



Connah's Quay Low Carbon Power

Environmental Statement Volume IV Appendix 12-D: Intertidal Survey Report

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1. Intertidal Walkover Survey Report

1.1 Introduction

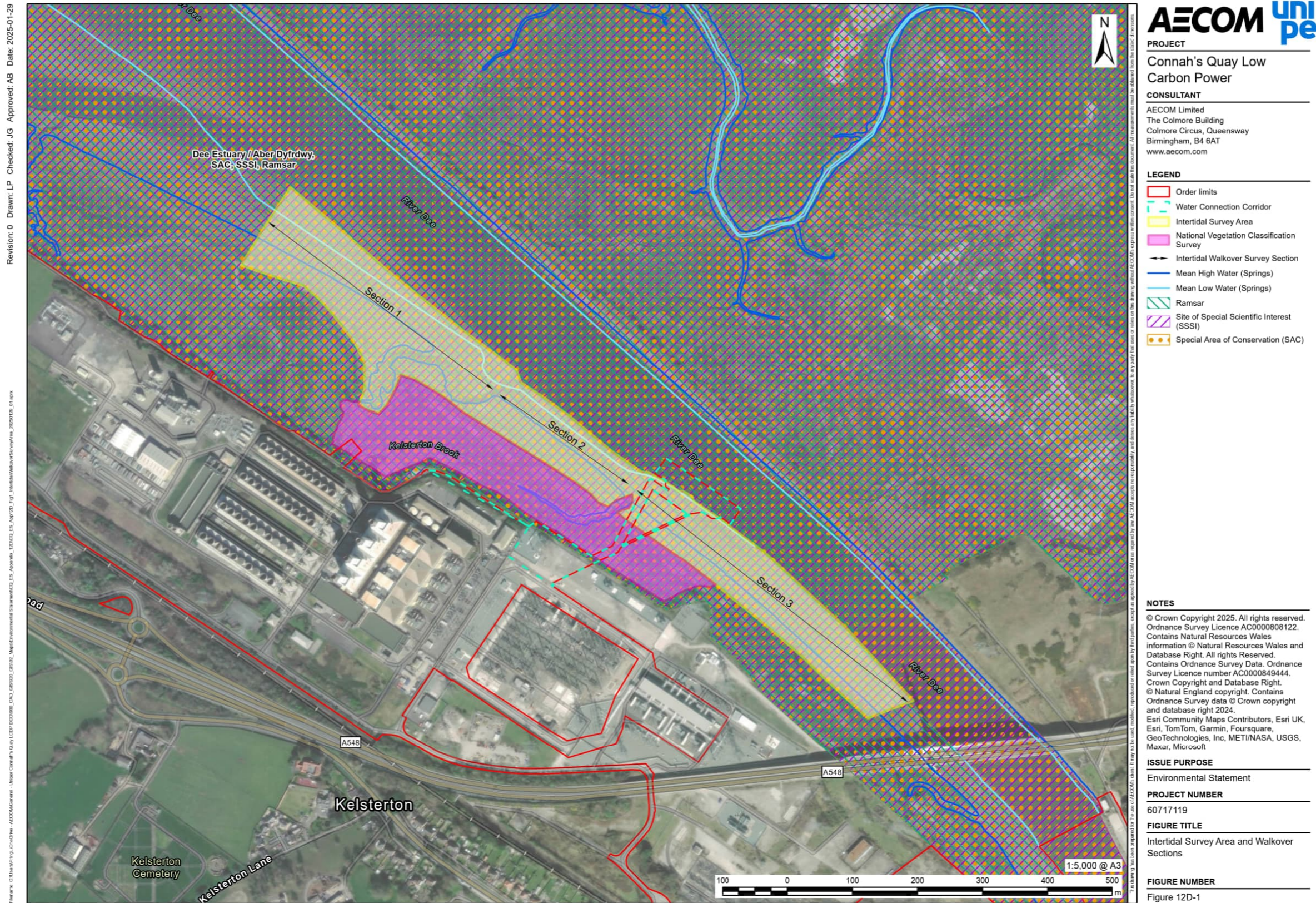
- 1.1.1 Uniper UK Limited (hereafter referred to as the Applicant) commissioned AECOM to undertake an Unmanned Aerial Vehicle (UAV (drone)) survey in combination with an intertidal walkover survey. The results of the surveys are to inform the baseline of an Environmental Statement (ES) for the demolition of an existing gas treatment plant (GTP) and above-ground installation (AGI), store buildings, and contractors' facilities on site and the construction, operation and maintenance of a Combined Cycle Gas Turbine (CCGT) generating plant with Carbon Capture Plant (CCP) (the 'Proposed Development') at Connah's Quay, Flintshire, Wales.
- 1.1.2 This intertidal survey report details the results of the UAV and walkover surveys conducted of the intertidal habitat at Connah's Quay, on the banks of the River Dee / Dee Estuary. This includes the presentation of drone data collected during the UAV flight surveys to create up to date intertidal habitat maps.
- 1.1.3 Photographs taken during the survey are provided as plates in **Annex A**.

1.2 Methodology

- 1.2.1 The surveys occurred over two days from 01 to 02 July 2024. Day one comprised two automated UAV flight surveys conducted of the intertidal survey area. The UAV surveys during day one produced detailed drone imagery of the entire intertidal survey area (**Plate 1**) which could be used to identify any points of interest requiring further investigation.
- 1.2.2 Additional UAV flight surveys were attempted on the morning of day two to further investigate the intertidal area, but the first attempt was stopped shortly after commencing due to the disturbance of birds using the intertidal habitat. A second attempt at UAV flight surveys during the afternoon of day two was also aborted due to strong winds.
- 1.2.3 Day two also consisted of the intertidal walkover survey. The walkover was conducted from west to east across the intertidal zone of the survey area, within the boundaries of the Dee Estuary / Aber Dyfrdwy (Wales) Special Area of Conservation (SAC), Site of Special Scientific Interest (SSSI) and Ramsar site (**Plate 1**). The walkover commenced at grid reference SJ 27807 71536 and finished at SJ 28674 70870 (**Plate 1**). The survey commenced at 1pm, which was two hours before low tide. The survey was conducted on foot by a marine ecologist and a safety survey second. Care was taken to ensure unstable sediment was avoided. Where areas of the intertidal shore were not accessible due to unstable sediment, binoculars were used to identify habitats and key features of interest.
- 1.2.4 When on site, the intertidal survey area was split into three sections for the walkover (**Plate 1**) due to the presence of Kelsterton Brook and other gullies and streams intersecting the intertidal habitat, which restricted continuous access along the intertidal area:

- Section One: SJ 27807 71536 to SJ 27990 71442;
 - Section Two: SJ 28099 71337 to SJ 28303 71203; and
 - Section Three: SJ 28311 71178 to SJ 28674 70870.
- 1.2.5 Section Three overlaps with the Water Connection Corridor for the Proposed Development (**Plate 1**).
- 1.2.6 The UAV data was used to create a 3-dimensional (3D) model of the entire intertidal walkover survey area, which has been used to confirm habitats identified during the intertidal walkover. This has also allowed identification of habitats which were not accessible by foot during the walkover due to unstable sediment. For example, close-up access to the brooks and streams intersecting the intertidal habitat was not possible due to unstable sediment, and therefore the UAV data 3D model could be used to provide a detailed view of the marine ecological features present.
- 1.2.7 Following the survey, the habitats identified during the walkover and by the UAV survey have been described using the European Nature Information System (EUNIS) for habitat classification, which facilitates the description of habitats using specific habitat identification criteria (Ref 1).
- 1.2.8 The habitat mapping produced for this survey report is broadscale but provides a good indication of the habitats present.

Plate 1: Intertidal survey and walkover sections



1.3 Findings from the intertidal survey

- 1.3.1 The intertidal habitat mapping over the total intertidal survey area, produced using drone data, is shown in **Plate 2**¹. The habitat mapping has also been split into Section One, Section Two and Section Three, as described in **Plate 1**, which are also shown in **Plate 3**, **Plate 5** and **Plate 6** respectively, and discussed in the relevant sections below.

¹ The UAV imagery was not able to pick up all areas of water in the estuary and streams due to reflections on the water surface. Therefore, these areas are greyed-out on **Plate 2**, **Plate 3**, **Plate 5** and **Plate 6** below.

Walkover Section One

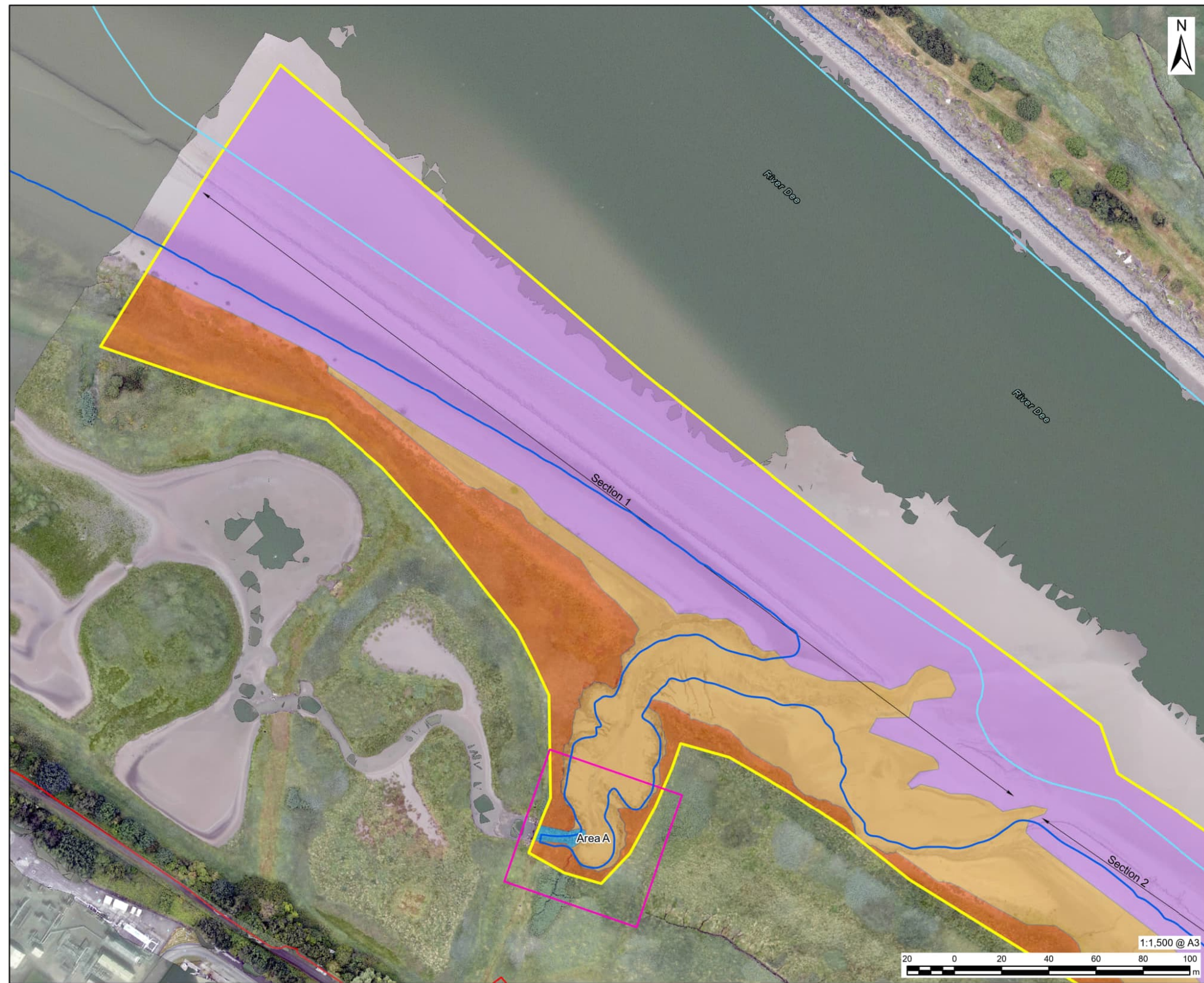
- 1.3.2 The intertidal sediment in Section One (**Plate 3**), which does not overlap with the Water Connection Corridor for the Proposed Development, consisted predominantly of soft intertidal mud, with some muddy sand present towards the upper shore, indicative of the EUNIS habitat types 'Intertidal Sandy and Muddy Sand (A2.2)' and 'Intertidal Mud (A2.3)' (**Plate 3**; **Plate A-1** (Annex A)). These habitats are representative of Annex I Mudflats and sandflats not covered by seawater at low tide (1140) which are a feature of the Dee Estuary / Aber Dyfrdwy (Wales) SAC (Ref 2). Mudflats and sandflats are also features of the Dee Estuary Site of Special Scientific Interest (SSSI) and Ramsar site (Ref 3 and Ref 4).
- 1.3.3 The muddy sediment identified was dry, stable and cracked on the upper shore, having had time to dry out, with the sediment becoming softer and more unstable towards the water line. Therefore, it was not possible to reach sediment closer to the water due to safety concerns. However, the number of bird prints in the mud indicated this area of intertidal mud is heavily used by bird species, as shown in **Plate A-1**.
- 1.3.4 The upper shore was intersected with small patches of encroaching saltmarsh, including common cordgrass (*Spartina anglica*) and common glasswort (*Salicornia europaea*) (see **Plate A-2** (Annex A)), representative of 'Coastal Saltmarshes and Saline Reedbeds (A2.5 (EUNIS))'. Saltmarshes characterised by *Salicornia* spp. are an Annex I habitat feature of the Dee Estuary / Aber Dyfrdwy (Wales) SAC (Ref 2). Both common cordgrass and glasswort species are also features of the Dee Estuary SSSI and Ramsar site (Ref 3 and Ref 4).
- 1.3.5 Several washed-up jellyfish were identified on the mud, two of which are shown in **Plate A-3** (Annex A), which appear to have been deposited during the tidal cycle and transported from elsewhere outside of the estuary. This included three moon jellyfish (*Aurelia aurita*) and one compass jellyfish (*Chrysaora hysoscella*). Two shore crab (*Carcinus maenus*) carcasses were also identified on the intertidal mud.
- 1.3.6 Section One includes a small stream located within a large gully, which previously transported water from Connah's Quay Nature Reserve into the estuary. The stream has now been largely blocked off (**Plate A-4** (Annex A)) to allow creation of pools in the Connah's Quay Nature Reserve, however a small volume of water is still present in the gully (**Plate A-5** (Annex A)). It is also apparent that the gully is inundated during the high tide, creating intertidal habitat. Towards the location of the stream, which is at the eastern extent of Section One, several small patches of unidentified green algae were present on the intertidal sediment, with patches also identified on the banks of the stream (**Plate A-6** (Annex A)). Sediment in the stream appeared to consist only of intertidal mud (A2.3).
- 1.3.7 The stream / gully and its banks have been identified as an Area of Interest (Area A; **Plate 3**), due to the provision of potential suitable habitat for Chinese mitten crab (*Eriocheir sinensis*). Chinese mitten crab is considered an invasive non-native species in the UK and is understood to be spreading in mid and lower catchments of the River Dee (Ref 5). The species has only

been recorded once within the Survey Area, however due to its preference to burrow in intertidal mud banks, the drone data collected from within Area A was reviewed for indications of the presence of Chinese mitten crab (**Plate 4**). Following this review of the drone data, the banks have been identified as having some structural complexity but appear to lack any obvious indications of the usually clearly visible burrows produced by Chinese mitten crab (Ref 6).

Plate 3: Section One of Intertidal Walkover Survey

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LEGEND

- Order limits
- Intertidal Survey Area
- Area of Interest
- Intertidal Walkover Survey Section
- Mean High Water (Springs)
- Mean Low Water (Springs)

Intertidal Broadscale EUNIS Habitat

- Intertidal Rock (A1)
- Intertidal Sand and Muddy Sand (A2.2)
- Intertidal Mud (A2.3)
- Coastal Saltmarshes and Saline Reedbeds (A2.5)

NOTES

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PROJECT NUMBER
60717119

FIGURE TITLE
Section One of Intertidal Walkover Survey

FIGURE NUMBER
Figure 12D-3

Plate 4: Screenshots of drone data taken from within 'Area A' (as shown in Plate 3) used to review indications of Chinese mitten crab presence



Walkover Section Two

- 1.3.8 Section Two of the walkover commenced on the east bank of the Connah's Quay Nature Reserve outlet brook (**Plate 1**).
- 1.3.9 In Section Two, the intertidal sediment also consisted of mud and muddy sand, indicative of the habitat types 'Intertidal Sandy and Muddy Sand (A2.2)' and 'Intertidal Mud (A2.3)' (**Plate 5**) (representative of Annex I habitat protected by Dee Estuary / Aber Dyfrdwy (Wales) SAC (Ref 2)). Sand content appeared to increase towards the lower shore and towards the eastern extent of Section Two, with clear striations shown in the sediment where the tidal cycle has deposited varying compositions of mud and sand (**Plate A-8** (Annex A)). A large, muddy depression of Intertidal Mud (A2.3) was also present (**Plate A-9** (Annex A)), with patches of green algae (**Plate A-10** (Annex A)). This appeared to be linked to the gully, which is connected to Connah's Quay Nature Reserve, as described in Section One.
- 1.3.10 Where sand content was higher, several sea gooseberries (*Pleurobrachia pileus*) and moon jellyfish were identified on top of the sediment, particularly towards Kelsterton Brook (**Plate A-11** (Annex A)). Sediment within Kelsterton Brook became muddier than the surrounding shore, with steep banks

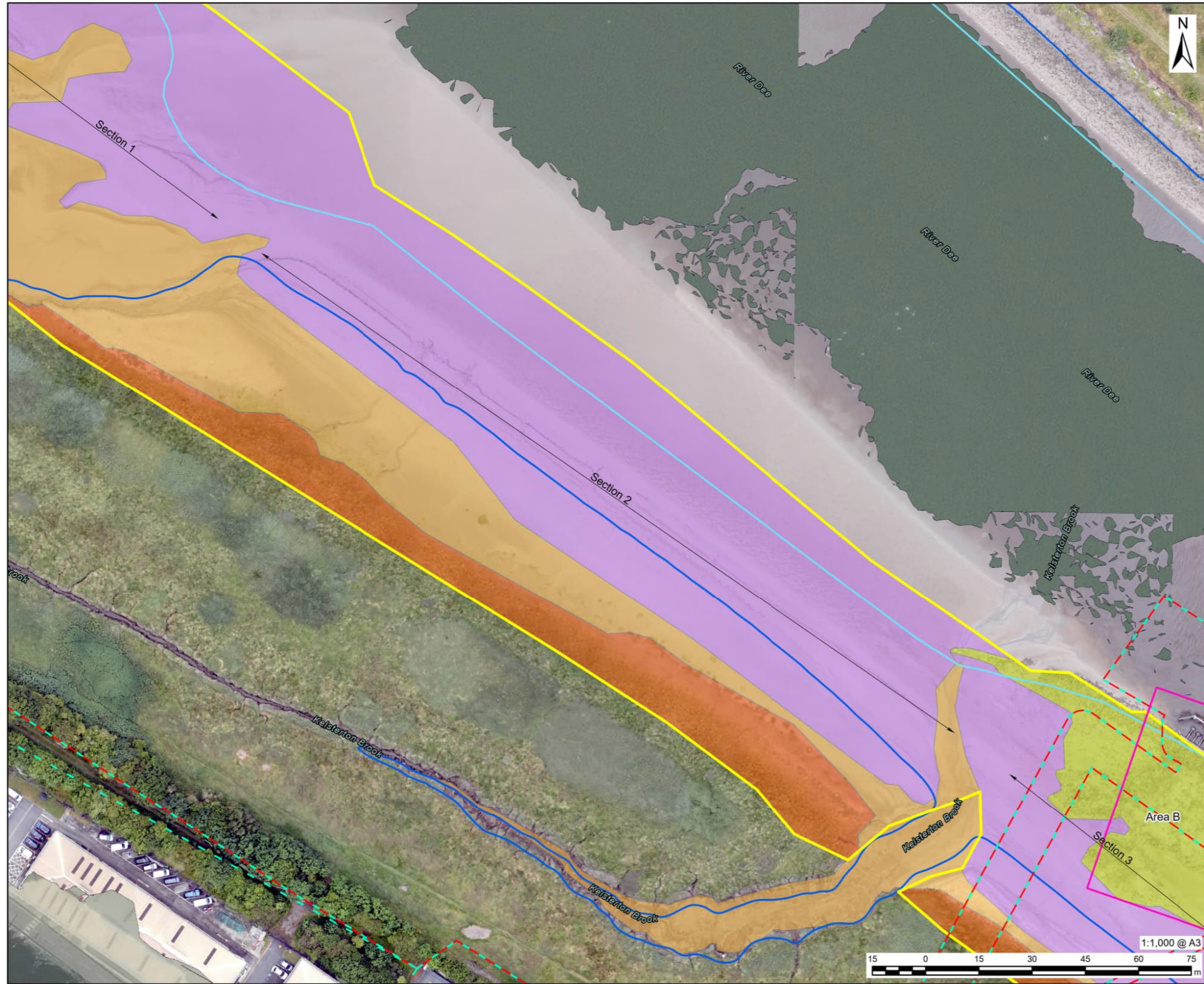
present (Intertidal Mud (A2.3). Kelsterton Brook was not originally included within the Intertidal Walkover Survey Area as it was not considered to be heavily influenced by the tide. However, during the survey, it was identified that Kelsterton Brook did include intertidal habitat, and therefore the habitat present in the brook has been mapped on **Plate 2**, despite being outside of the survey boundary.

- 1.3.11 Additionally, a dried-up gully was identified traversing from the saltmarsh to the water level. On the upper shore, the gully was colonised by small patches of saltmarsh (common cordgrass and common glasswort) indicative of 'Coastal Saltmarshes and Saline Reedbeds (A2.5)' and woody debris, with areas of sea lettuce also present.
- 1.3.12 There were no indications of Chinese mitten crab present in Section Two, with no burrows identified in the banks of Kelsterton Brook.

Plate 5: Section Two of Intertidal Walkover Survey

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LEGEND

- Order limits
- Water Connection Corridor
- Intertidal Survey Area
- Area of Interest
- Intertidal Walkover Survey Section
- Mean High Water (Springs)
- Mean Low Water (Springs)

Intertidal Broadscale EUNIS Habitat

- Intertidal Sand and Muddy Sand (A2.2)
- Intertidal Mud (A2.3)
- Intertidal Mixed Sediments (A2.4)
- Coastal Saltmarshes and Saline Reedbeds (A2.5)

NOTES

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ISSUE PURPOSE
 Environmental Statement

PROJECT NUMBER
 60717119

FIGURE TITLE
 Section Two of Intertidal Walkover Survey

FIGURE NUMBER
 Figure 12D-4

Walkover Section Three

- 1.3.13 The walkover in Section Three commenced on the eastern banks of Kelsterton Brook, extending to Flintshire Bridge (**Plate 1**). The upper and mid shore were identified primarily as muddy sand (Intertidal Sandy and Muddy Sand (A2.2)) (**Plate A-12**), with mud content increasing towards Flintshire Bridge and sediment becoming less stable to walk on (**Plate 6**) (representative of Annex I habitat protected by Dee Estuary / Aber Dyfrdwy (Wales) SAC (Ref 2)). Several sea gooseberries were identified on the muddy sand, with a washed-up moon jellyfish also present, likely deposited from elsewhere during the tidal cycle.
- 1.3.14 The lower shore adjacent to the outfall was characterised by a distinct row of boulders between the intertidal zone and water level which appeared to be artificial and specifically placed behind the existing outfall structures and eel screens (**Plate A-13** (Annex A) and Plate 7. Behind this, a large area of artificial boulders and mixed sediment (muddy sand with pebbles, cobbles and gravel) was present, creating intertidal pools during low tide (**Plate A-14** (Annex A)). This provided habitat representative of 'Intertidal Mixed Sediments (A2.4)'. Within the area of boulders, a concrete walkway was also identified, appearing as a navigable path to the outfall infrastructure. This area was identified as an additional Area of Interest (Area B; **Plate 2; Plate 6**) due to the apparent artificial nature of the boulders found there (**Plate 4**).

Plate 6: Section Three of Intertidal Walkover

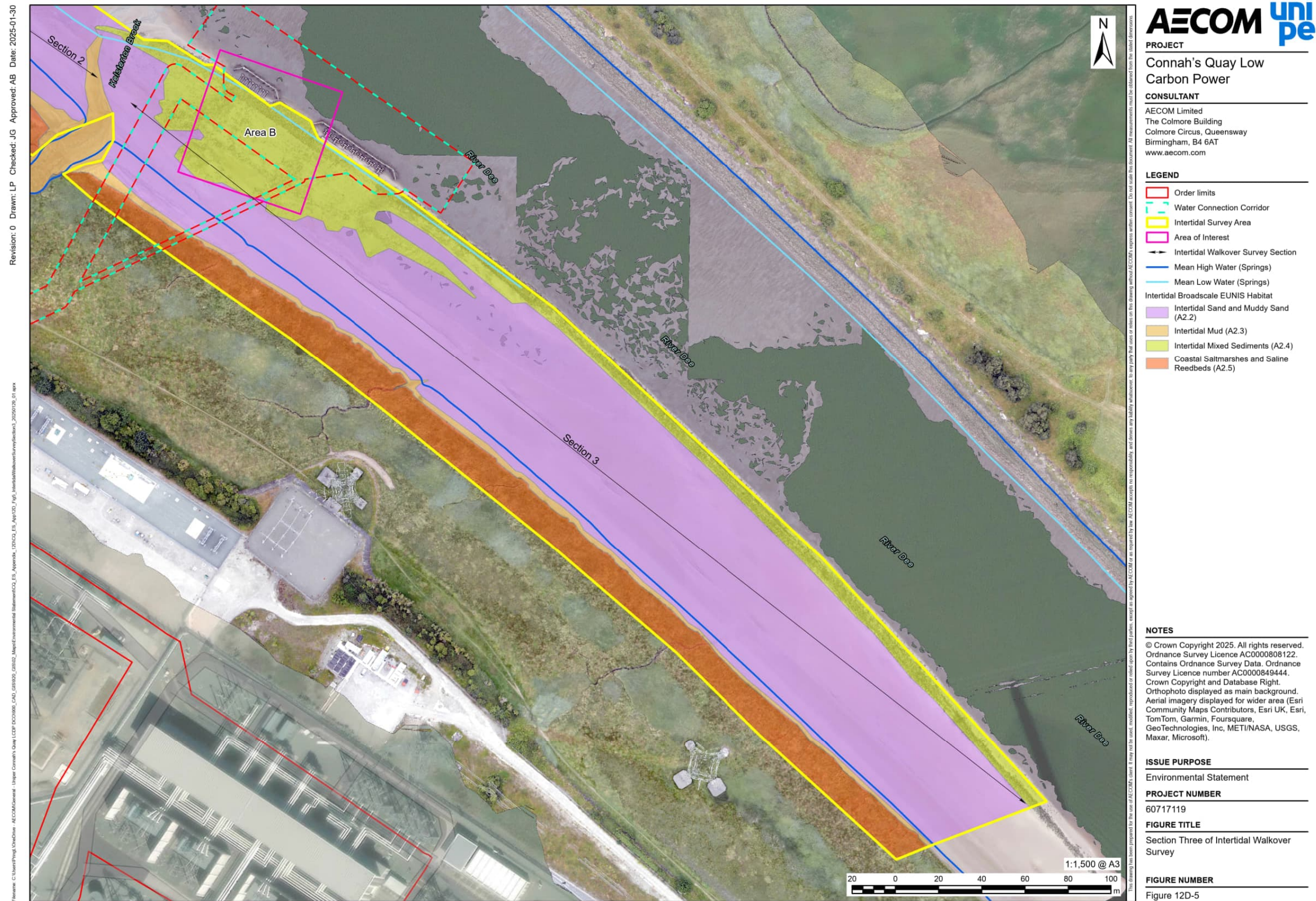
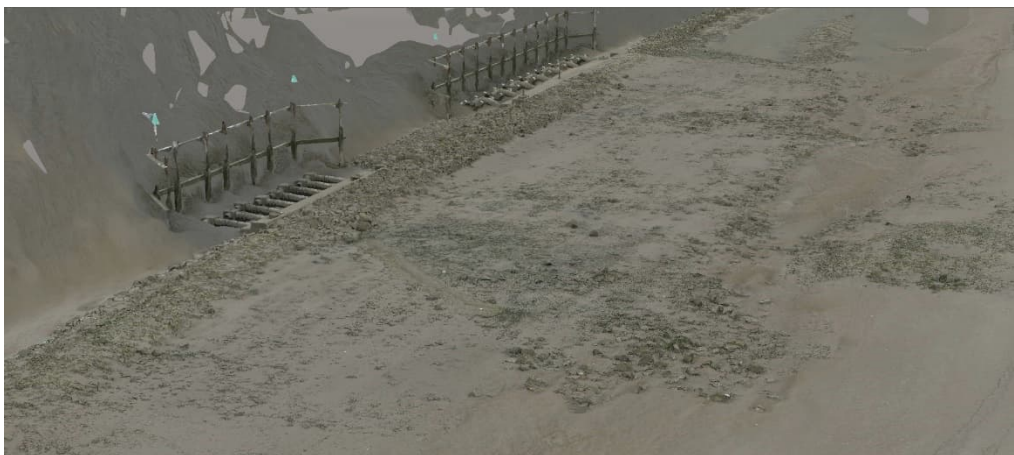


Plate 7: Screenshots of drone data taken from within 'Area B' (as shown on Plate 6) used to further review the artificial nature of the boulders present in Section 3



- 1.3.15 Large volumes of gutweed (*Ulva intestinalis*) and common rock barnacles (*Semibalanus balanoides*) were identified on the boulders and outfall infrastructure, with small fronds of sea lettuce also present in the intertidal pools. There were no fish or intertidal invertebrates identified in the intertidal pools. However, empty bivalve shells including common cockle (*Cerastoderma edule*) and shell fragments were present in the sediment.

Opportunistic bird sightings

1.3.16 Several species of bird were identified during the survey period. This included a small number of birds using the intertidal mudflats for foraging, although the majority were observed flying overhead, despite large numbers of bird prints present on the mudflats. The species observed on the mudflats have been specified below. The most abundant species appeared to be oystercatcher (*Haematopus ostralegus*) and gulls. Several bird species are features of the Dee Estuary SSSI and Ramsar site, which has been indicated below where applicable. The bird species recorded were:

- oystercatcher;
- herring gull (*Larus argentatus*);
- great black-backed gull (*Larus marinus*);
- lesser black-backed gull (*Larus fuscus*);
- black-headed gull (*Chroicocephalus ridibundus*);
- common tern (*Sterna hirundo*) – small numbers seen hovering over the water near the existing outfall infrastructure. Common tern is present in nationally important numbers and are a feature of the Dee Estuary SSSI and Ramsar site;
- cormorant (*Phalacrocorax carbo*) – one adult and one juvenile, seen resting on outfall infrastructure. Nationally important flocks of cormorant are present and are a feature of the Dee Estuary SSSI and Ramsar site;
- grey heron (*Ardea cinerea*);
- little egret (*Egretta garzetta*); and
- canada goose (*Branta canadensis*) - Five Canada geese were observed on mudflats adjacent to the area of boulders.

Opportunistic marine mammal sightings

1.3.17 There were no sightings of marine mammals during the survey period, as expected considering this stretch of the estuary does not represent important habitat for such species.

Other items of note

1.3.18 Opportunistic records of marine vessel traffic were also recorded during the intertidal walkover survey. Only one small marine vessel (a small powerboat travelling towards the mouth of the estuary) was identified over the two days of surveying, indicating that this stretch of the estuary is not heavily used by marine traffic. The presence of the vessel did not appear to disturb nearby marine birds.

1.4 Summary

1.4.1 The walkover survey and habitat mapping has indicated that the intertidal habitat surrounding the Proposed Development is relatively homogenous, largely consisting of intertidal sand and mud, with some encroaching

saltmarsh. The exception to this is the area of artificial boulders adjacent to the existing outfall infrastructure representing mixed intertidal sediment and intertidal pools. The intertidal soft sediments identified were also largely devoid of fauna and flora.

Annex A: Intertidal Walkover Photographs

Plate A-1: Intertidal mud in Section One



Plate A-2: Encroaching saltmarsh in Section One



Plate A-3: Compass and moon jellyfish in Section one

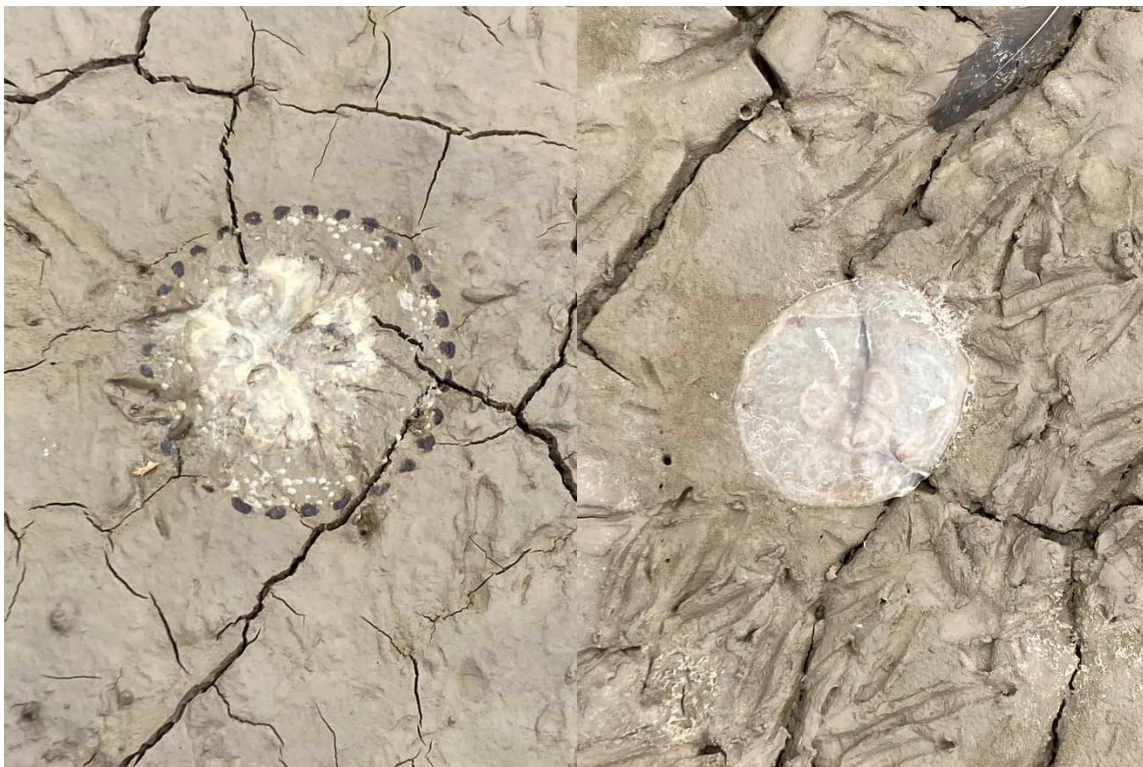


Plate A-4: Structure blocking off stream which once flowed from Connah's Quay Nature Reserve



Plate A-5: Stream located on eastern extent of Section One



Plate A-6: Patches of algae present on sediment close to stream



Plate A-7: Banks of the stream



Plate A-8: Section Two intertidal sediment



Plate A-9: Muddy depression present in Section Two



Plate A-10: Green algae present in muddy depression in Section Two



Plate A-11: Sea gooseberries present on sediment in Section Two



Plate A-12: Intertidal sediment in Section Three



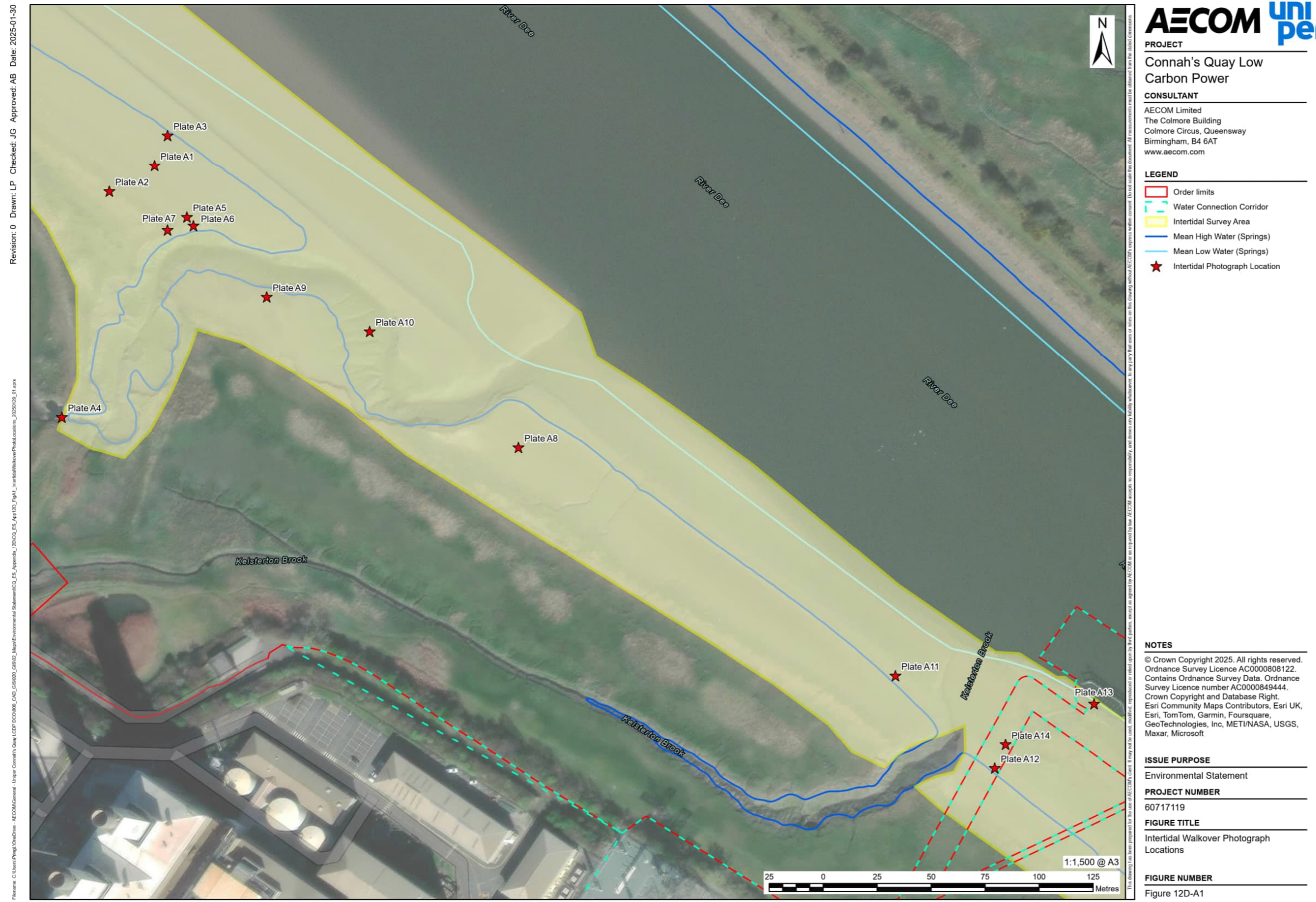
Plate A-13: Boulders placed around outfall infrastructure



Plate A-14: Artificial boulders, mixed sediment and intertidal pools behind outfall infrastructure



Plate A-15: Intertidal Walkover Photograph Locations



References

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