timber piles located west of this structure would also be removed.

3.2.25 Demolition of the Northern Arm would comprise the demolition of its upper section (in-situ concrete down to MLWS) followed by demolition of its lower section (precast and lean mix concrete down to the rock head). The demolition method for the upper section is anticipated to be as follows:

i. Wire cut the mass concrete walls and capping slab into liftable pieces;
ii. Use mobile crane or excavator with grab / grapple to remove pieces;
iii. Remove cut pieces from site; and
iv. Excavate fill material by excavator and stock-pile for potential re-use as walls are reduced.

3.2.26 The demolition method for the lower section is anticipated to comprise:

i. Excavate fill material by wire saw cutting, hydraulic breaker (used up to a total of 1-hour in any 24 hours) and excavator and stock-pile for potential re-use, thereby loosening the blocks from the structure;
ii. Lift concrete blocks out with excavator and grab/grapple;
iii. Remove mass concrete blocks from site;
iv. Excavate rock head to required dredge level; and
v. Remove any remaining timber piles or obstructions.

3.2.27 The demolition works associated with the marine infrastructure are shown in red in Figure 3-3.

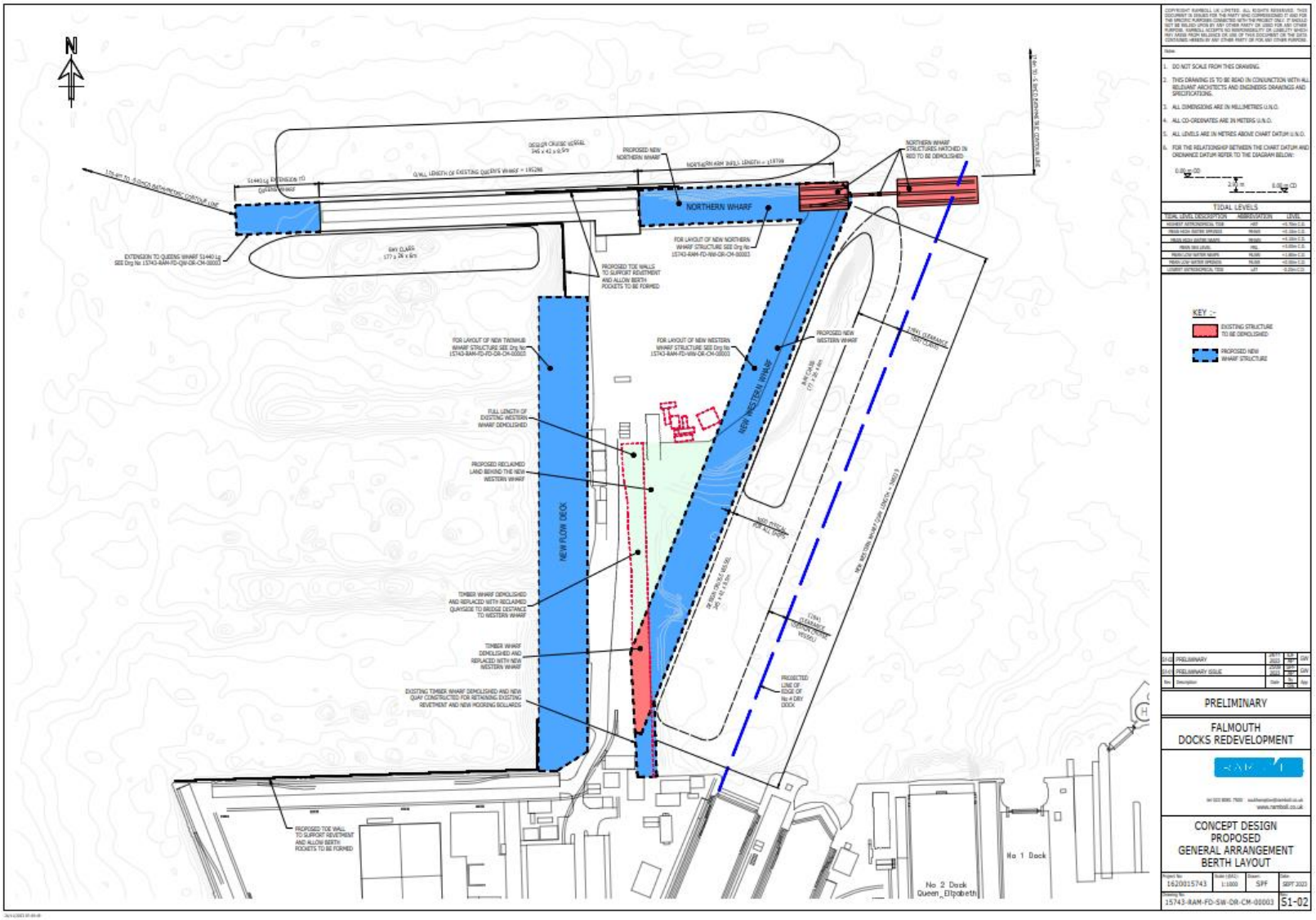


Figure 3-3 Proposed Development Marine Demolition Plan

Dredging

3.2.28 As presented in Figure 3-4, it is proposed to dredge pockets along the berths at Western Wharf, north and south of Queen's Wharf and in the western basin adjacent to the proposed FLOW Deck. The berth pockets are proposed to be dredged to -10.5 m CD to achieve the required bed depths and underkeel clearances associated with the FLOW devices and the various vessels that would berth at the site. These dredge depths are to the clear draught of the design vessel with an additional 1 m underkeel clearance at Lowest Astronomical Tide (LAT) and 300 mm siltation allowance. The remaining elements of King's Wharf and Empire Wharf to the west of the causeway would be removed and surface-skimming of the eastern side of the causeway to -5.5 m CD would be undertaken.

3.2.29 The total dredged area would be approximately 232,500 m^2, whilst the total volume of dredged material would be approximately 643,000 m^3. Dredged material would comprise seabed material in addition to rock material that has been identified in the dredge pockets through ground investigation surveys.

3.2.30 The dredge pockets would be formed using a backhoe dredger(s) to minimise sediment mobilisation. Stable batter slopes would be formed as part of the dredge process to ensure stability of the existing ground and prevent debris falling into the berth pockets. The sides of the dredge pockets would be graded and, if required, rock scour protection would be placed in the berth pockets. The dredge areas would then be surveyed again, and any missed areas or slipped material from batter slopes would be removed.

3.2.31 The dredged material suitable for disposal at sea would be loaded directly onto barges and taken to the disposal site, Falmouth Bay (B) Disposal Site (PL075). The contaminated dredge material would be landed and removed from site by Heavy Goods Vehicle (HGV). It is estimated that 29-34% of the dredge arisings will not be suitable for disposal at sea due to contamination and therefore will require disposal on land. A proportion of the dredged material is anticipated to be beneficially re-used on site.

3.2.32 Falmouth Bay (B) Disposal Site lies approximately 9.4 km to the south-east of the site (at its closest point), in the English Channel, as shown on Figure 3-5. The disposal site is not within an SAC, SPA or Ramsar Site.

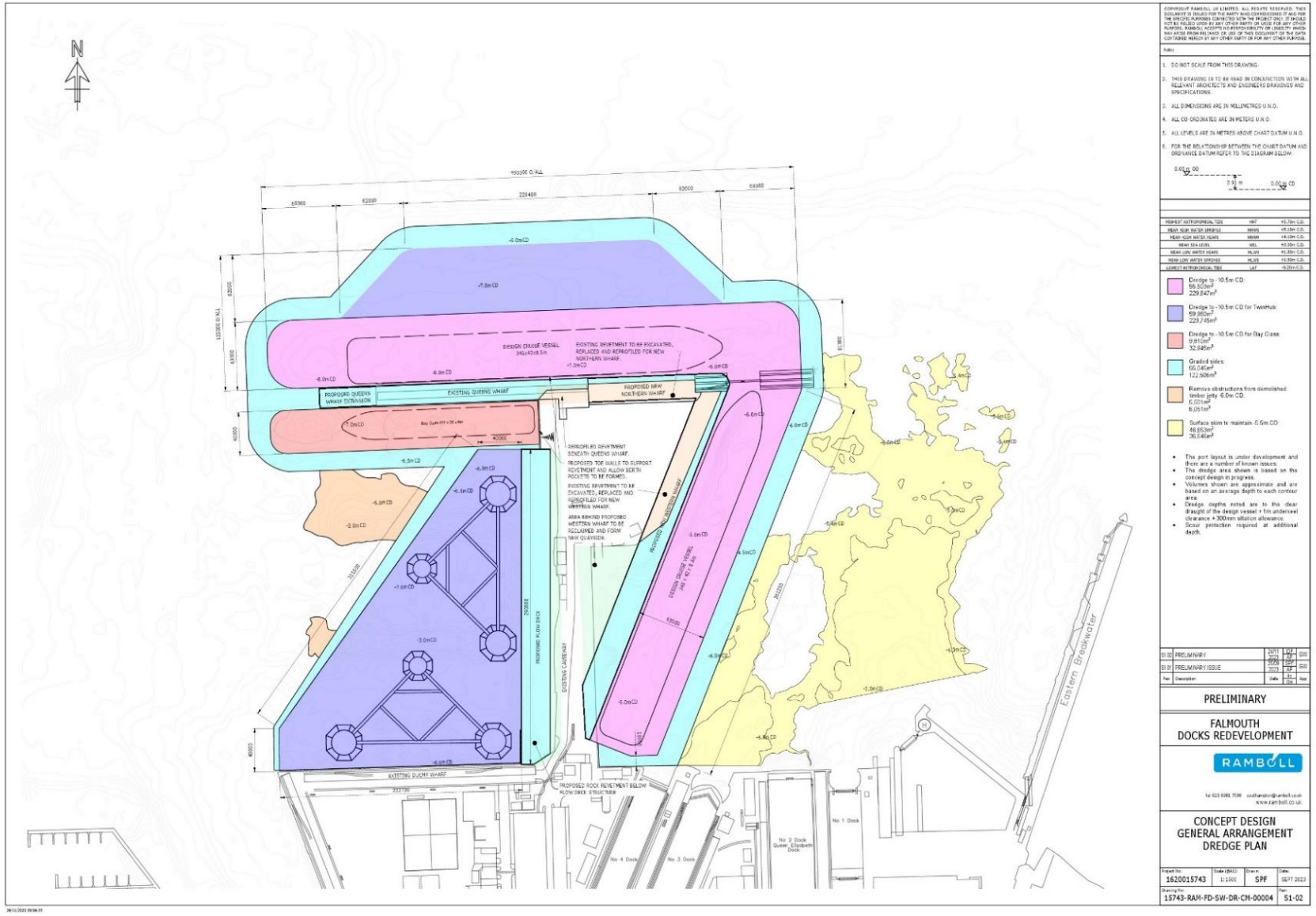


Figure 3-4 Proposed Development Dredging Plan

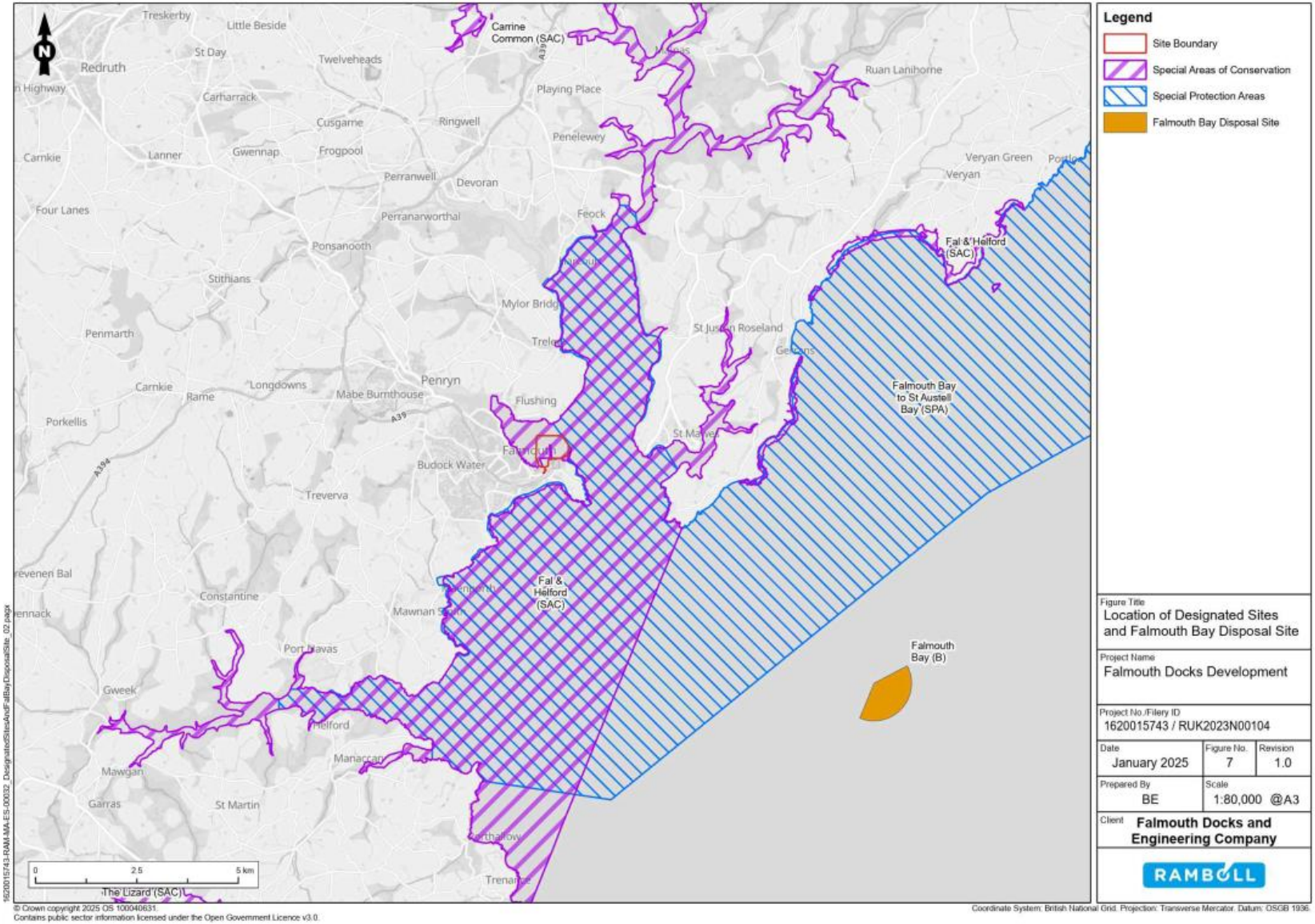


Figure 3-5 Location of Designated Sites and Falmouth Bay Disposal Site

Construction

3.2.33 The proposed new wharf structures would each be constructed following the same structural form and methodology. The suspended decks would consist of a combination of vertical and raking piles, supporting a series of longitudinal and transverse reinforced concrete beams with a reinforced concrete deck over. With the exception of the Queen's Extension, new revetment would be constructed beneath the decks, as well as transition slabs positioned at the landward edge of the quay, bridging between the reclaimed land behind and the new structures. An area of land reclamation in the zone between the existing causeway and the new Western Wharf would be constructed.

3.2.34 The key infrastructure required for each wharf, which would be constructed and installed, is summarised in Table 3.2 below:

Table 3.2: Main Infrastructure Required at each Wharf

Wharf	Requirements
Western Wharf	• Area of land reclamation in the zone between the existing causeway and the new wharf • New revetment (330 m in length) • A transition slab positioned at the landward edge of the quay, bridging between the reclaimed land behind and the new structure • 164 no. 1,270 mm diameter steel vertical piles • 46 no. reinforced concrete raking piles installed within the existing causeway revetment and area of reclaimed land behind • Suspended deck
Northern Wharf	• New revetment (160 m in length) • A transition slab positioned at the landward edge of the quay, bridging between the reclaimed land behind and the new structure • 80 no. 1,270 mm diameter steel vertical piles • 46 no. reinforced concrete raking piles • Suspended deck
Queen's Wharf	• 28 no. 1,016 mm diameter steel vertical piles • 20 no. 914 mm diameter steel raking piles • Suspended deck
FLOW Deck*	• New revetment (290 m in length) • Transition slab positioned at the landward edge of the quay, bridging between the reclaimed land behind and the new structure • 195 no. 1,321 mm diameter steel vertical piles • 140 no. reinforced concrete raking piles • Suspended deck
*Minimum requirement for FLOW to be operational (i.e. the FLOW Dolphins)	• New revetment (290 m in length) • 40 no. 1,321 mm diameter steel vertical piles • 32 no. reinforced concrete raking piles

Installation of Steel Tubular Vertical Piles

3.2.35 The installation of the steel tubular piles is considered to be similar regardless of the option chosen for providing lateral stability. The construction process will include:

- Rock armour would be removed locally to the proposed pile position and piles driven into the ground, using vibro-driving as far as possible (to minimise noise and impact on the surroundings) and using impact driving if required pile depths are not achieved through vibro-driving.
- Precast concrete troughs would then be placed over the piles, positioned to allow plant to track forward and drive the remaining piles through a similar drive/place/drive approach. Alternatively, a temporary steel working platform may be used. The contractor may prefer to have two teams working simultaneously, one driving piles and one placing concrete to allow the construction process to continue with minimal interruption between processes.

3.2.36 The steel tubular raking piles for Queen's Wharf Extension are envisaged to be installed with a similar method to the steel vertical piles, working out from the existing Queen's Wharf.

3.2.37 A piling rig would be utilised to undertake the percussive piling. It is estimated that approximately 6 hours is required for the installation of each pile, of which approximately 2 hours would comprise percussive piling (up to a total 4 hours of percussive piling on a given day). Piling would utilise soft-start procedures in line with JNCC Guidance (JNCC, 2010)[4].

Provision of Lateral Stability

3.2.38 To provide lateral stability, two options are being considered, and the most suitable will be selected following a detailed ground investigation (marine licence application reference MLA/2023/00253 and licence number L/2023/00383/1).

3.2.39 The first option to provide lateral stability is through the installation of raking piles on land behind the suspended decks and within the reclaimed land behind. The raking piles are proposed to be bored and cased reinforced concrete piles to resist tension and compression.

3.2.40 An alternative to the concrete raking piles (should the bedrock be found to be suitable in the detailed ground investigation) is to bore rock sockets for the vertical piles to a point of fixity which would allow a bending moment to develop at the toe of the piles. This process would be installing the piles through vibro-driving as above, followed by coring of the driven pile into the rock layer below through a process of 'drive-drill-drive'. The toe of the piles would then be grouted to fill any void between the steel piles and rock socket. This would likely have to be completed with marine plant.

Placement of New Revetment

3.2.41 New revetments would be formed by placing fill, filter layer and permanent rock armour and reinstatement of rock armour removed prior to dredging. Some compaction of the fill will be required.

Construction of Suspended Deck

3.2.42 Once the revetments and rock armour are completed, the suspended deck would be constructed by placing the remaining precast concrete trough elements by crane, to form the transverse and longitudinal beams. The deck would then be formed over the beams by placing precast concrete planks as form for the decking slab. The final *in situ* slab forming the load-bearing surface of the wharf would be the final concrete element to be constructed, by placing reinforcement over the precast planks in a combination of lifting pre-made cages into position by crane and fixing loose bars for both beams.

[4] JNCC 2010. Statutory Nature Conservation Agency Protocol for Minimising the Risk of Injury to Marine Mammals from Piling Noise. August 2010.

Finishing Works and Upgrades

Strengthening of Duchy and County Wharfs

3.2.43 Duchy Wharf would be strengthened through the construction of piled crane platforms and new mooring bollards on the land behind it, to allow mooring and fit out of FLOW devices. The crane platforms would be formed from bored concrete piles with a reinforced concrete deck over, to allow cranes to position at the rear of Duchy Wharf. The mooring bollards would be formed from reinforced concrete pads.

3.2.44 Some strengthening works may be required to Duchy and County Wharf piles. This is dependent upon the recommendations of a condition survey and structural assessment which will be undertaken during the detailed design phase.

Landside Works to Wharves

3.2.45 The final construction processes for each wharf would include the installation of braces to the seaward piles and then the fenders, fender panels and quay furniture (bollards, ladders, grab chains, etc.) to allow the wharf to service vessels. Installation of cathodic protection onto the steel piles is likely to be adopted to increase the service life of the structures.

Electrical Power Supply

3.2.46 Electrical power supply would be provided to each of the wharfs once they are constructed.

Roadway Improvements

3.2.47 Minor internal roadway improvements would be undertaken at Western Wharf and FLOW Deck comprising the marking of internal routes.

Landscaping Works

3.2.48 Landscaping works for the proposed development will involve the installation of a number of trees in planters within the site.

3.3 Operational Stage

3.3.1 As above-described, the proposed development comprises the strengthening, upgrade and extension of the existing poor condition marine infrastructure at the site, in addition to the dredging of deeper berth pockets. The proposed development would provide a total 26,133 m^2 of additional deck area (a total increase of 14,489 m^2 from the existing 11,644 m^2) and a total additional 810 m length of quayside. An area of open channel would be reinstated in the place of the Northern Arm, which is to be demolished. By reinstating alongside berth capability and increasing berth capacity, the proposed development would reduce conflicts between different site uses.

3.3.2 During the operational stage, the site would continue to accommodate existing maritime and industrial activities as well as those introduced through the proposed development, including but not limited to vessel movements and activities associated with cruise, cargo, freight, commercial fisheries, MoD vessels, ships for repair, and FLOW. Some activities (e.g. commercial fisheries) would be re-located within the site.

3.3.3 The following changes to activities and operations are anticipated upon completion of the proposed development, however there is a need for flexibility within day-to-day operations due to the nature of the proposed development as an operational dock:

- The operational development would accommodate approximately 24 no. freight vessels annually, an increase of 12 freight vessels from the existing operations.
- The existing site serves as a frequent cruise destination throughout the cruise season (between 01 April to 31 October inclusive)[5], with approximately eight to nine vessels visiting the site per month throughout the season. Excellence Class (up to 345 m in length) cruise vessels cannot currently be accommodated at the Docks due to the insufficient berth lengths and depths, instead, these anchor within the Falmouth Bay area and transport cruise passengers to Falmouth Docks via tender. Once the proposed development is completed, approximately 11 no. additional Excellence Class cruise vessels are anticipated to be accommodated annually at the site. Excellence Class vessels will be able to berth at the docks, therefore reducing the number of tender calls.
- The proposed development would provide capacity for assembly and maintenance of up to two FLOW devices (at Duchy Wharf and the FLOW Deck), which would be brought to and taken from the site using tugboats:
    - Each FLOW device would be able to support two wind turbines. FLOW turbines and towers would be lifted from their stored position on the land behind Duchy Wharf using a mobile crane.
    - At any one time, there would only be one fully integrated FLOW device (two turbines), with a second FLOW device base alongside the FLOW Deck awaiting integration on the Duchy Wharf, with one crane required to facilitate assembly.
    - Once a FLOW device is fully integrated it would be towed out to sea, and it is assumed that a fully integrated FLOW device would remain in dock for up to two weeks. FLOW devices would only return to Falmouth Docks if significant repairs were required that were unable to be conducted at sea.
- General port operation and maintenance activities would continue, including regular maintenance requirements, cathode protection replacement (once every 10 years) and fender replacement (once every 10-20 years).

3.3.4 Limited maintenance dredging is proposed. The anticipated volume of maintenance dredging is estimated to be up to approximately 8,000 m^3 every 5 years (and accordingly, up to approximately

[5] The typical cruise season runs between 01 April to 31 October however, occasionally cruise ships visit in the winter months.

16,000 m^3 every 10 years), as required, mostly within the eastern berth pocket. This would be undertaken in line with the requirements of the marine licence, once issued, with proposed disposal at the Falmouth Bay Disposal site.

4. Assessment Methodology

4.1.1 The procedure for assessment of projects that are not directly connected with, or necessary to, the management of the designation for conservation is an ordered process following a number of key stages[6].

4.2 Stage 1 – Screening

4.2.1 Under the first stage, it is necessary for the competent authority to examine if the proposed development will result in any 'likely significant effect' on the internationally important features of relevant designated sites, either alone or in combination with other plans or projects.

4.2.2 If it can be objectively concluded that there are not likely to be significant effects on relevant designated sites, no further assessment is necessary, the outcome should be documented and agreed, and permission should not be refused under the assessment.

4.2.3 If any 'likely significant effects' are identified or where it remains unclear whether effects will be significant, the assessment procedure should follow on to Stage 2.

4.2.4 Contrary to previous case law in England and Wales, following the Court of Justice of the European Union ruling (People over Wind, Peter Sweetman v Coillte Teoranta, Case C323/17, dated 12 April 2018), measures intended to avoid or reduce the harmful effects of a plan or project on a designated site should not be taken into account at this Screening stage, and instead these must be considered as part of an Appropriate Assessment (Stage 2). An exception to this is where the mitigation proposed is integral to or embedded in the project in order for the project to ensure compliance with an identified piece of legislation (other than the Habitats Regulations) or policy, as opposed to being required to avoid or reduce impacts to the specific features of the designated site.

4.2.5 Should it be determined that (in the absence of mitigation/avoidance measures) a plan or project will result in 'likely significant effects' on a designated site (or that such effects cannot be ruled out), the competent authority should proceed to the next stage (Stage 2 Appropriate Assessment), where further assessment is required.

4.3 Stage 2 – Appropriate Assessment

4.3.1 Under the second stage, it is necessary for the competent authority to determine whether the proposals, either alone or in combination with other projects or plans, will result in any adverse effects on the integrity of the site in view of the conservation objectives of the site. The precautionary principle should be applied, and the focus should be on objectively demonstrating, with supporting evidence, that there will be no adverse effects on the integrity of the designated site. Where this is not the case, adverse effects must be assumed.

4.3.2 If it is considered by the competent authority that the proposed development will not adversely affect the integrity of the site, permission can be granted. If this cannot be ascertained, or there is uncertainty, the assessment procedure should follow on to Stage 3.

4.4 Stage 3 Onwards

4.4.1 Under Stages 3 and 4, it is necessary for the competent authority to assess if there are alternative solutions and whether there are imperative reasons of overriding public interest. If these tests are passed, authorisation may be granted subject to compensation measures being secured.

[6] GOV.UK (2023) Guidance. Habitats regulations assessments: protecting a European site (online). Available at: Habitats regulations assessments: protecting a European site - GOV.UK

5. Stage 1 – National Site Network and Ramsar Sites Screening Assessment

5.1 Legislative Basis for Designations

5.1.1 In England, Wales and Scotland, a National Site Network has been created, comprising sites previously designated under the European Commission (EC) Nature Directives (previously referred to as "Natura 2000" sites). These sites, which include SACs and SPAs, continue to be designated through domestic legislation, comprising the Conversation of Habitats and Species (Amendment) (EU Exit) Regulations 2019[7] (the "2019 Habitats Regulations") in England.

5.1.2 The 2019 Habitats Regulations impart a duty on competent authorities to carefully consider whether any proposals are likely to have a significant effect on a National Site Network, either alone or in combination with other plans or projects.

5.1.3 In most circumstances, permission may only be given for a plan or project that has a likely significant effect to proceed if it has been ascertained that it will not have an adverse effect on the integrity of any such designated site.

5.1.4 The habitat types and species for which these sites are designated are those considered to be most in need of conservation at an international level. SACs with marine components are sites that contain qualifying marine habitats or species. Ramsar sites are designated under the Convention on Wetlands of International Importance (Ramsar Convention 1971). Although Ramsar sites do not form part of the National Site Network, many overlap with SAC and SPA boundaries, and Ramsar sites are in effect protected in the same way as SACs and SPAs under the 2019 Habitats Regulations as a result of policy[8]. Proposed SACs, potential SPAs and proposed Ramsar sites also require consideration within HRAs in the same way as the corresponding designated/listed sites[6].

5.1.5 The following sections outline those SPAs, SACs and Ramsar Sites within a 10 km search radius from the site and provide initial screening of those considered to be within the Zone of Influence (ZoI) of the proposed development, taken to be 2 km due to the scale of the proposed development and modelled demolition and construction stage activities (e.g. sediment plume modelling).

5.2 Special Protection Areas

5.2.1 The following is the only SPA within 10 km of the proposed development site:

- Falmouth Bay to St Austell Bay SPA (with marine components), located immediately adjacent to the site boundary to the north-east and east.

5.2.2 Reasons for designation and the qualifying features of the SPA are outlined in Table 5.1.

Table 5.1: Designation Criteria and Qualifying Features of SPAs within 10 km of the Proposed Development

SPA	Reference Code	Reasons for Designation	Qualifying Features	Initial Screening of Impact Pathways (Screen IN or OUT)
Falmouth Bay to St Austell Bay SPA	UK9020323	Designated as the site is regularly used by 1% or more of the Great Britain (GB) population	• Black-throated diver (*Gavia arctica*), non-breeding; • Great northern diver (*Gavia immer*), non-breeding; and	IN – screened in due to the potential for impact pathways. The SPA is within the proposed development's ZoI and is designated for qualifying features that may

[7] The National Archives (2019) The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 [online]. Available at: https://www.legislation.gov.uk/uksi/2019/579/contents/made#:~:text=The%20Conservation%20of%20Habitats%20and%20Species%20%28Amendment%29%20%28EU,Regulations%202019%20UK%20Statutory%20Instruments%202019%20No.%20579 [January 2025]

[8] Ministry of Housing, Communities and Local Government (2024). National Planning Policy Framework, Paragraph 194. Available at: National Planning Policy Framework [January 2025]

Table 5.1: Designation Criteria and Qualifying Features of SPAs within 10 km of the Proposed Development				
SPA	**Reference Code**	**Reasons for Designation**	**Qualifying Features**	**Initial Screening of Impact Pathways (Screen IN or OUT)**
		of Annex I species.	• Slavonian grebe (*Podiceps auritus*), non-breeding.	be affected by the proposed works.

5.2.3 There are no potential SPAs within 10 km of the site.

5.3 Special Areas of Conservation

5.3.1 The site is within 10 km of two SACs:

- Fal and Helford SAC (with marine components), which overlays part of the site; and
- Carrine Common SAC, which is located approximately 9.9 km north-west of the site at its nearest point.

5.3.2 Reasons for designation and qualifying features of each SAC are outlined in Table 5.2.

Table 5.2: Designation Criteria and Qualifying Features of SACs within 10 km of the Proposed Development				
SAC	**Reference Code**	**Reasons for Designation**	**Qualifying Features**	**Initial Screening of Impact Pathways (Screen IN or OUT)**
Fal and Helford SAC	UK0013112	Designated due to Annex I habitats that are a primary reason for selection of this site, Annex I habitats present as a qualifying feature but not a primary reason for selection of this site, and Annex II species that are a primary reason for selection of this site.	• 1110 Sandbanks which are slightly covered by sea water all the time; • 1130 Estuaries; • 1140 Mudflats and sandflats not covered by seawater at low tide; • 1160 Large shallow inlets and bays; • 1170 Reefs; • 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*); and • 1441 Shore dock (*Rumex rupestris*).	IN - screened in due to the potential for impact pathways. This SAC is within the proposed development's ZoI and is designated for features that may be affected by the proposed works.
Carrine Common SAC	UK0012795	Designated due to Annex I habitats that are a primary reason for selection of this site, and Annex I habitats present as a qualifying feature but not a primary reason for selection of this site.	• 4020 Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix*; and • 4030 European dry heaths.	OUT - screened out as the SAC is not considered to be within the proposed development's ZoI. Also, as this SAC is a terrestrial designation for immobile features (habitats), impact pathways are considered unlikely due to a lack of connectivity. Whilst the proposed development's construction stage would give rise to additional vehicle trips including HGVs on the A39 to Falmouth, the A39 is located at an approximately 1.5 km distance from this SAC. In line with DMRB guidance, air quality effects are not considered for designated habitats receptors at a distance of greater than 200 m of the Affected Road Network (ARN)[9].

[9] Design Manual for Roads and Bridges (DMRB) (2019) LA 105 Air Quality

5.3.3 There are no possible SACs within 10 km of the site.

5.4 Ramsar Sites

5.4.1 There are no Ramsar sites or proposed Ramsar sites within 10 km of the site.

5.5 Justification of Likely Significant Effect (LSE)

5.5.1 Based on the initial screening outlined above, the following designated sites have been identified as requiring further consideration to assess potentially likely significant effects (LSE):

- Falmouth Bay to St Austell Bay SPA with marine components; and
- Fal and Helford SAC with marine components.

5.5.2 Baseline information for these sites is provided and the potential for likely significant effects on each of these sites is discussed in turn in the sections below.

Falmouth Bay to St Austell Bay SPA

Table 5.3: Baseline Information for Falmouth Bay to St Austell Bay SPA (with marine components)

Baseline Information	Detail
Relationship between Designated Site and Application Site	Falmouth Bay to St Austell Bay SPA with marine components is located immediately adjacent to the site boundary to the east.
Qualifying Features	Falmouth Bay to St Austell Bay SPA supports the following qualifying features[10]: • Black-throated diver *Gavia arctica*, non-breeding (20.5% of the GB population (5 year peak mean 2009/10 – 2010/11, 115 individuals)); • Great northern diver *Gavia immer*, non-breeding (3.0% of the GB population (5 year peak mean 2009/10 – 2010/11, 74 individuals)); and • Slavonian grebe *Podiceps auritus*, non-breeding (1.4% of the GB population (5 year peak mean 2007/08 – 2011/12, 15 individuals)).
Conservation Objectives	The Conservation Objectives[11] for Falmouth Bay to St Austell Bay SPA are to: Ensure that, with regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features'), and subject to natural change, the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring: • The extent and distribution of the habitats of the qualifying features; • The structure and function of the habitats of the qualifying features; • The supporting processes on which the habitats of the qualifying features rely; • The populations of each of the qualifying features; and • The distribution of qualifying features within the site.
Condition	Falmouth Bay to St Austell Bay SPA covers 25,898 ha of the marine environment incorporating five shallow, sandy bays; Falmouth Bay, Gerrans Bay, Veryan Bay, Mevagissey Bay and St Austell Bay[12]. The river complex areas are part of a ria system, typified by steep sides and slow tidal currents, with subtidal rocky shores and exposed intertidal mud on creeks and river branches. The diversity of marine habitats is reflected in existing statutory protected area designations, some of which overlap or abut the SPA.

[10] JNCC (2017) Natura 2000 – Standard Data Form. Falmouth Bay to St Austell Bay Special Protection Area. Available at: https://jncc.gov.uk/jncc-assets/SPA-N2K/UK9020323.pdf [Accessed on: 23/01/2025]
[11] Natural England (2019) European Site Conservation Objectives for Falmouth Bay to St Austell Bay Special Protection Area Site code: UK9020323 Available at: https://publications.naturalengland.org.uk/publication/5504097741438976 [Accessed on: 23/01/2025]
[12] Natural England [online] Natural England Conservation Advice for Marine Protected Areas. Falmouth Bay to St Austell Bay SPA. Available at: https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK9020323 [Accessed on: 20/02/2024]

Table 5.3: Baseline Information for Falmouth Bay to St Austell Bay SPA (with marine components)	
Baseline Information	**Detail**
	Falmouth Bay to St Austell Bay SPA has the largest population of wintering Black-throated divers in the UK, making this the most important site for this species. The two-year peak mean (2009/10 – 2010/11) of 115 individuals represents almost twice as many as the site with the next highest estimate. Gerrans Bay alone has a five year mean peak estimate of 73 individuals. The site is the only SPA in England classified for wintering Great northern diver. It is the most southerly area in the UK to regularly hold Great northern divers and so it contributes to the range requirements of this species. Falmouth Bay to St Austell Bay SPA is the third SPA in the UK classified for wintering Slavonian grebe. The Falmouth Bay to St Austell Bay SPA holds 1.4% of the GB total for this species. There was no Marine Condition Assessment for the Falmouth Bay to St Austell Bay SPA available at the time of writing. However, Supplementary Advice on Conservation Objectives for the SPA[13] provides details on feature conditions and targets. For all of the three qualifying features, most targets are 'maintain' targets. However, based on knowledge of the sensitivity of the features, there is a target focused on restricting the frequency, duration, and/or intensity of disturbance caused by human activity so that birds are not significantly disturbed. A further target is to reduce aqueous contaminants, in order to restore water quality with regards to contaminants. Winter bird surveys were undertaken by Spalding Associates (Environmental) Ltd to assess presence and numbers of target species (Great northern diver, Black-throated diver and Slavonian grebe) around the Falmouth Docks area between November 2023 and May 2024. The winter bird survey report is provided in Appendix 2, and the findings have been used to inform the potential for likely significant effects within Table 5.4.
Threats	The Falmouth Bay to St Austell Bay SPA 'Advice on Operations'[14] identifies pressures associated with the most commonly occurring marine activities. Activities involved in the demolition and construction stage and operational stage of the proposed development (such as vessel movements, capital dredging, piling, construction of port and harbour structures, and operation of port and harbours) have been used to infer specific potential pressures on the SPA as a result of the proposed development. These are summarised below: • Disturbance (noise and vibration, including underwater noise); • Collision risk with static or moving objects not naturally found in marine environment; • Introduction of light and visual disturbance; • Contamination and surface water quality; • Changes to foraging habitat (including hydrodynamic changes to intertidal habitat); and • INNS.

Table 5.4: Screening of Potential Likely Significant Effects for Falmouth Bay to St Austell Bay SPA (with marine components)	
Key Issues and Relevant Threats	**Justification**
Disturbance (noise and vibration,	**Demolition and Construction Stage:**

[13] Natural England (2024) Falmouth Bay to St Austell Bay SPA Supplementary Advice [online]. Available at: https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK9020323&SiteName=falmouth%20bay%20to%20st%20austell%20bay&SiteNameDisplay=Falmouth+Bay+to+St+Austell+Bay+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=3 [Accessed on: 23/01/2025]

[14] Natural England (2024) Falmouth Bay to St Austell Bay SPA Advice on Operations [online]. Available at: https://designatedsites.naturalengland.org.uk/Marine/FAPMatrix.aspx?SiteCode=UK9020323&SiteName=falmouth+bay+to+st+austell+bay+spa&SiteNameDisplay=Falmouth+Bay+to+St+Austell+Bay+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=3,3 [Accessed on: 25/04/2024]

Table 5.4: Screening of Potential Likely Significant Effects for Falmouth Bay to St Austell Bay SPA (with marine components)	
Key Issues and Relevant Threats	**Justification**
including underwater noise)	Airborne and underwater noise and vibration generated by vessels, machinery and equipment used during the demolition and construction stage of the proposed development has the potential to lead to disturbance of the SPA bird species. Activities such as dredging, demolition and piling would generate noise, as assessed within ES Chapter 14: Noise and Vibration and ES Chapter 7: Underwater Noise. The location, nature (non-impulsive or impulsive), duration, magnitude and frequency of noise would vary throughout the indicative 42-month demolition and construction programme, according to the activity and wharf being worked on. Any disturbance impacts relating to noise and vibration would therefore be temporary and intermittent. Baseline environmental noise levels around the proposed development site are considered to be relatively high given the ongoing operational nature of Falmouth Docks and its surroundings; existing activities include ship repair, the presence of moored large offshore drilling rigs, the unloading of cargo including quarried material and glass recycling and vessel movements. Baseline noise surveys (see TA 14.1: Noise and Vibration Baseline Noise Survey) confirm that noise recorded on the Falmouth Docks site includes plant and shipyard activity such as HGVs, mobile plant and metal 'clanging'. At the existing site, the average number of non-cruise vessels that berth at the docks annually is 143 no. vessels (2022-2023 mean). The average number of cruise vessels accessing the site annually is 34 berthing cruise vessels and 11 cruise tender calls (2023-2024 mean, whereby 2024 values are based on current bookings which may be subject to change). With regards to vessel movements in proximity to the site, CCTV cameras situated at Queens Wharf and covering the extent of the inner harbour, North Queens and the main approach channel (an area extending slightly beyond the FDEC SHA) observed a total of 1453 vessel moves[15] of which approximately 10% were AIS vessel moves, over a 14-day period (12:00 24 October 2023 – 12:00 7 November 2023). Vessels recorded were leisure sailing (22%), leisure motorboat (23%), passenger ferry (22%), harbour or port craft (20%), kayak SUP row (8%) and other vessels (5%), and movements equated to 4.25 total vessels per hour and 0.4 total AIS vessels per hour[15]. The underwater noise climate is predominantly characterised by vessel noise from vessels transiting in and around the Fal Estuary. SPA bird species were recorded within the survey area during wintering bird surveys, which comprised 12 visits undertaken between November 2023 and May 2024 (see Appendix 2). The area surveyed comprised the Docks and its surrounds; the survey area therefore overlaps with the SPA extent in the north-east/east. Great northern diver were recorded making use of the survey area surrounding Falmouth Docks during six visits, and probable records of Black-throated diver were observed outside of the survey area on three visits. No Slavonian grebes were recorded during the surveys. The highest counts of Great northern diver were six birds (approximately 8% of the 5 year peak mean 2009/10 – 2010/11, 74 individuals[10]) during the November and January visits (with five during the December visit). One bird was recorded during a February visit. No activity was recorded in the late winter, with the occasional bird appearing again in May. Whilst some birds were recorded close to the Docks around the Northern Arm and the Eastern Breakwater Jetty (within 25 m), most activity within the survey area was recorded 525 – 775 m north-east/east of the Docks (within the SPA area, which at its closest point is approximately 150 m north-east of the easternmost point of the Northern Arm). Individuals were mostly observed diving and foraging in the survey area with individuals being very mobile, moving across the survey area. Given these observations, it is considered that SPA birds and their prey are likely to have a certain degree of habituation to surrounding industrial and maritime activity at the site and baseline airborne and underwater noise and disturbance levels. This is supported by the presence on occasion of Great northern divers foraging and diving in close proximity (within 275 m) to the quayside, east of the Western Wharf and around the Eastern Breakwater. As SPA birds were noted to be very mobile, it is considered that they would

[15] A&P (2024). FDEC Traffic Analysis Report (Falmouth). Revision 1. February 2024.

Table 5.4: Screening of Potential Likely Significant Effects for Falmouth Bay to St Austell Bay SPA (with marine components)	
Key Issues and Relevant Threats	**Justification**
	be able to move across and forage in the total 25,898.62 ha SPA area and beyond in response to any temporary disturbance from demolition and construction activities including vessel movements; disturbance from airborne and underwater noise and vibration is therefore not considered to give rise to any barrier to SPA birds' movements or their prey's movements during the demolition and construction stage. Noisy activities may deter divers from using areas close to the port at times, but their variable distribution during the surveys indicates that their distribution is likely affected by a range of factors and that they would be likely to use these areas when there is less disturbance. With regard to underwater noise specifically, it is considered that this would not lead to any likely significant effect on prey abundance and availability; as mentioned above, fish would continue to be able to move across the supporting habitat with SPA birds also able to respond accordingly. Whilst sources of underwater noise, which would be temporary and intermittent during the demolition and construction stage, could lead to a stress response in SPA birds or discourage/displace individuals from foraging and diving in the immediate surrounds of the Docks, this is not considered to give rise to a likely significant effect due to the ability of the mobile species to move across and forage within the total 25,898.62 ha SPA area and beyond (see 'Changes to foraging habitat' below for further detail). Furthermore, Figure 7 (Appendix 1) presents the lines of sight (underwater) from different locations around the Docks, providing an indication of how sound may either propagate freely into the wider Fal Estuary or be blocked by the shoreline or dock structures. Generally, underwater noise generated from the west side of the Docks would propagate westwards with the east of the Docks (and the SPA area) sheltered from underwater noise due to the presence of the marine infrastructure (the central causeway). Similarly, the Eastern Breakwater Jetty acts as an obstacle to underwater noise propagation, preventing noise propagation south-eastwards into the wider SPA area. ES Chapter 7: Underwater Noise and TA 7.1: Underwater Noise Modelling Report can be referred to for further detail and for the modelled outputs for impact piling, demolition with a hydraulic hammer and dredging (the worst-case underwater noise-generating activities) at different locations (noting that Figure 7 presents lines of sight rather than model outputs). Figure 7 indicates that activities occurring at the Northern Arm and the northern-most extent of the Western Wharf would lead to the most widespread underwater noise effects (the worst-case in terms of sound propagation distance). However, this is considered to be relatively localised when compared with the total SPA extent (particularly due to sheltering from the Eastern Breakwater Jetty). Underwater noise (and potential for any disturbance effects) would diminish with increasing distance from the noise source. As part of embedded construction best practice, measures would be incorporated into contractor method statements and the CEMP (based on the OCEMP[2] and to be secured by appropriately worded marine licence and planning conditions), with regard to noise control, including: • Minimisation of vessel and vehicle idling; • Avoidance and/or minimisation of the overlap of any noisy activities; and • Undertaking regular checks of plant and machinery to ensure these are working effectively and turning off engines when not in use. In accordance with standard construction methodologies and embedded measures for the purpose of minimising adverse effects on residential receptors, the demolition and construction stage programming is such that: • There would be natural periods of downtime for demolition works, piling and compaction works, as these would not be undertaken at nighttime; • Demolition and piling works would not overlap; • No more than one piling rig would work on-site and there would be natural periods of downtime between installation of each pile as the rig would be re-positioned; • No more than 4 hours of percussive piling per day;

Table 5.4: Screening of Potential Likely Significant Effects for Falmouth Bay to St Austell Bay SPA (with marine components)	
Key Issues and Relevant Threats	**Justification**
	• Vibro-piling would be utilised where reasonably practicable and where appropriate to achieve required pile depths, and soft-start methodology would be utilised for percussive piling; and • Use of the hydraulic breaker would be limited to a total of 1-hour in any 24 hours. Overall, a significant effect relating to disturbance from airborne and underwater noise and vibration is unlikely during the demolition and construction stage, as SPA birds are considered to have a certain degree of habituation to the surrounding industrial and maritime activity at the site and associated baseline noise and disturbance. Airborne and underwater noise and vibration effects would be temporary and relatively localised with birds and their prey being able to move across the SPA and beyond in response to any disturbance. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment. **Operational Stage:** The operations and the activities that would take place at the site during the operational stage of the proposed development are considered to be comparable in nature (and therefore, airborne and underwater noise level) to the baseline operations at the existing site. The small projected increase in cruise (11 no. additional Excellence Class vessels annually) and freight (12 no. additional freight vessels annually) vessels accessing the site and the relocation of cargo operations and other activities within the site are not considered to represent a significant change to the existing industrial and maritime use of the site (described in detail above). Furthermore, the cruise season is typically between 01 April to 31 October inclusive (outside of the wintering bird season) and the increase in berthing cruise vessels is anticipated to reduce the number of tender calls. As Excellence Class vessels would be accommodated at Falmouth Docks, there would be reduced anchoring in Falmouth Bay (south of Pendennis Point, within the SPA designated area itself) as per current arrangements. With regards to FLOW assembly and maintenance operations, activities such as crane operations to assemble/dismantle wind turbines would occur infrequently and comparable activities currently occur within the site. Activities during the operational stage are therefore not considered to be of the nature, scale and frequency to give rise to a likely significant effect relating to disturbance from airborne or underwater noise and vibration either directly on SPA birds or indirectly as a result of effects on their prey, given the existing noise climate at the site. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment.
Collision risk with static or moving objects not naturally found in marine environment	**Demolition and Construction Stage:** During the demolition and construction stage, construction plant, equipment, vessels and vehicles (up to HGV size) would be present at the site. These include but are not limited to a backhoe dredger(s), workboats, a piling rig and excavators. Whilst vessel movements would be minimised through the consolidation of deliveries and the completion of a portion of works from the land, construction plant, equipment and vessels could represent a collision risk for SPA birds. However, given the existing nature of the current site and its surroundings as an active operational port and busy navigational Carrick Roads channel, with vessels, buildings, wharf structures and cranes present, the SPA birds are assumed to be habituated to static and moving objects at the site and in its immediate surrounds. Whilst SPA birds were observed using the survey area for foraging and diving, with some observations within the site boundary, low numbers of SPA bird species were recorded overall and therefore the SPA birds are not solely reliant on the site and its immediate surrounds (see Maps 2-7 within Appendix 2 which show the location and distribution of all observations of target species in the survey area, with swim paths displayed where possible as well as individual observations of birds). As Great northern diver paths on Maps 2-7 of Appendix 2 are swim paths, the area in proximity to the Docks is considered to be used for foraging/diving rather than as a flight path. Whilst some birds were recorded close to the Docks around the Northern Arm and the Eastern Breakwater Jetty (within 25 m), most activity within the

Table 5.4: Screening of Potential Likely Significant Effects for Falmouth Bay to St Austell Bay SPA (with marine components)	
Key Issues and Relevant Threats	**Justification**
	survey area was recorded 525 – 775 m north-east/east of the Docks. The plant, equipment and vessels required during the demolition and construction stage would be present temporarily and would be of a similar nature and scale to the plant, equipment and vessels present at the existing operational Docks. Overall, a significant effect relating to collision risk is unlikely during the demolition and construction stage, as SPA birds are considered to be habituated to static and moving objects at the Docks. The proposed development would lead to the presence of static and moving objects during the indicative 42-month demolition and construction stage, but such presence is considered to be localised and temporary. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment. **Operational Stage:** During the operational stage of the proposed development, the extended and upgraded marine infrastructure is not considered to give rise to any likely significant effect relating to collision risk for SPA birds. This is concluded on the basis that the proposed development wharf design, geometry and elevation is in keeping with that of the existing infrastructure, to which the SPA birds are habituated. Furthermore, Falmouth Docks infrastructure would not extend into the SPA designated area itself, nor would it extend further northwards into the Carrick Roads channel. Whilst the movement and presence of a greater number and size (up to Excellence Class, approximately 345 m in length and approximately 70 m in height above the water line) of cruise ships has the potential to lead to a collision risk for SPA birds, this is not considered to give rise to a likely significant effect. The additional 11 no. Excellence Class cruise vessels that would access the site throughout the year during the operational stage is not considered to be significant in the context of the baseline vessel movements at the existing operational site (detailed above). The SPA birds are considered to be habituated to the frequent vessel movements and busy navigational passage of the Carrick Roads channel. Furthermore, whilst cruise ships would occasionally access the site in winter months, the majority of cruise ship movements are likely to occur within the main cruise season (between 01 April to 31 October inclusive), largely outside of the seasonal window for the SPA birds (which are non-breeding and therefore in their highest number in winter). The Black-throated diver and Slavonian grebe are most likely to be present November to April, whilst the Great northern diver is most likely to be present October to May[16]. This is supported by the findings of the wintering bird survey with Great northern diver recorded in November, January and February within the survey area surrounding Falmouth Docks with no activity in late winter and the occasional bird appearing in May. No Black-throated diver and Slavonian grebe were recorded within the survey area. However, records obtained from Cornwall Bird Watching Preservation Society (CBWPS) between 01 November 2023 to 31 May 2024 (see Appendix 2 for detail) indicate that Black-throated divers were recorded off Pendennis Point, south of the survey area, in all months except February and May, with activity peaking in April. Slavonian grebes were observed in January, February and April off Castle Beach, approximately 800 m south of the survey area, with the largest number of two individuals at one time recorded in February. During the operational stage, as Excellence Class vessels would be accommodated at Falmouth Docks, there would be reduced anchoring in Falmouth Bay (south of Pendennis Point, within the SPA designated area itself) as per current arrangements, and the number of tender calls would also decrease. Therefore, no likely significant effect relating to collision risk with Excellence Class vessels is anticipated. The presence of FLOW devices, turbines and associated crane at the site could give rise to a collision risk for SPA birds. The FLOW device hub height is 125 m, and the FLOW structure would be 230 m in height with the blades attached. As described in Section 3.3,

[16] Natural England (2019) Falmouth Bay to St Austell Bay SPA Advice on Seasonality [online]. Available at: https://designatedsites.naturalengland.org.uk/Marine/Seasonality.aspx?SiteCode=UK9020323&SiteName=falmouth%20bay%20to%20st%20austell&SiteNameDisplay=Falmouth+Bay+to+St+Austell+Bay+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=3 [Accessed on: 25/04/2024]

Table 5.4: Screening of Potential Likely Significant Effects for Falmouth Bay to St Austell Bay SPA (with marine components)	
Key Issues and Relevant Threats	**Justification**
	at any one time, there would be only one fully integrated FLOW device (two turbines) at the site, and a fully integrated (blades attached) FLOW device would remain at the Docks for up to two weeks, after which tugboats would tow it out to sea through the SPA including areas within which SPA birds were recorded during the November 2023-May 2024 survey (see Map 1, Appendix 2). Thus, the presence of integrated FLOW devices and turbines both at the site and within the SPA during towing is considered to be localised and temporary. As the turbine blades would be static, not rotating, this is not considered to represent a significant collision risk for birds, particularly as no SPA birds were recorded within the western dock basin (immediately north of Duchy Wharf and west of the FLOW Deck, the proposed wharves for FLOW activities) during the November 2023-May 2024 wintering bird surveys (see Map 1 within Appendix 2). As Great northern diver paths on Maps 2-7 of Appendix 2 are swim paths, the area in proximity to the Docks is considered to be used for foraging/diving rather than as a flight path and accordingly these birds are not considered to be at risk of collision during flight. No likely significant effect relating to collision risk with FLOW devices and turbines is anticipated. Overall, a significant effect relating to collision risk is unlikely during the operational stage, given SPA birds are considered to be habituated to vessels and marine infrastructure, the peak cruise season would not overlap with the presence of peak overwintering bird activity within the site, and fully integrated FLOW turbines would be present temporarily and with stationary blades. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment.
Introduction of light and visual disturbance	**Demolition and Construction Stage:** During the demolition and construction stage, the presence of construction plant, equipment, vessels and vehicles, such as HGVs, backhoe dredger(s), workboats, a piling rig, and excavators is not anticipated to lead to a likely significant effect relating to visual disturbance for SPA birds, as these are considered likely to be habituated to the existing setting of this section of waterfront and the Carrick Roads channel, which has baseline levels of visual disturbance due to the presence of vessels, buildings, cranes, marinas and wharfs. Vessels that access the site currently include freight vessels (approximately 60 – 100 m in length and approximately 7 m in height[17]), military vessels (approximately up to 180 m in length and approximately 33 m in height[17]) and ship repair vessels (approximately up to 260 m in length and approximately 39 m in height[17]). Whilst no Black-throated divers or Slavonian grebes were recorded in the survey area surrounding the site, limited numbers of Great northern divers have been recorded diving and foraging within 25 m of the Docks, with the majority of activity recorded within 525 – 775 m, indicating a degree of habituation to the existing site activities/operations. The Great northern divers were recorded during six of the 12 survey visits in November 2023-May 2024, and were recorded within 275 m of the Docks during three of those six visits. This indicates that the Great northern divers approach the Docks despite infrastructure and vessel presence and suggests an opportunistic behaviour pattern whereby individuals approach the Docks during moments of lesser disturbance, which they are habituated to. Any visual disturbance from construction plant, equipment, vessels and vehicles would be temporary during the indicative 42-month demolition and construction stage, is not considered to be of greater significance than the current baseline setting and is therefore not anticipated to be a barrier to SPA birds' movements into and across the SPA. As any visual disturbance would be localised to the site, SPA birds are considered to be able to continue to range across the overall 25,898.62 ha SPA area and beyond, particularly as these species are noted to be mobile. During the demolition and construction stage, any vessels such as workboats accessing the site would be lit in accordance with relevant regulations and it is possible that some additional task-based, localised lighting could be required to illuminate working areas. However, SPA birds are considered to be habituated to existing lighting associated with

[17] Vessel heights above calculated above mean water line, are indicative and will vary depending on the tide.

Table 5.4: Screening of Potential Likely Significant Effects for Falmouth Bay to St Austell Bay SPA (with marine components)	
Key Issues and Relevant Threats	**Justification**
	operations at the current site, including white, red and green external marine navigational lights, vessel navigation lights including above uppermost continuous decks and on masts, wharf lighting and building lighting. The existing Queens Wharf, Duchy Wharf and the western edge of the Western Wharf are lit 24 hours a day, seven days a week, at the current site, with lighting consisting of flood lights, lamps and red navigational lighting. Any additional lighting used during the construction and demolition stage would be fully compliant with relevant standards as per embedded standard practice measures, temporary, and localised (restricted to within the site boundary), and as such not considered to represent a significant change in comparison to the baseline setting. A significant effect relating to lighting is therefore considered unlikely. Overall, significant effects relating to visual disturbance or introduction of light are considered unlikely during the demolition and construction stage, as required plant, vessels, machinery and lighting are not anticipated to give rise to a significant visual change nor a significant increase in lighting levels in comparison to the baseline setting to which SPA birds are considered to be habituated. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment. **Operational Stage:** As detailed above, SPA birds using the site and its surroundings are considered to be habituated to the existing setting of this section of waterfront and the Carrick Roads channel, which experience baseline levels of visual disturbance due to the presence of vessels, buildings, cranes, marinas and wharfs. During the operational stage of the proposed development, the extended and upgraded marine infrastructure is not considered to give rise to any likely significant effect relating to visual disturbance or introduction of lighting for SPA birds. This is concluded on the basis that the proposed development wharf design, geometry, elevation and lighting strategy is in keeping with that of the existing infrastructure, to which the SPA birds are habituated. Furthermore, Falmouth Docks infrastructure would not extend into the SPA designated area itself, nor would it extend further northwards into the Carrick Roads channel. SPA birds are considered to be habituated to existing site lighting associated with Docks operations, including navigational, vessel, wharf and building lighting. During the operational stage, the proposed development is not anticipated to lead to any significant introduction of light; any additional lighting (for example lighting required along the proposed Northern Wharf and the eastern side of the Western Wharf) would be consistent with existing lighting and therefore not represent a significant change to the baseline environment. The activities anticipated to occur at the site during the operational stage of the proposed development would be very similar in nature to those currently occurring at the site. As described in detail above within 'Collision risk with static or moving objects not naturally found in marine environment', the proposed development is anticipated to lead to an additional 11 no. Excellence Class cruise ships and 12 no. additional freight ships annually and would facilitate FLOW devices for FLOW maintenance and assembly. Vessels would be lit in accordance with the International Regulations for Preventing Collisions at Sea (COLREGs) and Port Marine Safety Code (PMSC) and FLOW turbines would have aviation lights. However, such activities are not considered to lead to a significant increase in visual disturbance or lighting levels given the existing industrial nature and scale of the 24/7 operations and activities at the site, and particularly as any visual disturbance or lighting arising from Excellence Class ships or FLOW would be temporary and intermittent – the average berthing duration of cruise ships in the Docks was 1.1 days in 2022/2023, and a fully integrated FLOW device would remain at the site for up to two weeks before being towed away. Overall, significant effects relating to visual disturbance or introduction of light are considered unlikely during the operational stage, as the proposed development is not anticipated to give rise to a significant visual change nor a significant increase to the lighting levels in comparison to the existing operational Docks, to which SPA birds are considered to be habituated. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment.

Table 5.4: Screening of Potential Likely Significant Effects for Falmouth Bay to St Austell Bay SPA (with marine components)	
Key Issues and Relevant Threats	**Justification**
Contamination and surface water quality	**Demolition and Construction Stage:** There is potential for impacts to water quality to arise due to mobilisation of contaminated sediment, creation of sediment plumes during the capital dredge or disposal of material at sea, or accidental spillages during the demolition and construction stage. Impacts and effects relating to sediment quality and water quality have been fully assessed within ES Chapter 8: Marine Water and Sediment Quality and ES Volume 2 Technical Appendix 8.4 WFD Assessment and in relation to the Fal and Helford SAC below. Contractor method statements and the CEMP (based on the OCEMP[2] and to be secured by appropriately worded marine licence and planning conditions) would outline standard practice construction methods to be adhered to, including surface water protection and appropriate handling and management of any hazardous or contaminated materials. Vessels accessing the site during the demolition and construction would follow the standard requirements of both MARPOL[18] and the EA's guidance on works in, near or over watercourses[19] and carry appropriate spill kits should accidental spillage occur, to minimise the damage caused by such an event. Potential effects of the demolition and construction stage on water clarity, quality, temperature and oxygen levels are discussed within the WFD Assessment (Technical Appendix 8.4) and are anticipated to be temporary and not continuous during the indicative 42-month demolition and construction stage, as the different activities (including strengthening and enabling works, demolition, dredging and construction) would entail works of a different nature and scale. No inputs relating to nutrients and microbial patterns are anticipated. There is potential for mobilisation of sediments throughout the demolition and construction stage, particularly during capital dredging (the worst-case activity in terms of interaction with the seabed surface and substratum). Sediments within the site boundary have been identified to contain contaminants of Cefas ALs 1 and 2 (see ES Volume 2 Factual Ground Investigation Report and Ground Investigation Interpretative Report). Sediment plumes generated from the capital dredging and the dispersion of dissolved contaminants during capital dredging would lead to temporary and localised impacts on the water column; these effects have been modelled and are described in detail within ES Chapter 6: Coastal Processes and Sediment Regime, Chapter 8: Marine Water and Sediment Quality and TA 6.3: Sediment Plume Modelling. Similarly, sediment plumes generated from the disposal of dredge arisings at Falmouth Bay (B) Disposal Site are presented and described in ES Chapter 8 and TA 6.3. Given the dynamic tidal environment of the Carrick Roads and English Channel respectively, it is anticipated that elevated water turbidity and elevated dissolved contaminant concentrations would be localised, temporary and not lead to any likely significant effects on SPA birds or their supporting habitat. Such localised elevations in water turbidity and dissolved contaminant concentrations are also not predicted to lead to any indirect likely significant effects on SPA birds as a result of prey availability or the ability of birds to forage and find their prey. Given the ability of mobile species (SPA birds and their prey) to continue to range across the overall 25,898.62 ha SPA area, a significant effect relating to contamination and surface water quality is not considered likely. During the November 2023-May 2024 wintering bird surveys (see Appendix 2), limited numbers of SPA birds were recorded using the area surrounding the site, with only Great northern divers observed within the survey area. Black-throated divers and Slavonian grebes were not recorded within the survey area (there were probable records of Black-throated diver observed outside of the survey area on three visits and no Slavonian grebes were recorded). However, these were

[18] The name for the International Convention for the Prevention of Pollution from Ships

[19] Pollution Prevention Guidance No 5: Works in, Near or Over Watercourses (note guidance no longer supported by the EA, but continues to be utilised as good practice within the UK)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/485199/pmho1107bnkg-e-e.pdf

Table 5.4: Screening of Potential Likely Significant Effects for Falmouth Bay to St Austell Bay SPA (with marine components)	
Key Issues and Relevant Threats	**Justification**
	observed in low numbers south of the site off Pendennis Point and Castle Beach (according to target species records obtained from CBWPS from 01 November 2023 to 31 May 2024, from areas around Falmouth Bay including Maenporth Beach (approximately 4.3 km south of the survey area), Swanpool (approximately 2.3 km south of the survey area), Pendennis Point (approximately 1.5 km east of the survey area) and Pennance Point (approximately 2.5 km south of the survey area)). This suggests that other suitable habitat is available for the SPA birds to forage. Overall, a significant effect to SPA bird species (either directly on SPA birds or indirectly as a result of effects on their prey) relating to contamination and surface water quality during the demolition and construction stage is unlikely given the temporary nature and predicted extent of modelled sediment plume and dissolved contaminant plumes, the mobile nature of the SPA bird species and the availability of supporting habitat and prey across the SPA area. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment. **Operational Stage:** During the operational stage, no likely significant effect relating to contamination or surface water quality is predicted to arise. The proposed development is not expected to introduce either point source pollution (as no new outfalls or discharges are proposed) or diffuse pollution (as suitable management of surface water run-off and operational waste would occur, as per existing port operations). Therefore, no additional input of pollutants or nutrients into the marine environment is expected. The use of the site will continue to be port-related with continued frequent passage and berthing of vessels during the operational stage. The small projected increase in vessels to and from Falmouth Docks once the proposed development is operational is not considered to give rise to any significant change to water quality. The Docks would continue to operate under existing management procedures and regulatory requirements relating to the handling of potentially hazardous materials, spill response and ballast water management. Such measures are considered to be standard practice, in line with relevant regulations, and suitable to minimise and manage risk to surface water quality during the operational stage. Any low-frequency, short-duration maintenance dredging campaigns that may be required at the site would be of significantly smaller scale than the capital dredge occurring as a part of the demolition and construction stage works. The maintenance dredging would target local sediments that would infill, and therefore there is considered to be low potential for mobilisation and transport of contaminants during maintenance dredge campaigns. Overall, a significant effect relating to contamination and surface water quality is unlikely during the operational stage, as existing port management protocols and regulatory requirements relating to surface water pollution, vessel management and handling of potentially hazardous materials would continue to be adhered to. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment.
Changes to foraging habitat (including hydrodynamic changes to intertidal habitat)	**Demolition and Construction Stage:** Whilst the wintering bird surveys noted that Great northern diver were recorded making use of the survey area (see Appendix 2) for foraging and diving, the records of the three target species obtained from CBWPS from 01 November 2023 to 31 May 2024 from areas around Falmouth Bay indicate that most records of Great northern diver were observed from Swanpool, Maenporth, and Pendennis Point - all south of the survey area. Most of the CBWPS records of Black-throated diver were observed off Pendennis Point and most of the CBWPS records of Slavonian grebe were observed off Castle Beach, approximately 800 metres south of the survey area. The SPA bird species are therefore considered to use a range of foraging grounds in supporting habitats across the 25,898.62 ha SPA area and beyond. As described within 'Disturbance (noise and vibration, including underwater noise)' and 'Introduction of light and visual disturbance' above, no likely significant effect relating to either noise or visual disturbance is

Table 5.4: Screening of Potential Likely Significant Effects for Falmouth Bay to St Austell Bay SPA (with marine components)	
Key Issues and Relevant Threats	**Justification**
	anticipated during the demolition and construction stage of the proposed development. Any disturbance would be localised, temporary and not significant given the baseline setting and the SPA birds' likely habituation to existing operational Docks activities. Furthermore, no likely significant effect relating to contamination and surface water quality is anticipated, as described within 'Contamination and surface water quality' above. Therefore, the demolition and construction stage is not predicted to give rise to impacts that could lead to a barrier to SPA birds movements or prey availability across the 25,898.62 ha SPA area. As such, overall no likely significant effect relating to changes to water column foraging habitat within and surrounding the site is predicted during the demolition and construction stage. Intertidal habitats also form part of SPA birds' supporting habitat, although the findings of the wintering bird surveys (see Appendix 2) indicate that SPA birds make limited use of the intertidal zone within the study area (e.g. the Carrick Roads estuarine channel). As previously described, during the capital dredge contaminated sediments would be mobilised, suspended in the water column (forming a sediment plume) and then be re-deposited on the seabed. Such deposition is not predicted to reach intertidal zones, and as such no change to either the physical or chemical characteristics of sediments within intertidal habitats is predicted that could lead to any likely significant effect relating to changes in foraging habitat. Other potential impacts on intertidal habitat could occur due to hydrodynamic changes, for example with regards to wave conditions, tidal levels (water level and tidal currents) or sediment regime. During the demolition and construction stage, there would be a transition from the baseline hydrodynamic conditions to those predicted for the operational proposed development. The worst-case effect would occur once the demolition and construction stage is complete (i.e. during the operational stage), which is accordingly described below. During the demolition and construction stage, no likely significant effect relating to changes to foraging habitat due to hydrodynamic changes to intertidal habitat and the water column is predicted. Accordingly, changes to foraging habitat (including hydrodynamic changes to intertidal habitat) has been screened **out** of Stage 2 Appropriate Assessment. **Operational Stage:** As described above (see 'Disturbance (noise and vibration, including underwater noise)', 'Introduction of light and visual disturbance' and 'Contamination and surface water quality'), no likely significant effect relating to changes to foraging habitat (the water column) is predicted during the operational stage of the proposed development, as the proposed development is not anticipated to lead to a significant change in the nature, frequency or scale of the infrastructure and activities occurring at the Docks. The proposed development would increase the area of suspended deck and wharf structures from 11,644 m^2 to 26,133 m^2, a total increase of 14,489 m^2. At its closest point, the Docks infrastructure (excluding the Northern Arm which would be removed and reinstated as open channel) is located approximately 230 m from the SPA boundary. Therefore, the increase in suspended deck area at the Docks could lead to a loss of some water column area that may be used as supporting habitat for SPA species. However, neither the existing nor proposed Docks infrastructure is located within the SPA itself (the key area designated for supporting SPA birds). The proposed new wharf lengths would not extend closer to the SPA boundary than in the current layout, rather the Northern Arm (the structure closest to the SPA) would be removed. The new wharf lengths comprise extensions to the existing wharfs and are located immediately adjacent to the existing structures, within water column that is therefore not considered to be key foraging habitat due to the Docks' proximity. This is evidenced by the wintering bird surveys (Appendix 2), which recorded a low number of SPA species observations in/over the waters immediately adjacent to Falmouth Docks and demonstrated that the SPA species are not reliant on these areas alone. Therefore, no likely significant effect relating to loss of water column habitat is predicted, particularly as this loss is outside of the SPA area and SPA birds would continue to be able to move across and forage within the total 25,898.62 ha SPA area and beyond.

Table 5.4: Screening of Potential Likely Significant Effects for Falmouth Bay to St Austell Bay SPA (with marine components)	
Key Issues and Relevant Threats	**Justification**
	There is potential for the proposed development to impact intertidal habitats (that form part of the SPA birds' supporting habitat) during the operational stage through hydrodynamic changes (for example, changes in tidal levels, currents, wave conditions and sediment regime). Such changes have been modelled and are described in detail within ES Chapter 6: Coastal Processes and Sediment Regime, with relevant model outputs presented in Appendix 1. Model results confirm that during the operational stage, the proposed development would result in no change in wave height greater than 0.1 m along the coastline or over intertidal areas for the 1-year conditions modelled (Appendix 1 Figures 4a-d), very minor and limited impact on tidal propagation (and as such, no effect on intertidal exposure and habitat function, see Appendix 1 Figures 5a-b), minor and localised effects on current speeds (Appendix 1 Figures 6a-b), and negligible changes in deposition of fine sediment (less than ±0.5 cm annually and adjacent to the Northern and Western Wharves, see Appendix 1 Figure 3). Therefore, no significant change to hydrodynamics is predicted and as such no likely significant effect relating to changes to foraging habitat due to hydrodynamic changes to intertidal habitat or within the water column is expected. Accordingly, changes to foraging habitat (including hydrodynamic changes to intertidal habitat) has been screened **out** of Stage 2 Appropriate Assessment.
INNS	**Demolition and Construction Stage:** The proposed development is not considered to introduce new INNS or contribute to the spread of INNS during demolition and construction. No terrestrial INNS listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) were recorded on site during the UKHab survey of the terrestrial extent of the site, undertaken in September 2023 (ES Volume 2 TA 2.11 Ecological Impact Assessment). Marine INNS identified during the Multidisciplinary Ecological Survey undertaken in May 2023 (ES Volume 2 Technical Appendix 9.3) are stated in Table 5.7. Standard practice measures to minimise and prevent the spread of INNS would be implemented, in line with the Water Framework Directive and MMO licensing requirements, to prevent material, equipment or vessels potentially contaminated with INNS from accessing the site. These measures would be incorporated into contractor method statements and the CEMP (based on the OCEMP[2] and to be secured by appropriately worded marine licence and planning conditions), to reduce the risk of introduction or spread of INNS in both the marine and terrestrial environment, and would include: • Treatment/control of invasive plants, if identified, and adherence to standard biosecurity protocol during demolition and construction; • Industry best practice would be followed, with clean, check, dry procedures in place for plant and materials arriving on site; • During works, measures will be in place to ensure that equipment is biosecure; • Use of the smallest vessels possible to undertake the works; • Frequent vessel checks and appropriate ballast water management; and • Follow port and harbour protocols. Overall, a significant effect relating to INNS is unlikely during the demolition and construction stage, given embedded measures to implement a CEMP and adhere to standard practice measures. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment. **Operational Stage:** The proposed development is not considered to introduce new INNS or contribute to the spread of INNS during the operational stage. Similar maritime activities would occur at the site as in the current setting, and thus comparable numbers and types of vessels would access the site as in the current setting, including cargo, cruise, fishing, ship repair and military vessels. The site would also be accessed by additional freight vessels, larger cruise vessels, and vessels associated to the FLOW industry, however this small projected increase in vessels moving to and from Falmouth Docks once the proposed development is operational would not represent a significant increase in comparison to the baseline

Table 5.4: Screening of Potential Likely Significant Effects for Falmouth Bay to St Austell Bay SPA (with marine components)	
Key Issues and Relevant Threats	**Justification**
	vessel traffic. The existing controls and measures currently in place to manage and prevent the introduction and spread of INNS at the site would be maintained during the operational stage of the proposed development. A biodiversity net gain strategy[20] has been developed for the proposed development, involving the placement of potted trees on-site, which would not result in a risk with regards to spread or introduction of INNS. Overall, a significant effect relating to INNS is unlikely during the operational stage, as the existing port and harbour protocols currently in place for the site would be maintained. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment.

Table 5.5: Conclusions for Falmouth Bay to St Austell Bay SPA	
Is the potential scale or magnitude of any effect likely to be significant?	
Alone	No.
In combination with *other* plans or projects	No other plans or projects have been identified that could interact with the scale and scope of the proposed development. Therefore, no cumulative impacts are anticipated that could result in a likely significant in-combination effect.
In the absence of mitigation, are the proposals likely to have a significant effect on the designated site?	
No. Likely significant effects are screened out and no Stage 2 Appropriate Assessment is required.	

Fal and Helford SAC

Table 5.6: Baseline Information for Fal and Helford SAC (with marine components)	
Baseline Information	**Detail**
Relationship between Designated Site and Application Site	Fal and Helford SAC with marine components overlays part of the site. The SAC covers a total area of 6,362.83 ha.
Qualifying Features	Fal and Helford SAC supports the following qualifying features[21]: • H1110 Sandbanks which are slightly covered by sea water all the time; • H1130 Estuaries; • H1140 Mudflats and sandflats not covered by seawater at low tide; • H1160 Large shallow inlets and bays; • H1170 Reefs; • H1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*); and • S1441 Shore dock (*Rumex rupestris*). The following qualifying features are not considered within screening for likely significant effects on the basis that they are not present within, nor in proximity to, the site boundary (within the 2 km ZoI) and as such no direct or indirect pathway is considered possible and therefore no further assessment is required: • H1130 Estuaries – the site or the proposed development's ZOI is not located within the Estuaries feature. The site is located within the Large shallow inlets and bays feature, which transitions into the Estuaries feature in the upper reaches of the Percuil River and the northernmost extent of the River Fal including the Truro River and Tresilian River;

[20] Ramboll (2024). Falmouth Docks Development. Biodiversity Net Gain Assessment. 15743-RAM-FD-SW-RP-EV-00023.
[21] JNCC [online] Fal and Helford SAC. Available at: https://sac.jncc.gov.uk/site/UK0013112 [Accessed on: 24/01/2025]

Table 5.6: Baseline Information for Fal and Helford SAC (with marine components)	
Baseline Information	**Detail**
	• H1330 Atlantic salt meadows – this saltmarsh vegetation found in the upper reaches of estuaries is not present within the proposed development's ZoI; and • S1441 Shore dock – no habitats suitable for shore dock and no evidence of this species were identified on site during the September 2023 UKHab survey of the site's terrestrial extent (Technical Appendix 2.11: Ecological Impact Assessment). Shore dock requires a freshwater source which is not present on the site. Assessment is required for *H1110 Sandbanks which are slightly covered by sea water all the time, H1140 Mudflats and sandflats not covered by seawater at low tide, H1160 Large shallow inlets and bays and H1170 Reefs*. These Annex I habitats comprise the following sub-features, the distribution of which (using Magic Map data) is shown below in Figures 5-1 – 5-3. Those sub-features in bold below have been mapped as present within the proposed development's 2 km ZoI: • **Intertidal coarse sediment** • Intertidal mixed sediments • Intertidal mud • Intertidal sand and muddy sand • Intertidal seagrass beds • **Intertidal rock** • **Infralittoral rock** • Circalittoral rock • **Maerl beds** • **Subtidal seagrass beds** • Subtidal coarse sediment • Subtidal mud • **Subtidal mixed sediment** • **Subtidal sand**
Conservation Objectives	The Conservation Objectives[22] for Fal and Helford SAC are to: Ensure that the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintain or restoring: • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats; • The structure and function of the habitats of qualifying species; • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely; • The populations of qualifying species; and • The distribution of qualifying species within the site.
Condition	The designated site is complex, comprising of the Fal and Helford ria systems (drowned river valleys) and Falmouth Bay. Both ria systems receive low freshwater input and therefore contain a notable range of fully marine habitats with a high diversity of species across the majority of the designated site. These habitats are highly influenced by the degree of exposure of the site which varies greatly from extremely sheltered mudflats in the upper Fal to more exposed rocky coastal areas around the mouth of the Helford. Furthermore, the south-westerly location promotes warmer seawater temperatures which allow species to occur that are usually more southerly in their distribution. The majority of the shores of the upper Fal and Helford are fringed by sheltered intertidal sandflats and mudflats which are recognised for their important sediment dwelling species and communities. These mudflats and sandflats support a wide range

[22] Natural England (2018) European Site Conservation Objectives for Fal and Helford Special Area of Conservation Site Code: UK0013112. Available at: https://publications.naturalengland.org.uk/publication/5176566698999808 [Accessed on: 24/01/2025]

Table 5.6: Baseline Information for Fal and Helford SAC (with marine components)	
Baseline Information	**Detail**
	of invertebrate and bird communities, which make a vital contribution to the structure and function of the Fal and Helford system. In several areas of the upper reaches of the estuaries, Atlantic salt meadows are present. Salt meadow transition from mudflats through to woodland also occurs which is a rare occurrence in the UK. In the lower Fal and Falmouth Bay, extensive beds of the unattached coralline red algae maerl are present which support a high diversity of flora and fauna, including large numbers of thornback rays (*Raja clavate*). These maerl beds are classified as Habitats of Principal Importance/ Priority Habitats under the Natural Environment and Rural Communities Act 2006 (NERC) and are the most south-westerly examples in Britain. Other Priority Habitats within the site include subtidal seagrass beds (*Zostera marina*), which are present in both the Fal and the Helford. These seagrass beds act as nursery areas for species such as bass (*Dicentrarchus labrax*), and cuttlefish (*Sepiida*), and also important habitats for a variety of other species. Intertidal seagrass beds are present in the Fal Ruan. The site also supports a population of native oyster (*Ostrea edulis*), which supports a traditional commercial fishery. Both intertidal and subtidal rocky reef features are also present in the SAC. This includes circalittoral reef in Falmouth Bay which supports the nationally important pink sea fan (*Eunicella verrucosa)*. Other rocky habitats include highly productive kelp forest communities, estuarine reef, and littoral rocky shore communities. The most recent results of the Marine Condition Assessment[23] are summarised by feature below (for those features considered within Table 5.7). The Marine Condition Assessment is currently only applied to 'marine habitat features' listed in Annex I of the EC Habitats Directive. **Large shallow inlets and bays:** Only two designated sites in the southwest are designated for their 'Large shallow inlets and bays'. The large shallow inlets and bays feature of the Fal and Helford SAC covers the Carrick Roads, Falmouth Bay, and the lower Helford. Differences in wave exposure and tidal flows throughout the embayment, along with varying topography, contribute to the high diversity in marine environments. This complex Annex I feature covers a large proportion of the site and contains a variety of sub-features. In the 2020 SAC Condition Assessment, the feature was 56% unfavourable (no change), 24% unfavourable (declining) and 20% favourable. **Sandbanks which are slightly covered by sea water all the time:** The unimpeded tidal regime and presence of a wide variety of mobile and stable sediment types have, amongst other factors, significantly contributed to the high diversity of this interest feature. Within the Fal and Helford, a full range of sublittoral sediments are found which support extensive areas of maerl, a coralline red alga, as well as seagrass and other rich sediment communities. This diversity has resulted in the site displaying one of the most biologically rich examples of sandbanks in the UK. In the 2020 SAC Condition Assessment, the feature was 51% unfavourable (no change), 34% unfavourable (declining) and 15% favourable. **Mudflats and sandflats not covered by seawater at low tide:** Sheltered intertidal mudflats and sandflats in the Fal and Helford SAC support a diverse range of infaunal species, with species composition and richness varying between sediment types. In the 2018 SAC Condition Assessment, the feature was 99% unfavourable (no change) and 1% favourable. **Reefs:** The Fal and Helford SAC supports highly diverse reef habitats including rocky shore communities with rock pools, overhangs, and boulders; diverse kelp forest communities; areas of shallow estuarine bedrock, boulders, and cobbles; and deeper reefs in Falmouth Bay. As part of the Annex I reef feature, there are three sub-features listed in the Fal and Helford SAC: intertidal rock, infralittoral rock, and

[23] Natural England [online] Designated Sites View, Fal and Helford SAC, Feature Condition. Available at: https://designatedsites.naturalengland.org.uk/Marine/MarineFeatureConditionDirect.aspx?SiteCode=UK0013112&SiteName=fal%20and%20helford&SiteNameDisplay=Fal%20and%20Helford%20SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality= [Accessed on: 22/01/2025]

Table 5.6: Baseline Information for Fal and Helford SAC (with marine components)	
Baseline Information	**Detail**
	circalittoral rock. In the 2020 SAC Condition Assessment, the feature was 52% favourable and 48% unfavourable (no change).
Threats	The Site Improvement Plan[24] for the SAC identifies key prioritised issues for the site. The following are considered to be either threats or pressures: • Marine consents and permits: shipping; • Invasive species; • Water pollution; • Public access/disturbance; • Siltation; • Marine consents and permits: channel maintenance; • Fisheries: recreational marine and estuarine; • Fisheries: commercial marine and estuarine; • Fisheries: private; and • Air pollution: risk of atmospheric nitrogen deposition. The Fal and Helford SAC 'Advice on Operations'[25] identifies pressures associated with the most commonly occurring marine activities. Activities involved in the demolition and construction stage and operational stage of the proposed development (such as vessel movements, capital dredging, piling, construction of port and harbour structures and operation of port and harbours) have been used to infer specific potential pressures on the SAC as a result of the proposed development. These are summarised below: • Habitat removal and disturbance; • Overshadowing and changes to light; • Increased suspended sediment concentrations; • Suspended sediment deposition; • Contaminated sediment mobilisation and deposition; and • Introduction and/or spread of invasive non-native species (INNS).

[24] Natural England (2014). Site Improvement Plan: Fal and Helford (SIP082). Available at: http://publications.naturalengland.org.uk/publication/5480087138861056 [Accessed on: 23/01/2025]
[25] Natural England (2024). Fal and Helford SAC Advice on Operations [online] https://designatedsites.naturalengland.org.uk/Marine/FAPMatrix.aspx?SiteCode=UK0013112 [Accessed on: 23/01/2025]

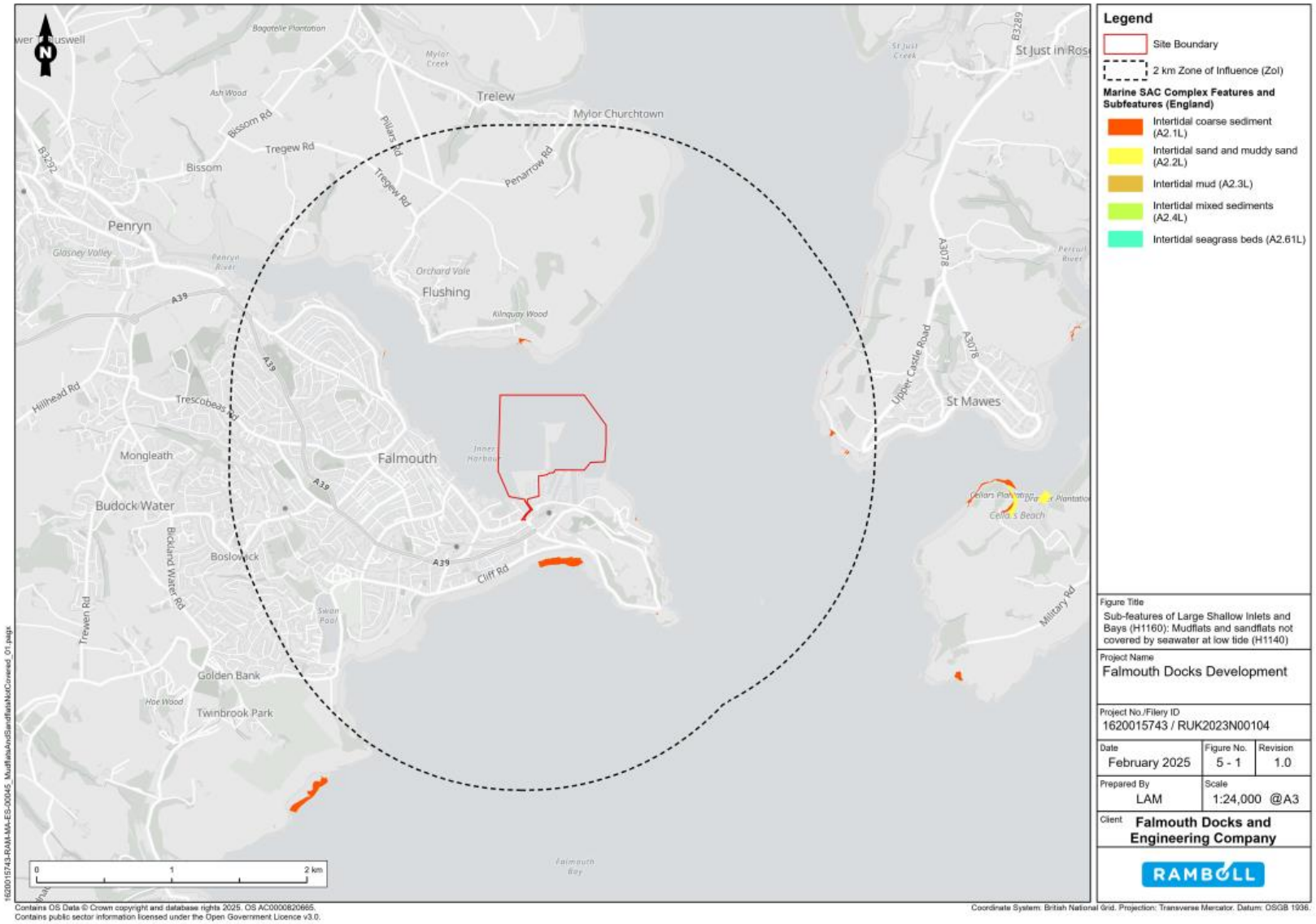


Figure 5-1 Map Showing Sub-features of Large Shallow Inlets and Bays (H1160): Mudflats and sandflats not covered by seawater at low tide (H1140) (as mapped on Magic Maps)

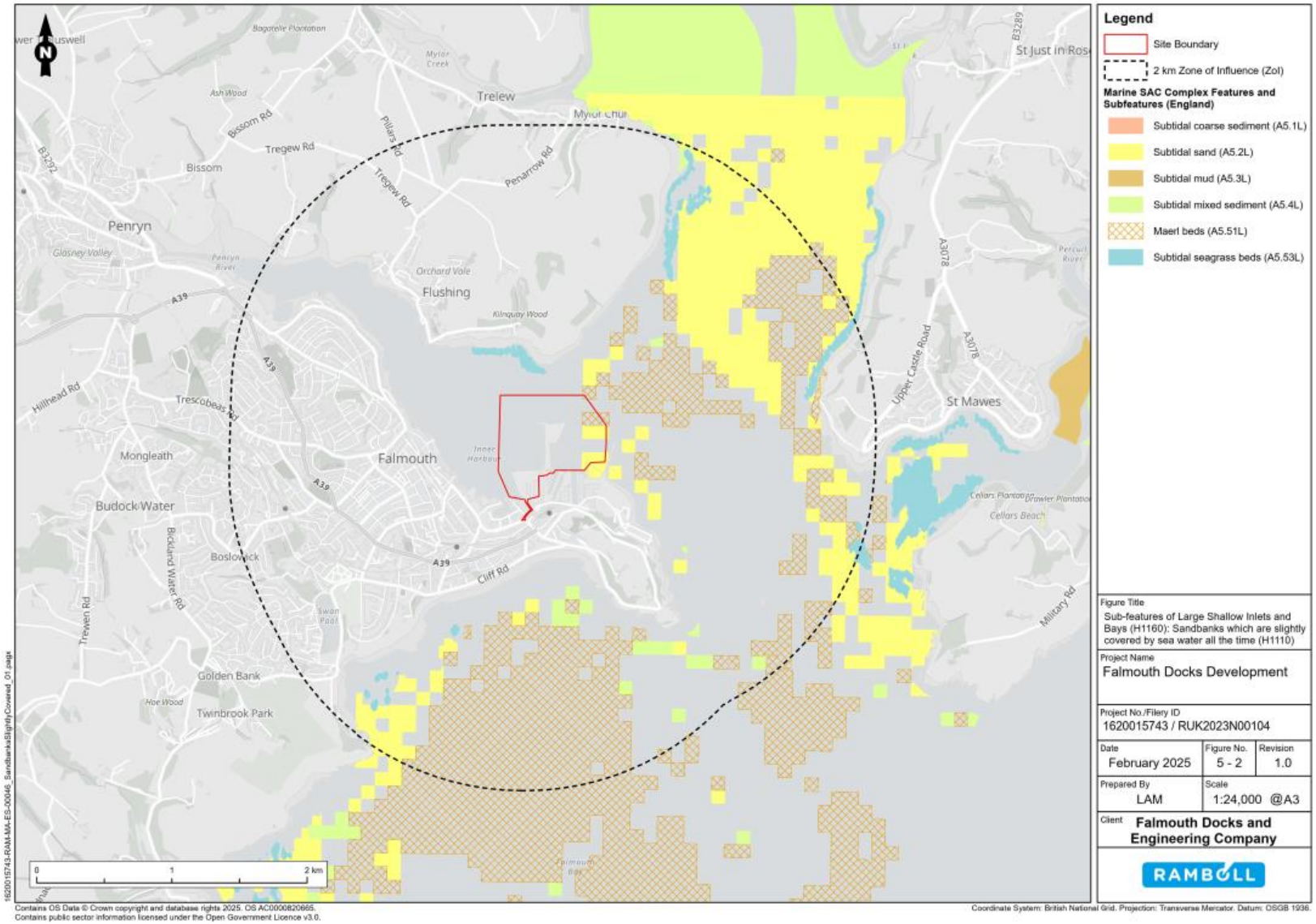


Figure 5-2 Map Showing Sub-features of Large Shallow Inlets and Bays (H1160): Sandbanks which are slightly covered by sea water all the time (H1110) (as mapped on Magic Maps)

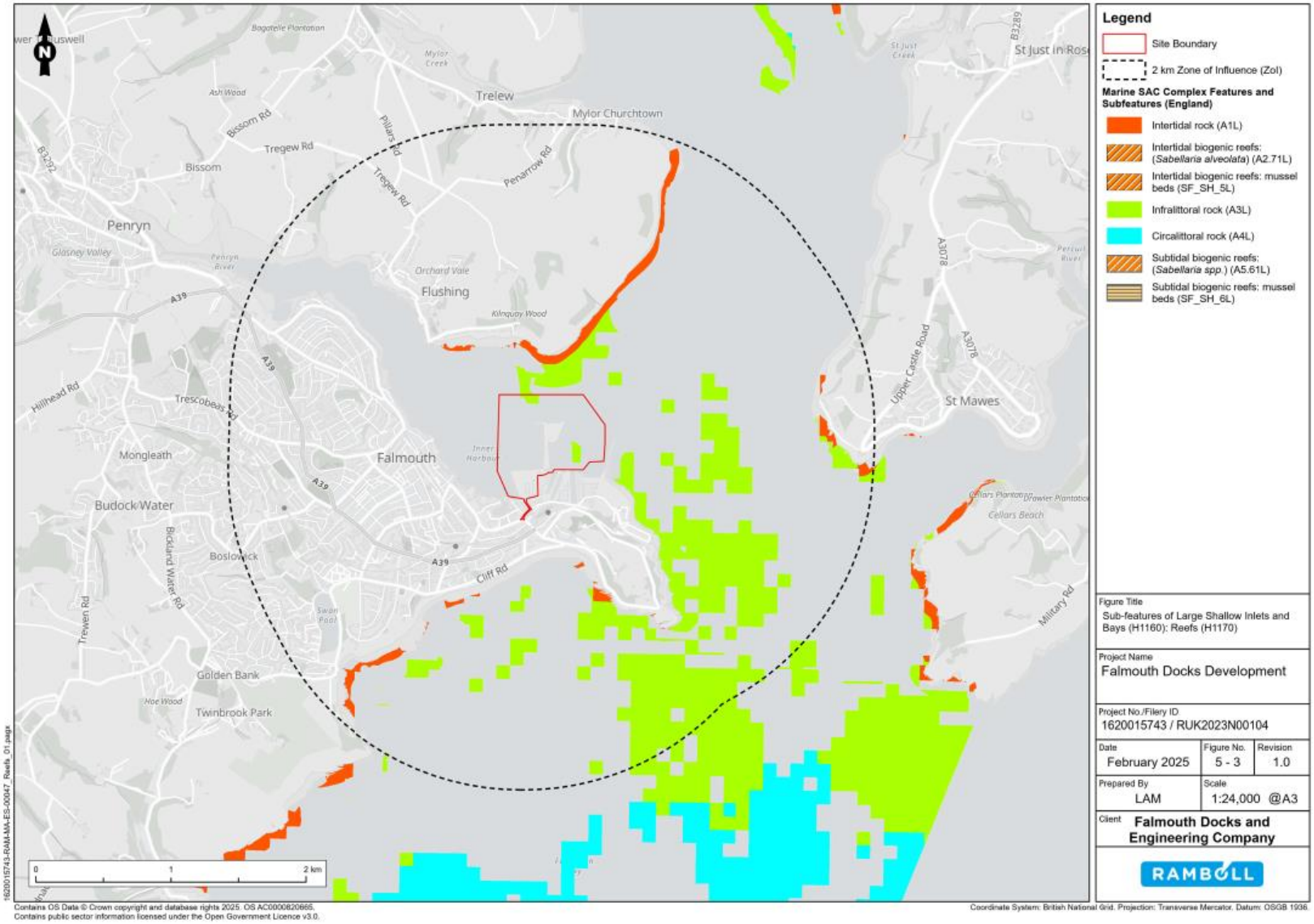


Figure 5-3 Map Showing Sub-features of Large Shallow Inlets and Bays (H1160): Reefs (H1170) (as mapped on Magic Maps)

Table 5.7: Screening of Potential Likely Significant Effects for Fal and Helford SAC (with marine components)	
Key Issues and Relevant Threats	**Justification**
Habitat Removal and Disturbance	**Demolition and Construction Stage:** During the demolition and construction stage, habitat removal will occur due to capital dredging and the installation of new infrastructure into the seabed within the wharf. In addition, other activities and plant within the marine environment could lead to the abrasion, removal or disturbance of benthic habitats. Such activities include excavation, installation of toe walls, demolition and the installation of new piles and revetment. However, the areas of disturbance are located within the area proposed to be dredged (see Figure 3-4) and so the worst-case effect is habitat removal from dredging. Any disturbance or abrasion during the demolition and construction stage would occur shortly prior to or shortly after the capital dredge, and therefore this effect is overridden by the seabed/substratum removal during dredging. The project specific surveys recorded seabed conditions within the site boundary consist predominantly of sublittoral cohesive mud and sandy mud with generally mixed (coarser) sediments and the presence of maerl. Maerl beds are sub-features of the 'Sandbanks which are slightly covered by sea water all the time' qualifying feature. Whilst the scale and footprint of the proposed works have been minimised as far as practicable whilst allowing the proposed development's objectives to be met, there is potential for loss of seabed habitat that is a designating feature of the SAC. Therefore, this effect has been screened **in** for Stage 2 Appropriate Assessment. There are no activities taking place during the demolition and construction stage of the proposed development that have the potential to affect tidal currents or wave exposure that could affect benthic habitats and so this effect has been screened **out** of Stage 2 Appropriate Assessment. **Operational Stage:** During the operational stage of the proposed development, there is potential for disturbance to the seabed surface and substratum through propeller scour and wash from vessel movements at the site and from maintenance dredging. There is also possible disturbance to benthic habitats as a result of changes in water flow (tidal current) conditions due to the creation of dredge pockets, the installation of additional revetment and piles and changes to the form of the quay line. Such structures can change the form/profile of an area of seabed resulting in localised changes to flow rates and tidal regime, scour and altered hydrodynamics as a result of the presence of new infrastructure in the docks. At the existing site, the average number of non-cruise vessels that berth at the docks annually is 143 no. vessels (2022-2023 mean). The average number of cruise vessels accessing the site annually is 34 berthing cruise vessels and 11 cruise tender calls (2023-2024 mean, whereby 2024 values are based on current bookings which may be subject to change). With regards to vessel movements in proximity to the site, CCTV cameras situated at Queens Wharf and covering the extent of the inner harbour, North Queens and the main approach channel (an area extending slightly beyond the Falmouth Docks and Engineering Company (FDEC) Statutory Harbour Authority (SHA)) observed a total of 1453 vessel moves[15], of which approximately 10% were Automatic identification system (AIS) vessel moves, over a 14-day period (12:00 24 October 2023 – 12:00 7 November 2023). Vessels recorded were leisure sailing (22%), leisure motorboat (23%), passenger ferry (22%), harbour or port craft (20%), kayak stand up paddle (SUP) row (8%) and other vessels (5%), and movements equated to 4.25 total vessels per hour and 0.4 total AIS vessels per hour[15]. During the operational stage of the proposed development, the small projected increase in cruise (11 no. additional Excellence Class vessels

Table 5.7: Screening of Potential Likely Significant Effects for Fal and Helford SAC (with marine components)	
Key Issues and Relevant Threats	**Justification**
	annually, which is anticipated to reduce the number of tender calls) and freight (12 no. additional freight vessels annually) vessels accessing the site and the use of the site to support the FLOW industry (involving tugboats bringing FLOW devices to and from site) are not considered to represent a significant change from the baseline number of vessel movements and the existing industrial and maritime use of the site. The operations and the activities that would take place at the site during the operational stage of the proposed development are therefore considered to be comparable in nature and frequency to the baseline operations. The need for ongoing maintenance dredging post construction has been identified. However, any maintenance dredging that may be required at the site would be of a significantly smaller scale than the capital dredge. It has been estimated that approximately 8,000 m^3 every 5 years or up to approximately 16,000 m^3 every 10 years will be required, with the maintenance dredging mostly limited to the eastern berth pocket. As the maintenance dredging would require the removal of a limited volume of sediment, mostly from the eastern berth pocket, in localised areas adjacent to the dock structures, maintenance dredging is not considered to give rise to a likely significant effect with regards to removal of substrate/substratum. To determine potential effects from changing hydrodynamics, tidal flow and wave modelling (Technical Appendix 6.4 Tidal Flow Modelling and Technical Appendix 6.1 Wave Modelling) has been undertaken to predict the impacts of the proposed development on water movement conditions. The difference in significant wave height between the baseline and proposed development layout are predicted to be localised in the area immediately around the proposed development and no change in wave height greater than 0.1 m is seen along the coastline or over intertidal areas for the 1 year conditions (Appendix 1 Figures 4a-d). For tidal currents, the main changes predicted are highly localised areas of reduction in current speed, with some highly localised increases in current speed, within and adjacent to the site boundary (Appendix 1 Figures 6a-b). Similarly, the change in water models is predicted to be minor, no greater than 1 mm (Appendix 1 Figures 5a-b). Given the very minor and highly localised modelled differences in wave conditions, tidal current and tidal level between the baseline conditions and operational proposed development conditions, these are not considered to give rise to any likely significant effect on the SAC or its qualifying features. The modelled differences are considered to be negligible, particularly in the context of the wider SAC, and would neither affect the SAC's ability to support a diversity of qualifying features nor affect the function, condition or distribution of any features or sub-features. Therefore, water flow (tidal current) and wave changes during the operational stage have been screened **out** of Stage 2 Appropriate Assessment. Overall, no likely significant effects relating to habitat removal or disturbance is anticipated during the operational stage. This is concluded on the basis that vessel movements will be similar to the existing baseline and any maintenance dredging would be low-volume, infrequent and highly localised. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment.
Overshadowing and introduction of/changes to light (other than due to increased SSC)	**Demolition and Construction Stage:** Changes in light could affect rates of photosynthesis of marine plants and algae or cause disturbance to light sensitive marine receptors such as some fish. During the demolition and construction stage, the only changes to light available for photosynthesis would be due to the presence of workboats moving through the site causing minor shading which is not considered

Table 5.7: Screening of Potential Likely Significant Effects for Fal and Helford SAC (with marine components)	
Key Issues and Relevant Threats	**Justification**
	significant in the context of existing numbers of vessel movements and berthing vessels at the site. There are no designating features that would be disturbed by lighting on the site. Overall, no likely significant effects relating to changes in light are predicted during demolition and construction and this effect has therefore been screened **out** of Stage 2 Appropriate Assessment. **Operational Stage:** During the operational stage of the proposed development, the main pathway to a change in ecologically relevant light is additional overshadowing from the new footprint of the wharves and from the presence of additional berthed vessels. The proposed development would increase the area of suspended deck and wharf structures from 11,644 m^2 to 26,133 m^2, a total increase of 14,489 m^2. The areas directly beneath the new wharf structures would be permanently shaded and areas just beyond shaded to differing extents throughout each day and throughout the year. The worst-case scenario would occur during early mornings/late evenings in winter months, as the sun is typically lowest in the sky. At the existing site, vessels' average duration in port is 6.7 days for cargo vessels, 1.1 days for cruise, 6.4 days for ship repair, 19.6 days for military and 4.9 days for other vessel types (2022/23). Military vessels frequently berth alongside for three to six months. Vessel berthing durations are anticipated to remain comparable to the existing site during the operational stage and so overshadowing would not significantly increase. Changes in light can affect rates of photosynthesis of marine plants and algae. The photosynthetic species that are sub-features of the qualifying Annex I SAC habitats, maerl and seagrass, were not identified in the locations that could be subject to overshadowing (during benthic ecology project surveys, live maerl was identified outside of the site boundary, within the approach channel to the Docks and to the southeast of the Eastern Breakwater). In conclusion, no likely significant effects relating to introduction of light, shading or overshadowing are predicted during the operational stage, as the proposed development is not anticipated to give rise to a significant change in comparison to the baseline environment with regards to lighting and berthing operations, and the effects of shading from suspended deck structures would be highly localised, and over some areas (not directly underlying the suspended decks) would be periodic and transient (changing according to time of day and time of year). Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment.
Increased suspended sediment concentrations	**Demolition and Construction Stage:** During the demolition and construction stage, the proposed works have the potential to cause a localised and temporary increase in suspended sediment concentration (SSC) levels within the water column due to seabed disturbance. The demolition and construction activity with the greatest potential to give rise to elevated SSC levels (the worst-case) would be the capital dredge. Increased SSC levels can lead to adverse effects on photosynthetic species, by decreasing the availability of light at the seabed. The sub-features within the SAC that could be affected by elevated SSC are therefore maerl beds and seagrass beds, with all other sub-features not considered directly sensitive to this pressure. Without mitigation, the peak sediment plume that would be generated by the capital dredging (over a 15-day simulation to include all tide ranges) is predicted to travel downgradient

Table 5.7: Screening of Potential Likely Significant Effects for Fal and Helford SAC (with marine components)	
Key Issues and Relevant Threats	**Justification**
	of the site (eastwards, around the east of Pendennis towards Falmouth Bay) (see ES Volume 2 TA 6.3: Sediment Plume Modelling Report). Given the predicted pattern of dispersion of suspended sediments, it is considered that the sediment plume generated by the capital dredge could reach areas of maerl in proximity to the site. However, the sediment plume would not reach any known seagrass beds (including those closest to the site, located approximately 160 m to the north along the Flushing headland, see Figure 5-2) and as such, the seagrass feature would not be affected by elevated SSC due to the lack of impact pathway. Whilst increases in SSC are considered to be short-lived, returning to baseline levels shortly after the completion of dredging operations, there is potential for a likely significant effect for the maerl sub-feature and therefore, this effect has been screened **in** for Stage 2 Appropriate Assessment. Some dredge arisings will be deposited at Falmouth Bay (B) Disposal Site. Sediment plume modelling undertaken for this disposal shows that the predicted sediment plume generated from the disposal of material would not interact with or reach the SAC, given the distance between the disposal site and the SAC boundary (see Figure 3-5 and ES Volume 2 Technical Appendix 6.3: Sediment Plume Modelling Report). Therefore, no further assessment of sediment disposal is required as any impact on the SAC, or its qualifying features, is unlikely and this effect has been screened **out** for Stage 2 Appropriate Assessment. **Operational Stage:** The operations and activities that would take place at the site during the operational stage of the proposed development are considered to be similar to the current baseline operations at the site (including vessel movements and maritime and industrial activities) with regards to potential to give rise to sediment mobilisation and elevated SSC, and therefore no likely significant effect is anticipated. Fine sediment transport modelling has been undertaken to predict any potential changes to naturally occurring levels of suspended sediment and infill rates (the sediment regime) as a result of the presence of proposed development. Figures 1a-d and 2a-d (Appendix 1) show the maximum suspended sediment concentration experienced during four wave conditions modelled for the existing site layout and for the proposed development layout respectively. For both the baseline and proposed layouts, during typical wave conditions (representative offshore wave conditions from SW, Figures 1a and 2a), the concentrations of suspended sediment are generally very low. The highest maximum SSC is predicted during more extreme storm conditions (1 year return period (RP) offshore wave condition from 130°N, Figures 1d and 2d). Comparison of Figures 1a-d and 2a-d shows that there is negligible difference in maximum SSC levels in the water column during the operational stage of the proposed development in comparison to the baseline environment, for all four modelled wave conditions. Some small changes in concentration contours are seen, however as the figures represent peak values, such effects are short-lived. The overall effect of the proposed development on operational stage SSC is therefore very minor and no likely significant effect on the SAC or its qualifying features is predicted. Change to the depth of annual fine sediment deposition at the site is also predicted to be negligible (Figure 3, Appendix 1), potentially requiring only infrequent, low-volume, minor maintenance dredging. Any maintenance dredging that may be required at the site would therefore be of a significantly smaller scale than the capital dredge occurring as part of the demolition and construction stage (approximately 8,000 m^3 every 5 years or

Table 5.7: Screening of Potential Likely Significant Effects for Fal and Helford SAC (with marine components)	
Key Issues and Relevant Threats	**Justification**
	up to approximately 16,000 m^3 every 10 years), comprising low-frequency, short-duration campaigns leading to localised, short-term effects only (with the maintenance dredging mostly limited to the eastern berth pocket). Therefore, no likely significant effect relating to elevated SSC levels due to sediment mobilisation during maintenance dredging is predicted. Overall, no likely significant effects relating to elevated SSC are anticipated during the operational stage, as the proposed development is not predicted to result in any significant change to the baseline sediment regime and site operations. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment.
Suspended sediment deposition	**Demolition and Construction Stage:** Sediment mobilised during the demolition and construction stage is expected to disperse away from the site, to be re-deposited in a different location, potentially leading to smothering of the habitats on which it settles. The accumulation of dredged sediment (for all areas of the site) has been modelled for the capital dredge (the worst-case activity with regard to sediment mobilisation). Without mitigation, the spatial footprint within which fine sediment deposition could occur during the capital dredge is largely within the dredged berth pockets themselves (which would be re-dredged), in addition to deposition to the west, north, east and south-east of the site (with potential to reach along the eastern side of Pendennis Point, see ES Volume 2 Technical Appendix 6.3 Sediment Plume Modelling Report). Whilst the effect of smothering/siltation is considered to be highly localised in the context of the wider SAC, and although mobilisation and deposition of sediment occurs naturally within this system, a likely significant effect due to smothering/siltation is possible given the distribution of Annex I habitat sub-features within or in the vicinity of the site boundary. Therefore, this effect has been screened **in** for Stage 2 Appropriate Assessment. Sediment plume modelling undertaken for the disposal of dredge arisings at Falmouth Bay (B) Disposal Site shows that no sediment is predicted to be re-deposited within the SAC, given the distance between the disposal site and the SAC boundary (see Figure 3-5 and TA 6.3: Sediment Plume Modelling Report). Therefore, no further assessment of sediment disposal is required as no impact on the SAC or its qualifying features is likely and this is screened **out** for Stage 2 Appropriate Assessment. **Operational Stage:** The operations and activities that would take place at the site during the operational stage of the proposed development are considered to be similar to the current baseline operations at the site (including vessel movements and maritime and industrial activities) with regards to potential to lead to smothering/siltation and therefore no likely significant effect is anticipated. As above-mentioned, fine sediment transport modelling has been undertaken to predict any potential changes to infill rates as a result of the proposed development. Figure 3 (Appendix 1) presents the difference in the pattern of predicted annual deposition of fine sediment between the baseline and the proposed development. Increases and decreases in annual fine sediment deposition are negligible (less than ±0.5 cm annually). Some small areas of increased infill of up to 2 cm/year are predicted to occur adjacent to the Northern Wharf and Western Wharf. With regards to larger grain-size sediment, there is potential for a minor increase in deposition of sand or larger grain-size sediment within the dredged areas (as the proposed development is predicted to lead to a minor and localised reduction in current speeds within the dredged area), however any changes will be very minimal and small in magnitude because the general sediment fluxes are low at the site. Overall, any changes to fine and larger sediment deposition are

Table 5.7: Screening of Potential Likely Significant Effects for Fal and Helford SAC (with marine components)	
Key Issues and Relevant Threats	**Justification**
	predicted to be highly localised, extremely minor and would not lead to any likely significant effect on the qualifying features or sub-features of the SAC with regard to smothering/siltation rate changes. Any maintenance dredging that may be required at the site would therefore be of a significantly smaller scale than the capital dredge occurring as part of the demolition and construction stage comprising low-frequency, short-duration campaigns leading to localised effects only (with the maintenance dredging mostly limited to the eastern berth pocket). As such, no likely significant effect relating to smothering/siltation due to sediment deposition during maintenance dredge campaigns is predicted. Overall, significant effects relating to smothering/siltation rate changes are unlikely during the operational stage, as the proposed development is not predicted to result in any significant change to the baseline sediment regime and site operations. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment.
Contaminated sediment mobilisation and deposition	**Demolition and Construction Stage:** There is potential for impacts due to mobilisation of contaminated sediment during the capital dredge. Impacts and effects relating to sediment quality and water quality have been fully assessed within ES Chapter 8: Marine Water and Sediment Quality and the WFD Assessment (ES Volume 2 Technical Appendix 8.4), and effects related to turbidity are considered herein (see 'Increased SSC' above). The site lies within an area subject to a long history of navigation, port, and harbours, including industrial and maritime use. Contaminant types and levels within marine sediment vary across the site, but contaminants of Cefas Action Levels (ALs) 1 and 2 were identified during the March 2024 Ground Investigation (GI), including mercury, zinc, copper, lead, Tributylin (TBT) and polychlorinated biphenyls (PCBs) (see ES Volume 2 Factual Ground Investigation Report and Ground Investigation Interpretative Report for further detail). There is therefore potential for the mobilisation of contaminants during the demolition and construction stage activities, particularly during the capital dredge, which is the activity with the greatest interaction with the seabed surface and substratum (i.e. the worst-case activity). Such mobilisation could give rise to suspension and deposition of contaminated sediment, potentially affecting subtidal habitats such as maerl. Whilst this effect is predicted to be highly localised within the context of the wider SAC, there is potential for a likely significant effect related to mobilisation of contaminants to occur for designating features. Therefore, this effect has been screened **in** for Stage 2 Appropriate Assessment for further consideration of effects on the integrity of the SAC. **Operational Stage:** As described previously, any low-frequency, short-duration maintenance dredging campaigns that may be required at the site would be of significantly smaller scale than the capital dredge occurring as a part of the demolition and construction stage works. The maintenance dredging would target local sediments that would infill, and therefore there is considered to be low potential for mobilisation and transport of contaminants during maintenance dredge campaigns. Overall, a significant effect relating to contaminated sediment mobilisation and deposition is unlikely during the operational stage. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment.

Table 5.7: Screening of Potential Likely Significant Effects for Fal and Helford SAC (with marine components)	
Key Issues and Relevant Threats	**Justification**
Introduction and/or spread of marine invasive non-native species (INNS)	**Demolition and Construction Stage:** The proposed development is not considered to introduce new INNS or contribute to the spread of INNS during demolition and construction. During the Multidisciplinary Ecological Survey undertaken in May 2023 (ES Volume 2 Technical Appendix 9.3), two invasive species of marine alga, *Bonnemaisonia hamifera* and *Asparagopsis armata* were identified. The invasive barnacle *Austrominius modestus* and the red ripple bryozoan *Watersipora subatra* were identified in the grab samples. Standard practice measures to minimise and prevent the spread of INNS would be implemented, in line with the Water Framework Directive and MMO licensing requirements, to prevent material, equipment or vessels potentially contaminated with INNS from accessing the site. These measures would be incorporated into contractor method statements and the CEMP (based on the OCEMP[2] and to be secured by appropriately worded marine licence and planning conditions), to reduce the risk of introduction or spread of INNS, and would include: • The production of a Biosecurity Risk Assessment and Plan to be produced, as part of the CEMP that shall be developed for the proposed development. This document will reference the Biosecurity Plan produced by Falmouth Harbour for a Biosecurity Plan for the Falmouth Haven Marina and Boat Park; • All project vessels will adhere to the International Maritime Organisation (IMO) Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines 2011); • All project vessels shall adhere to the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention); and • In the event any material introduced into the marine environment, is derived from the marine environment, it will be from a suitable source or cleaned to ensure no marine INNS can be introduced. Overall, a significant effect relating to INNS is unlikely during the demolition and construction stage, given embedded measures to implement a CEMP and adherence to standard practice measures. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment. **Operational Stage:** The proposed development is not considered to introduce new INNS or contribute to the spread of INNS during the operational stage. Similar maritime activities would occur at the site as in the current setting, and thus comparable numbers and types of vessels would access the site as in the current setting, including cargo, cruise, fishing, ship repair and military vessels. The site would also be accessed by additional freight vessels, larger cruise vessels, and vessels associated to the FLOW industry, however this small projected increase in vessels moving to and from Falmouth Docks once the proposed development is operational would not represent a significant increase in comparison to the baseline vessel traffic. The existing controls and measures currently in place to manage and prevent the introduction and spread of INNS at the site would be maintained during the operational stage of the proposed development. Overall, a significant effect relating to INNS is unlikely during the operational stage, as the existing port and harbour protocols currently in place for the site would be maintained. Therefore, this effect has been screened **out** of Stage 2 Appropriate Assessment.

Table 5.8: Conclusions for Fal and Helford SAC	
Is the potential scale or magnitude of any effect likely to be significant?	
Alone	Yes – the potential for likely significant effects has been identified during the demolition and construction stage only. The following impact pathways have been screened in for Appropriate Assessment: • Habitat removal and disturbance; • Increased suspended sediment concentrations; • Suspended sediment deposition; and • Contaminated sediment mobilisation and deposition. For the operational stage of the project and for the disposal of dredge spoil, no likely significant effect is predicted and all impact pathways for these stages have been screened out from requiring an Appropriate Assessment.
In combination with *other* plans or projects	No other plans or projects have been identified that could interact with the scale and scope of the proposed development. Therefore, no cumulative impacts are anticipated that could result in a likely significant in-combination effect.
In the absence of mitigation, are the proposals likely to have a significant effect on the designated site?	
Yes. Likely significant effects are screened in and a Stage 2 Appropriate Assessment is required for further consideration of effects to the integrity of the SAC.	

6. STAGE 2 – Appropriate Assessment

6.1 Designated Sites with Likely Significant Effects

6.1.1 The Stage 1 Screening identified the Fal and Helford SAC as the only designated site where there is potential for likely significant effects to occur in the absence of mitigation. The proposed development has the potential to affect the integrity of Fal and Helford SAC due to the potential for the following likely significant effects during the proposed development's demolition and construction stage (Table 5.7):

- Habitat loss and disturbance;
- Elevated suspended sediment concentrations (SSC);
- Suspended sediment deposition; and
- Contaminated sediment mobilisation and deposition.

6.2 Information for Appropriate Assessment: Fal and Helford SAC

6.2.1 The potential for effects on the integrity of Fal and Helford SAC is assessed for each of these effects in turn below, with consideration of the SAC's conservation objectives, key issues and relevant threats, to inform an Appropriate Assessment of the proposed works.

6.2.2 To inform the baseline and impact assessments for the proposed development, an extensive survey effort was undertaken in order to determine the presence, distribution, structure and condition of benthic habitats within and in proximity to the proposed development footprint.

6.2.3 Surveys comprised a high-level DDV survey in May 2022 (ES Volume 2 Technical Appendix 9.1 Port Falmouth DDV Survey Report) and a multidisciplinary ecology survey in May 2023 (ES Volume 2 Technical Appendix 9.3 Falmouth Benthic Ecology Survey Report).

6.2.4 The May 2023 survey scope was agreed with Natural England (ES Volume 2 Technical Appendix 9.2 Benthic Survey Scope and Agreements) and comprised 15 targeted DDV transects, survey of hard port structures by remotely operated vehicle (ROV), as well as collection of 29 Day Grab samples for taxonomic ID and particle size distribution (PSD) analysis. The survey findings also ground-truth the mapping of SAC features and sub-features provided on Magic Maps (shown on Figures 5-1 – 5-3), for the area within the benthic ecology survey study area. Outside of the benthic ecology survey study area, the locations/distributions of sub-features shown on Magic Maps (Figures 5-1 – 5-3) are utilised.

6.2.5 This report to inform the appropriate assessment (RIAA) draws on the detailed studies listed below, available as part of the application package. However, a number of key images and figures have been duplicated in this report to aid discussion. The Technical Appendices relevant to this HRA, all of which are included within ES Volume 2 are:

- 6.1 Wave Modelling Report;
- 6.2 Sediment Transport Modelling Report;
- 6.3 Sediment Plume Modelling Report;
- 6.4 Tidal Flow Modelling Report;
- 8.1 Factual Ground Investigation Report;
- 8.3 Ground Investigation Interpretative Report;
- 9.1 Port Falmouth DDV Survey Report (2022 survey);
- 9.2 Benthic Survey Scope Agreements;
- 9.3 Falmouth Benthic Ecology Survey Report (2023 survey); and
- 9.5 Maerl Technical Note.

6.2.6 This RIAA also draws on the detailed assessment in ES Volume 1 Chapter 9 Marine Ecology.

<u>Habitat removal and disturbance</u>

6.2.1 The Stage 1 Screening identified that, during the demolition and construction stage, there will be permanent habitat loss from dredging (creation of three berth pockets and surface-skim) and the installation of new marine infrastructure. The capital dredge would remove substrate and non-target species (including epifaunal and infaunal communities) from the site and the installation of new structures will replace small areas of habitat. Disturbance to seabed habitats has been scoped out, as the areas affected are located within the dredge footprint.

Baseline Considerations

6.2.2 The site is located within the *Large shallow inlets and bays* Annex I habitat (H1160), which covers the inshore areas of Falmouth Bay, the Carrick Roads, and the lower Helford. Within the site boundary, two sub-features are mapped on Magic maps: Reefs (H1170) and Sandbanks slightly covered by seawater all of the time (H1110), including the Maerl bed sub-feature of subtidal sandbanks (Figure 5-2 and Figure 5-3). These were mapped in a small area just inside and west of the Eastern Breakwater. The Reef habitat overlaps with the eastern dredge pocket and the mapped maerl bed is outside. This habitat mapping information has been investigated and ground-truthed during project-specific ecological surveys undertaken in 2022 (ES Volume 2 Technical Appendix 9.1) and 2023 (Technical Appendix 9.3).

6.2.3 The 2022 DDV survey found that the *Reef* feature (also mapped as infralittoral rock) was not present within the eastern dredge footprint as mapped in Magic. The biotopes mapped within the docks, including in the region of putative mapped reef, were SS.Smu Sublittoral cohesive mud and sandy mud communities (SS.Smu) and Infralittoral mixed sediments (SS.SMx.Imx). This feature of the SAC is therefore unaffected by direct habitat loss from dredging and the placement of new infrastructure. For maerl, only a few of the 2022 DDV transects within the docks recorded the presence of maerl, but as fragments of dead thalli only (Technical Appendix 9.1).

6.2.4 The 2023 detailed DDV and grab survey recorded similar seabed conditions at the site consisting predominantly of sublittoral cohesive mud and sandy mud with generally mixed (coarser) sediments occurring further from the existing port structures. The 2024 GI survey (Technical Appendices 8.1 and 8.3) found that the site conditions comprised marine sediments (typically described as a soft black silty clay or black clayey silt with occasional anthropogenic material, becoming firm to very stiff orangish brown or greenish grey gravelly clay with fine to coarse siltstone and slate gravel with depth), which ranged in thickness between approximately 0.5 m and 1.0 m. These cores are of a small diameter but do concur with the findings of the benthic surveys.

6.2.5 The biotopes recorded from 2023 project survey grab data were sediment-based biotopes with polychaete and bivalve dominated infaunal communities (Figure 1, Appendix 3). Biotope classifications based on the DDV imagery are presented in Figure 2, Appendix 3.

6.2.6 The site does "consist of sandy sediments that are permanently covered by shallow sea water, typically at depths of less than 20 m below chart datum" as per the JNCC definition of *Sandbanks which are slightly covered by sea water all the time*[26], however the site is considered to contain a fairly uniform bathymetry with mixed substrates (subtidal mud, sand, coarse sediment and mixed sediment) rather than "distinct banks (i.e. elongated, rounded or irregular 'mound' shapes) which may arise from horizontal or sloping plains of sandy sediment".

6.2.7 In 2022 the initial exploratory DDV survey found the dredge pockets to be sediment-based habitats (ES Volume 2 Technical Appendix 9.1). There were some small dead fragments of maerl observed in a few transects but live maerl was only recorded outside of the site boundary. In 2023 there were 14

[26] JNCC (online). 1110 Sandbanks which are slightly covered by sea water all the time. Available at: https://sac.jncc.gov.uk/habitat/H1110/ [Accessed on: 14/02/2025]

DDV transects undertaken within the dredge pockets and site boundary. The cover of live maerl in all of the transects within the site boundary was in the 0-1 % cover category (Figure 4, Appendix 3).

6.2.8 The survey data show that the seabed habitats within the docks and proposed dredge pockets do not support maerl habitat of conservation importance. In consultation with Natural England, interest has been expressed in relation to the habitats to the north of Queen's Wharf, to establish if this area supports maerl habitats of conservation importance.

6.2.9 The 2022 survey was able to undertake only one DDV transect within the northern dredge pocket (DDV11), due to the presence of berthed vessels at the time of investigations. The habitats recorded within this transect were infralittoral mixed sediment (SS.SMx.Imx) and sublittoral macrophyte-dominated communities on sediments (SS.SMp). The DDV found the sediment well covered with green, brown and red algae throughout with small patches of muddy sand and sandy mud between a coarser fraction composed of dead maerl. Some small examples of live maerl were observed at the northern end of the transect but this is outside of the dredge pocket and outside of the site boundary.

6.2.10 In 2023, there were 5 transects undertaken in and around the northern dredge pocket. The cover of live maerl in all of these transects was in the 0-1 % cover category (Figure 4, Appendix 3). Dead maerl was recorded in all 5 transects, mainly in the 5-25 % cover category with occasional 0-1 % and 25-50 % indicating a high degree of patchiness (Figure 5, Appendix 3). All were recorded to have a 2D structure (Figure 3, Appendix 3). Stills images from all five transects are provided in Appendix 4. Live maerl was only found outside of the site boundary (Figure 4, Appendix 3). Maerl beds, with a 3D structure comprising a mixture of live and dead coral, were only observed outside the site boundary, for example in DDV14, as shown in the stills images also provided in Appendix 4.

6.2.11 Sediment cores taken during the GI studies (TA 8.1 and 8.3), whilst small in diameter, did record sediment type, including maerl, present. There were observations of dead maerl fragments in a number of the cores in the northern dredge pocket. However, the sediments were predominantly clay, silt and sand in the first 1 m, with no maerl thalli fragments above 10 mm, regularly cited to be the size threshold at which maerl thalli (dead or live) have functional benefits above inorganic gravels (Nature Scot, 2018; Axelsson, 2023).

6.2.12 The 2022 and 2023 project survey data show that the habitat within the northern dredge pocket has been mapped in the Maerl Technical Note (Appendix 9.5) as 'maerl in sediment' comprising a 2D layer of small fragments of predominantly dead thalli. The areas within the dredge footprint are not considered maerl beds or to have any of the key features of maerl habitats that require protection.

Effect and Design Principles

6.2.13 To minimise the removal of habitat for the proposed development, the approach employed has been avoidance and minimisation of dredging as far as reasonably practicable within the proposed design. Minimisation of the scale of the capital dredge has been embedded within the design principles for the proposed development. The dredge requirements for the proposed development are therefore considered to be the minimum possible extent and volume of dredging, whilst providing the necessary underkeel requirements for safe alongside berthing of FLOW Devices and Excellence Class cruise ships and allowing the project objectives (to reduce conflicts between different site uses, support FLOW, and future proof the port with respect to cruise and cargo capacity) to be achieved. This requires the pocket dredge of berth areas to be -10.5 m CD, in addition to surface skim of seabed on eastern side of the site to maintain - 5.5 m CD (Figure 3-4).

6.2.14 Vessels with greater underkeel requirements would enter and leave the Docks on the high tide to avoid the need for dredging in the approach channel to the Docks. This environmentally driven design decision means that the proposed dredging extent is limited to the areas directly adjacent to the wharfs (pocket dredging) and dredging is entirely avoided within the approach channel, where higher

quality maerl habitat, including live maerl, is present (see Figure 3 and Figure 4, Appendix 3). Further details regarding the proposed development's design evolution are provided in ES Volume 1 Chapter 3: Alternatives and Design Evolution.

6.2.15 Accordingly, the total proposed dredge task comprises a total volume of approximately 643,000m^3 over approximately 23.25 ha (0.23 km^2). As a result of the capital dredge, subtidal sediments would be removed from the north, east and west areas of the site (Figure 3-4).

6.2.16 A similar approach was employed with regard to the scale and extent of infrastructure as far as reasonably practicable within the proposed design, to minimise permanent loss of habitat. A key design concept has therefore been to re-develop and modernise the existing Falmouth Dock facility and re-use, repair and upgrade the existing structures as far as practicable. This approach has minimised the requirement for entirely new structures; instead, the extension and re-development of existing infrastructure within the existing Docks area and wharfs has been prioritised. The design of the new structures intends to match the geometries and elevation of the existing structures as far as possible.

6.2.17 As such, the scale and extent of the proposed infrastructure, including the revetment lengths and pile numbers and diameters (see Table 3.2) are considered to be the minimum requirements to ensure the structural integrity of the proposed development, and allow the achievement of the proposed development's objectives – including achieving necessary wharf lengths to allow the safe berthing of Excellence Class cruise vessels and FLOW devices, and providing flexibility and space requirements on the quayside to accommodate various industries and vessels, reduce conflicts between different site uses, achieve operational efficiency and realise the economic potential of Falmouth Docks.

6.2.18 The reclamation of land and the installation of infrastructure such as revetment, toe walls and piles would lead to a permanent loss of approximately 12,154.8 m^2 (0.012 km^2) of seabed habitat area within the docks and SAC. As presented in Tables 1-4 of Appendix 5, this calculation takes into account that an area of seabed would be reinstated due to the removal of the Northern Arm, and that a proportion of the proposed infrastructure would be placed in locations that are currently covered by infrastructure (for example, revetments underlying the suspended decks would be excavated and then re-placed). The placement of additional revetment would lead to an increase in intertidal habitat (albeit of poor quality due to overshadowing – see BNG Assessment for more detail).

6.2.19 Thus, the total habitat lost within the docks and the SAC from the proposed development will be 0.24 km^2. Direct habitat loss occurs within the dock area only.

Potential Effects on Integrity of the SAC

6.2.20 Whilst the habitat loss within the docks is very small, equating to a total of only 0.38 % of the SAC, it still has the potential to affect the SAC's Conservation Objective[22] to maintain/restore the extent and distribution of qualifying natural habitats. Many individual small losses are known to have the potential to slowly and gradually erode protected habitats.

6.2.21 An area of *Sandbanks which are slightly covered by sea water at all times,* as mapped on Magic overlaps a very small region of the eastern dredge pocket. The Supplementary Advice on Conservation Objectives (SACO[32]) for the SAC includes targets to "maintain the total extent and spatial distribution of subtidal sandbanks to ensure no loss of integrity, whilst allowing for natural change and succession". Thus, any loss of this habitat should be considered in relation to site integrity. However, project specific surveys found the whole of the application site, including the small region of the seabed, inside the Eastern Breakwater, to contain a fairly uniform bathymetry with mixed substrates rather than "distinct banks (i.e. elongated, rounded or irregular 'mound' shapes) which may arise from horizontal or sloping plains of sandy sediment" that are characteristic of sandbanks. Thus, no subtidal sandbank habitat will be removed by dredging and there is considered

to be no potential to result in an adverse effect on the site integrity (AEOSI) of the Fal and Helford SAC in relation to this qualifying feature.

6.2.22 The baseline has established that the seabed to be lost to project activities will be sediment-based habitats, in particular coarse sand and gravels, sandy mud and mixed sediment, all sub-features of the Large shallow inlets and bays. The SACOs[32] for the SAC includes targets to "maintain the total extent and spatial distribution of the large shallow inlet and bay to ensure no loss of integrity, while allowing for natural change and succession". There will be some small permanent reduction in the extent of this feature as a result of the project.

6.2.23 However, the actual seabed habitat that would be lost due to dredging and the installation of permanent infrastructure is not considered to compromise any of the designating features protected by the SAC, particularly as no maerl habitat within the dredge pockets and the areas immediately adjacent to the dock structures are contaminated and have been subject to shading and disturbance from propellor wake/wash. The function of these areas is therefore limited in the context of the overall SAC and no loss of integrity is considered to occur.

6.2.24 There are further SACOs targets associated with the structure of the Large shallow inlets and bays Annex I habitat, including but not limited to targets relating to habitat zonation, morphology, sediment movement and tidal regime. The model results shown in Figures 1 - 6 (Appendix 1) indicate that the proposed development would not lead to any significant changes to baseline environmental conditions and coastal processes within the Large shallow bays and inlets Annex I habitat, such as tidal levels, current speeds, wave heights, annual deposition depths and maximum suspended sediment concentrations. Any changes are highly localised and minor (see Figures 1 – 6, Appendix 1), and overall negligible, with no potential to affect the overall structure of the Large shallow bays and inlets Annex I habitat, or processes of natural change and succession.

6.2.25 No significant change to supporting processes (considered to be a more helpful factor in determining site integrity[27]) is predicted. As only negligible and highly localised effects on hydromorphology, sediment regime and physical processes of the coastal system are predicted during the operational stage (once the entirety of the permanent habitat loss has taken place), the proposed development would not affect the characteristics, structure and function of the Large shallow inlets and bays qualifying features.

6.2.26 The maerl beds sub-feature of Large shallow inlets and bays is a particularly important feature of the SAC, as the maerl beds in the Fal, particularly at St Mawes, are some of the best examples of this habitat in England. There are also maerl beds outside this main area. However, the extensive baseline surveys have shown that the areas of seabed lost to project activities do not support maerl beds.

6.2.27 The area around the northern dredge pocket has been mapped as 'maerl in sediment' (Figure 6, Appendix 3). This descriptor can include a broad range of habitat characteristics. The 'maerl in sediment' observed in the northern dredge pocket was observed mostly in low % cover and only as small, dead thalli fragments (Figure 3, Appendix 3). These fragments do not provide the structural complexity to enhance biodiversity that is particular to maerl beds and also do not represent an important source of vegetative fragments or propagules that support reproduction and habitat longevity. Rather, this area has been mapped to sediment biotopes characterised by infaunal polychaetes and bivalves and patches of high % cover of seaweed. Therefore, there is no loss of extent of the maerl bed feature of the SAC as a result of project activities within the docks.

[27] The SACOs notes that it is "difficult to put an extent objective on a mobile, changing feature. An understanding of the supporting processes will be more helpful in determining site integrity".

6.2.28 Overall, it is considered that the permanent loss of areas of seabed habitat within the SAC due to dredging and installation of infrastructure during the proposed development's demolition and construction stage would not be of the scale to lead to adverse effects on the integrity of the designated site. The extent and scale of the design has been minimised as far as practicable, as the design has aimed to extend, stabilise and strengthen the already-existing structures, suspended decks and rock revetments. The permanent loss of habitat is overall not expected to lead to any measurable deleterious effect on the Sandbanks which are slightly covered by sea water all the time and Large shallow inlets and bays qualifying features or sub-features, and therefore there will be **no adverse effect on site integrity** of the SAC.

Elevated Suspended Sediment Concentrations (SSC)

6.2.29 The Stage 1 Screening identified that, during the demolition and construction stage, there is potential for a likely significant effect to occur on the maerl bed sub-feature of the SAC due to increased SSC levels, particularly as a result of fine sediment mobilisation during the capital dredge. Sediment suspended in the water column can lead to a reduction in incident light levels at the seabed available for photosynthesis. Maerl beds in particular, a key designating habitat of the SAC, may be sensitive to long-term changes in light availability.

Baseline Considerations

6.2.30 The ecological baseline considered for areas affected by potential increases in SSC comprises only those areas outside of the dredged footprint (outside the area where direct habitat removal takes place). The zone of influence for increases in SSC has been determined by sediment plume modelling, which is based on the dredging methodology and informed by baseline characteristics for levels of sediment transport, waves and tides (Technical Appendices 6.1 - 6.4).

6.2.31 The baseline is based on extensive survey effort undertaken to determine the presence, distribution, structure and condition of benthic habitats within and in proximity to the proposed development footprint. These comprised a high-level DDV survey in May 2022 (Technical Appendix 9.1) and a multidisciplinary ecology survey in May 2023 (Technical Appendix 9.3). In addition, at Natural England's request, a technical note collating all available information on the presence of maerl habitat has been prepared (see Technical Appendix 9.5 Falmouth Technical Note – Maerl). These appendices can be referred to for full details of survey methodology and results, and other background information. The assessments below are supported by the main impact assessments for benthic ecology as provided in ES Volume 1 Chapter 9 Marine Ecology.

6.2.32 In relation to designating features and sub-features of the SAC, in particular Annex I *Reef* and Annex I *Sandbanks slightly covered by seawater all of the time*, these were mapped on Magic Maps (Figures 5-1 – 5-3) but were not found to be present during project specific surveys. Therefore, the key habitat for consideration, in relation to the potential for AEOSI within the SAC, is maerl beds.

6.2.33 Maerl biotopes were only recorded outside the site boundary (Figure 2, Appendix 3). Within the site boundary, the seabed was found to be dominated by sediment-based habitats (Figures 1 and 2, Appendix 3). However, as the key sub-feature of the SAC, the presence of maerl within the site boundary and the study area was investigated in detail. Within the site boundary, no maerl was found in the inner dock or in the eastern and western dredge pockets. To the north of Queen's Wharf, maerl was found, and mapped as 'maerl in sediment' (Technical Appendix 9.5) but was characterised by a patchy covering of deal maerl only, with none of the structural complexity characteristic of the maerl bed sub-feature, which is created by both live and dead maerl.

6.2.34 Live maerl was observed to the east of the site boundary, in the approach channel, together with dead maerl, as a habitat with the 3D structural complexity of maerl beds that is known to support and enhance biodiversity. The maerl habitat was identified as the biotopes and habitat complexes SS.SMp.Mrl – *Maerl beds* and SS.SMp.Mrl.Pcal.R - *Phymatolithon calcareum maerl beds with red seaweeds in shallow infralittoral clean gravel or coarse sand* along DDV12 – 14 in the eastern part of the survey array (Figure 2, Appendix 3).

6.2.35 *Phymatolithon calcareum* was identified using the SACFOR analysis of still images taken along these three transects. This species was recorded in all stills along DDV14 and was recorded to be super abundant, i.e. a 80-100% cover, in 8 of 13 stills along this transect. The estimated physical structure (dead maerl gravels/fragments with a 2D structure, or 3D maerl bed with either only dead or both live and dead maerl thalli) was assessed (Figure 3, Appendix 3) as well as the estimated percentage surface cover of dead and live maerl (Figure 4 and Figure 5, Appendix 3).

6.2.36 The Maerl Technical Note (ES Volume 2 Technical Appendix 9.5) provides a full characterisation of the physical environment within the site boundary (and wider area, where data allow) in terms of bathymetry (including historic dredging activity), backscatter, flow/tidal data, shading, geochemical environment (including both particle size distribution (PSD) and sediment contamination levels) and ecological environment (broad biotopes and species of note). The Maerl Technical Note considers these characteristics and summarises the available historic and current survey data on the distribution of maerl within and in proximity to the site boundary, including the May 2023 survey results that are summarised above. Subsequently, the Maerl Technical Note takes a precautionary approach to classifying areas of maerl within the site boundary and survey area according to the categorisations within Fal and Helford SAC's Conservation Advice Package. Maerl habitat types were described according to the background summary of maerl in the SAC as follows in the Conservation Advice Package, though no formal definition of some of these was available:

- pristine live maerl beds with up to 100% live maerl coverage;
- extensive areas of dead maerl with little to no live maerl;
- extensive areas of dead and crushed maerl;
- living maerl overlying dead maerl; and
- areas of maerl in sediment.

6.2.37 The only maerl habitat types present within the survey area were "areas of maerl in sediment" and "living maerl overlying dead maerl". The distribution of these habitats in the survey area is presented in Figure 7, Appendix 3, which shows that "living maerl overlying dead maerl" was present to the east of the site boundary (but not within it), and on the northern and southern boundary of this habitat is a band of "areas of maerl in sediment".

6.2.38 Whilst surface coverage of live maerl was occasionally high (up to 65% cover) to the east of the site boundary, it was always accompanied by significant dead maerl coverage (Figure 4 and Figure 5, Appendix 3), hence its categorisation as "living maerl overlying dead maerl".

6.2.39 The areas to the north and south of the area of "living maerl overlying dead maerl" were classified as "areas of maerl in sediment" as the maerl coverage was patchy, with only small (<1 cm) thalli present in a 2D structure. The 'maerl in sediment', as mapped for this project, covers a gradient of habitats, from patches of small dead thalli lying on sediments (and possibly mobile) with only a 2D habitat structure to areas outside the site boundary that have both dead and live thalli (Figure 3 and Figure 5, Appendix 3).

Effect and Proposed Mitigation

6.2.40 The mean increase in SSC that would be generated by the capital dredging in all three areas of the site (the west area, east area, and north area), without mitigation[28], was predicted to remain largely within and to the immediate east and west of the site boundary (when modelled over a 15-day simulation to include all tide ranges). However, without mitigation, the maximum sediment plume that could be generated by the capital dredging in all three areas of the site (when modelled over a 15-day simulation to include all tide ranges) was predicted to travel downgradient from the site (eastwards, around the east of Pendennis towards Falmouth Bay).

6.2.41 Whilst this gradient in SSC would be temporary and relatively short-lived, the potential for effects of this plume (without mitigation), and particularly the subsequent sediment deposition, was considered to have likely significant effects on the integrity of the maerl sub-feature of the SAC. A scheme of mitigation was therefore developed to minimise sediment suspension, as far as practicable, during the capital dredge operations, with the adoption of selected plant and dredge methodology. The proposed mitigation[29] for all dredging activity for the proposed development is as follows:

- Dredging using a backhoe dredger(s) with a 10 m^3 (or smaller) lidded bucket for all areas; and
- Restricting dredging according to tidal driven water movements, specifically restricting the dredge window to the period from 1.75 hours before low water to 1.75 hours before high water only.

6.2.42 These measures significantly reduce the potential for sediment dispersion. Use of a lidded backhoe dredger also allows for increased accuracy, reduced production rate and reduced sediment disturbance and release rate in comparison to dredging using other plant. Dredging solely on specific tides leads to an elongated dredge programme (the quickest possible duration being a total of 58 weeks, assuming use of a single dredger with a $10m^3$ bucket and relatively high rates of productivity) in comparison to dredging continuously, thereby reducing the rate of sediment suspension and resultant SSC elevation in the water column.

6.2.43 The modelling (over a 15-day simulation to include all tidal ranges) determined maximum and mean increases of SSC during capital dredging of the west, east, and north areas of the site respectively, with the proposed mitigation in place (Figures 8a-f, Appendix 1 present SSC).

6.2.44 The peak sediment plume figures do not show the nature of the plume at any given time, but are an amalgam of the results from different times over the simulation, to indicate the scale and location of where concentration increases may occur. The mean plots indicate the average conditions experienced at any particular location, but they do not provide information on the scale and location of the plume at any given time and so should be considered along-side the peak concentration figures. For the purposes of the modelling figures only suspended sediment increases of more than 1 mg/l (approximately 20% of the typical baseline concentrations seen) are plotted. Full details on this impact pathway from a physical perspective are provided in Chapter 6: Coastal Processes and Sediment Regime, and TA 6.3: Sediment Plume Modelling Report can be referred to for further details on the method and results of the modelling.

6.2.45 It should be noted that the modelling shown in Figures 8a-f, Appendix 1 represents the worst-case as the fastest possible rate of dredging (quickest possible dredging programme of 58 weeks) has been modelled, and because the modelling has been undertaken using the un-dredged bathymetry, which

[28] The unmitigated dredging scenario is referred to as Scenario 1 in ES Volume 2 TA 6.3 Sediment Plume Modelling.

[29] The adopted dredging methodology employing these mitigation measures is referred to as Scenario 3 in ES Volume 2 TA 6.3 Sediment Plume Modelling.

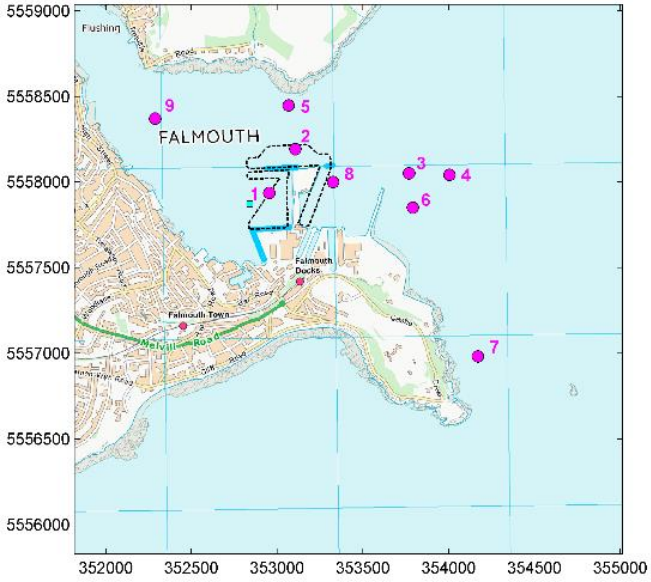
does not take into account the effect of localised changes in current speeds that may reduce the distance of sediment dispersion following the formation of deeper berth pockets.

6.2.46 Increases in SSC are, on average, largely confined to the area within the site boundary (red line) (Figures 8d-f, Appendix 1). The highest peak increases in SSC (in the order of 100(s) of mg/l above background levels) are largely predicted to be within the site boundary in the immediate vicinity of the dredged berth pocket areas (black dashed lines), when the dredging method mitigation is in place (Figures 8a-c, Appendix 1). Each dredge pocket has an individual pattern of sediment dispersion.

6.2.47 During dredging of the east area of the site, the peak plume extends no more than 200 m outside of the site boundary to the east and west of the site, after which increases in SSC fall below 1 mg/l (Figure 8a, Appendix 1).

6.2.48 During dredging of the west area, the peak plume extends beyond the site boundary to the west only (Figure 8c, Appendix 1).

6.2.49 During dredging of the north area, the peak plume extends approximately 300 m outside of the site boundary to the west of the site and up to 1 km east and south of the site, at which point the increases in concentration fall below 1 mg/l (Figure 8b, Appendix 1). Dredging in the north area of the site is therefore predicted to generate the largest peak sediment plume footprint, reaching the areas of "living maerl overlying dead maerl" to the east of the site boundary (noting that the peak sediment plume represents the temporary peak effect, rather than the mean conditions)[30].



Figures 6-1 Representative Locations Chosen for Further Analysis

6.2.50 The specific locations marked on Figure 6-1 were chosen for further analysis for increases in SSC, using the following rationale:

- Sites 1, 2 and 8 within the western, northern and eastern berth pockets;
- Sites 3 and 4 in positions where maerl habitat has been identified including in region of maximum % cover of live maerl;
- Site 5 close to seagrass and kelp habitats to the north off Flushing Headland (Figure 5-2);
- Site 6 at position of maerl south-east of the Eastern Breakwater, based on historical data;

[30] Assuming dredging in the quickest possible programme (total of 58 weeks), dredging in the north area would take 18 weeks, dredging in the east of the site would take 20 weeks and dredging in the west of the site would take 20 weeks.

- Site 7 near the southern extent of the modelled sediment dispersion, without mitigation[28]; and
- Site 9 north-west of the site boundary, outside the predicted zone of influence.

6.2.51 The modelled SSC increases at the specified locations shown on Figure 6-1 are provided in Technical Appendix 6.3 Sediment Plume Modelling and summarised here. Locations 3, 4 and 6, in areas where maerl has or was previously observed, would experience maximum SSC peaks of 3.5, 0.2 and 0.5 mg/l during dredging in the north of the site (the worst-case area). However, such peaks would be very short-lived as suspended sediment levels return to baseline with a few hours of operations ceasing. Average increases in SSC and 95% of the increases in SSC at these locations during dredging of the north of the site would be much lower (≤0.1 mg/l).

6.2.52 The modelling shows that high levels of SSC are restricted to the immediate area around the dredge pockets as follows:

- Dredging operations in the Eastern Berth Pocket would cause a maximum increase in SSC at Point 8 and Point 2, in very close proximity to the dredge pockets and within the site boundary, peaking at 6.2 and 6.3 mg/l respectively. The average increase in SSC is highest at 0.3 mg/l at Point 8. At all Points outside the site boundary the maximum increase in SSC is predicted to be between 0.1 and 0.2 mg/l;
- Dredging operations north of Queens' Wharf would cause a maximum peak concentration increase in SSC of 13.7 mg/l at Point 2. The average increase in SSC at this location is 0.8 mg/l. The average increase in SSC is 0.4 mg/l at Point 1 and 0.2 mg/l at Point 2. For Points outside of the site boundary, the maximum increase is 3.5 mg/l at Point 3 and 0.5 mg/l or less everywhere else; and
- Dredging operations in the Western Berth Pocket would cause a maximum increase in SSC of 78.1 mg/l at Point 1, with an average increase in SSC at this location of 3.7 mg/l. The peak concentration increase at Point 2 is 4.4 mg/l, with an average increase in SSC of 0.1 mg/l. At the other locations, the predicted peak concentration increase is 0.3 mg/l or less.

6.2.53 At Points outside of the site boundary, including at Points 3, 4 and 6 to the east of the Eastern Breakwater, where live maerl was identified as present, the average increase in SSC at all sites is less than 0.1 mg/l. The maximum increase is 3.5 mg/l (at Point 3, dredging north of Queen's Wharf), which will occur for a very short period, on some tides only.

6.2.54 At all sites, increases in SSC are predicted to be very short-lived, returning to baseline levels shortly after the completion of dredging operations. There would be no long-term increase[31] in SSC within the site boundary or wider zone of influence. The study area has generally low turbidity naturally, with baseline levels of SSC reported to be in the region of 6-40 mg/l, though most values recorded at regular monitoring stations were in the <3 mg/l range inside the site boundary and between 5 and 10 mg/l to the north of Queen's Wharf (Technical Appendix 6.2 Sediment Transport Modelling).

6.2.55 Increased SSC levels during the capital dredging operations would be temporary, non-continuous and of short-duration due to the natural downtime between the tides, during which dredging would stop and suspended sediment would disperse and dissipate. Timeseries data presented within the Technical Appendix 6.3 Sediment Plume Modelling Report show that the peaks in suspended sediment concentrations occur daily with dredging operations but return to baseline levels within a few hours of dredging operations finishing each day.

[31] Defined as a change in water clarity sufficient to cause a change in one rank on the Water Framework Directive scale (e.g. from clear to intermediate for one year).

Potential Effects on Integrity of the SAC

6.2.56 The Conservation Objectives for the SAC[22] include the objective to maintain/restore the supporting processes on which qualifying natural habitats rely. The Supplementary Advice on Conservation Objectives (SACOs) for the SAC[32] includes targets to "Maintain natural levels of turbidity (e.g. suspended concentrations of sediment, plankton and other material) across the habitat" and "Maintain the natural light availability at the maerl surface" as changing light conditions can affect maerl's ability to photosynthesise and grow. Advice on operations for this habitat sets a target in relation to changes in suspended sediment load to be a change in one rank on the WFD (Water Framework Directive) scale e.g. from clear to intermediate for one year.

6.2.57 The proposed plant (maximum 10 m^3 lidded backhoe dredger(s)) and dredge timings (from 1.75 hours before low water to 1.75 hours before high water) are considered to be effective mitigation to minimise the rate of release of fine sediment into the water column as far as reasonably practicable.

6.2.58 Increased SSC levels during the capital dredging operations would be temporary, non-continuous and of short-duration due to the natural downtime between the tides, during which the dredge operations would stop, and suspended sediment would be dispersed. Furthermore, as dredging would be undertaken at any time of day, according to tidal windows rather than daylight hours, portions of the dredging (and therefore periods of increased SSC) would occur during night-time and therefore not affect light levels at the seabed. The predicted increases in SSC are very low and short-term (returning to baseline levels shortly after the completion of dredging operations) and do not constitute an increase in WFD turbidity level[33].

6.2.59 It is also highly likely that the maximum increase in SSC would be within the natural variation of the system, whereby naturally occurring weather events such as storms leads to increased SSC concentrations (see Figures 1a-d, Appendix 1, for modelled maximum SSC for a range of offshore wave conditions in the baseline environment; Figure 1d specifically presents more extreme storm conditions during which SSC of 130 mg/l and up to 150 mg/l are modelled to occur in the vicinity of the Docks and to the east of the Docks respectively). In August 2023, for example, Storm Antoni caused unseasonably strong winds, gusting up to 70 mph and coincided with a temporary ten-fold increase in turbidity levels within the site boundary.

6.2.60 The scale of the predicted peak and mean sediment plumes, shown on Figures 8a-f, Appendix 1, is considered to be relatively small in the context of the wider 6,362.83 ha SAC, as such any effects relating to the elevated SSC levels would be highly localised with the proposed mitigation in place. Minimisation of the scale of the capital dredge (and therefore the potential for sediment mobilisation and suspension) has also been embedded within the design principles for the proposed development - the dredge requirements for the proposed development are considered to be the minimum possible extent and volume of dredging (limited to within the Docks only), whilst allowing the project objectives and necessary underkeel requirements for safe alongside berthing (for FLOW Devices and Excellence Class cruise ships) to be achieved.

6.2.61 The increased SSC levels during the capital dredge described above are not expected to lead to changes in water clarity or light availability that could affect the primary production of maerl habitat (shown on Figure 5-2 and Figures 3 - 4 of Appendix 3) or other benthic ecological receptors in any measurable or prolonged way, and therefore is not expected to have any large-scale or prolonged deleterious effect on either maerl or the wider 'Sandbanks which are slightly covered by sea water all

[32] Natural England (2023). Designated Sites View. Supplementary Advice on Conservation Objectives (SACOs) – Fal and Helford SAC. Available at: https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK0013112&SiteName=fal+and+helford&SiteNameDisplay=Fal+and+Helford+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality= [Accessed on: 12/02/2025]

[33] https://www.legislation.gov.uk/uksi/2015/1623/pdfs/uksiod_20151623_en_auto.pdf

the time' Annex I habitat. This is concluded on the basis that increased SSC levels would be temporary, localised and of a very low level outside the site boundary. As such, increased SSC during the demolition and construction stage of the proposed development is not predicted to significantly impact the supporting processes on which maerl relies, nor to undermine the long-term achievement of the above-listed SAC Conservation Objectives or SACOs targets with respect to the lasting preservation of maerl sub-feature or the 'Sandbanks which are slightly covered by sea water all the time' Annex I habitat.

6.2.62 Overall, with the implementation of mitigation in the form of choice of plant and dredging non-continuously according to the tides, it is considered that increased SSC during the proposed development's demolition and construction stage would be neither of the spatial nor temporal scale to lead to adverse effects on the integrity of the SAC. Therefore, there would be **no adverse effect on site integrity**.

Suspended sediment deposition

6.2.63 The Stage 1 Screening identified that, during the demolition and construction stage, there is potential for a likely significant effect to occur on seabed habitats due to the deposition of fine sediments thrown into suspension by the capital dredge that are then transported to other areas. Sediment deposition has the potential to smother habitats and species, affecting biological processes, and when severe can cause mortality.

Baseline Considerations

6.2.64 With regards to maerl habitat, as described above and in full detail within the Maerl Technical Note (ES Volume 2 Technical Appendix 9.5), the maerl habitats within the site boundary and benthic ecology study area have been categorised in a precautionary manner with consideration of a range of data/information sources including an extensive survey effort (ES Volume 2 Technical Appendices 9.1 and 9.3). The maerl habitat types are shown in Figure 7 Appendix 3, which ground-truths, supersedes (in the footprint of the surveyed area) and is supplemented by the mapping of locations of maerl on Magic Maps presented in Figure 5-2.

6.2.65 With regards to infralittoral rock (*Reef*), the findings of the benthic ecology surveys (ES Volume 2 Technical Appendices 9.1 and 9.3) indicate that infralittoral rock habitat is not present within the site boundary. However, infralittoral rock is present on the seabed to the east of Pendennis (Figure 5-3).

Effect and Proposed Mitigation

6.2.66 Without mitigation, the total deposition at the end of the entire dredge campaign was modelled to occur within and outside the site boundary, including to the east and south-east of the site, with sediment settling on the seabed along the eastern side of Pendennis, towards Falmouth Bay[28]. Although mobilisation and deposition of sediment occurs naturally within this system, without mitigation, deposition from the capital dredging was modelled to occur over areas of likely maerl habitat (Figure 5-2 and Figure 7 Appendix 3).

6.2.67 Smothering is a key threat to live maerl in particular, as it reduces light and oxygen that can affect the rate of photosynthesis, and where of sufficient sediment depth can result in mortality[34]. The rate of sedimentation can also influence the status of reef habitats and/or their associated communities[32]. Deposition in new areas may lead to changes to sediment composition and distribution. Such potential effects relate to the SAC's Conservation Objectives to maintain/restore the supporting

[34] https://www.marlin.ac.uk/habitats/detail/255/maerl_beds

processes on which qualifying natural habitats rely and to maintain/restore the structure and function (including typical species) of qualifying natural habitats.

6.2.68 On the basis of the identification of potential likely significant effects on sensitive habitats, a scheme of mitigation has been developed (by modelling across a range of different scenarios in order to determine the method that minimised the extent of sediment disturbance as much as possible, see ES Volume 2 Technical Appendix 6.3 Sediment Plume Modelling Report) in terms of the selection of plant and the dredge methodology. The proposed mitigation[29] is as follows:

- Dredging using a backhoe dredger(s) with a 10 m^3 (or smaller) lidded bucket; and
- Dredging according to tides, specifically from 1.75 hours before low water to 1.75 hours before high water only.

6.2.69 Minimisation of the scale of the capital dredge (and therefore the potential for sediment mobilisation and subsequent deposition) has also been embedded within the design principles for the proposed development - the dredge requirements for the proposed development are considered to be the minimum possible extent and volume of dredging (limited to the Docks only), whilst allowing the project objectives and necessary underkeel requirements for safe alongside berthing (for FLOW Devices and Excellence Class cruise ships) to be achieved.

6.2.70 Deposition of suspended fine sediment at the end of the complete capital dredging operation, with the proposed mitigation in place, was modelled (Figures 9a-d, Appendix 1). This was undertaken for each dredge pocket individually and shown for all areas combined (Figure 9d, Appendix 1). Sediment deposition of less than 1 mm is not presented on the plots. The berth pockets are marked in grey, as any sediment re-deposited within the berth pockets would be re-dredged until the required dredge depths are achieved, and because any sediment/habitat removed from the site during the capital dredge would not be impacted by smothering and siltation rate changes. ES Volume 1 Chapter 6: Coastal Processes and Sediment and ES Volume 2 Technical Appendix 6.3: Sediment Plume Modelling Report can be referred to for further detail.

6.2.71 The most extensive deposition occurs within the site boundary, in areas very close to dredge pockets in particular, declining with distance from the dredge location. There are differences in deposition patterns depending on the dredge location (see Figures 9a-c, Appendix 1).

6.2.72 During dredging in the eastern pocket (Figure 9a, Appendix 1), deposition is predicted within the site area (red line), in addition to deposition of approximately 10 mm in a localised spot at the end of the Eastern Breakwater.

6.2.73 During dredging in the west of the site (Figure 9c, Appendix 1), total deposition depths of up to 50 mm are predicted to the west of the site boundary, in addition to approximately 2-5 mm of deposition in a localised spot at the end of the Eastern Breakwater.

6.2.74 The predicted footprint of deposition is largest as a result of dredging in the north of the site. During dredging in the north of the site (Figure 9b, Appendix 1), an area of approximately 100 mm of deposition is shown to the west of the site boundary, in addition to a localised spot of deposition of approximately 10 mm at the end of the eastern breakwater, and a second localised spot of approximately 5 mm of deposition further to the north from the end of the eastern breakwater.

6.2.75 For all dredging locations, deposition of a few tens of centimetres is predicted within the site boundary, immediately outside of the berth pockets (Figure 9d, Appendix 1). Up to 200 mm of deposition is predicted up to 150 m west of the site boundary, and up to 50 mm of deposition is predicted in a localised area at the end of the Eastern Breakwater. Outside of these areas the predicted deposition is of up to 5 mm, declining to less than 1 mm at distances of 370 m to the west of the site and 300 m to the east of the site.

6.2.76 Some localised deposition around the Eastern Breakwater is modelled for all dredging locations. However, it should be noted that the representation of the Eastern Breakwater within the model is precautionary and as such, deposition predicted in this localised area is considered to be the worst-case.

6.2.77 Of the locations marked on Figure 6-1, total (dredging in all areas of the site combined, Figure 9d, Appendix 1) deposition of suspended fine sediment is predicted to accumulate at a level greater than 20 mm at Points 1 and 2 only, within the inner docks. At Points 3, 4 and 6, where maerl has been recorded, the highest depth of deposition was 0.7 mm. At all other points outside of the site boundary, deposition was modelled to be 0.1 mm or lower. However, the contour maps indicate that sediment deposition greater than 1 mm is predicted to the east of the site boundary, with a very small, highly localised patch of sediment deposition in the range of 20 - 50 mm predicted at the tip of the Eastern Breakwater (Figure 9d, Appendix 1).

6.2.78 Negligible deposition is predicted to occur over areas of infralittoral rock, such as to the east and south-east of the site, along the eastern side of Pendennis, at Points 6 and 7 (see Figure 5-3 for mapped locations of *Reef*). With the implementation of mitigation, deposition at these points is predicted to be 0.6 mm and 0.2 mm respectively. Such deposition depths are considered to be negligible and would occur over a localised area of infralittoral rock only, and therefore smothering/siltation rate changes would not affect the overall structure or function of infralittoral rock or its associated communities within the SAC. As such, the proposed development would not affect the integrity of the SAC nor undermine the achievement of the SAC's Conservation Objectives and SACO targets related to the lasting preservation of the infralittoral rock sub-feature or *Reefs* Annex I habitat.

6.2.79 For potential effects on maerl habitat, with mitigation in place, very minimal deposition is predicted to occur outside of the site boundary - minimal deposition is predicted to the north of the northern dredge pocket and a small patch of deposition is predicted to the east of the site boundary, extending from the tip of the Eastern Breakwater eastwards (Figure 9d, Appendix 1).

6.2.80 The area just north of the northern site boundary has sediment deposition predicted to occur in the 1-2 mm range only. Closer to the northern dredge pocket there is a gradient in deposition, such that within the site boundary, predicted deposition is mostly up to 20 mm and is 50 mm very close to the northern dredge pocket. This is predicted to occur in an area that was mapped as 'maerl in sediment', characterised by 0-1% live maerl, with the presence of small dead thalli fragments and a lack of habitat structural complexity. The absence of live maerl indicates that no maerl mortality is expected to occur from sediment deposition in the region of the seabed around the northern dredge pocket.

6.2.81 The area around the Eastern Breakwater has potential deposition up to 10 mm across most and a small region at the tip of the breakwater showing 20 - 50 mm deposited sediment depth. However, at the tip of the Eastern Breakwater, the 2022 DDV survey recorded (in DDV17) a mixed sediment habitat fairly bare of life with anthropogenic debris (cables and pipelines) clearly visible, and a nearby grab sample taken in 2023 (station S23) recorded a gravel-based habitat supporting the biotope *Mediomastus fragilis, Lumbrineris spp. and venerid bivalves in circalittoral coarse sand or gravel* (Figure 1, Appendix 3). Further east, a maximum sediment deposition depth of 1 - 20 mm was modelled in an area of transition between habitats mapped as 'maerl in sediment' and 'live maerl overlying dead maerl' (Figure 7 Appendix 3). The survey data that are available at this point (the southern end of video transect DDV13, see stills images comparing the northern and southern end of DDV13 in Appendix 4) shows the habitat was characterised by dead maerl only, with no 2D structure. Thus, it indicates the patch of deposition occurs in an area that does not support maerl habitat of conservation importance.

6.2.82 On average, areas of maerl in sediment would experience 2.72 mm of deposition after completion of dredging in all areas of the site (the entire dredge operation). The highest maximum sediment deposition within a 25 m x 25 m grid square of area of maerl in sediment would be 233.6 mm, due to highly localised accumulation at the western end of Queen's Wharf (Figure 9d, Appendix 1).

6.2.83 As areas of maerl in sediment mapped to the north of the site comprise dead fragments that do not photosynthesise, direct effects due to fine sediment deposition on this habitat area would relate to changes in sediment composition and characteristics rather than oxygen and light availability. Deposition on the areas of maerl in sediment is considered unlikely to change the function of the habitat as the maerl fragments present are too small to give the habitat a three-dimensional structure, and the deposited fine sediments are unlikely to change the particle size distribution of these sediments (see below for further detail).

6.2.84 With regards to the areas of living maerl overlying dead maerl (Figure 7, Appendix 3), on average this habitat would experience 0.42 mm of deposition after completion of dredging in all areas of the site (the entire dredge operation). The highest maximum sediment deposition within a 25 m x 25 m grid square of living maerl overlying dead maerl would be 18.4 mm. However, as shown through comparison of Figure 7, Appendix 3 and Figure 9d, Appendix 1, the footprint of sediment deposition constitutes only a small proportion of the habitat type (the western-most extent of living maerl overlying dead maerl, closest to the site boundary). This is also evidenced by the fact that whilst Point 3 (Figure 6-1) would experience a total suspended fine sediment deposition depth of 0.7 mm, Point 4 would experience total suspended fine sediment depth of <0.1 mm.

Potential Effects on Integrity of the SAC

6.2.85 The proposed plant (maximum 10 m^3 lidded backhoe dredger(s)) and dredge timings (from 1.75 hours before low water to 1.75 hours before high water) are considered to be effective mitigation to minimise sediment disturbance and resulting mobilisation and dispersion. Specifically, the use of the smaller, lidded backhoe is predicted to reduce the rate of deposition (by minimising the rate of sediment release into the water column), whilst the chosen timing of the dredging reduces the deposition total to the east and south-east of the proposed development.

6.2.86 The Conservation Objectives for the SAC include the objectives to maintain/restore the supporting processes on which qualifying natural habitats rely and to maintain/restore the structure and function (including typical species) of qualifying natural habitats. With regards to the maerl sub-feature, the SACOs for the SAC includes targets to "Maintain the natural rate of sediment deposition", "Restore the existing distribution of sediment composition types across the [maerl] sub-feature" and "Maintain the existing distribution of sediment composition across the [Sandbanks which are slightly covered by seawater all the time] feature (and each of its sub-features)".

6.2.87 In areas mapped as living maerl overlying dead maerl (Figure 7, Appendix 3), the modelled worst-case deposition levels are up to 10 mm in a localised patch at the tip of the Eastern Breakwater, which is lower than the reported mortality at a deposition depth of 20 mm for maerl in relation to muddy sediments[34]. The predicted values are also based on a highly conservative assumption, assuming each of the three dredging campaigns take place sequentially and immediately following the previous campaign, assuming no interval between each campaign during which some additional sediment movement would occur.

6.2.88 However, dredging may not occur in this way since each pocket could be dredged entirely separately as the construction programme will focus on one area of the wharf at a time. Thus, a time gap between each dredging area may occur in practice, which could be months (dependent on project funding), allowing some removal of deposited sediments due to water movements. In addition, the modelling around the Eastern Breakwater represents a more simplified and conservative structure

than actually exists, and so the limited dispersion outside of the site boundary is likely to be lower and less extensive than modelled.

6.2.89 The sediment deposition rates in the SAC would not be a long-term effect (as shown in Figure 3, Appendix 1, which shows that only negligible and highly localised changes to annual fine sediment deposition and infill would occur during the operational stage, with no effects on the wider sediment regime). The combined effect of the three dredging campaigns is predicted to result in minimal deposition outside of the site boundary. Thus, the proposed development is not considered to undermine the long-term achievement of the SACO target to "Maintain the natural rate of sediment deposition".

6.2.90 Furthermore, the predicted suspended fine sediment deposition footprint during the capital dredge is considered to be very localised in the context of the Fal and Helford SAC and overall would not significantly impact the maerl sub-feature. There would be no effect relating to deposition on maerl habitat and wider Annex I habitat beyond the modelled deposition footprint shown in Figure 9d, Appendix 1. Negligible deposition would occur in most of the area within the surveyed area classified as 'living maerl overlying dead maerl' (Figure 7, Appendix 3).

6.2.91 As such, smothering and siltation rate changes during the demolition and construction stage of the proposed development are predicted to not significantly impact the structure and function of maerl, or the supporting processes on which it relies. The proposed development is considered unlikely to undermine the long-term achievement of the above-listed SAC Conservation Objectives or SACOs targets with respect to the lasting preservation of maerl.

6.2.92 Overall, with the implementation of mitigation in the form of choice of plant to reduce the rate of deposition, and dredging specifically between 1.75 hours before low water to 1.75 hours before high water only to reduce the total deposition to the east of the proposed development, it is considered that the deposition predicted to result from the proposed development's demolition and construction stage would be neither of the spatial scale nor depths to lead to habitat loss or mortality, change in spatial extent or distribution of maerl, or impacts on reproduction and longevity. Accordingly, **no adverse effects on site integrity** of the SAC are predicted.

<u>Mobilisation and deposition of contaminated sediments</u>

6.2.93 The Stage 1 Screening identified that, during the demolition and construction stage, there is potential for a likely significant effect to occur on seabed habitats due to the deposition of contaminated sediments from capital dredging. Contaminated sediments have the potential to result in toxicity and mortality in marine species.

Baseline Considerations

6.2.94 The baseline for this pathway is as described for sediment deposition above.

Effect and Proposed Mitigation

6.2.95 The proposed mitigation and design of the dredge programme minimises sediment disturbance and hence the mobilisation of sediments, including those that are contaminated. The mobilisation and deposition of contaminated sediments is determined by the extent of sediment dispersion and deposition, as detailed in the previous pathways, as well as the behaviour of the sediment-bound contamination itself. This section considers the effect of contamination only; deposition effects have been considered above and are drawn upon here.

6.2.96 There are areas of sediment within the dredge pockets that have contamination concentrations, for some elements (Cu, Pb, Hg, Zn, TBT, PCBs), above Cefas Action Level 2 and are considered the

greatest risk in terms of mobilisation and deposition in other areas. Some GI sediment cores indicated the possible presence of H_2S (black colour of sediment) but this was not observed in all cores, generally those in the inner docks around the east and west dredge pockets.

6.2.97 During the mobilisation of sediments, some sediment-bound contamination will partition from the sediment-bound phase to the aqueous phase. Modelling of the concentration of contaminants into the aqueous phase was undertaken (but only for Scenario 1[28] that does not include the mitigation to minimise sediment dispersion) and compared against EQS values for maximum allowable concentration (MAC) and annual average (AA) (Technical Appendix 6.3 Sediment Plume Modelling). This modelling was applied to dredging at any tidal state, giving values estimated to be twice that which would occur following adoption of tidal state restrictions adopted as mitigation for the Scenario 3[29] dredging methodology (which was not modelling for contamination dispersion). Only TBT was found to exceed the EQS values for concentrations in water outside the site boundary, but for a very small plume area beyond the Eastern Breakwater only (Figures 7.1 to 7.15 of Technical Appendix 6.3 showing dispersion without mitigation). Considering the nature of water movement this is expected to be further diluted.

6.2.98 The dissolution of some contamination into the aqueous phase will reduce levels of contaminants bound within sediments, meaning that the actual concentrations of contaminants within deposited sediments would be lower than they were in the pre-dredged sediment. There is, however, no estimation of the concentrations for the deposited sediments.

6.2.99 However, the modelling of sediment dispersion and deposition (Technical Appendix 6.3 Sediment Plume Modelling, and Figure 9d, Appendix 1) indicates very limited deposition close to the Eastern Breakwater. Areas within the mapped 'maerl in sediment' and 'live maerl over dead maerl' close to the Eastern Breakwater (Figure 7, Appendix 3), sediment deposition of up to 10 mm is modelled (with a tiny patch up to 50 mm at the breakwater tip where anthropogenic debris and gravel based habitats only were found). In this area, most maerl was found to be dead (Figure 3, Appendix 3). Where live maerl is present some contamination may occur under a fine layer of deposition, but this is expected to be highly localised, and reducing rapidly over time due to water movements.

Potential Effects on Integrity of the SAC

6.2.100 The proposed plant (maximum 10 m^3 lidded backhoe dredger(s)) and dredge timings (from 1.75 hours before low water to 1.75 hours before high water) are considered to be effective mitigation to minimise sediment disturbance and resulting mobilisation and dispersion, including mobilisation and dispersion of contaminants. The use of the smaller, lidded backhoe is predicted to reduce the rate of deposition (by minimising the rate of sediment release into the water column), whilst the chosen timing of the dredging reduces the deposition total to the east and south-east of the proposed development. This is considered to be effective mitigation in respect to minimising deposition of contaminated sediments.

6.2.101 There is expected to be therefore, **no adverse effect on site integrity** for the maerl sub-feature of the Fal and Helford SAC as a result of the deposition of contaminated sediments, given the spatial extent and intensity of deposition, and given the location of predicted deposition mostly in a small area of habitat largely comprising dead maerl thalli that do not contribute to the longevity of the feature within the SAC, nor comprise maerl beds that support high biodiversity.

7. CONCLUSION

7.1.1 This report has been prepared to provide information to the competent authority regarding the potential for the proposed development to have effects on designated sites, in accordance with the HRA process required under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

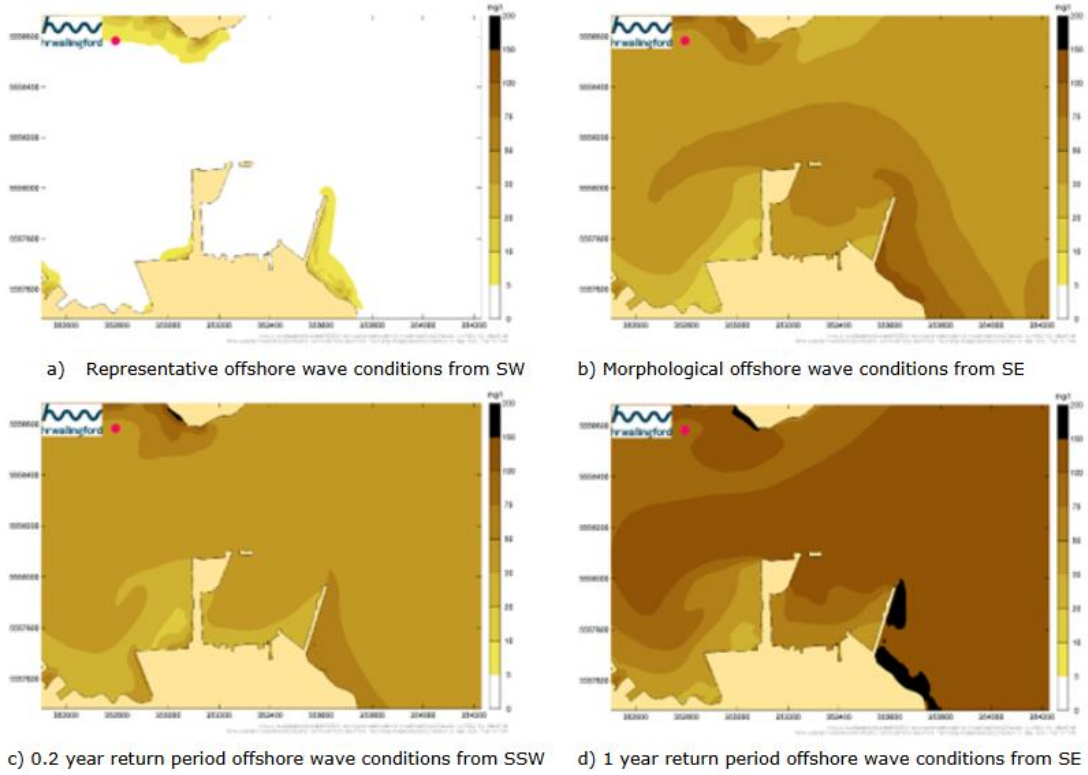
7.1.2 The effects of the proposed development have been discussed using the available information and professional judgement.

7.1.3 It is not considered that the proposed development (either alone or in-combination with other plans or projects) will result in a likely significant effect on the Falmouth Bay to St Austell Bay SPA.

7.1.4 After the implementation of mitigation, it is not considered that the proposed development (either alone or in-combination with other plans or projects) will result in an adverse effect on the integrity of the Fal and Helford SAC.

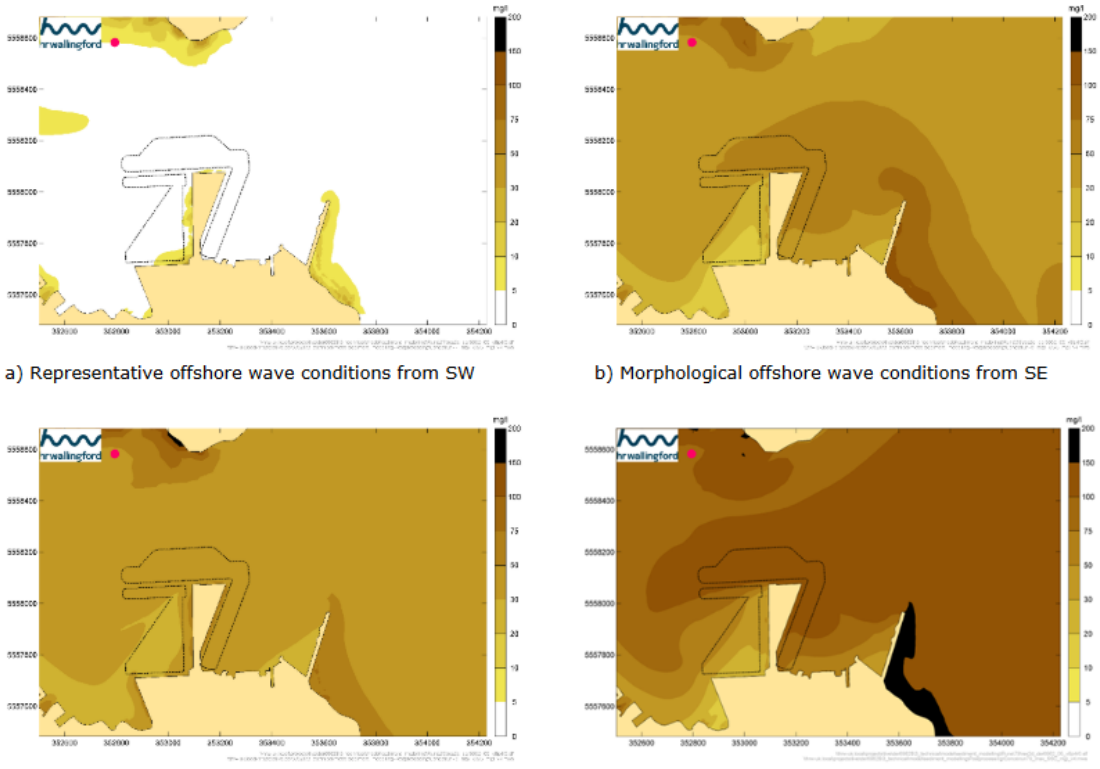
7.1.5 In conclusion, and following appropriate assessment of the proposed development along with the mitigation measures developed to minimise habitat disturbance (minimising the extent of dredging) and to minimise potential for sediment disturbance and dispersal (using specific dredging plant during specific tidal windows only), it is considered there would be **no adverse effect on site integrity** of the Fal and Helford SAC during the demolition and construction stage or the operational stage.

APPENDIX 1 - FIGURES OF MODELLING RESULTS



a) Representative offshore wave conditions from SW
b) Morphological offshore wave conditions from SE
c) 0.2 year return period offshore wave conditions from SSW
d) 1 year return period offshore wave conditions from SE

Figures 1a-d Modelled maximum suspended sediment concentration for a range of offshore wave conditions with the existing baseline site layout. Source: Technical Appendix 6.2 Sediment Transport Modelling Report.



a) Representative offshore wave conditions from SW
b) Morphological offshore wave conditions from SE
c) 0.2 year return period offshore wave conditions from SSW
d) 1 year return period offshore wave conditions from SE

Figures 2a-d Predicted maximum suspended sediment concentration for a range of offshore wave conditions with the proposed development in place. Source: Technical Appendix 6.2 Sediment Transport Modelling Report.

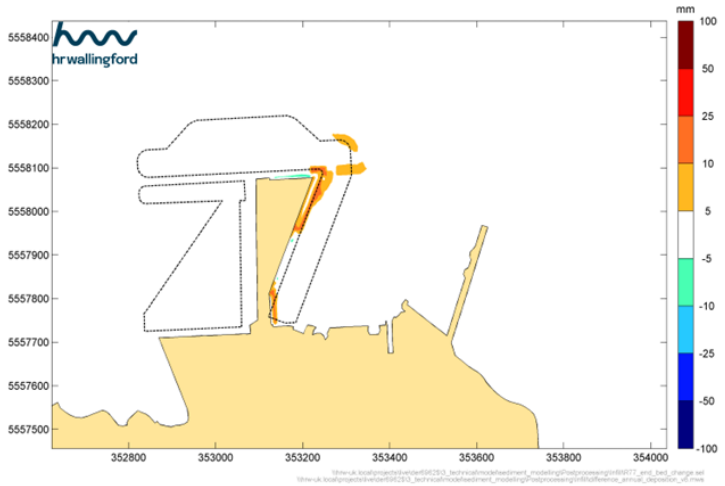
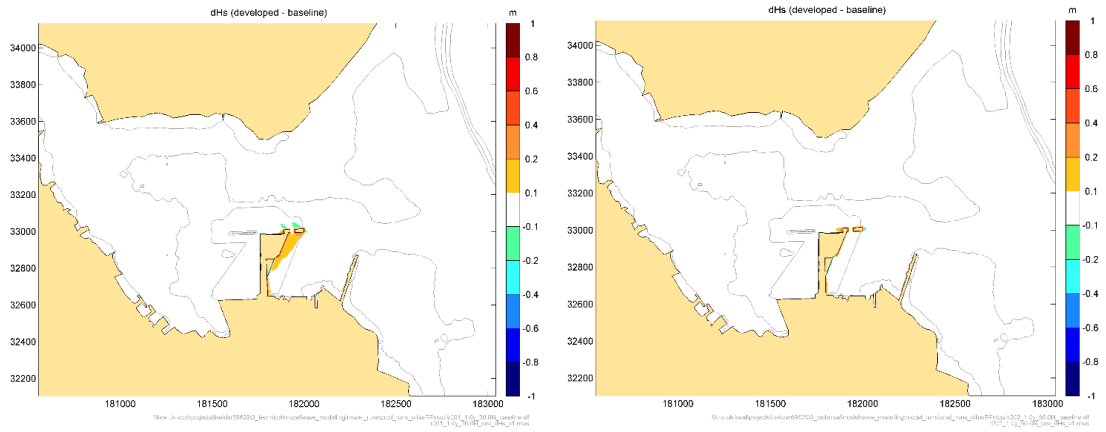
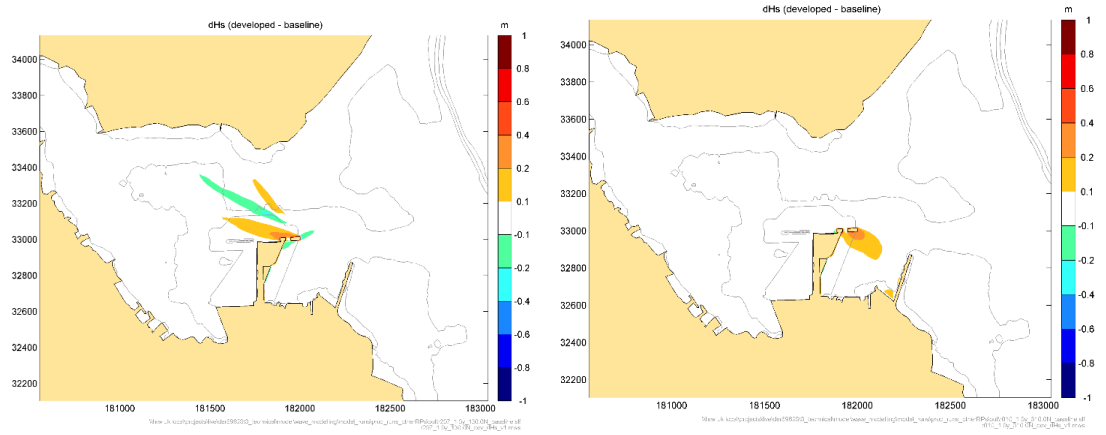


Figure 3 Predicted change to annual deposition depth of fine sediment with the proposed development in place (comparison to baseline). Source: Technical Appendix 6.2 Sediment Transport Modelling Report.



a) 1 year return period conditions from 30°N

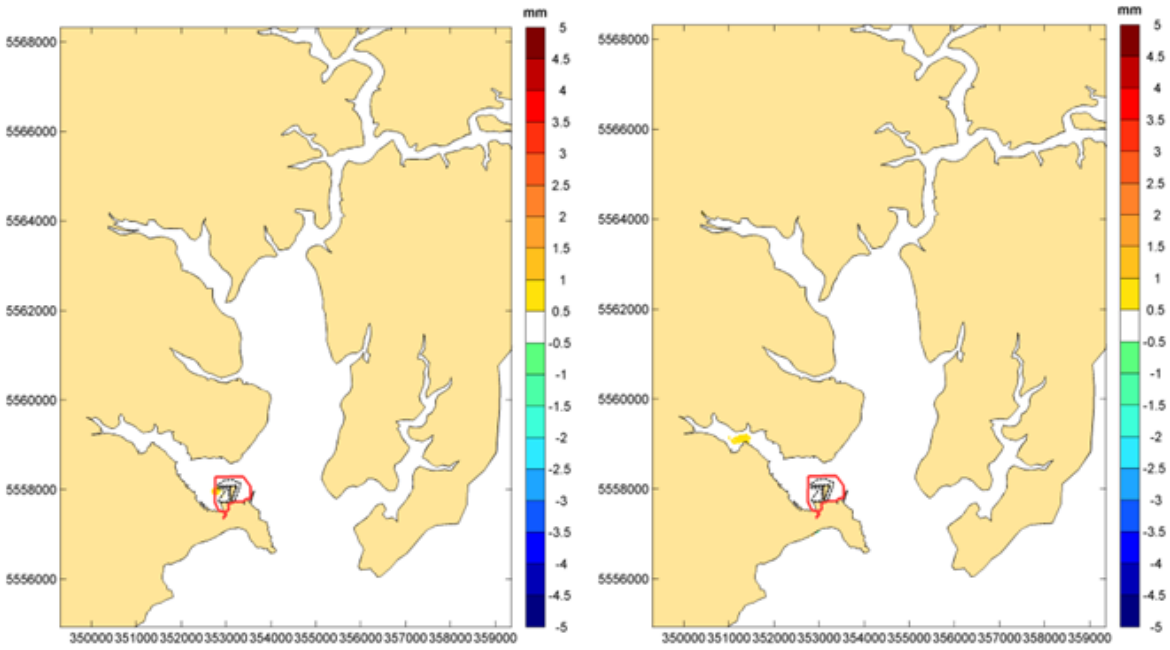
b) 1 year return period conditions from 90°N



c) 1 year return period conditions from 120°N

d) 1 year return period conditions from 300°N

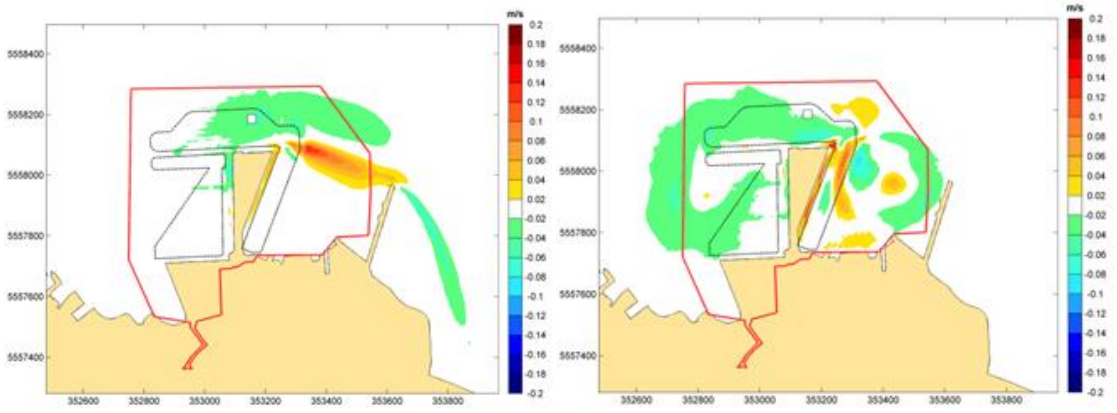
Figures 4a-d Predicted effect of proposed development on 1 year return period significant wave height at MHWS (difference in significant wave height (Hs) between the baseline and proposed development layout). Source: Technical Appendix 6.1 Wave Modelling Report.



a) Effect on maximum water level

b) Effect on minimum water level

Figures 5a-b Predicted effect of the proposed development on maximum and minimum water levels (simulated for the full spring neap cycle). Source: Technical Appendix 6.4 Tidal Flow Modelling Report.



a) Peak ebb

b) Peak flood

Figures 6a-b Predicted effect of the proposed development on current speed at time of peak ebb and peak flood. Source: Technical Appendix 6.4 Tidal Flow Modelling Report.

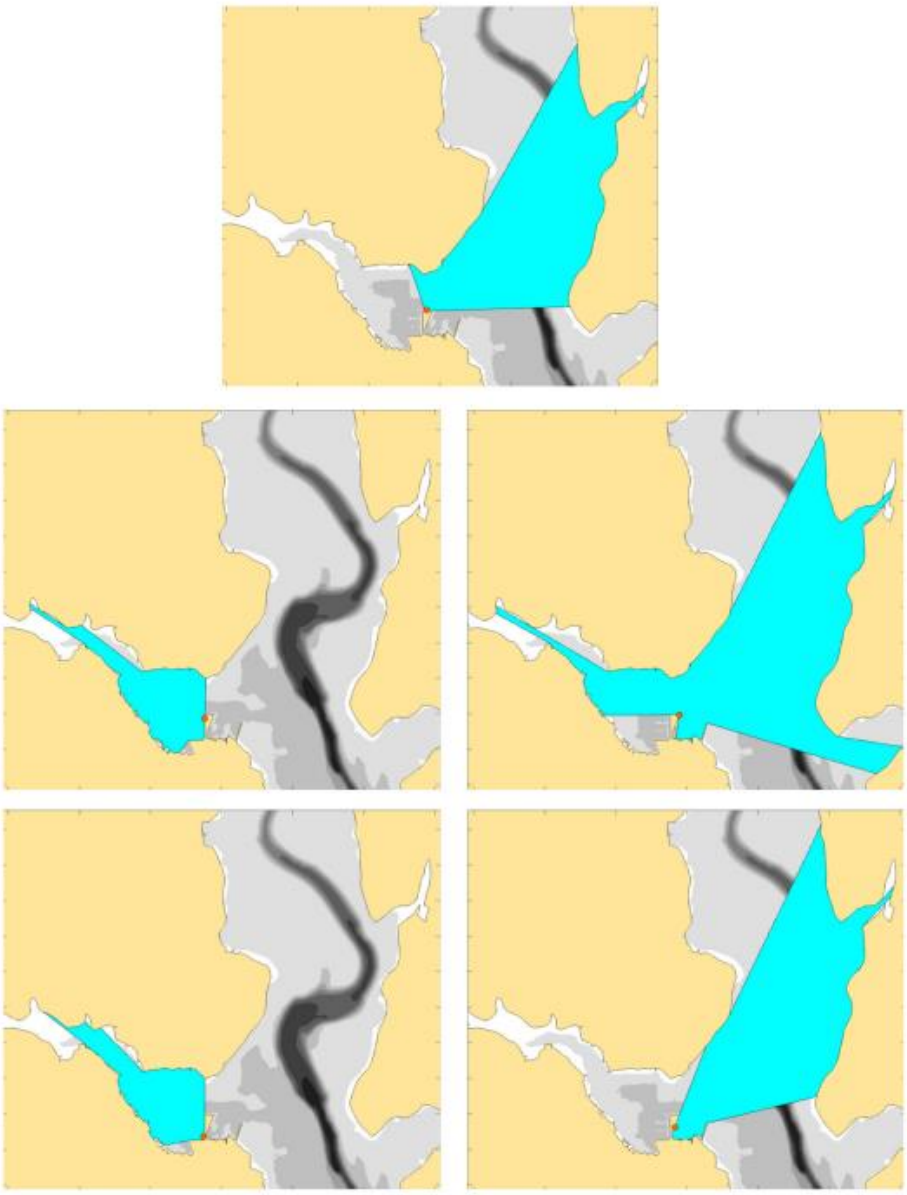
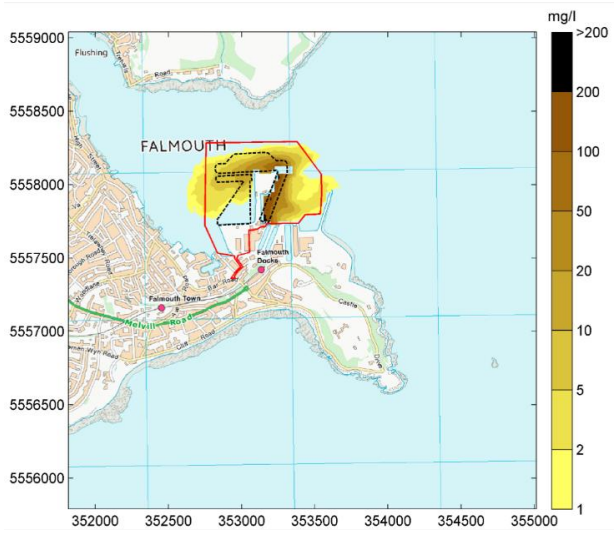
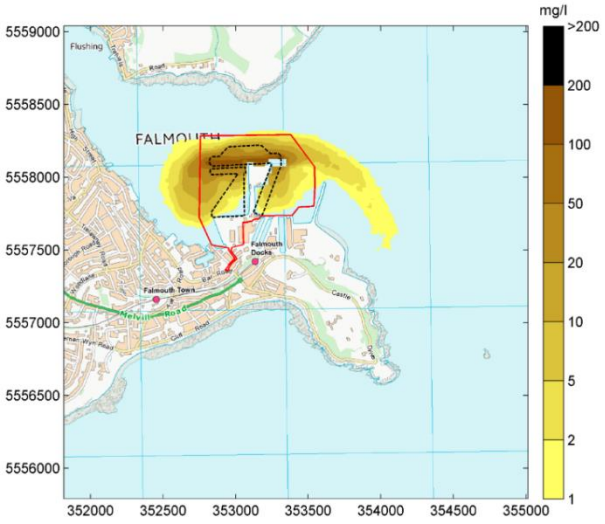


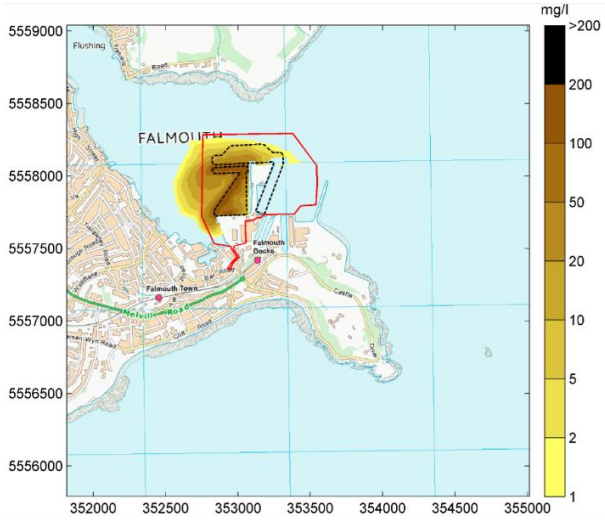
Figure 7 Line of sight (blue area) from different positions around the Docks. Source: ES Volume 2 Technical Appendix 7.1 Underwater Noise Modelling Report.



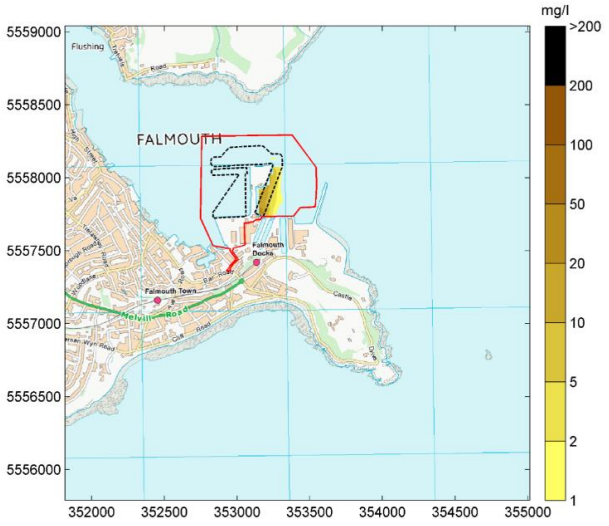
a) Peak predicted increase in suspended sediment concentration, dredging in the east area of the site (Western Wharf)



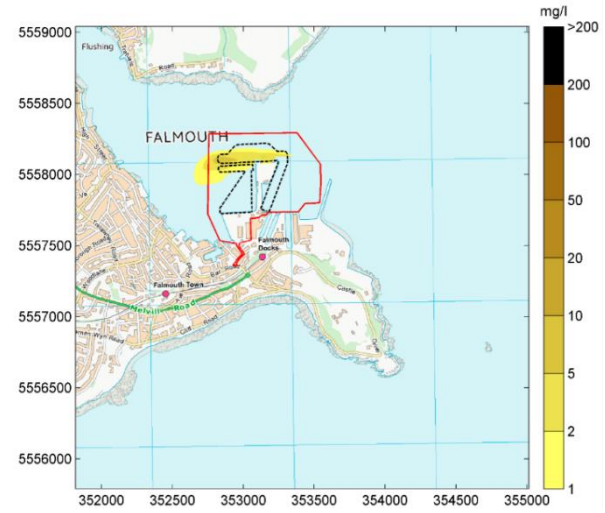
b) Peak predicted increase in suspended sediment concentration, dredging in the north area of the site (Queen's Wharf)



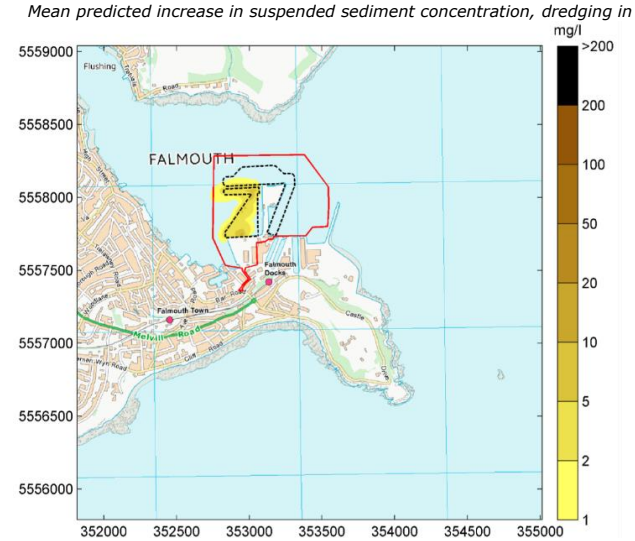
c) Peak predicted increase in suspended sediment concentration, dredging in the west area of the site (FLOW Deck)



d) Mean predicted increase in suspended sediment concentration, dredging in the east area of the site (Western Wharf)

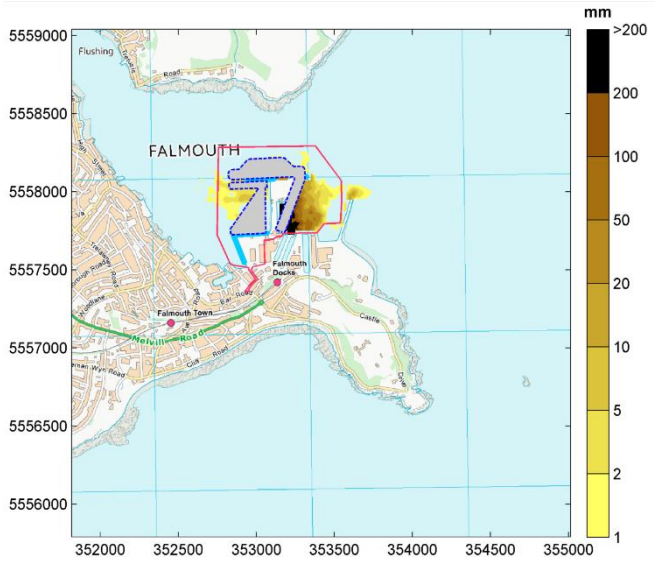


e) Mean predicted increase in suspended sediment concentration, dredging in the north area of the site (Queen's Wharf)

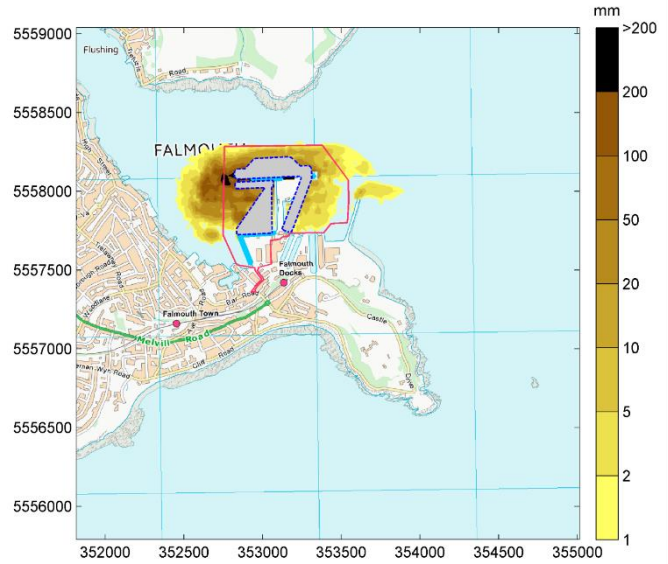


f) Mean predicted increase in suspended sediment concentration, dredging in the west area of the site (FLOW Deck)

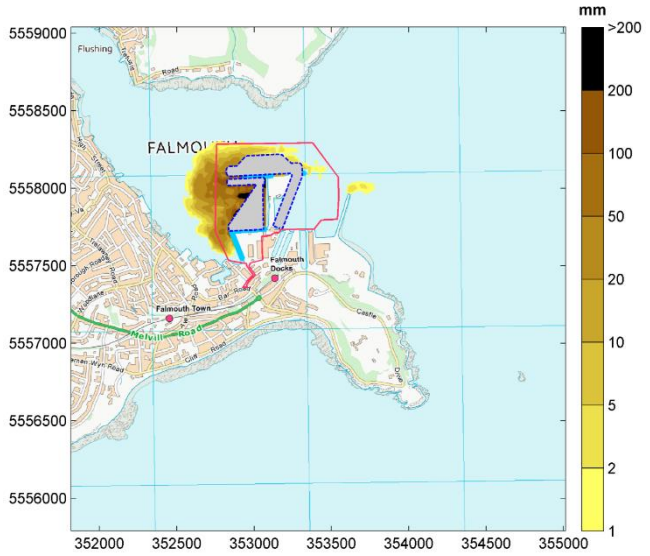
Figures 8a-f Modelled maximum and mean increases of SSC during capital dredge, with mitigation in place. Source: Technical Appendix 6.3 Sediment Plume Modelling Report.



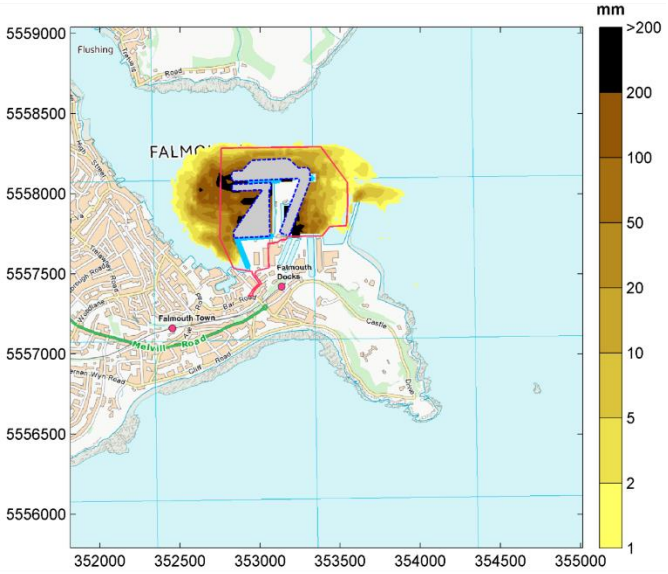
a) Predicted fine sediment deposition at the end of dredging in the east area of the site (Western Wharf)



b) Predicted fine sediment deposition at the end of dredging in the north area of the site (Queen's Wharf)



c) Predicted fine sediment deposition at the end of dredging in the west area of the site (FLOW Deck)



d) Predicted fine sediment deposition resulting from complete capital dredge campaign (dredging in all areas of the site)

Figures 9a-d Modelled predicted deposition at the end of capital dredge, with mitigation in place. Source: Technical Appendix 6.3 Sediment Plume Modelling Report.

APPENDIX 2 - WINTER BIRD SURVEY

WINTER BIRD SURVEYS

THE DOCKS, FALMOUTH TR11 4NR

NOVEMBER 2023 - JUNE 2024

Spalding Associates (Environmental) Ltd
10 Walsingham Place
Truro
Cornwall
TR1 2RP

Tel: 01872 272711
Email: office@spaldingassociates.co.uk

WINTER BIRD SURVEYS AT THE DOCKS, FALMOUTH TR11 4NR

OS Grid Ref:	SW 819 327
Survey period:	November 2023 – May 2024
Surveyors:	Robyn Hickman MSci (Hons Katherine Hampton BSc (Hons) Amy Horn-Norris BSc (Hons) Msc MCIEEM CSJK Aidan Hulatt BSc (Hons) MSc ACIEEM Anna Tomlin BSc (Hones) James Drage-Hubert
Time spent on site:	12 x 3 hours
Taxonomic groups:	Winter Birds
Report author:	Robyn Hickman MSci (Hons)
Report completed:	28th June 2024
Filename & issue number:	Falmouth Docks_Winter Bird Surveys_F1x
Report No:	23-100_Falmouth Docks_Winter Bird Surveys_F1x
Report for:	Mr Mike Pereir, A&P Group
Document approved by:	Katherine Hampton BSc (Hons) QCIEEM
Signature:	
Date:	28th June 2024

1. INTRODUCTION

Spalding Associates (Environmental) Ltd were instructed by A&P Group to carry out Winter Bird Surveys at Falmouth Docks, Falmouth, TR11 4NR. This report informs the Habitat Regulations Assessment issued by Ramboll UK Ltd, to address a proposal to extend part of the dock which lies within close proximity to the designated Falmouth Bay to St Austell Bay Special Protection Area (SPA).

The aim of the surveys was to assess presence and numbers of target species around the Falmouth Docks area – factors contributing to the designation of the SPA – and any potential impacts of the proposed development.

1.1. Falmouth Bay to St Austell Bay SPA

The Falmouth Bay to St Austell Bay SPA covers a 259km^2 stretch of the south coast of Cornwall, including areas of Falmouth Bay, Gerrans Bay, Veryan Bay, Mevagissey Bay and St Austell Bay. It also includes Carrick Roads, an estuarine channel stretching north from the survey area between Falmouth and St Mawes.

This statutory site qualifies under Article 4.1 of the Directive (2009/147/EC) as it is used regularly by 1% or more of the Great Britain population of the following species listed in Annex I in any season, and in particular by overwintering individuals: Great northern Diver *Gavia immer*, Black-throated Diver *Gavia arctica* and Slavonian Grebe *Podiceps auratus.*

Great Northern Diver

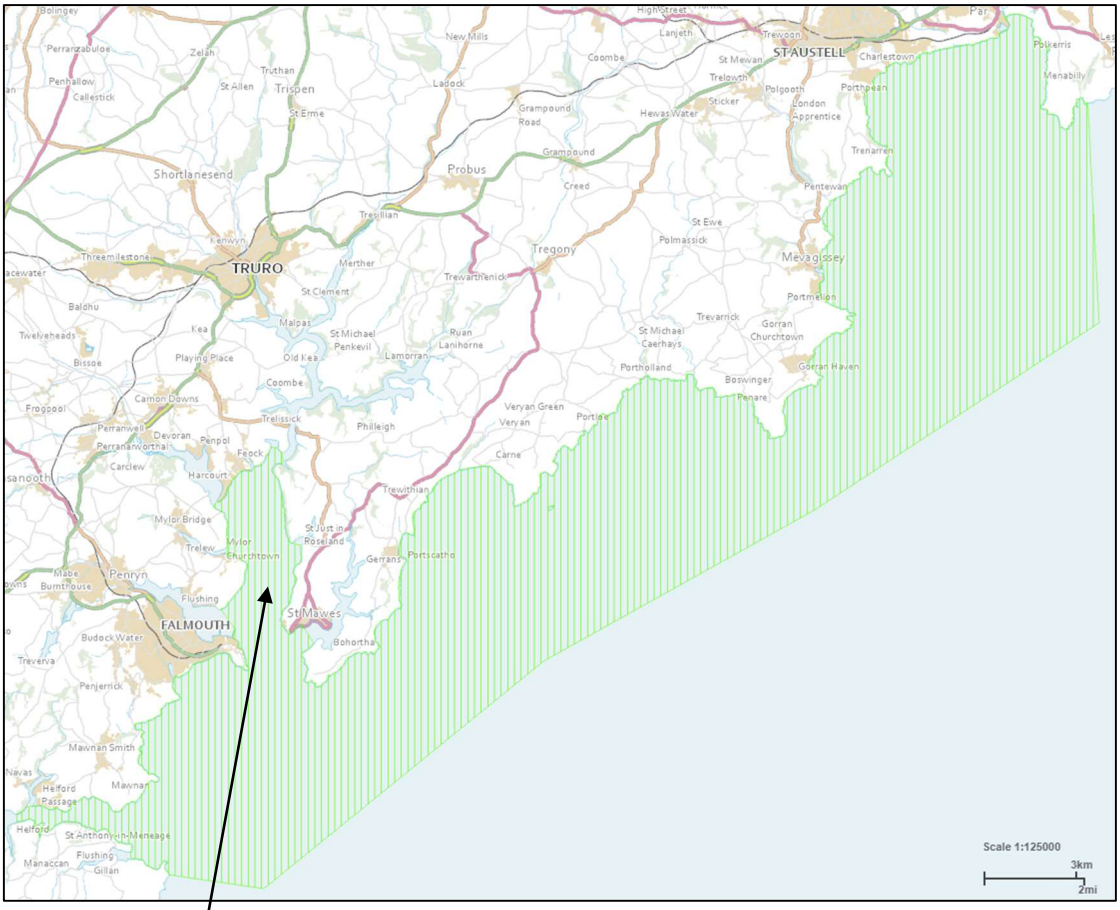
The largest of the UK's divers, this species is Amber-listed under the Birds of Conservation Concern 5: the Red List for Birds (2021), and listed under Schedule 1 of the Wildlife & Countryside Act 1981 (as amended). Approximately 2,500 birds overwinter around the country in Marine, Intertidal and Wetland habitats.

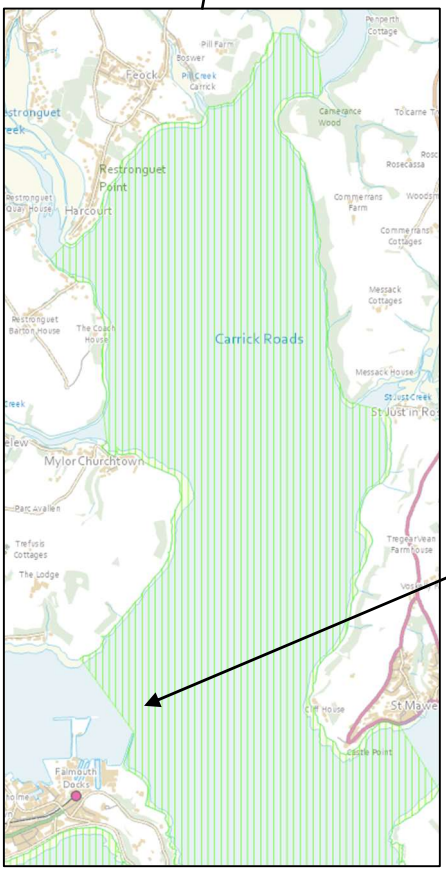
Black-throated Diver

The Black-throated Diver is Amber listed Birds of Conservation Concern 5: the Red List for Birds (2021), and listed under Schedule 1 of the Wildlife & Countryside Act 1981 (as amended). Approximately 200 pairs breed in the north-west regions of Scotland, with 560 individuals overwintering further south around the UK's coast.

Slavonian Grebe

The Slavonian Grebe is listed Red under the Birds of Conservation Concern 5: the Red List for Birds (2021), and listed under Schedule 1 of the Wildlife & Countryside Act 1981 (as amended). Small numbers of this species, approximately 28 pairs, breed in Scotland, with 995 individuals overwintering around the UK's coast.





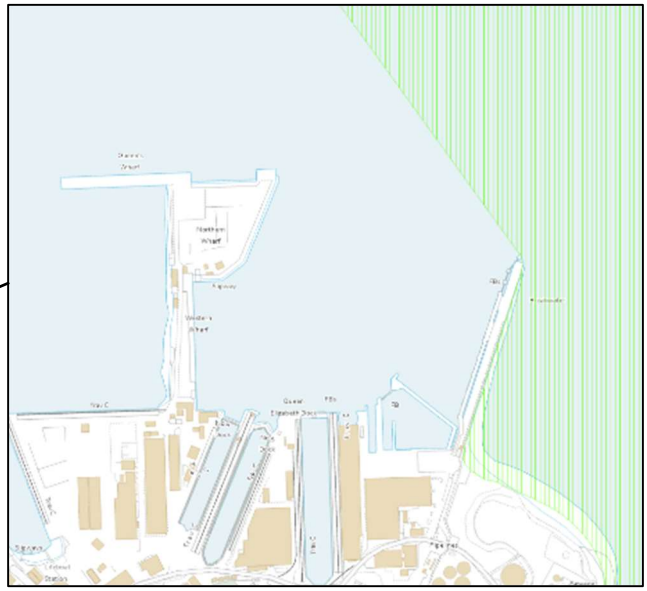


Figure 1. Maps of the Falmouth Bay to St Austell Bay SPA, highlighting Carrick Roads estuary and the designation boundary in relation to the survey area.

2. METHODOLOGY

2.1. Survey Methodology

The methodology employed in this survey has been adapted from the Wetland Bird Survey (WeBS)[1] methodology determined by the British Trust for Ornithology. This method is applicable where habitats are present that have the potential to support priority waterbird species, including divers and grebes.

The target species of these surveys were those listed under the Falmouth Bay to St Austell Bay Special Protection Area (SPA) designation: Great Northern Diver Gavia immer, Black-throated Diver Gavia arctica and Slavonian Grebe Podiceps auratus. Observations of target species were recorded in detail; species, observation time, behaviour/s shown, and its position, consisting of zone and markings on a field map indicating movements within the area (if observed). Other non-target species were recorded as present, with some detail on behaviour and numbers (if observed).

Table 1. Summary of visits over the survey period

Visit No.	Date	Time	Surveyors (see Section 2.2.)	Tide	Temp	Cloud	Sea State	Swell	Wind
1	28/11/2023	11:30 - 14:30	RH, AJHN, KH, AH	Low	8	4	1	1	1
2	20/12/2023	9:30 - 12:30	AJHN, KH, JD-H, RH	High	9	8	3	3	5
3	11/01/2024	10:20 - 13:20	JD-H, KH, RH, AH	Low	3	7	2	2	1
4	02/02/2024	08:45 - 11:45	AJHN, JD-H, KH, RH	High	10	8	1	0	1
5	13/02/2024	12:30 - 15:30	AJHN, RH, AT, JD-H	Low	9	8	6	7	6
6	27/02/2024	12:30 - 15:30	RH, AJHN, JD-H, KH	Low	7	8	3	2	3
7	18/03/2024	9:30 - 12:30	AH, AT, RH, AJHN	High	11	6	2	1	3
8	03/04/2024	11:00 - 14:00	KH, AH, RH, AT	High	10	6	6	7	7
9	11/04/2024	9:30 - 12:30	AH, AT, KH, RH	Mid	13	8	2	2	3
10	01/05/2024	12:30 - 15:30	RH, KH, JD-H, AT	Mid	13	5	3	2	5
11	17/05/2024	11:00 - 14:00	RH, JD-H, KH, AT	Mid	17	1	1	0	1
12	29/05/2024	12:15 - 15:15	AT, KH, RH, AJHN	Mid	14	7	2	1	3

As the site had both overwintering and passage potential for the target species, surveys were originally scheduled to take place every three weeks, from November to April inclusive. However, following opinion from Natural England in January 2024, this schedule was adjusted to two per month, extending into May, forming a total of twelve surveys. See Table 1 for a summary of each visit.

The area immediately surrounding the survey area is not considered an intertidal habitat. However, as much of the nearby Carrick Roads estuarine channel is visible from points C and D, it was deemed appropriate to time the surveys to start or end within two hours of high, low and mid-tide in order to cover the full range of activity around the Docks. Tide status was split evenly between the 12 surveys.

Due to the size of the site, the surveys required four surveyors to allow accurate coverage of the full survey area. Surveyors were placed strategically at four vantage points around the dockyard (see Figure 2). In order to mitigate for surveyor bias, points were assigned on a rotational basis. The points were as follows:

[1] Bird Survey & Assessment Steering Group. (2023). Bird Survey Guidelines for assessing ecological impacts, v.1.1.1. https://birdsurveyguidelines.org [26/06/2024]

- Point A: On the west side of the Western Wharf, looking west towards Penryn estuary;
- Point B: On the north side of the crane track between Dock Nos 2 & 3, covering the inner Dock harbour;
- Point C: On the north side of the Northern Wharf, looking north to Flushing and up Carrick Roads estuary; and
- Point D: On the north side of the Eastern Breakwater Jetty, looking east across to St Mawes and north up Carrick Roads.

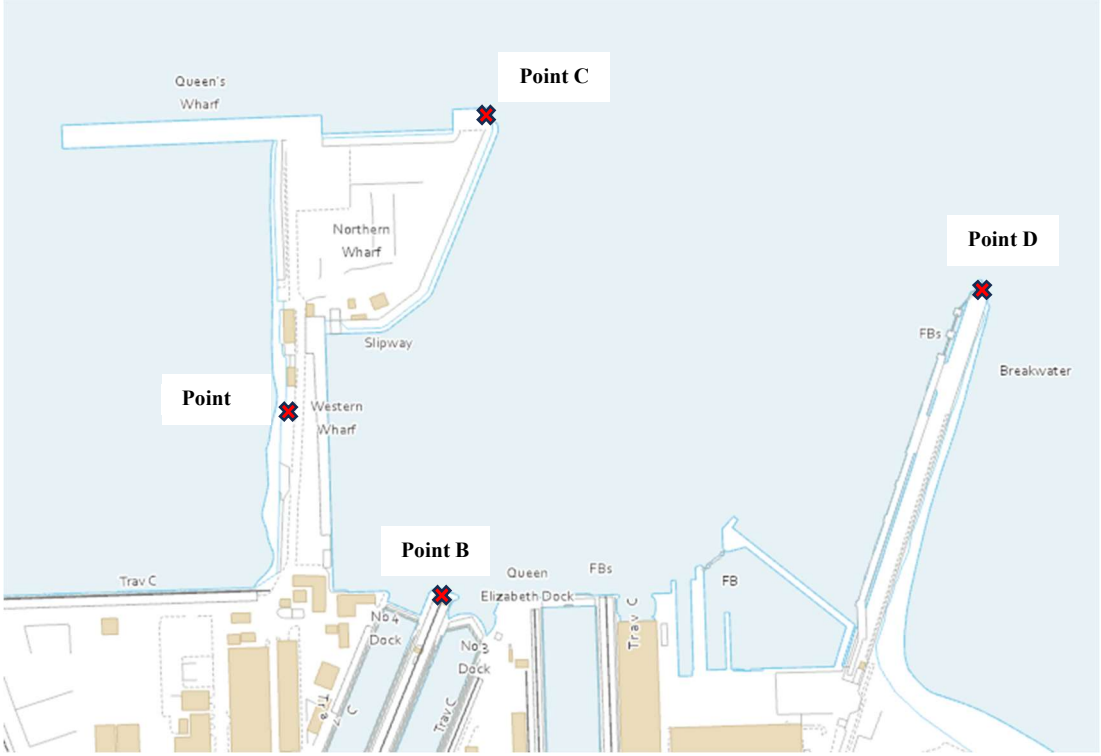


Figure 2. Map of survey vantage points

Prior to each survey, conditions were recorded such as temperature (°C), wind (Beaufort scale 0-12), cloud cover (Okta scale 0-9), sea state and swell (Douglas scale 0-9). See Appendix 1 for scale descriptions. Tide status at the time of survey (high, low, mid) was split evenly between the 12 surveys. Surveys were carried out in 'adequate' conditions with good visibility, i.e. avoiding high levels of precipitation, wind and sea swell (Table 1).

Each survey was scheduled so as to not conflict with the presence of scheduled large vessels alongside the Eastern Breakwater Jetty (point D), which would have prevented access and greatly reduced visibility to the east.

Equipment used included binoculars, and for the longer range points (A,C,D), Opticron telescopes and Canon cameras with 600mm lenses.

For the purposes of the survey, the total visible survey area within the estuary was split into separate zones, to assist in reporting on how the birds are using the area surrounding the site (Figure 3). The first level (1A, 1B, 1C, 1D) denotes activity 25 metres or closer to the dockyard, with the sub-sections describing the survey point with the best visibility of the area. The second level (2A, 2B, 2C, 2D) denotes activity a further 250 metres from the first level, again with subsections indicating the closest survey point. The third, fourth and fifth levels (3WEST, 3EAST, 4WEST, 4EAST, 5WEST, 5NORTH, 5EAST) each describe activity another 250 metres from the previous level, and are split into cardinal directions.

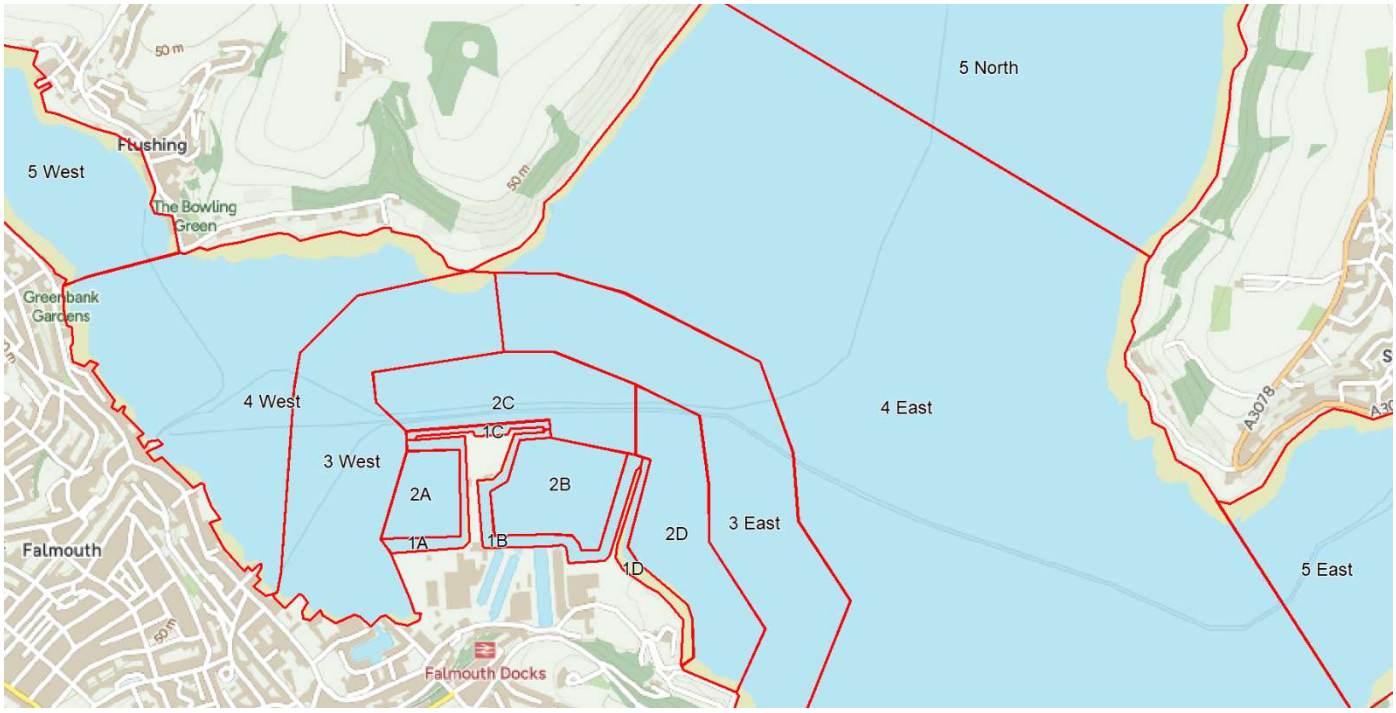


Figure 3. Map of zones within the survey area

2.2. Surveyors

Robyn Hickman MSci (Hons) QCIEEM

Robyn Hickman is a professional, full-time practising ecologist and bird specialist. She has over seven years of experience conducting bird surveys in a professional and academic capacity, both in the UK and abroad. Both her undergraduate and Master's dissertations focussed on factors affecting breeding success and prospecting behaviour in weaverbird species in South Africa. She is a trainee bird ringer in her spare time, particularly focussing on passerines, Barn Owls and Storm Petrels, and has ringed all over Cornwall as well as places including the Aberdeenshire coast and Gibraltar. She also voluntarily works with the British Trust for Ornithology (BTO) as a nest recorder under the Nest Record Scheme, as well as general annual breeding bird surveys. She has also carried out surveys for Cornwall Birdwatching Preservation Society (CBWPS) on Willow Tit and Dipper, and for the Royal Society of the Protection of Birds (RSPB) on Cirl Buntings.

Amy Horn-Norris BSc (Hons) MSc MCIEEM CSJK

Amy Horn-Norris has been a professional, full-time practising ecologist for over eight years. She has a range of experience and specialises in birds having been interested from a very young age. She has extensive experience of bird surveying in various habitats around Cornwall as well as across the UK and abroad. Previous to her current position at Spalding Associates she has worked as a self-employed freelance ecologist carrying out surveys including breeding bird and vantage point surveys. She has also carried out surveys and guided walks for the British Trust for Ornithology (BTO), Royal Society of the Protection of Birds (RSPB) and Birdlife International. The subject of her MSc dissertation from the University of Exeter was woodland bird breeding success. She also rings birds in her leisure time including Schedule 1 Barn Owl ringing in association with the Barn Owl Trust. She currently holds both her Level 2 Bat licence and her Dormouse Licence.

Katherine Hampton BSc (Hons) QCIEEM

Katherine Hampton is a professional, full-time practising ecologist and bird expert. She has been ringing since 2017 and interested in birds since a young age. She achieved her C permit in 2019 and has ringed in many locations including Portland Bird Observatory, Isle of Wight and Dublin (cannon netting). She carried out her dissertation at University of Exeter on cannon netting Brent Geese. She has experience working with birds in Cornwall as well as Suffolk and Norfolk and has previously volunteered for RSPB including bird surveys in Suffolk and the Cairngorms. She has also volunteered on bird projects abroad including New Zealand. She currently holds both her Level 2 Bat licence.

Aidan Hulatt BSc (Hons) MSc ACIEEM

Aidan Hulatt is a professional, full-time practising ecologist and bird expert. He holds a trainee bird ringing permit and has been carrying out breeding bird survey transects for the British Trust for Ornithology since 2012 in Cornwall and Devon. He has surveyed farmlands across the Somerset Levels and Devon for farmland bird distribution and has also assisted with the monitoring of a release programme of Cranes in Somerset. He worked for the University of Exeter on Pheasant cognition and behaviour and for the Game & Wildlife Trust assessing woodlands for the ecological impacts of mass Pheasant releases. He has also worked abroad in Costa Rica on bird monitoring and ringing projects.

Anna Tomlin BSc (Hons)

Anna Tomlin is a professional ecologist with two years' experience and a first-class BSc (Hons) degree in Conservation Biology and Ecology. She holds a Hazel Dormouse Survey & Research Class Licence CL10a and a Level 2 Bat Survey & Research licence with extensive experience in harp trapping, mist netting and bat ringing projects across Devon and Cornwall. She has experience conducting reptile surveys including translocation projects and volunteers for Cornwall Bat Group and Cornwall Mammal Group with experience locating Harvest Mouse nests. She has undertaken multiple bird surveys including general breeding birds, Corn Bunting surveys and passerine nest checks for multiple previous projects.

James Drage Hubert

James Drage Hubert is a 3rd year student studying Zoology at the University of Exeter. He has had an enduring interest in the natural world, particularly birds, since a very young age. Recently he has completed multiple nesting bird surveys for Spalding Associates, at a variety of sites, including known Corn Bunting strongholds. Prior to this, his depth of survey experience extends to both the UK and abroad, including cliff nesting seabird surveys, National Trust breeding bird surveys, monthly BTO WEBS surveys, and nestbox monitoring for the BTO nest recording scheme. He is the bird representative for the university ecological society, is actively involved in Cornwall RSPB group, and counts and records birds in his leisure time.

2.3. Writeup & Data Presentation

To supplement the data collected during the survey, confirmed records of target species from community birding websites online including Cornwall Bird Watching and Preservation Society (CBWPS) have been compiled and included in the results of this report.

Data is presented in the Excel file titled 'Falmouth Docks Winter Bird Surveys_Results' and in Maps 1-7. The Excel file contains raw data with a visits summary sheet listing weather and brief findings, a zones usage sheet and a 'Master' sheet of all observations and timings.

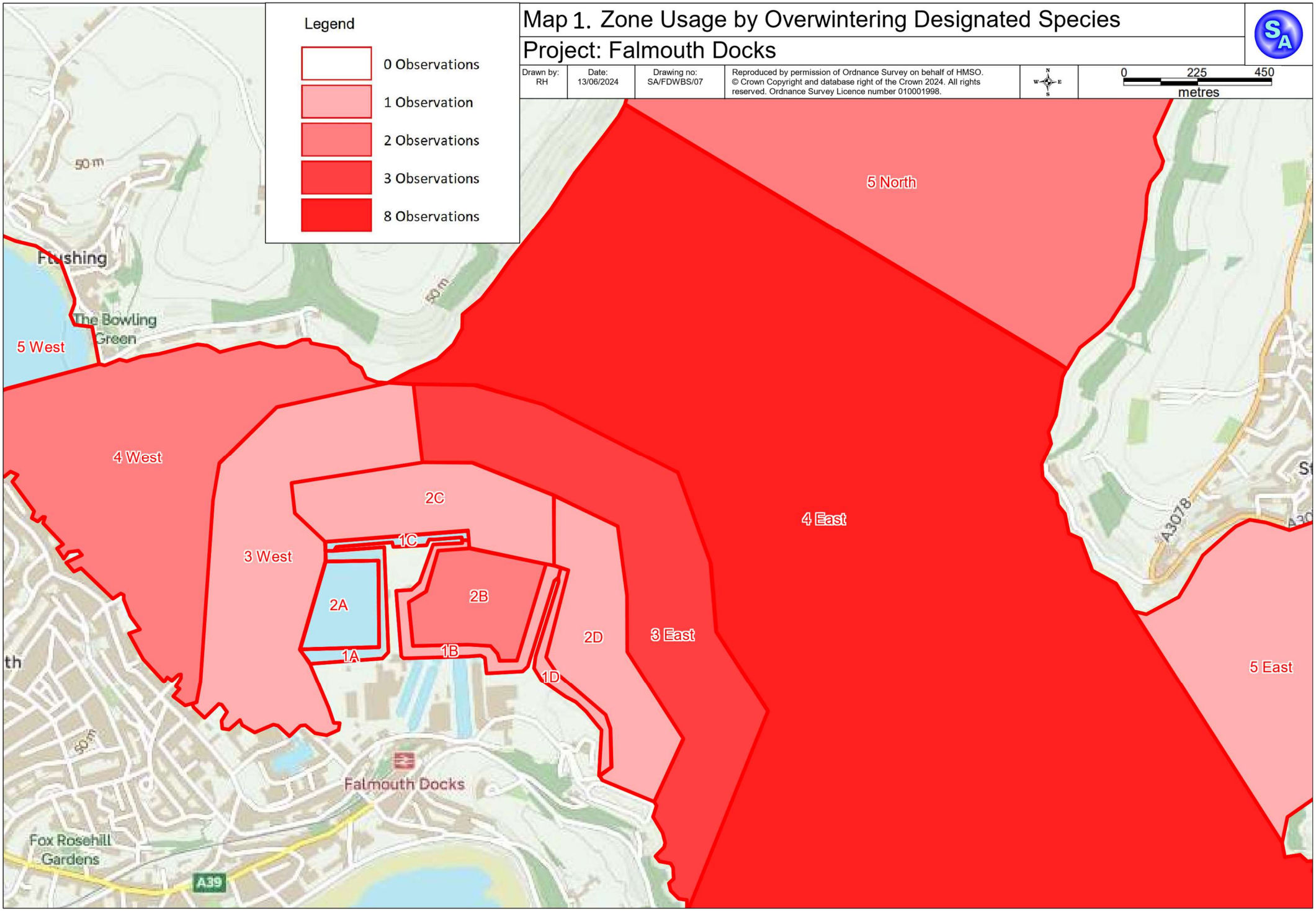
Map 1 shows the usage of each zone by target species, measured by the number of observations within that zone. Maps 2-7 show the location and distribution of all observations of target species in the survey area. Paths are displayed where possible as well as individual observations of birds. Where possible, each bird has been confirmed to be a separate individual. However, due to the location and time of the last observation of some individuals, these had the possibility to be the same bird as in other observations and therefore have not been counted as separate birds. These observations have been denoted on the map using the (X)* symbol, and are excluded from the minimum count for each survey.

2.4. Limitations

Weather was a large limiting factor for these surveys, and working around the presence of large vessels on the eastern jetty meant that occasionally it was not possible to complete a survey on the week it had been scheduled, in order to fulfil two surveys a month. However, surveys were carried out as close as possible to the original schedule ensuring an even coverage of the survey months.

In the further zones (level 5), presence of target species may be under-recorded due to the decreasing visibility with distance. In addition, observation end time/precise zone change time was occasionally not possible to record due to visibility challenges, or diving behaviours leading to lost visuals. Therefore, the time spent in each zone could not be accurately recorded. However, this did not impact the presence/absence data collected for each zone which has been used to measure zone usage.

It is therefore considered that these surveys have been adequate in assessing how overwintering birds are currently using the site and has enabled an assessment of the value of the site for these species to be made.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0 Observations
1 Observation
2 Observations
3 Observations
8 Observations
Map 1. Zone Usage by Overwintering Designated Species
Project: Falmouth Docks
Drawn by: RH
Date: 13/06/2024
Drawing no: SA/FDWBS/07
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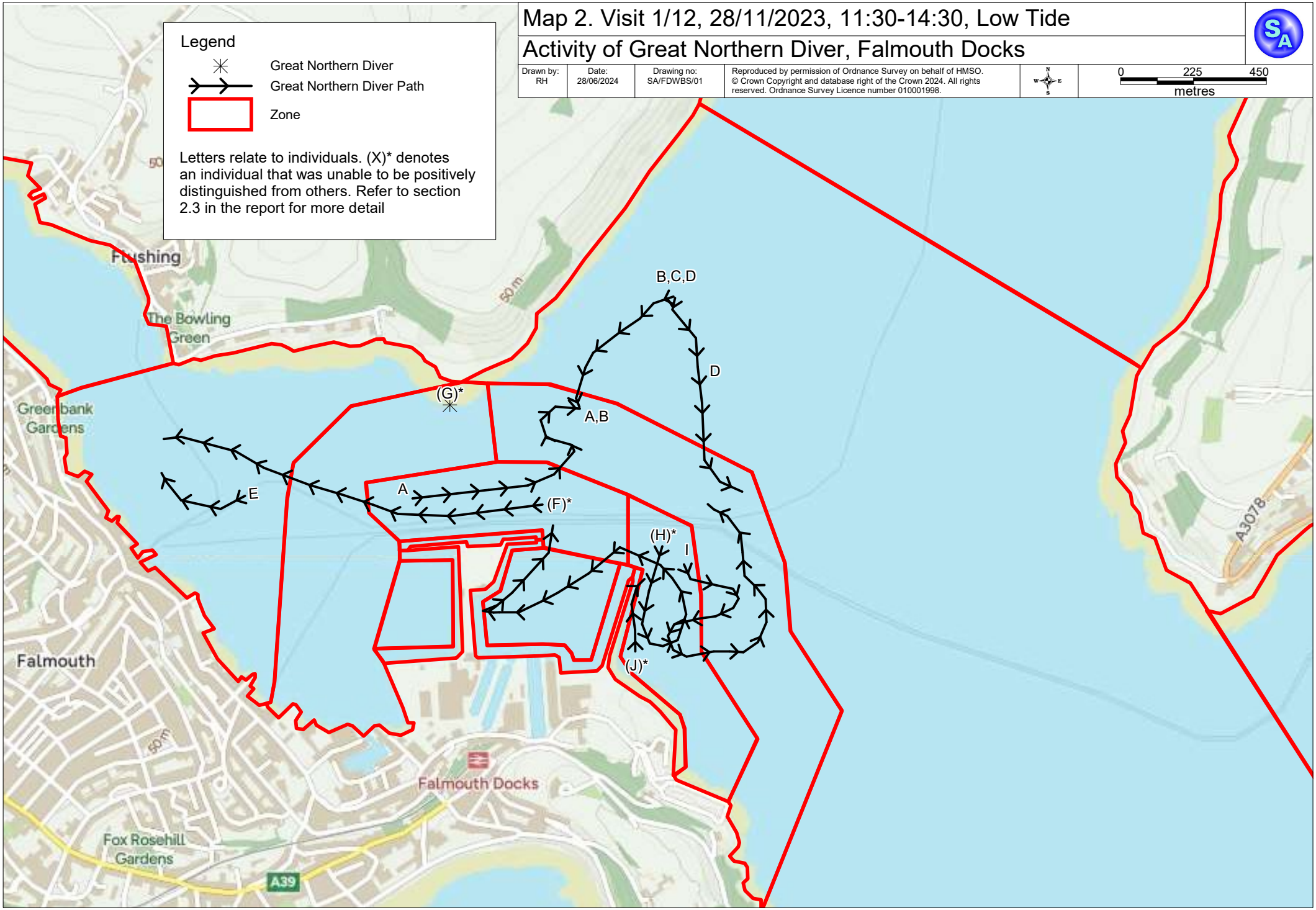
0 225 450
metres
5 North
5 West
4 West
3 West
2C
1C
2A
2B
1A
1B
2D
1D
4 East
3 East
5 East
Flushing
The Bowling Green
Falmouth Docks
Fox Rosehill Gardens
A39
A3078
50 m


Map 2. Visit 1/12, 28/11/2023, 11:30-14:30, Low Tide
Activity of Great Northern Diver, Falmouth Docks
Drawn by: RH
Date: 28/06/2024
Drawing no: SA/FDWBS/01
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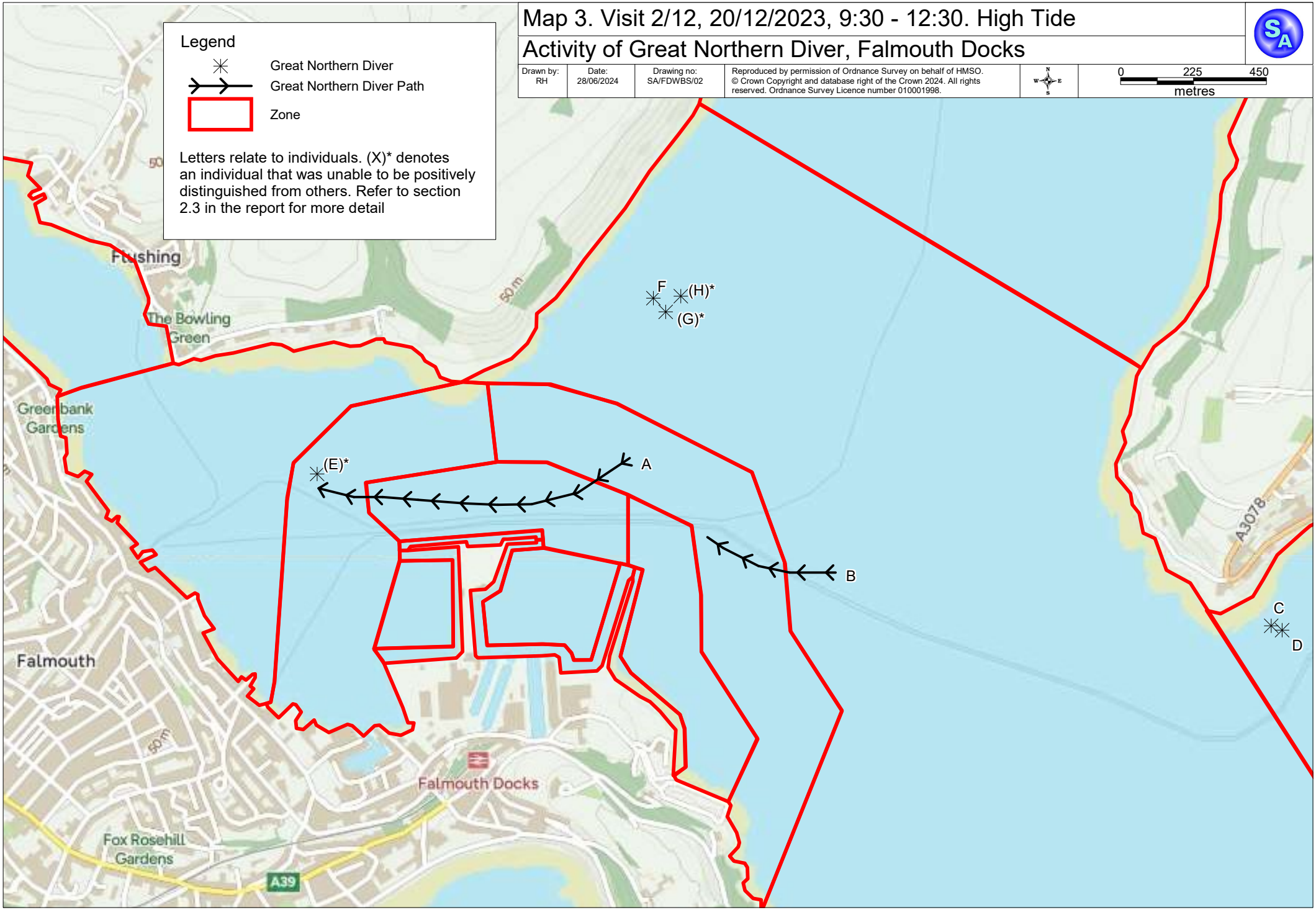
0 225 450
metres
Legend
Great Northern Diver
Great Northern Diver Path
Zone
Letters relate to individuals. (X)* denotes an individual that was unable to be positively distinguished from others. Refer to section 2.3 in the report for more detail
Flushing
The Bowling Green
Greenbank Gardens
Falmouth
Falmouth Docks
Fox Rosehill Gardens
A39
A3078
50m
B,C,D
D
A,B
(G)*
E
A
(F)*
(H)*
I
(J)*


Map 3. Visit 2/12, 20/12/2023, 9:30 - 12:30. High Tide
Activity of Great Northern Diver, Falmouth Docks
Drawn by: RH
Date: 28/06/2024
Drawing no: SA/FDWBS/02
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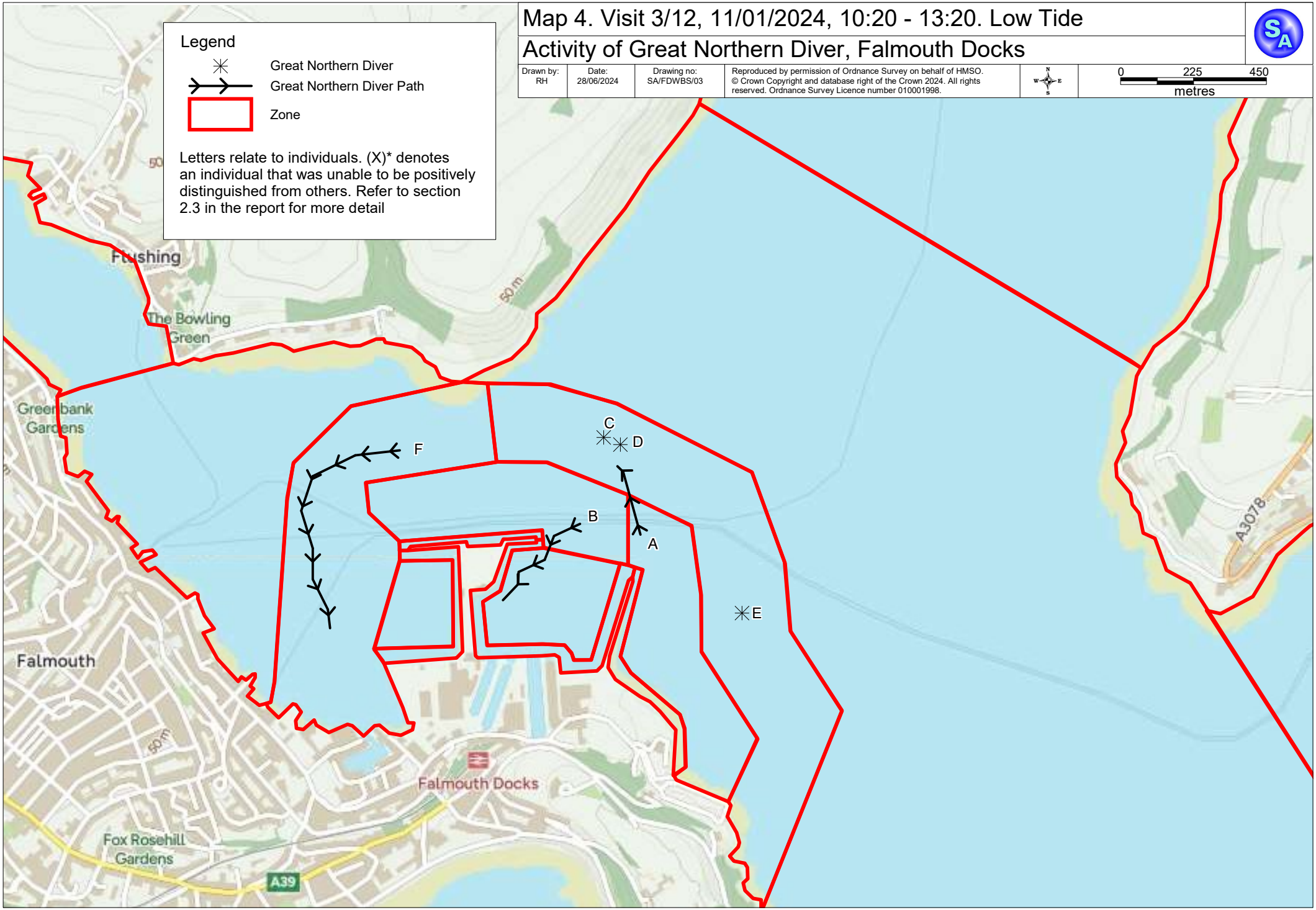
metres
Legend
Great Northern Diver
Great Northern Diver Path
Zone
Letters relate to individuals. (X)* denotes an individual that was unable to be positively distinguished from others. Refer to section 2.3 in the report for more detail
Flushing
The Bowling Green
Greenbank Gardens
Falmouth
Falmouth Docks
Fox Rosehill Gardens
A39
A3078
50m
F
(H)*
(G)*
(E)*
A
B
C
D


Legend
Great Northern Diver
Great Northern Diver Path
Zone
Letters relate to individuals. (X)* denotes an individual that was unable to be positively distinguished from others. Refer to section 2.3 in the report for more detail
Map 4. Visit 3/12, 11/01/2024, 10:20 - 13:20. Low Tide
Activity of Great Northern Diver, Falmouth Docks
Drawn by: RH
Date: 28/06/2024
Drawing no: SA/FDWBS/03
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0 225 450
metres
Flushing
The Bowling Green
Greenbank Gardens
Falmouth
Falmouth Docks
Fox Rosehill Gardens
A39
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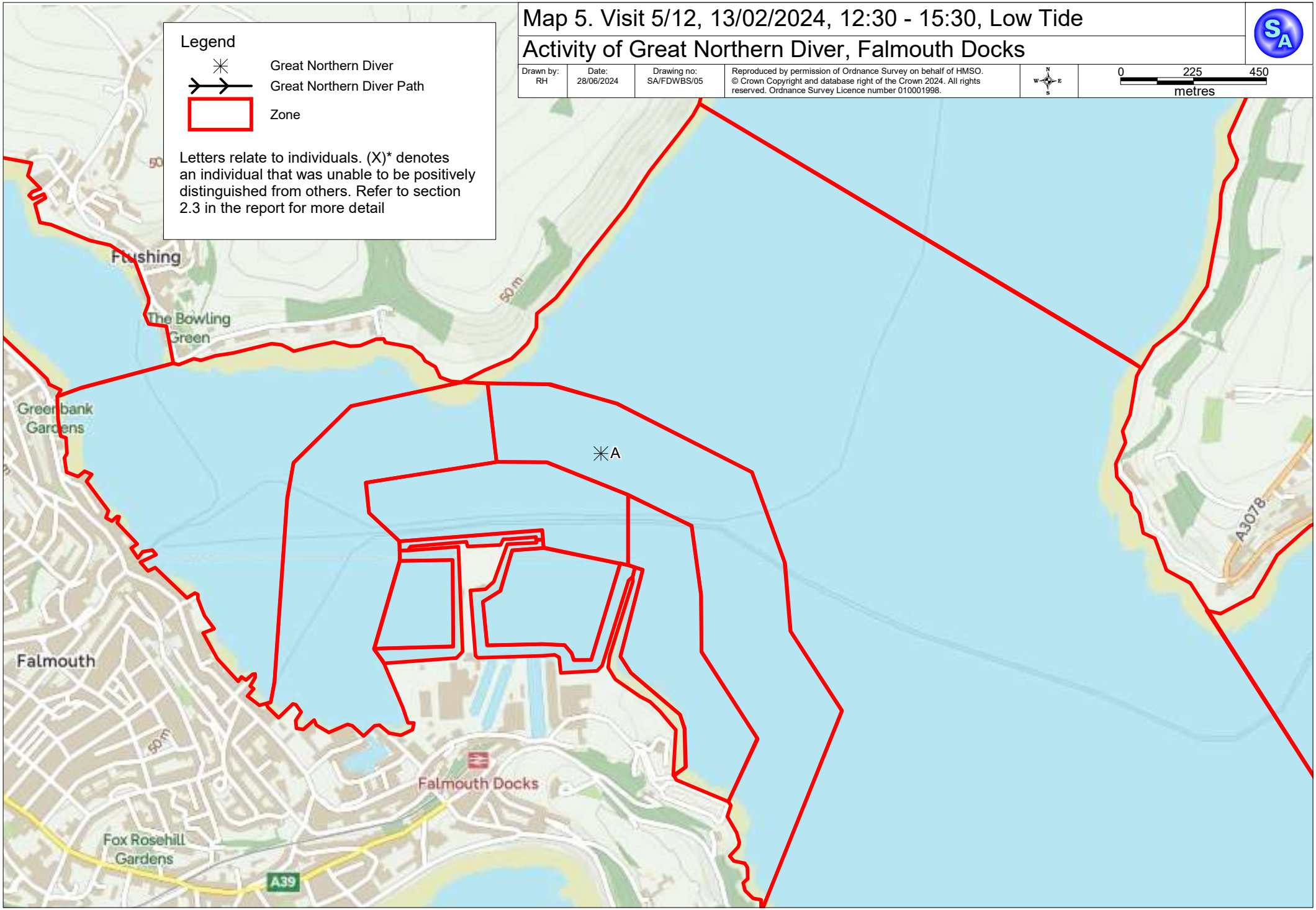
D
E
F


Legend
Great Northern Diver
Great Northern Diver Path
Zone
Letters relate to individuals. (X)* denotes an individual that was unable to be positively distinguished from others. Refer to section 2.3 in the report for more detail
Map 5. Visit 5/12, 13/02/2024, 12:30 - 15:30, Low Tide
Activity of Great Northern Diver, Falmouth Docks
Drawn by: RH
Date: 28/06/2024
Drawing no: SA/FDWBS/05
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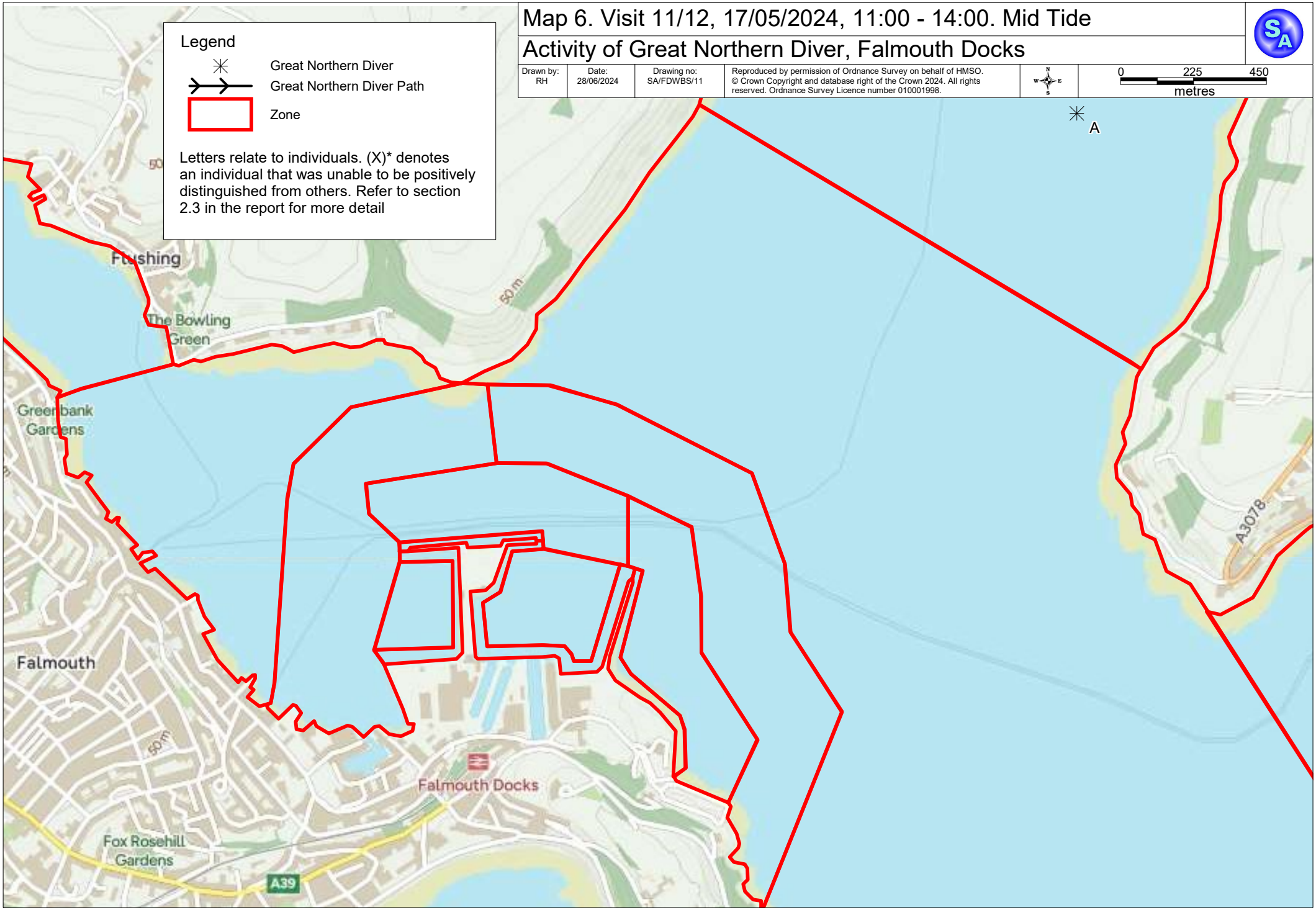
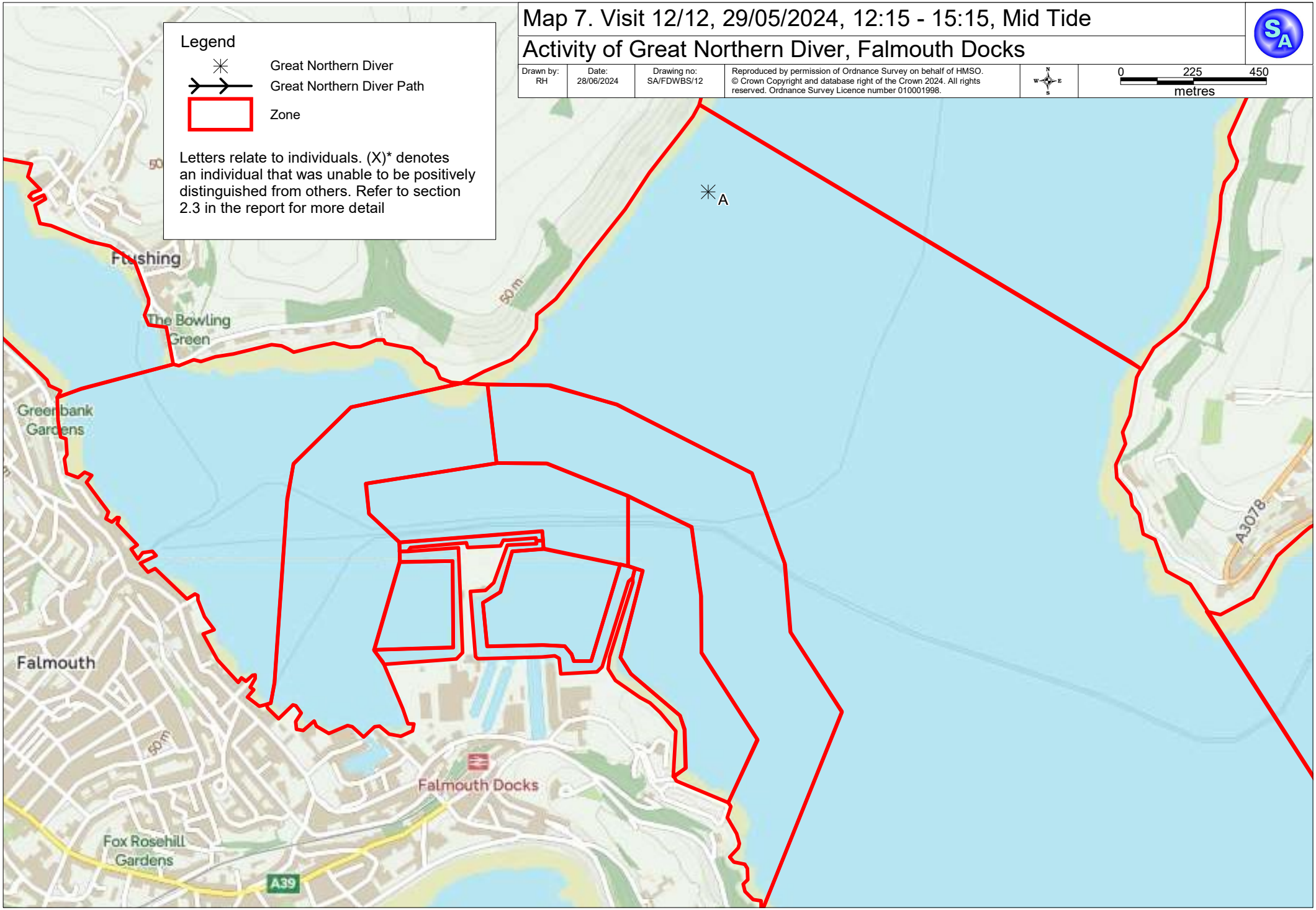
0 225 450
metres
Flushing
The Bowling Green
Greenbank Gardens
Falmouth
Falmouth Docks
Fox Rosehill Gardens
A39
A3078
50m
A

Map 6. Visit 11/12, 17/05/2024, 11:00 - 14:00. Mid Tide

Activity of Great Northern Diver, Falmouth Docks

Drawn by:	Date:	Drawing no:	Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown Copyright and database right of the Crown 2024. All rights reserved. Ordnance Survey Licence number 010001998.	0 225 450 metres
RH	28/06/2024	SA/FDWBS/11		




Legend
Great Northern Diver
Great Northern Diver Path
Zone
Letters relate to individuals. (X)* denotes an individual that was unable to be positively distinguished from others. Refer to section 2.3 in the report for more detail
Map 7. Visit 12/12, 29/05/2024, 12:15 - 15:15, Mid Tide
Activity of Great Northern Diver, Falmouth Docks
Drawn by: RH
Date: 28/06/2024
Drawing no: SA/FDWBS/12
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0 225 450
metres
A
Flushing
The Bowling Green
Greenbank Gardens
Falmouth
Falmouth Docks
Fox Rosehill Gardens
A39
A3078
50 m

3. RESULTS

3.1. Summary of Survey Findings

During the surveys, Great Northern Diver were recorded making use of the survey area. Probable records of Black-throated Diver were seen outside of the survey area. Slavonian Grebe was not observed during the surveys.

In total, 49 species of bird were recorded. This included three Biodiversity Action Plan (BAP) priority species: Herring Gull, Common Linnet, and House Sparrow. 30 of these species are Red- or Amber-listed under the Birds of Conservation Concern 5: the Red List for Birds (2021) (Table 2).

Table 2: Red- and Amber-listed species recorded during the surveys

Scientific Name	Common Name	Conservation Status	BAP	Schedule 1	No. Surveys Present
Accipiter nisus	Sparrowhawk	Amber			3
Actitis hypoleucos	Common Sandpiper	Amber			5
Alca torda	Razorbill	Amber			5
Anas platyrhynchos	Mallard	Amber			2
Anthus pratensis	Meadow Pipit	Amber			5
Apus apus	Swift	Red			2
Ardea alba	Great White Egret	Amber			1
Arenaria interpres	Turnstone	Amber			3
Chroicocephalus ridibundus	Black-headed Gull	Amber			7
Columba livia	Feral Pigeon	Amber			10
Columba palumbus	Woodpigeon	Amber			8
Corvus frugilegus	Rook	Amber			1
Delichon urbicum	House Martin	Red			3
Gavia arctica	**Black Throated Diver**	**Amber**		X	3
Gavia immer	**Great Northern Diver**	**Amber**		X	6
Haematopus ostralegus	Oystercatcher	Amber			6
Ichthyaetus melanocephalus	Mediterranean Gull	Amber		X	2
Larus argentatus	Herring Gull	Red	X		11
Larus canus	Common Gull	Amber			2
Larus fuscus	Lesser Black-backed Gull	Amber			11
Larus marinus	Greater Black-backed Gull	Amber			11
Linaria cannabina	Linnet	Red	X		5
Morus bassanus	Gannet	Amber			7
Passer domesticus	House Sparrow	Red	X		2
Phalacrocorax aristotelis	Shag	Red			12
Rissa tridactyla	Black-legged Kittiwake	Red			6
Thalasseus sandvicensis	Sandwich Tern	Amber			2
Tringa totanus	Redshank	Amber			1
Troglodytes troglodytes	Wren	Amber			2
Uria aalge	Guillemot	Amber			6

3.2. Target Species

The target species Great Northern Diver was recorded during six of the twelve surveys (Table 3). No other target species were recorded within the survey area. The highest minimum count was 6 birds in November and January, and the lowest counts were 1 bird in February and May. No activity was recorded in the late winter, with the occasional bird appearing again in May. See Maps 1-6 for detailed findings for each survey.

In addition, probable records of Black-throated Diver were observed in three of the surveys, although these individuals were only seen at a great distance outside of the survey area, further north up the Carrick Roads estuarine channel (beyond the 5NORTH zone).

Slavonian Grebes were not recorded during the surveys.

Most activity was recorded to the north and east of survey points C and D, with some birds venturing into close zones around the docks (1D, 2B). Zone 4EAST was used the most with 8 observations, with 3EAST following with 3 observations. Individuals were mostly observed diving and foraging in the survey area, with little intra-species interaction save for occasional loose congregations of three or four birds. Individuals were very mobile and often travelling between zones across the survey area.

Table 3. Summary of target species results from surveys

Visit No.	Date	Time	Tide	Target Species Seen?	Min Count
1	28/11/2023	11:30 - 14:30	Low	Y	6
2	20/12/2023	9:30 - 12:30	High	Y	5
3	11/01/2024	10:20 - 13:20	Low	Y	6
4	02/02/2024	08:45 - 11:45	High	N	-
5	13/02/2024	12:30 - 15:30	Low	Y	1
6	27/02/2024	12:30 - 15:30	Low	N	-
7	18/03/2024	9:30 - 12:30	High	N	-
8	03/04/2024	11:00 - 14:00	High	N	-
9	11/04/2024	9:30 - 12:30	Mid	N	-
10	01/05/2024	12:30 - 15:30	Mid	N	-
11	17/05/2024	11:00 - 14:00	Mid	Y	1
12	29/05/2024	12:15 - 15:15	Mid	Y	1

3.3. Non-target Species

Marine bird species

One Red-throated Diver was also seen during one survey, loafing towards Penryn in zone 4WEST. Turnstone, Rock Pipit, Common Sandpiper, Grey Heron, Little Egret, and Kingfisher were all seen making use of the habitat within and immediately surrounding the docks area by foraging.

Seven gull species – Herring Gull, Black-headed Gull, Mediterranean Gull, Common Gull, Lesser Black-backed Gull, Great Black-backed Gull and Black-legged Kittiwake – were observed during the surveys, making use of habitats on the dockyard and the surrounding seas and harbours. A minimum of 20 Herring Gull and 5 Great Black-backed Gull nests were observed on the dockyard buildings on an ad-hoc basis during the surveys in May. Black-legged Kittiwake were generally observed foraging in the further zones to the east.

Sandwich Tern and Gannet were also observed foraging to the east, with some individuals travelling over the dockyard area and sometimes foraging in the closest zones. Razorbill and Guillemot were also seen in the mid-range zones (i.e. 3WEST) loafing individually or in groups or two or three.

Shag and Cormorant were frequently seen during most of the surveys across all zones, including some individuals in good breeding condition during the later visits. These species were both using the inner harbour and closest zones to forage.

Redshank, Little Grebe and Oystercatcher were all seen in zones 3WEST and 4WEST, foraging on or nearby Flushing beach. A possible Great White Egret was seen flying east from Flushing towards Carrick Roads. Mute Swan were seen foraging amongst boats in the harbours towards Penryn.

Generalist bird species

Multiple generalist species were observed using the docks to forage and commute. These include Feral Pigeon, Pied Wagtail, Robin, Wren, Woodpigeon, Linnet, House Sparrow and Meadow Pipit, all seen foraging on the dockyard, in particular making use of the vegetation growing on the eastern side of the Western Wharf. Anecdotally, Linnet, Woodpigeon and Pied Wagtail have been known to use the docks to breed. During the surveys, Linnet were indeed seen to be engaging in breeding behaviour on the Western Wharf (pair feeding together and male singing in suitable nesting habitat).

Corvids (Jackdaw, Carrion Crow, Rook and Magpie), Hirundines (House Martin, Swallow), Linnet, Woodpigeon, Swift and Goldfinch were all observed to be flying over the docks to and from Flushing. Buzzard, Sparrowhawk and Green Woodpecker were also seen at Flushing. Mallard were seen loafing in areas close to land, near Flushing Beach and harbours towards Penryn.

Marine Mammals

Two species of marine mammal were recorded; Grey Seal *Halichoerus grypus* and Common Dolphin *Delphinus delphis*. Common Dolphin is listed as a BAP Priority species and Grey Seal is protected under the Grey Seals Protection Act of 1914. On the fourth survey on the 2nd February 2024, a large loose pod of Common Dolphin (approximately 50 individuals) was present in Falmouth Bay, foraging in every zone across the survey area including the inner harbour (2B).

3.4. Results of Desktop Study

Records of the three target species were obtained from Cornwall Bird Watching Preservation Society (CBWPS), from areas around Falmouth Bay including Maenporth Beach (approximately 4.3km south of the survey area), Swanpool (approximately 2.3km south of the survey area), Pendennis Point (approximately 1.5km east of the survey area) and Pennance Point (approximately 2.5km south of the survey area). Records from 1st November 2023 to 31st May 2024 inclusive have been listed. Records are summarised below and in Figures 4 and 5.

Of the three target species, Great Northern Diver were most frequently seen with 52 total records. This species was present in the area every month of the survey period and in the highest numbers of any of the target species. January held the most activity with 16 records, and the maximum group count being 18 individuals. Although only six records were found in May, birds seemed to congregate in larger groups, the maximum count being over 21 individuals. Most records were observed from Swanpool, Maenporth, and Pendennis Point – all south of the survey area.

Black-throated Diver were less frequently seen, with 13 total records, and no individuals observed in February or May. Activity levels peaked in April, with five records including individuals or small groups of two. The largest group recorded was in January with a total of 14 individuals. Most records were observed off Pendennis Point.

Slavonian Grebe was recorded the least of the three target species, with seven records only observed across January, February and April. Activity had two peaks in February and April with three records observed in each month. A more solitary species, the largest number of individuals seen at a time was two in February. Most records were observed off Castle Beach, approximately 800 metres south of the survey area.

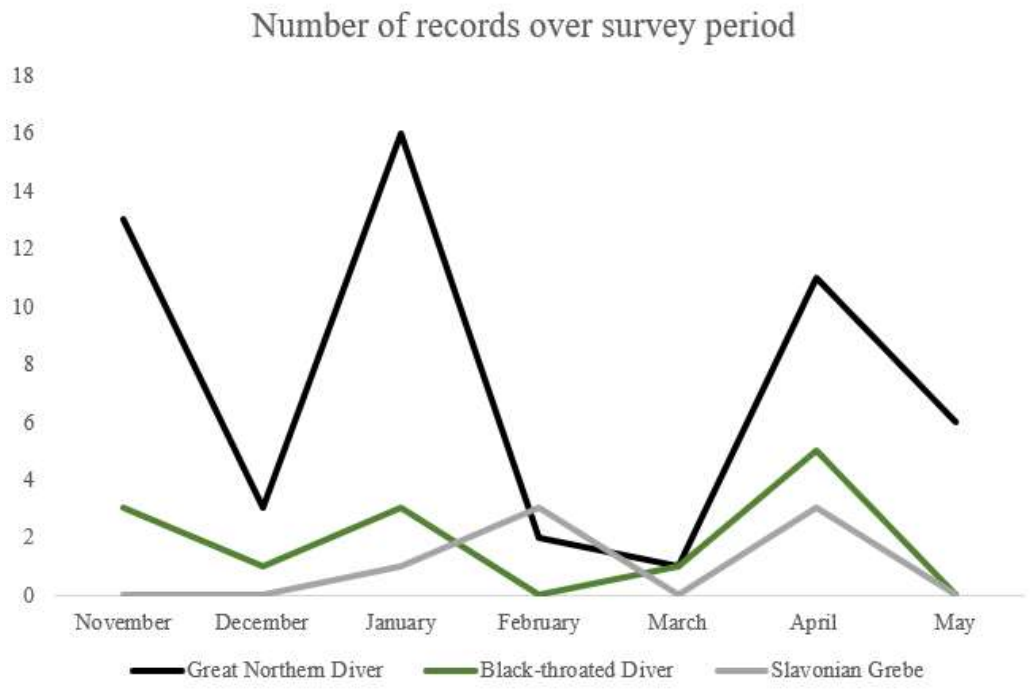


Figure 4. Number of target species records observed in Falmouth Bay from November 2023 – May 2024. Source: Cornwall Bird Watching Preservation Society (CBWPS)

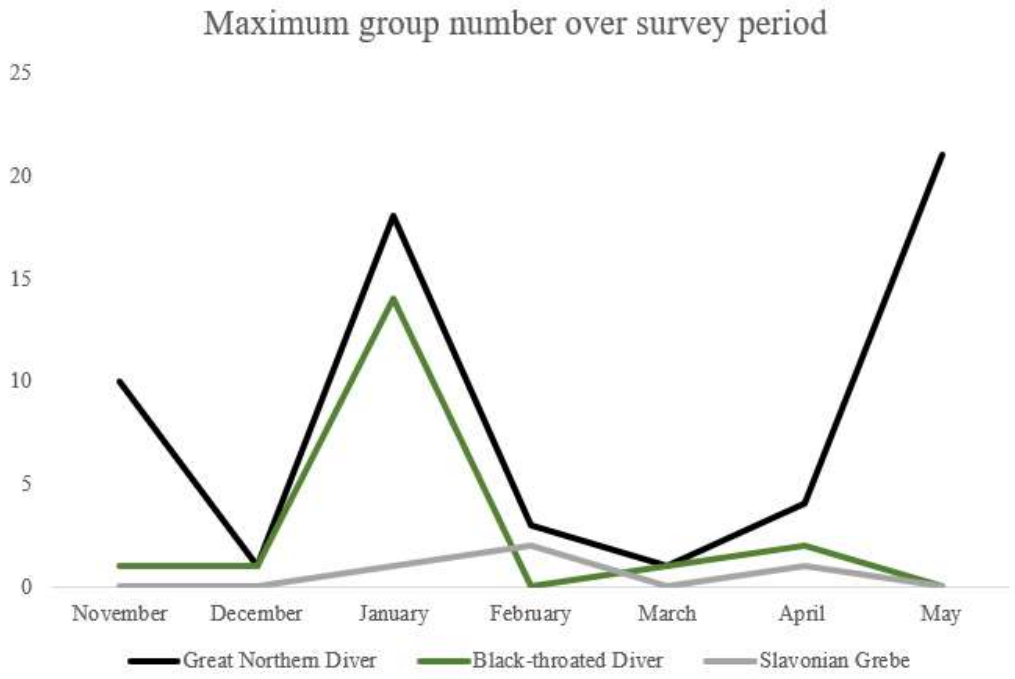


Figure 5. Maximum number of individuals observed at one time in Falmouth Bay from November 2023 – May 2024. Source: Cornwall Bird Watching Preservation Society (CBWPS)

Conclusion

Of the three target species, Great Northern Diver were most regularly seen in the survey zones during the surveys, although no activity was recorded in March and April. The maximum individual count peaked in November and January with at least 6 birds recorded. Probable Black-throated Diver were also seen making use of habitats outside of the survey area, beyond the 5NORTH zone.

Survey findings align with nearby records of both diver species, as Great Northern Diver was most frequently recorded and in larger groups. In records, Black-throated Diver were primarily observed slightly south of the survey area. Considering survey findings of individuals north of the survey area, it is likely that this species may have also been present in the intermediate areas within the survey zones during the survey period. Although no Slavonian Grebe were recorded during the surveys, records from community birdwatching groups indicate that this species was present in small numbers during the survey period, with peak activity occurring slightly south of the survey area. It is possible that this species may have also been present in habitat closer to the Docks during this time.

APPENDIX 1
Scales used in assessment of survey conditions

Beaufort Wind Scale

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-19 ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (18-25 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Twigs breaking off trees, generally impedes progress
9	41-47	Strong Gale	High waves (23-32 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (29-41 ft) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (37-52 ft) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	

Otka Cloud Scale

Sky Cover (oktas)	Sym-bol	Name	Abbr.
0		Sky **Clear**	SKC
1		**Few*** Clouds	FEW*
2			
3		**Scattered**	SCT
4			
5		**Broken**	BKN
6			
7			
8		**Overcast**	OVC
(9)		Sky **Obscured**	
(/)		Not Measured	

Douglas Sea State & Swell Scale

Douglas sea and swell scale

Devised in the 1920s by Captain H.P. Douglas CMG, RN, Hydrographer of the Royal Navy, for estimating the roughness of the sea for navigation and recommended for international use in 1929, this scale consists of pairs of digits, each on a scale from 0 to 9, the first representing 'sea' and the second 'swell'.

State of the sea			Swell	
Code figure	Height (m)	Description	Code figure	Description
0	0	Calm (glassy)	0	No swell
1	0 – 0.1	Calm (rippled)	1	Very low (short and low wave)
2	0.1 – 0.5	Smooth (wavelets)	2	Low (long and low wave)
3	0.5 – 1.25	Slight	3	Light (short and moderate wave)
4	1.25 – 2.5	Moderate	4	Moderate (average and moderate wave)
5	2.5 – 4.0	Rough	5	Moderate rough (long and moderate wave)
6	4.0 – 6.0	Very rough	6	Rough (short and heavy wave)
7	6.0 – 9.0	High	7	High (average and heavy wave)
8	9.0 – 14.0	Very high	8	Very high (long and heavy wave)
9	Over 14.0	Phenomenal	9	Confused (wave length and height indefinable)

APPENDIX 3 – MARINE SURVEYS HABITAT INFORMATION

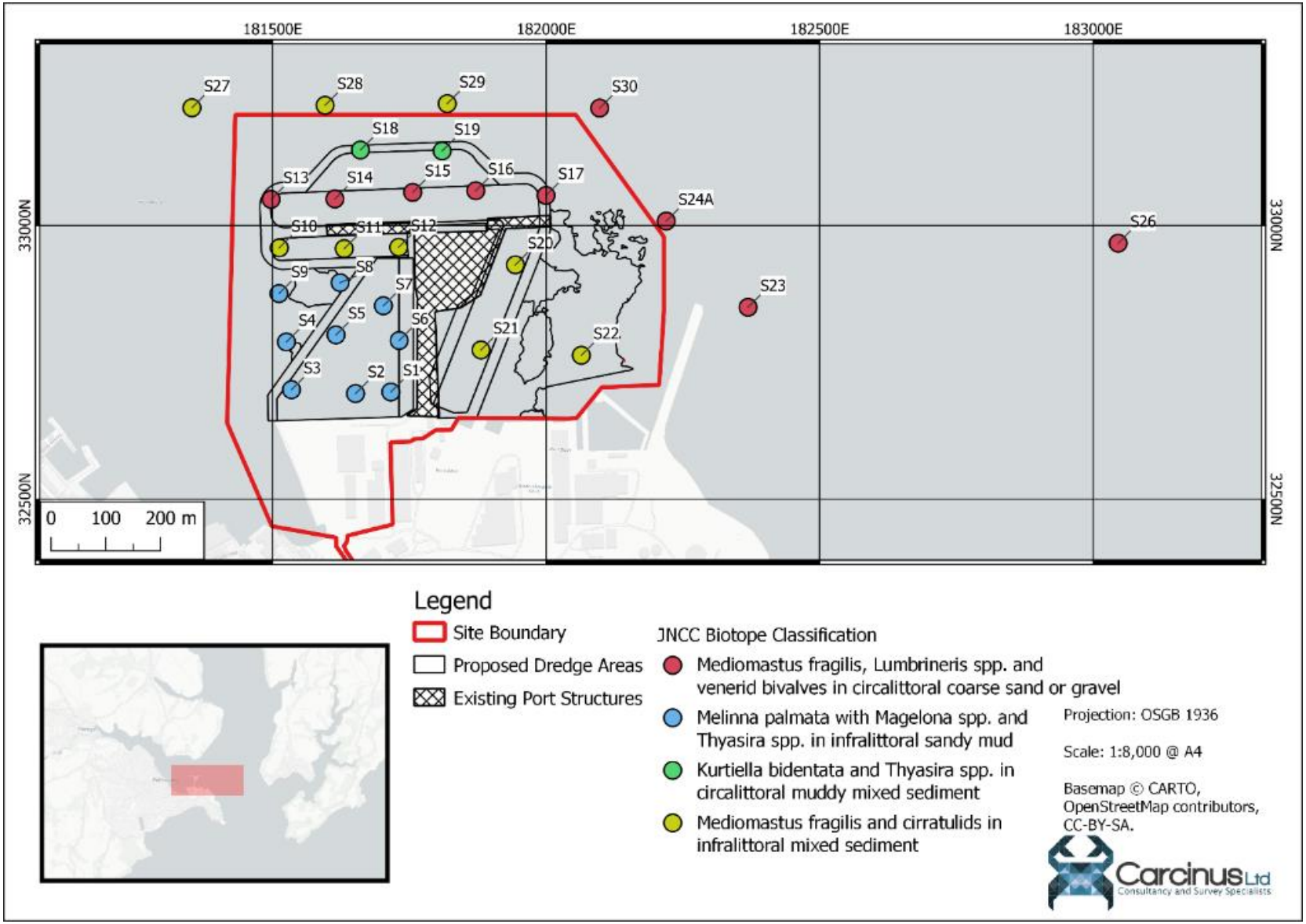


Figure 1 JNCC biotopes assigned to grab samples collected during the May 2023 survey.

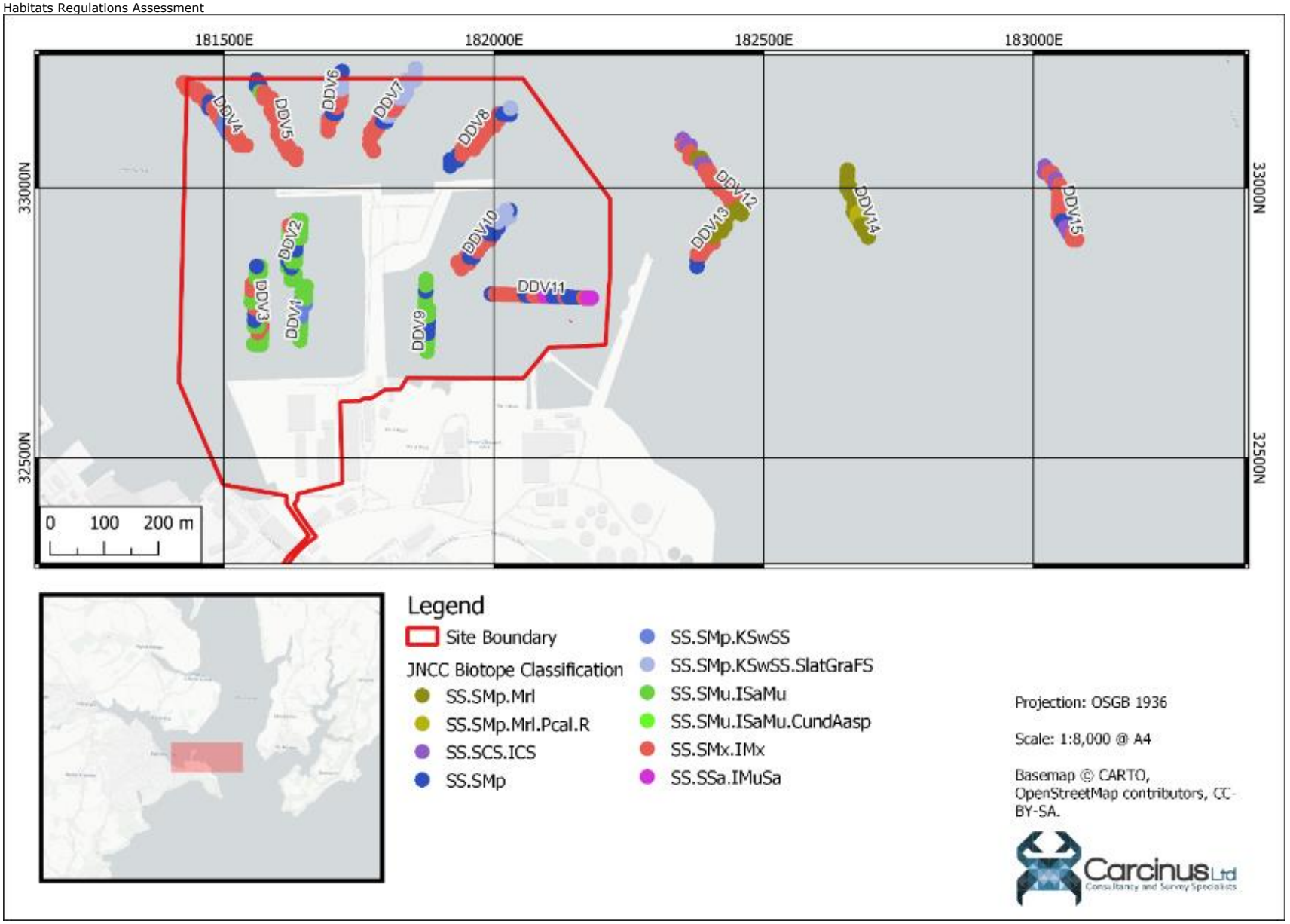


Figure 2 JNCC biotopes/habitat complexes assigned to DDV transects surveyed in May 2023.

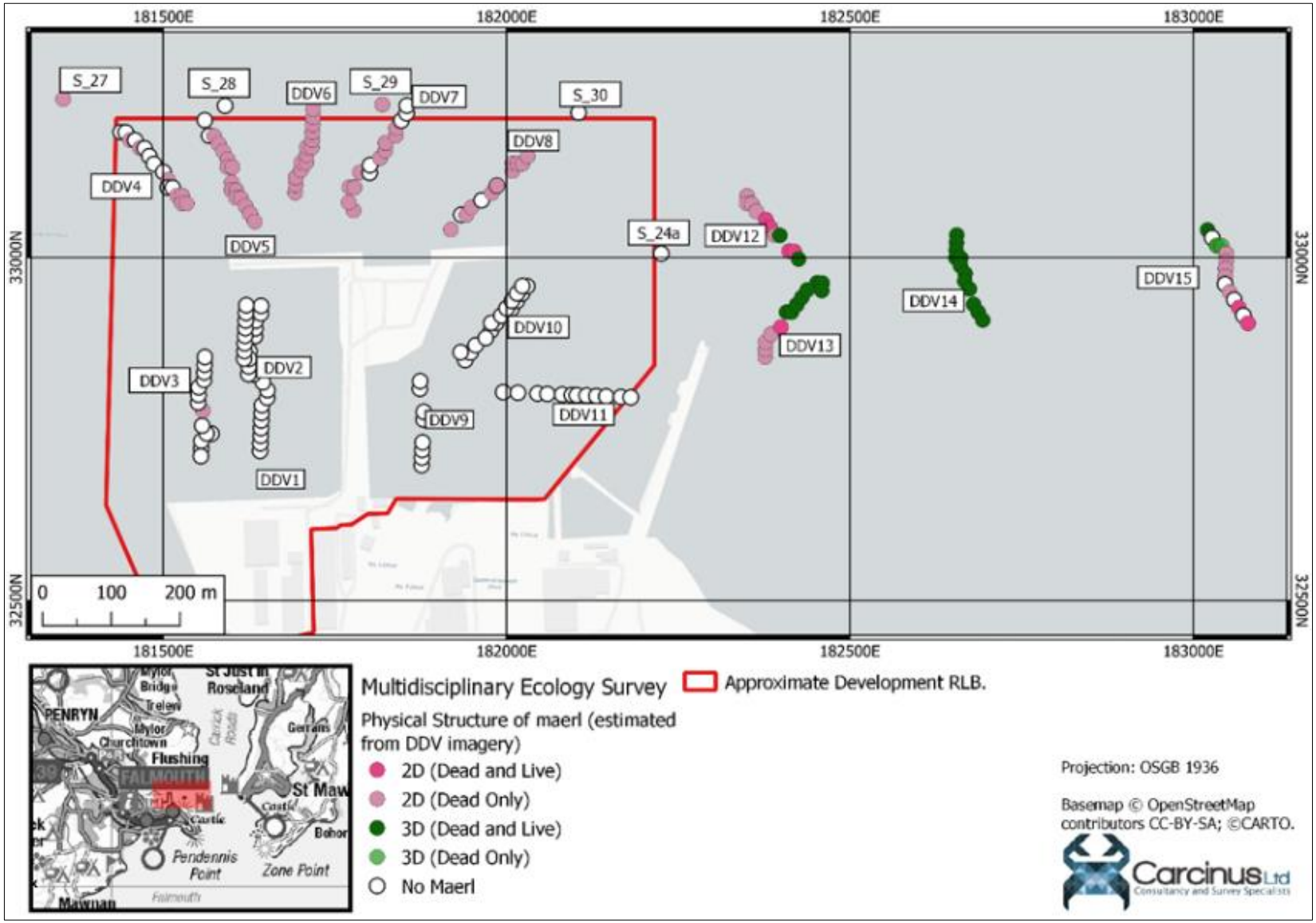


Figure 3 Estimated 3D/2D structure of identified areas of maerl along May 2023 DDV transects.

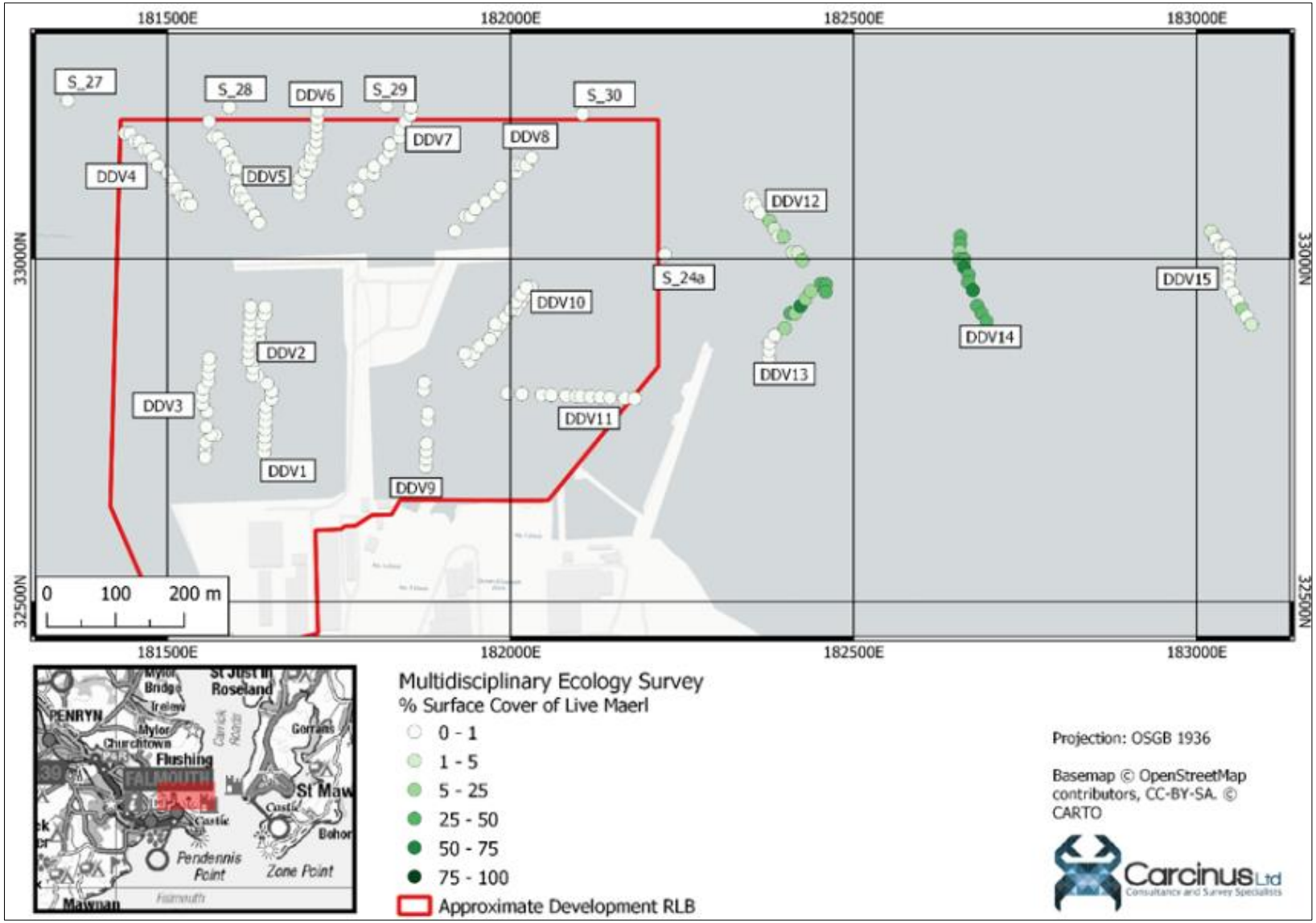


Figure 4 Surface cover of live maerl, presented as the percentage cover of each still image taken along each May 2023 transect.

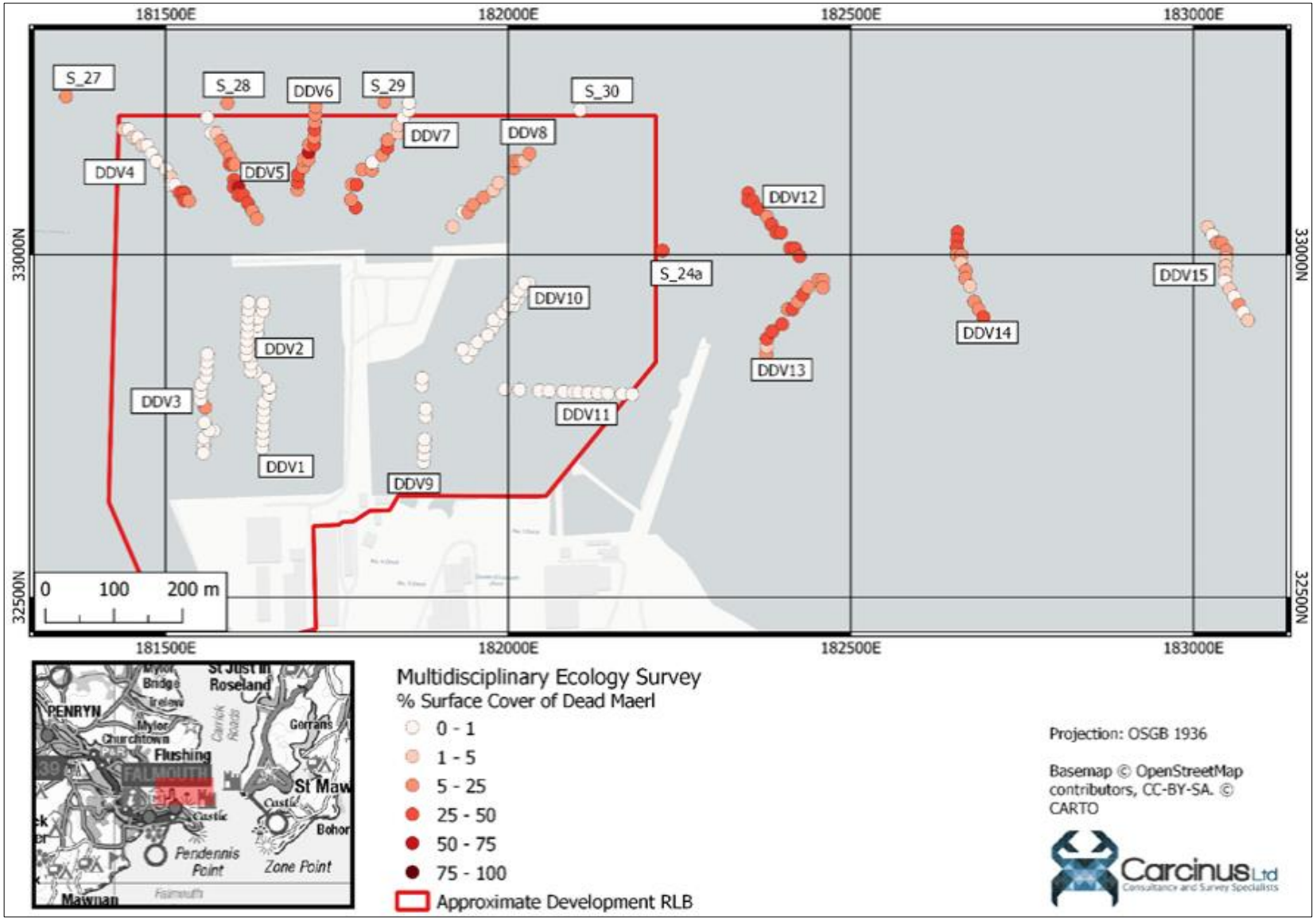


Figure 5 Surface cover of dead maerl/maerl gravel, presented as the percentage cover of each still image taken along each May 2023 transect.

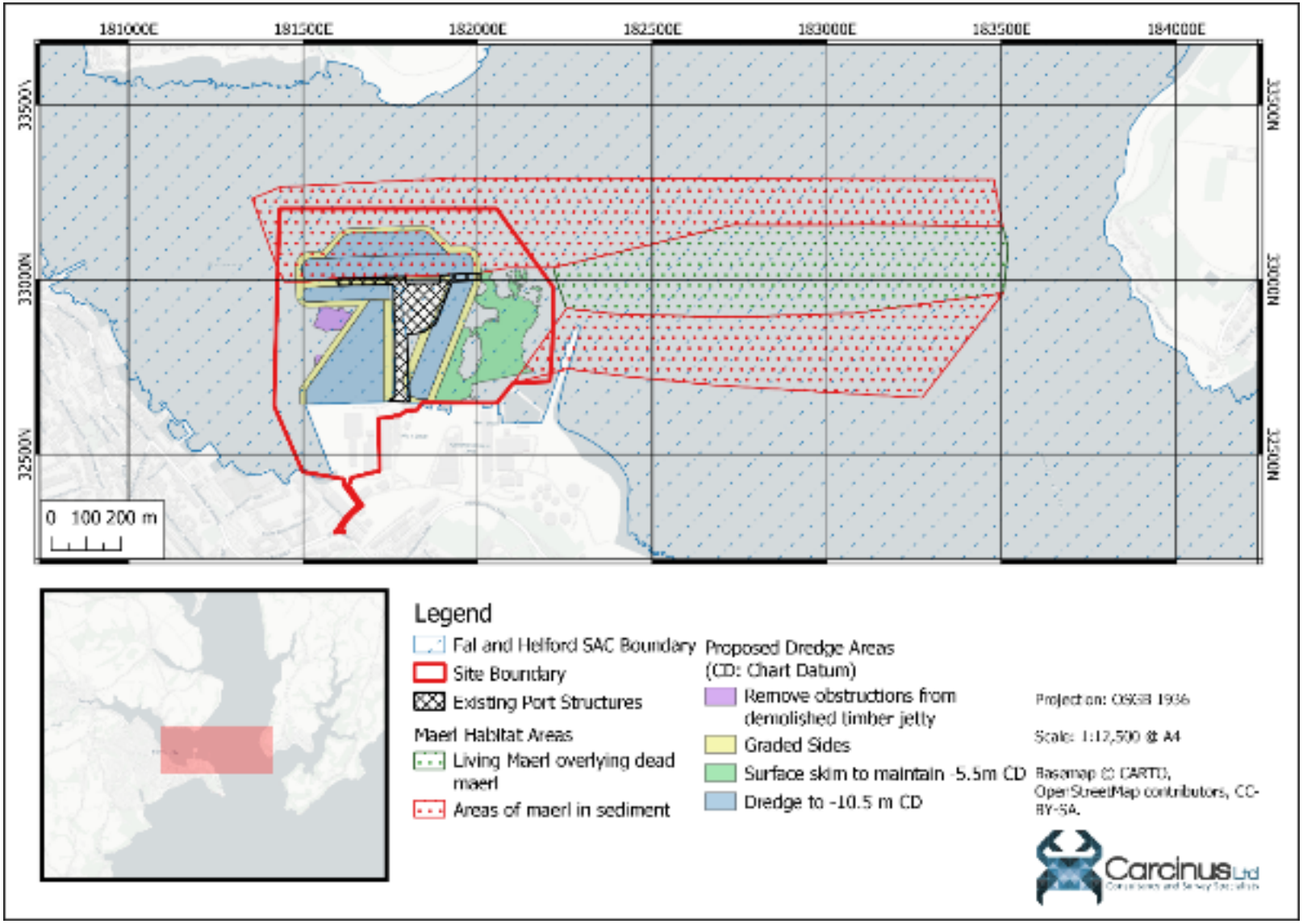


Figure 6 Plan showing areas of maerl habitat and the proposed dredging.

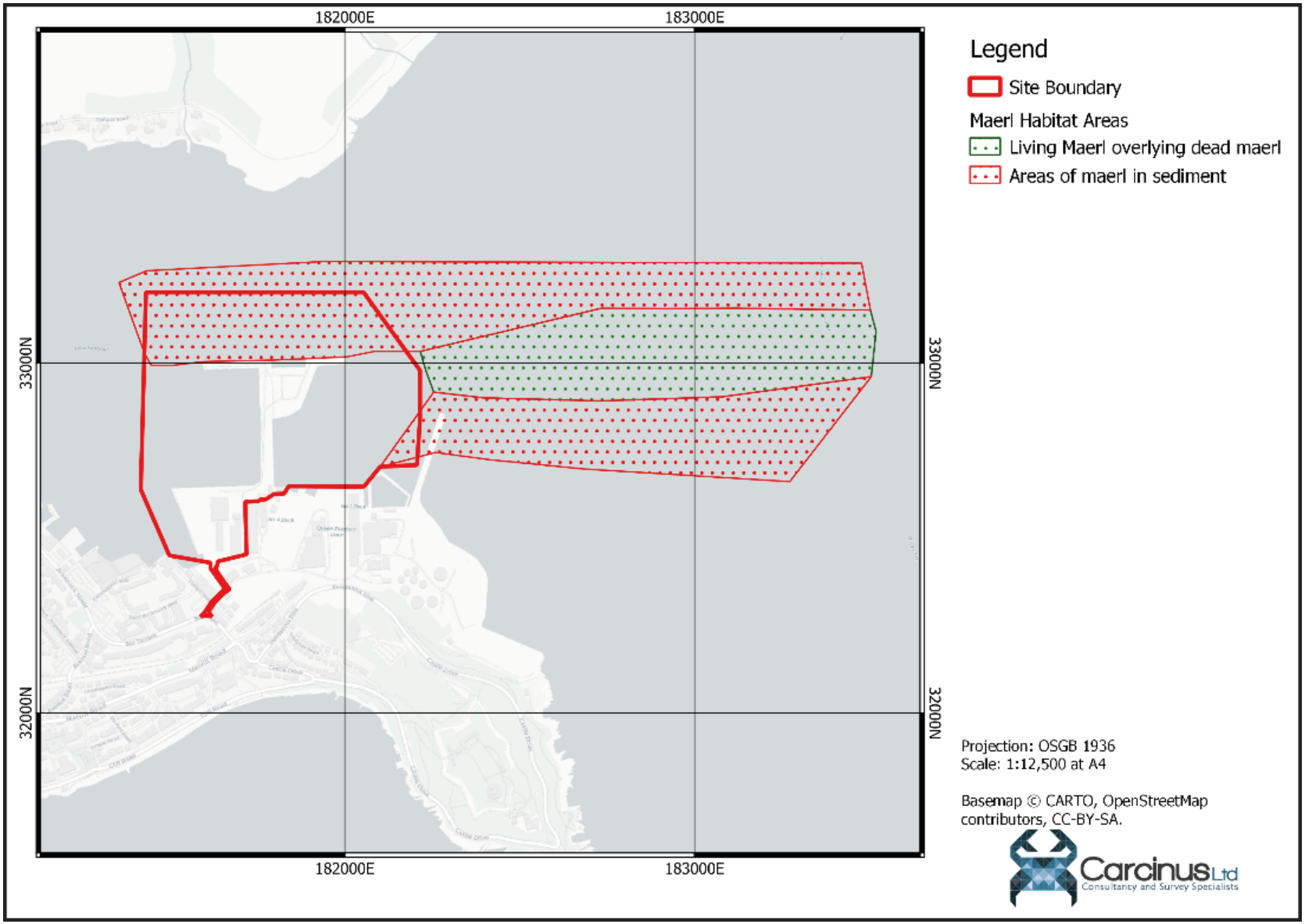
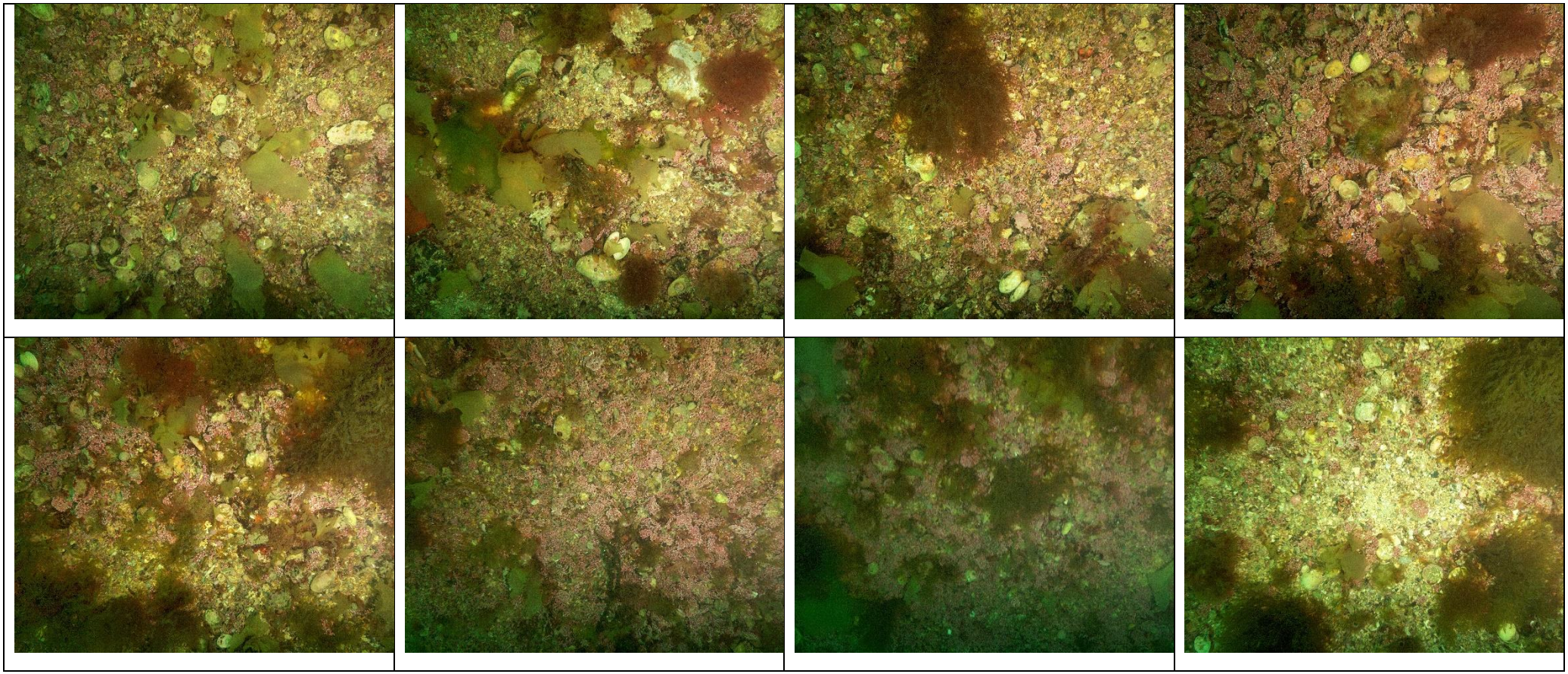


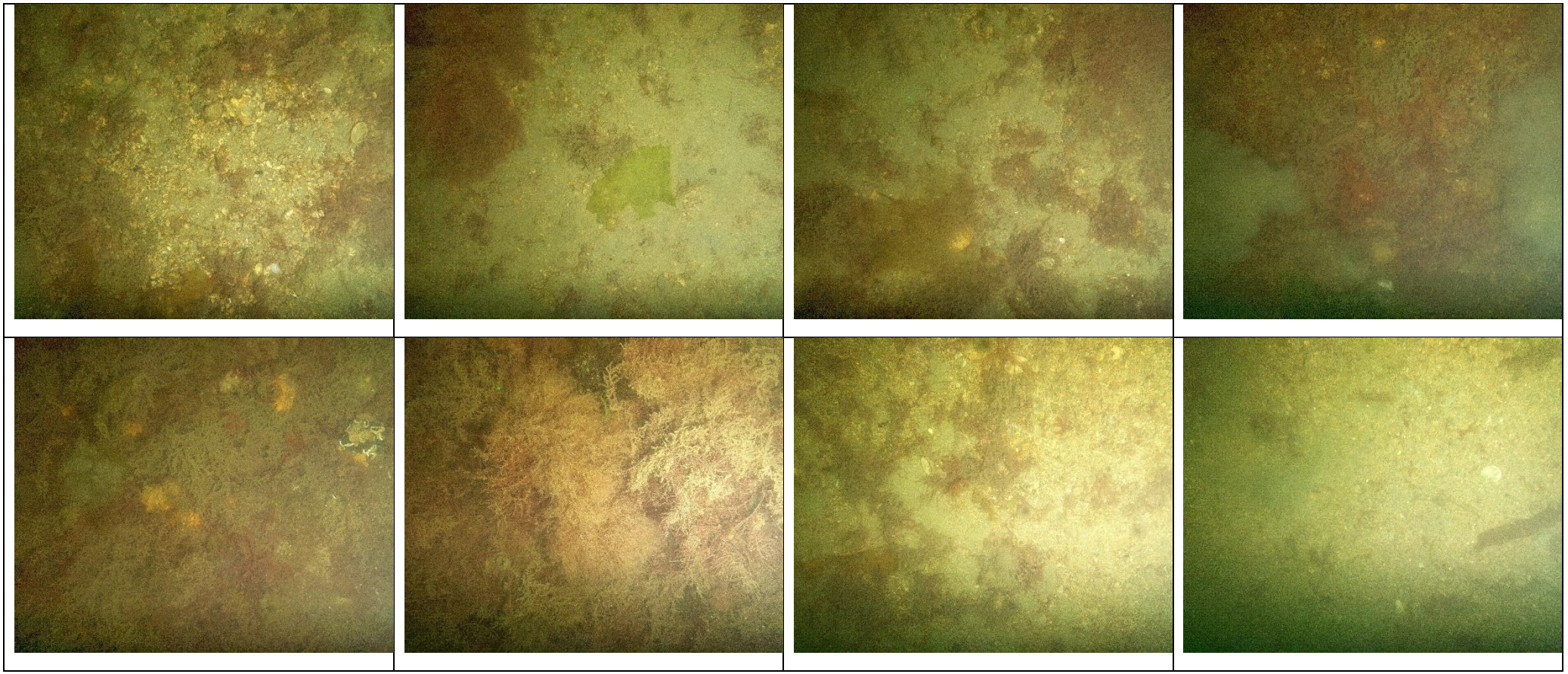
Figure 7 Maerl Habitat Areas Identified Within the Site Boundary and Benthic Ecology Survey Study Area

APPENDIX 4 – STILL IMAGES FROM KEY 2023 DDV SURVEY TRANSECTS

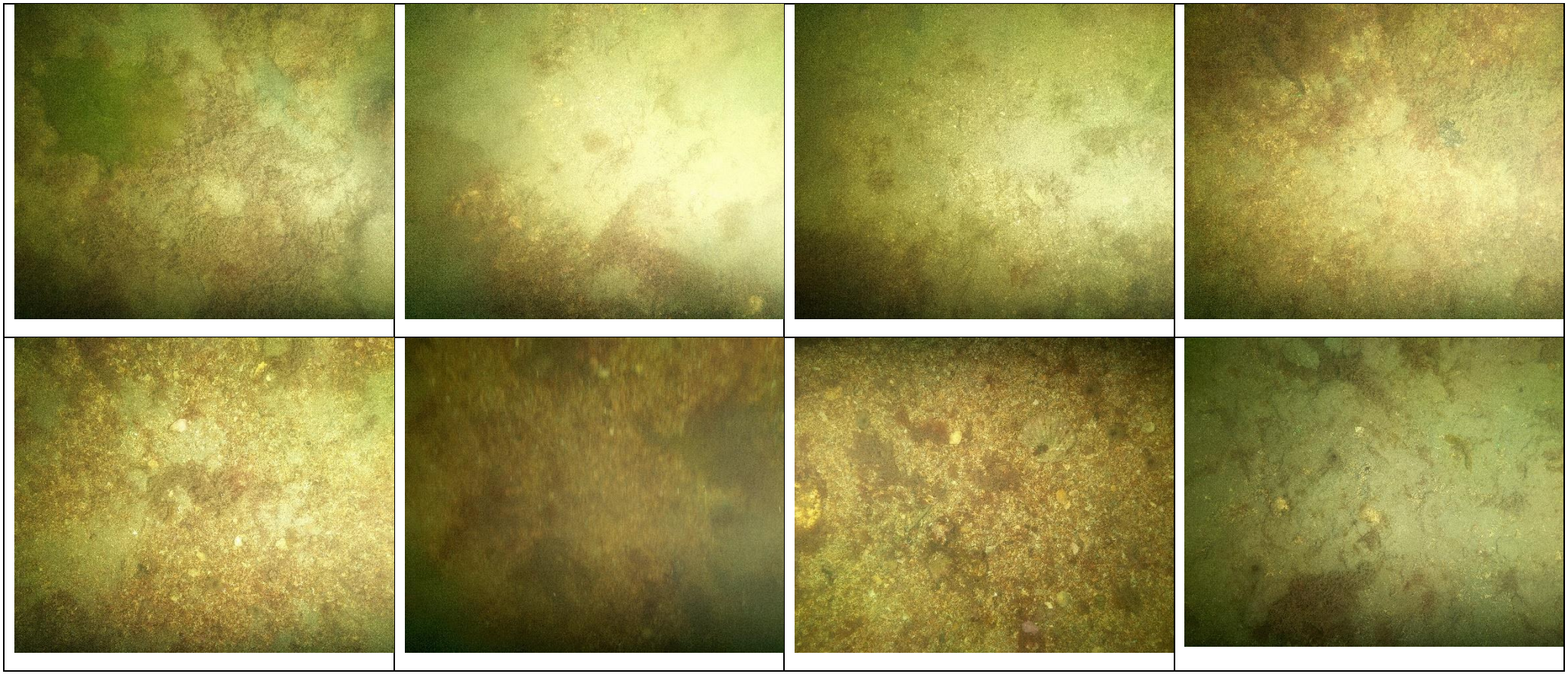
Outside and east of site boundary: 2023 DDV14 – image numbers 1, 2, 5, 7, 8, 10, 11, 13



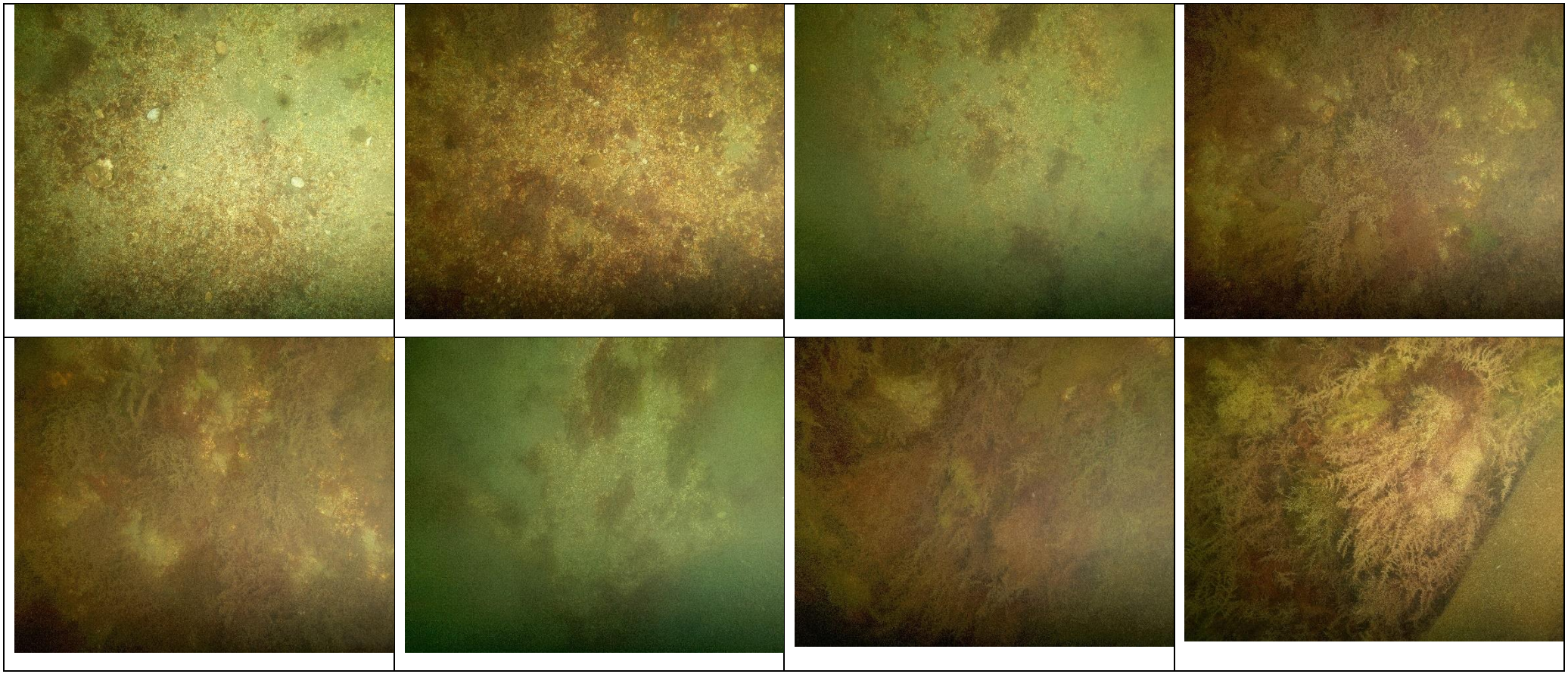
North: 2023 DDV4 – image numbers 4, 7, 10, 13, 15, 17, 19, 22



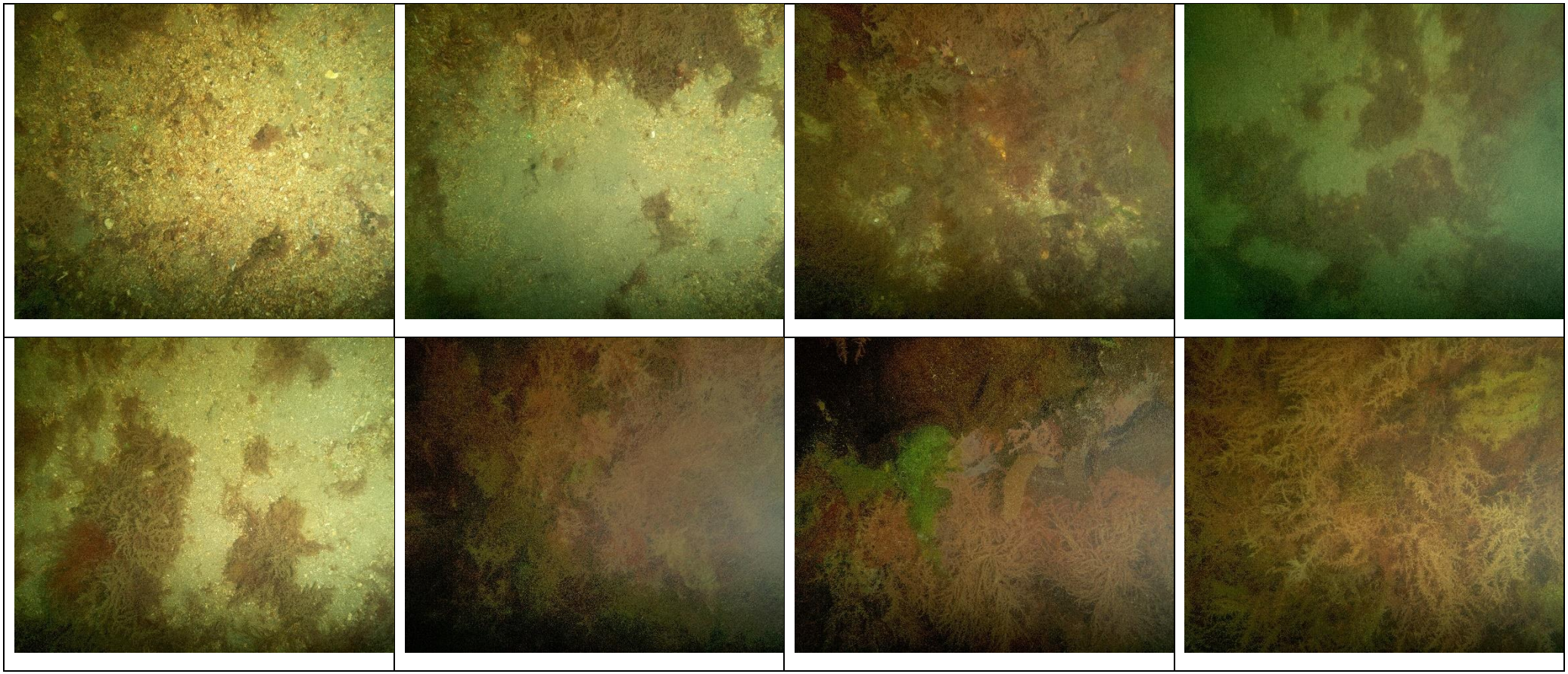
North: 2023 DDV5 – image numbers 2, 3, 5, 7, 10, 11, 14, 17



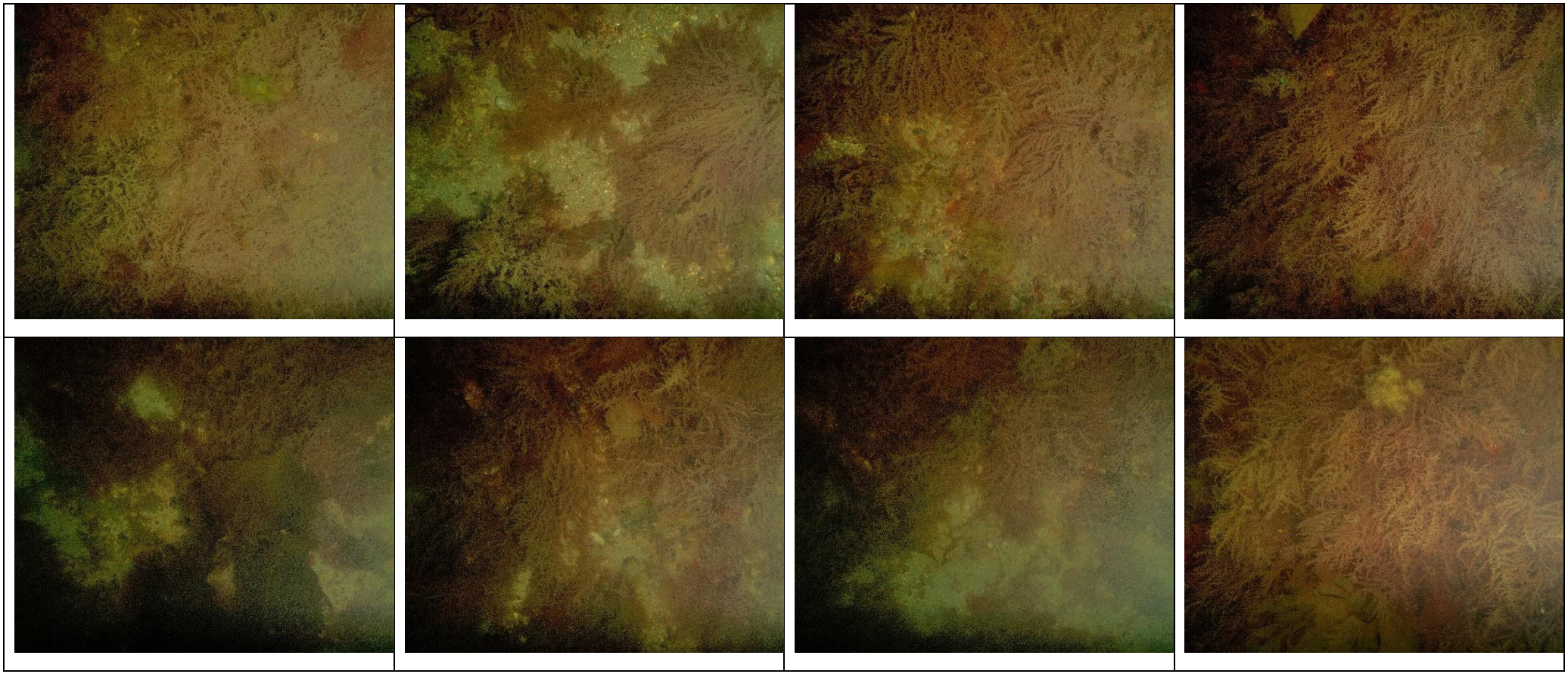
North: 2023 DDV6 – image numbers 2, 4, 6, 8, 10, 12, 14, 16



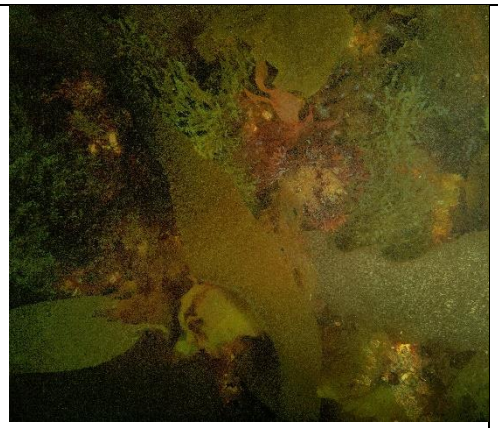
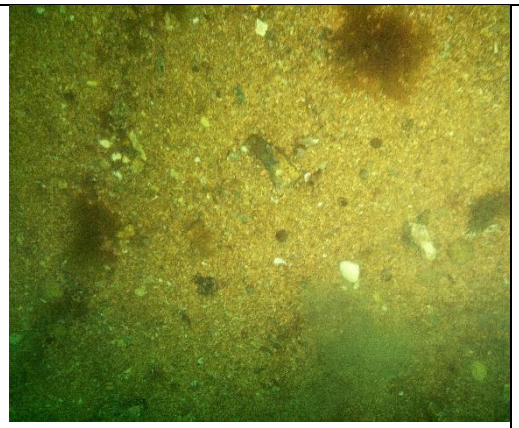
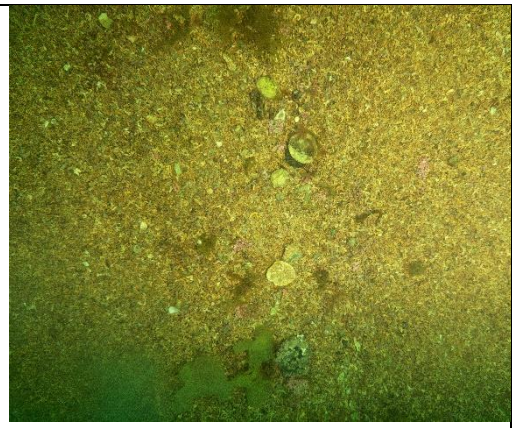
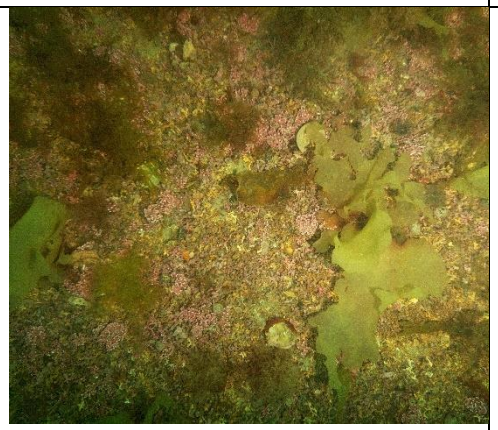
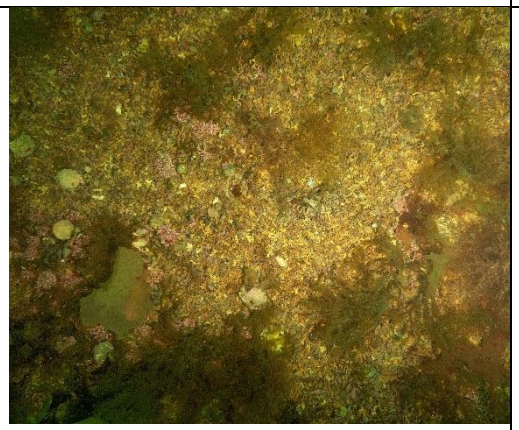
North: 2023 DDV7 – image numbers 1, 4, 7, 9, 12, 15, 17, 20



North: 2023 DDV8 – image numbers 1, 3, 4, 6, 7, 8, 10, 12



Eastern Breakwater: 2023 DDV13 – image numbers 2, 4, 6 (southern end of transect), 10, 11, 12 (northern end of transect)

Southern End			
Northern End			

APPENDIX 5 - CALCULATIONS OF SEABED HABITAT LOSS

Table 1: Western Wharf				
Activity	**Details**	**Loss or Gain of SAC Area**	**Approximate Surface Area (m^2)**	**Notes**
Strengthening and Enabling Works	Toe wall (located south of Western Wharf, to the west of the dry docks)	Loss	25	
	Stabilisation of existing causeway – cross-tied or ground-anchored combi wall and backfill between wall and existing structure	Loss	126	
Construction	Installation of 164 no. 1,270 mm diameter vertical piles and placement of 330 m length of revetment	Loss	3240	Area takes into account overlap with existing revetment (to be excavated and re-placed) and timber wharf to be demolished
	Reclaimed Land	Loss	2069	Area takes into account overlap with existing revetment (to be excavated and re-placed) and timber wharf to be demolished
TOTAL/NET		**Loss**	**5,460**	

Table 2: Northern Arm and Northern Wharf				
Activity	**Details**	**Loss or Gain of SAC Area**	**Surface Area (m^2)**	**Notes**
Demolition	Demolition of Northern Arm	Gain	823	Area takes into account that an area to be demolished that will be re-covered by revetment
Construction	Installation of 80 no. 1,270 mm diameter vertical piles and placement of 160 m length of revetment	Loss	660	Area takes into account overlap with existing revetment (to be excavated and re-placed) and Northern Arm to be demolished
TOTAL/NET		**Gain**	**163**	

Table 3: Northern Face of Existing Queen's and Queen's Extension

Activity	Details	Loss or Gain of SAC Area	Surface Area (m^2)	Notes
Strengthening and Enabling Works	Toe wall on northern face of existing Queen's Wharf	Loss	124	
Construction	Installation of 28 no. 1,016 mm diameter vertical piles	Loss	22.7	
	Installation of 20 no. 914 mm diameter raking piles	Loss	13.1	
TOTAL/NET		**Loss**	**159.8**	

Table 4: FLOW Deck, Southern Face of Existing Queen's and Duchy Wharf

Activity	Details	Loss or Gain of SAC Area	Surface Area (m2)	Notes
Strengthening and Enabling Works	Toe walls (located along north extent of FLOW Deck and southern face of existing Queen's)	Loss	19	Area takes into account overlap with existing revetment (to be excavated and re-placed)
	Toe walls (located along south extent of FLOW Deck and along Duchy Wharf)	Loss	159	
Construction	Installation of 195 no. 1,321 mm diameter vertical piles and placement of 290 m length of revetment, and backfilled void	Loss	6,520	Area takes into account overlap with existing revetment (to be excavated and re-placed)
TOTAL/NET		**Loss**	**6,698**	