ARUP

Orion Land and Leisure Limited

Cardiff Peninsula - Plot 1

Information to Inform a Habitats Regulations Assessment

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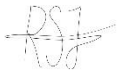
		Signature			
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1. Introduction

1.1 Background

Ove Arup and Partners Ltd (Arup) has been commissioned by Orion Land & Leisure Limited to provide ecological consultancy services to inform the proposed development of land at Cardiff Peninsula – Plot 1 project located in Cardiff Bay (henceforth referred to as the 'site'). This includes the production of a Habitats Regulations Assessment (HRA) report.

1.2 Purpose of this Document

This document has been prepared by Arup to provide information to the Local Planning Authority (LPA) in relation to the potential for effects on European Sites as required by Regulation 63(1) of the Habitats Regulations. The document covers a report to inform stages one and two of the HRA process (as detailed in Section 3.4) in respect to construction and operation of the scheme and is to be provided to the LPA to formally request their views on the assessment under Regulation 63 of the Habitats Regulations.

1.3 Legislative Context

Responsibility for determining whether a project or plan will have a likely significant effect on a European Site lies with the 'competent authority, which in this case is Cardiff Council. This Habitats Regulations screening report and appropriate assessment has been prepared to assist the competent authority in determining the potential for likely significant effects of the project on European designated sites 'European Sites', in compliance with the requirements of the Conservation of Habitats and Species Regulations 2017 (as amended[1]); hereafter referred to as the 'Habitats Regulations'.

Regulation 63 of the Habitats Regulations requires a competent authority, to make an 'Appropriate Assessment' of the implications of the plan or project for that site in view of its conservation objectives, before deciding to undertake or give consent for a plan or project which (a) is likely to have a significant effect on a European Site (either alone or in combination with other plans or project), and (b) is not directly connected with or necessary to the management of that site. In light of the conclusions of the assessment, the competent authority may proceed with or consent to the plan or project only after having ascertained that it will not adversely affect the integrity of the European Site.

All plans and projects should identify any possible effects early in the plan/project making process and then either alter the plan/project to avoid them or introduce mitigation measures to the point where no adverse effects remain. The 'competent authority' shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned, and if appropriate having obtained the opinion of the general public.

For the purpose of this assessment, European sites are taken to include any sites within the National Site Network, including those previously designated under the Habitats Directive (92/43/EEC), as well as Ramsar sites. For completeness these have included Special Areas of Conservation (SAC), Special Protection Areas (SPA), European Marine Sites (EMS) and Wetlands of International Importance designated under the Ramsar Convention (known as Ramsar sites). The UK Government wishes that candidate and possible sites (e.g. cSACs and pSACs) included in a list sent to the European Commission are also considered as if they have already been classified or designated. A brief summary of these designations is detailed below:

- SACs are high-quality conservation sites that have been given strict protection under the Habitats Regulations. These important sites are selected to conserve a range of rare and vulnerable animals, plants and habitats (excluding birds).

[1] Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

- SPAs are strictly protected sites that have been implemented to protect rare and vulnerable bird species and their habitats.
- EMSs are marine areas protected as SACs or SPAs often managed through underlying Site of Special Scientific Interest (SSSI) or Areas of Special Scientific Interest (ASSI). These areas range from subtidal to intertidal and can comprise the entire SAC or SPA or only part of it.
- Ramsar sites are wetlands of international importance that have been designated under the Ramsar Convention (1971). Sites are selected for their international significance relating to all ecology, botany, zoology, limnology or hydrology wetland components. The designation recognises the importance of wetlands as economic, social and environmental entities and the need to conserve them.

Sites contained within the National Site Network are designated for both Annex I habitat features and Annex II species. The statutory nature conservation organisations have a duty to publish conservation advice for EMSs (under Regulation 37 of the Habitats Regulations). This information contains the conservation objectives and targets relating to maintaining the integrity of these features.

1.4 Structure of this Report

This report uses the following structure:

- Section 2 provides information on the proposed works (the 'project') including the environmental baseline and a description of the development;
- Section 3 provides information on the methodology used in the assessment;
- Section 4 provides information on the European Sites that are considered within the assessment;
- Section 5 - provides the screening assessment for any potential pathways to European Sites;
- Section 6 – provides the appropriate assessment and considers mitigation options and residual effects;
- Section 7 - provides conclusions.

2. Project Description

2.1 Site Location and Context

The location of the site is shown in Figure 1, at National Grid Reference (NGR) ST 18040 72863, nearest postcode CF11 OJY. The redline boundary of Plot 1 is shown in Figure 1, and covers an area of approximately 0.85ha.

The site is located within Cardiff Bay, in the wider area of the Cardiff International Sport Village (CISV). The urban setting around the site comprises recreational buildings (Cardiff International Pool, Ice Arena, and Cardiff International White-Water Centre (CIWW)), residential apartment blocks, associated roads and parking, and brownfields parcels. The intention is that some of the brownfield parcels are also going to be brought forward for development by Orion Land and Leisure Ltd. under a separate outline planning application. This separate application would cover the area of Plots 2-6, as shown in Picture 1 below for context. A planning application for a Meanwhile Use (MWU) Phase 1 development within the boundary of Plots 2-6 was also submitted on 10 May 2024 under planning application reference 24/01089/FUL.

Picture 1 The current application area of Plot 1, shown in relation to proposed neighbouring application within Plots 2-6

The Plot 1 site relevant to this HRA is located at the southern section of the wider site and is currently a car park used by residents of the apartment buildings to the east and also visitors to the sporting facilities present to the north (Cardiff International Pool) and west (CIWW). The southern boundary of the site is adjacent to the River Ely, and the site is raised in relation to the river with vertical sheet pilling forming the bank of the river.

2.2 Proposed Development

Full planning permission is being sought for the proposed development which is for senior living accommodation with associated car parking, cycle parking and landscaping. It involves construction of a 4-5 storey residential block of 77 units. 40 car parking spaces will be provided.

The landscape design plan shows the proposed development and associated landscaping within drawing reference CPM-CAM-10-100L-DR-L-0100. The planning boundary, shown as the red line boundary on Figure 1, is 0.85ha in total area.

Further details of the proposed development design and baseline environmental conditions relevant to this report can be found within the following documents included within the planning application:

- Roof Plan & Landscaping Site Layout CPM-ASC-10-0000-DR-A-PL-0003
- Drainage and Earthworks Strategy Report 5498 Cardiff Bay Peninsula Plot 1
- Plot 1 Construction and Demolition Noise and Vibration Levels Report and Noise Impact Assessment Plot 1 reference CPM-HIL-10-0000-RP-E-PL-1001
- Air Quality Assessment Plot 1 reference CPM-HIL-1A-0000-RP-E-PL-1001
- Lighting Layout Drawing 35172-HML-XX-XX-SK-E-171002 and Lighting Contour Drawing 35172-HML-CH-00-DR-E-172001
- Transport Statement reference C23135/TS101 and Travel Plan Report reference C23135/TP101

Key elements from these reports are summarised within the ecological impact assessment (EcIA) submitted separately.

This assessment is based on the design proposals at the time of writing. If these proposals are altered an ecologist should be consulted to ensure the HRA is still valid.

2.2.1 Drainage Foul Water

There is an existing foul water public sewer network located in the vicinity of the site, however the site currently does not produce any foul flow.

It is estimated that Plot 1 would produce 33.4l/day of foul flow and this would be connected into the existing foul water public sewer network located to the north of the site. The capacity of the existing network is to be confirmed and a pre-development enquiry has been sent to Welsh Water (DCWW) to open discussion on the foul water capacity on the wider DCWW network to accommodate Plot 1 requirements. The impact of any foul flow resulting from the development is excluded from our EcIA, with details to be confirmed through consultation with DCWW. It is assumed that the receiving Waste Water Treatment Works will adhere to any existing regulatory standards which are in place to protect the environment; if there are any changes required to discharge consents the associated ecological impacts would need to be assessed separately and are not within the scope of this HRA.

Refer to the Drainage and Earthworks Strategy Report[2] for more details.

2.2.2 Drainage Surface Water, SuDS

Existing surface water run-off from the site is discharged, unattenuated and unrestricted into the River Ely via existing storm water and highways water outfalls.

Sustainable drainage system (SuDS) features have been proposed which include the following: green/brown/blue roof, and permeable surfacing. These, along with the proposed landscape features, will provide attenuation during small storm events and they will serve as water treatment. This will improve the quality of the discharged surface water as it currently runs across contaminated land before reaching the water bodies.

It is likely that runoff rates will be reduced from the existing brownfield runoff rate, however they will still discharge unattenuated and unrestricted into the River Ely as per the existing situation. It is proposed that all surface water runoff is discharged to the River Ely via suitable oil, petrol and silt interception devices up to Environment Agency Class 1 Standards. The surface water attenuation requirements to be provided on site will be confirmed with the SuDS Approval Body (SAB).

It is proposed that a new high-level surface water overflow will be installed through the sheet piled wall close to the existing surface water outfalls (diameter approximately 450mm). It is proposed that this is installed from a pontoon on the water.

The proposed uses of the site along with the SuDS measures proposed will ensure that water leaving the site by the piped system to any waterbodies will be of good quality. Refer to the Drainage and Earthworks Strategy Report[2] for more details.

2.2.3 Demolition and Construction Noise and Vibration

In order to construct the proposed project, the existing car park will need to be demolished, and new buildings constructed. The noisiest activities during construction are anticipated to be breaking activities, cutting slabs and loading/unloading of materials, and general construction vehicle noise.

Pilling will be required and it is assumed that this will be continuous auger flight piling, driven cast in-situ piles or rotary bored piling. It is not foreseen that percussive pilling will be required for the development.

A noise and vibration assessment has been undertaken considering the proposed demolition and construction techniques[3] including an assessment of the levels of noise and vibration at Ecological Sensitive Receptors (ESR) within 200m (C and D) as shown in Table 1 below.

Picture 2 Ecological Sensitive Receptors included within Plot 1 construction and demolition noise and vibration levels assessment

Full results are included in the Noise Impact Assessment Report[4] and Appendix M of the EcIA for noise and vibration. These noise and vibration results are based on using the proposed piling methods of driven cast in-situ piling and continuous flight auger piling, and assuming compliance with best practice construction methods.

[2] Drainage and Earthworks Strategy Report 5498 Cardiff Bay Peninsula Plot 1

[3] Plot 1 Construction and Demolition Noise and Vibration Levels (May 2024)

[4] Noise Impact Assessment Plot 1 CPM-HIL-10-0000-RP-E-PL-1001 Hilson Moran

Table 1 Summary of baseline and predicted construction noise and vibration levels at ecological receptor

Sensitive receptor	Baseline Daytime Noise	Development Stage Noise				Development Stage Peak Particle Velocity (PPV)
		Site Preparation	Substructure	Super Structure	Landscaping	
Fish within the migration corridor	46 to 47 dB L_{Aeq}	75 dB $L_{Aeq,10hr}$	74 dB $L_{Aeq,10hr}$	74 dB $L_{Aeq,10hr}$	75 dB $L_{Aeq,10hr}$	7 mm/s*

*Note that there is a difference in impedance between land and water that means that when vibration reaches the waterline it will not transmit efficiently between the shore and the river. Consequently, the magnitude of vibration in the river will be significantly lower than the worst-case value given, which is based on historic data across land only.

2.2.4 Operational Noise

The existing operational noise within the site comes from the current use as a car park, which is already fully utilised during sporting events in the local area. Building services will be controlled to below the existing environment, and noise from the new development would come from vehicles and pedestrian use of the area. It is anticipated that during operation there will be a negligible increase in noise compared to the baseline.

2.2.5 Construction Programme

Construction is anticipated to take place over 19 months, with construction anticipated to start around June 2025 with a forecast completion date of January 2027.

2.2.6 Contamination

Given its long history as an oil and fuel depot, the Cardiff Peninsula masterplan site is anticipated to have contaminated soils and contaminated groundwater. This is likely to have an impact on construction works involved in earthworks and substructure. Remedial works have been undertaken historically including the installation of a cement bentonite wall adjacent to the development land to stop leachate and gas migration along with the installation of a new leachate drainage system and in-situ and ex-situ bioremediation of hydrocarbon contaminated soils. In addition, there has been the excavation and replacement / removal of contaminated soils, a groundwater, surface water and ground gas monitoring regime, and the capping of the ISV site with 200mm of hardcore placed over geotextile to provide a temporary cap to the underlying contaminated soils. Refer to the Drainage and Earthworks Strategy Report[5] for more details.

2.2.7 Additional vehicle and pedestrian numbers

The site area is currently used as a car park with around 300 spaces which can be fully utilised during sporting events in the local area. During construction there will be an anticipated temporary periods of concentrated construction activities, but it is not envisaged that these will result in a significant increase in traffic flows when compared against the current car park use and its potential trip generation.

During operation it is not anticipated that there would be any increase in pedestrian or vehicle numbers compared to the baseline. However, because pedestrians will be directed around the south edge of the development on a new active travel boardwalk there will be some additional level of use in this area compared to the baseline where the water edge was not accessible.

Refer to the Transport Statement and Travel Plan[6] for further details.

2.2.8 Air Quality

[5] Drainage and Earthworks Strategy Report 5498 Cardiff Bay Peninsula Plot 1

[6] Transport Statement reference C23135/TS101 and Travel Plan Report reference C23135/TP101

Local monitoring data (NO_2, PM_{10} and $PM_{2.5}$) found the existing baseline conditions were compliant with the relevant annual and hourly Air Quality Strategy objectives. A statistically significant downward trend in NO_2 concentrations was also identified at nearby monitoring locations.

It is anticipated that there will be some generation of dust during the construction phase, which could have some temporary impacts on surrounding receptors (medium-low risk). The residual effects of dust and PM_{10} generated by construction activities following the application of the mitigation measures and good site practice is not significant.

Refer to the Air Quality Assessment[7] for more details.

2.3 Environmental Baseline

A Preliminary Ecological Appraisal (PEA)[8] for the CISV site (including a portion of the present Plot 1 site relevant to this HRA), including an Extended Phase 1 Habitat Survey, was first undertaken in August 2022. An update PEA was then undertaken in 2023[9] due to an extension in the site boundary to include Cardiff Peninsula (including the entirety of the present Plot 1 site). Both Extended Phase 1 Habitat Surveys were conducted with reference to the standard Joint Nature Conservation Committee (JNCC) Extended Phase 1 Habitat survey methodology[10].

Biodiversity records from Aderyn[11] were obtained on 12th July 2023 as part of the 2023 PEA. The search included data from within 2km of the scheme, and within the last ten years, for: Local Wildlife Sites (LWS), Local Nature Reserves (LNRs) and Ancient Woodland Sites; records of protected and notable flora and fauna species (protected species included all those protected by European or UK law, and notable species included those identified as being of Principal Importance, as listed in response to Section 7 of the Environment (Wales) Act 2016); Section 7 Priority Habitats; and records of Invasive Non-Native Species (INNS) as listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and The Invasive Alien Species (Enforcement and Permitting) Order 2019.

The PEA identified the presence of the Severn Estuary European Marine Site (EMS), comprised of the Severn Estuary SPA, SAC and Ramsar site, 1.2km south-east of the Plot 1 site. The location of the Severn Estuary EMS is displayed in Figure 2, and the sites are described in detail in Section 4 below.

A total of six habitat types were identified during the 2023 Phase 1 habitat survey of the site. The majority of the site is hardstanding/gravel (J5), with other habitats including semi-improved neutral grassland (B6), scrub dense/continuous (A2.1), amenity grassland (J1.2), running water (G2) and species poor defunct hedgerow (J2.2.2). The River Ely is within the site boundary on the south edge of Plot 1.

A suite of Phase 2 species surveys has been carried out across the wider site of CISV, including within the site boundary, in 2023 and 2024. These included surveys for bats, otter, invertebrates, plants, breeding and wintering birds, and reptiles. The results relevant to the designation of the Severn Estuary EMS are further detailed below. A full summary of ecological baseline information for all ecological receptors can be found in the EcIA.

Four breeding bird surveys of the wider CISV site were undertaken across April to June 2023. A total of 37 species were recorded, with 25 species considered to have bred within the wider CISV site. No species recorded within the CISV site during the breeding season were listed as qualifying features of the Severn Estuary SPA and Ramsar sites.

[7] Air Quality Assessment Plot 1 reference CPM-HIL-1A-0000-RP-E-PL-1001

[8] Arup. (2022). Preliminary Ecological Appraisal. Cardiff International Sports Village

[9] Arup. (2023). Ecological Appraisal. Cardiff International Sport Village & Cardiff Peninsula

[10] Joint Nature Conservation Committee (2010) Handbook for Phase 1 habitat survey – a technique for environmental audit

[11] https://aderyn.lercwales.org.uk/ [Accessed: 14/12/20].

Although no bird species were recorded within the Plot 1 site, during the surveys, a number of species were recorded in close proximity including feral pigeon (*Columba palumbus*) and woodpigeon (*Columba palumbus*). It is possible that other species using the wider site such as house sparrow (*Passer domesticus*) and dunnock (*Prunella modularis*) may utilise habitats within the site during the breeding season, with dunnock being a Section 7 species of Principal Importance for Conservation in Wales and being most likely to be breeding on site. None of these species are qualifying species of the nearby Severn Estuary Ramsar or SPA. Further details can be found in the Breeding Bird Survey Report[12].

Lesser black-backed gulls (*Larus fuscus*) were recorded within the wider CISV site, however, they are currently only included within the Severn Estuary Ramsar site designation for future consideration.

Wintering bird surveys of the CISV site were conducted on six occasions, from October 2022 to March 2023. A total of 26 target species were recorded within the wider CISV site during the surveys, including five species of gull, eight species of Anseriformes (ducks, geese and swans), and 13 other species. No qualifying species were recorded as listed under the Severn Estuary SPA or Ramsar site. Lesser black-backed gull was recorded as detailed above; however, this species is listed as a species identified for possible future consideration and furthermore noted only as a species for consideration during the breeding season. Assemblages of waterbirds were noted within Cardiff Bay comprising a peak in December of approximately 1% of the SPA and Ramsar population, and 1.7% of the Severn Estuary SSSI. Excluding gulls from these totals, reduces the assemblage population percentage. The wintering bird survey transect did not extend to Plot 1, and habitats being largely car park are considered unsuitable for any notable wintering birds including qualifying species associated with the Severn Estuary SPA and Ramsar. Further details can be found in the Wintering Bird Survey Report[13].

The River Taff, Cardiff Bay waterbody and Severn Estuary provide suitable habitat for a variety of fish species and are located within 0.1km of the site. The River Ely is within Plot 1 site on the south boundary. There is an existing level of disturbance within the water at the site location from the Cardiff Bay Yacht Club from boats motoring in and out of moorings, which are located adjacent to floating walkways just south of the site boundary, and small watercraft originating from Cardiff White Water Centre.

[12] Arup (2023). Breeding Bird Survey Report 2023. Cardiff International Sports Village.

[13] Arup (2023) . Wintering Bird Survey Report 2022/2023. Cardiff International Sports Village.

3. HRA Guidance and Methodology

This section sets out the guidance and evidence base used in assessing the potential effects of the project.

3.1 Guidance and Policy

This information has been informed by the following guidance and policy documents:

- Planning Policy Wales - Technical Advice Note (TAN) 5: Nature Conservation and Planning[14];
- The Habitats Regulations Assessment Handbook, DTA Publications Ltd[15]; and
- Tyldesley, D. and Chapman, C. 2018. People Over Wind[22] – some Implications of the Judgment. The Habitat Regulations Journal, Issue 10, pp. 19 – 23.

This guidance is intended to improve understanding of how projects are regulated under the Habitats Directive. This guidance draws on experience throughout Britain and on case law in Britain and Europe.

3.2 Desk Study Information

In addition to the guidance noted above, a number of websites were used to gather information on the European Sites in order to inform this assessment, in particular, the Management Plans for European Sites and Regulation 37 information. Websites used include:

- Natural Resources Wales (NRW) website[16];
- Biodiversity records received from Aderyn[17] on 12th July 2023;
- MAGIC (Multi-Agency Geographic Information for the Countryside) website[18]; and
- JNCC website[19].

The documents obtained provide the main elements of NRW's management plans for European Sites along with the Conservation Objectives for the features. The features will be considered to be in Favourable Conservation Status only when the conservation objectives are being met. These objectives therefore provide an indication of the type of effects which could affect the features of European Site. An effect which could affect the ability of a site or feature to meet its objective could be considered to be an adverse effect on the integrity of the European Site concerned.

3.3 Habitats Regulations Assessment Methodology

To understand the potential implications for European Sites from the project it is necessary to identify those sites that are located close to the project or are linked by pathways such as hydrological connections.

All European Sites, including European Marine Sites, within 2km of the project were identified using Geographic Information System data from datasets downloaded from the JNCC, MAGIC and NRW. This was extended to 10km for sites for which bats are a qualifying feature or sites where a direct hydrological pathway was noted.

3.3.1 Understanding Qualifying Interests and Conservation Objectives

[14] Welsh Government. (2009). Technical Advice Note 5: Nature Conservation and Planning. Cardiff: Welsh Government.
[15] Tyldesley, D. and Chapman, C. (2013) The Habitats Regulations Assessment Handbook. UK, DTA Publications Ltd https://www.dtapublications.co.uk/
[16] Natural Resources Wales Find Protected Areas of Land and Seas https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/find-protected-areas-of-land-and-seas/designated-sites/?lang=en
[17] https://aderyn.lercwales.org.uk/.
[18] MAGIC. Magic interactive Mapping Application. http:/www.magic.gov.uk/MagicMap.aspx
[19] JNCC Website https://jncc.gov.uk/

For each of the sites identified, the qualifying features were established and the conservation objectives for each feature were obtained. Information was also sought to understand the potential vulnerability of the features to any effects that might arise from the project.

3.3.2 Identification of the Potential Effects of the Project

Any potential pathways for effect on European Sites resulting from the project were identified prior to consideration of best practice procedures (for example, Guidelines for Pollution Prevention and Construction Industry Research and Information Association (CIRIA) guidance) or the integration of any mitigation measures.

3.3.3 Identification of Plans or Projects Considered for In-Combination Effects

An 'in-combination' assessment is required where the project may have an effect on a European Site, but on its own the effects would not be significant. The potential effects of the project should be considered in-combination with other plans or projects that similarly may have an effect, where the combined effects may become significant.

Details of other plans and projects which are currently proposed or consented within the vicinity of the European Sites identified were obtained from the local planning authority website[20] to inform the in-combination assessment of the project.

3.3.4 Consideration of the Significance of Potential Effects

The significance of potential effects was assessed in the absence of any avoidance and/or mitigation measures. The assessment has been made with awareness of the conservation objectives for the features of the European Sites, although as stated in the relevant guidance the assessment of the project against the conservation objectives is not required until the Appropriate Assessment stage of the HRA process. In the assessment of the significance of effects, professional judgement was applied using the following criteria (as sufficient information about the elements and interests is often unavailable):

- The vulnerability/sensitivity of the receiving environment/features of interest;
- When the risk of effects is likely to occur (e.g. construction and/or operation);
- The likely geographical extent of the effects; and
- Likelihood of significant effects (e.g. those above negligible in magnitude) occurring based on previous experience with similar elements, where available.

Where there was not enough information about the risk of qualifying interest being present, or of the risk of effects, the assessment used the precautionary principle to inform the judgement. The precautionary principle has been applied to ensure that any assessment errs on the side of caution, without being overly cautious. This principle means that the conservation objectives should prevail where there is uncertainty or that harmful effects will be assumed in the absence of evidence to the contrary.

3.4 The HRA Process

The assessment of a project under the Habitats Regulations can be split into several sections as shown in Appendix A[21]; however, there are effectively four stages to the assessment as described below.

Stage 1 is the assessment of the likelihood of a plan or project having a significant effect on a European Site or its features. This is the trigger for the need for an Appropriate Assessment as set out in Regulation 63(1). The Appropriate Assessment (Stage 2) is the detailed consideration of the potential effects of the plan or project in relation to the conservation objectives for the European Site(s) to determine if there is likely to be an adverse effect on the integrity of the site (i.e. an effect that would compromise the site meeting its conservation objectives). Providing it can be demonstrated that with appropriate mitigation measures the

[20] Cardiff Council website. https://www.cardiff.gov.uk/ENG/resident/Planning/Pages/default.aspx

[21] Tyldesley, D. (2011). Assessing Projects Under the Habitats Directive: Guidance for Competent Authorities. Bangor: Countryside Council for Wales.

plan or project would not give rise to an adverse effect on the integrity of a European Site, the plan or project can proceed.

Where this cannot be demonstrated or there is uncertainty, the assessment would then need to consider if there were any other alternatives to the plan or project (Stage 3) that would not give rise to adverse effects on the integrity of the European Site. If there are no alternatives, Stage 4 would then consider if there are any Imperative Reasons of Overriding Public Interest (IROPI), only at this stage can Compensatory Measures be considered. It is very unusual for plans or projects to be considered in Stages 3 or 4.

3.5 Consideration of Mitigation

With regards to case law (Coillte vs People Over Wind[22]) the inclusion of plainly established and uncontroversial mitigation during Stage 1 is no longer considered appropriate. Mitigation, as considered by the Centre Européen de Coopération Juridique (CECJ) in regard to the case law, is interpreted to mean measures that are intended to avoid or reduce the harmful effects of the envisaged project on the site concerned.

Consequently, any project which identifies an impact on a European Site and where avoidance and mitigation is applicable will need to address these measures during Stage 2 Appropriate Assessment.

3.6 Limitations

Information provided by third parties, including publicly available information and databases, is considered correct at the time of publication. Due to the dynamic nature of the environment, conditions may change in the period between the preparation of this report, and the construction and operation of the project.

The HRA has been undertaken in as detailed a way as possible, using all available data sources where they exist. However, the conclusions drawn from this is necessarily limited by the age, type, coverage and availability of data. Any uncertainties and the limitations of the assessment process are acknowledged and highlighted.

22 People over Wind, Case C323/17 European Court of Justice, 12th April 2018.

4. European Sites Potentially Affected by the Proposal

4.1 Identification of European Sites

Figure 2 shows the location of the project in relation to European Sites within 10km of the site. As detailed in Section 3.3, all European Sites within 2km of the project are required to be considered within the HRA, and those within 10km that are notified for their populations of bats, or where there is a direct downstream hydrological connection from the site to the European Site.

Three European Sites were identified within 2km of the project:

- Severn Estuary SAC (1.2km south-east of the project)
- Severn Estuary SPA (1.2km south-east of the project)
- Severn Estuary Ramsar (1.2km south-east of the project)

These three sites are collectively known as the Severn Estuary European Marine Site (EMS). The features of these European sites are described in Tables 2-4.

4.1.1 Severn Estuary SAC

Table 2 Features of the Severn Estuary SAC, together with a summary of conservation objectives and vulnerabilities. Detailed conservation objectives are included in Appendix C

Interest features	Quality and Importance	Conservation Objectives	Vulnerabilities
Annex 1 habitats that are a primary reason for selection of the site			
Sandbanks which are slightly covered by sea water all the time; Subtidal sandbanks	The Severn Estuary subtidal sandbanks can be considered to contribute to the gravelly and clean sand sandbank resource. The Severn Estuary contributes approximately 3% of the UK Natura 2000 resource for subtidal sandbanks, by area.	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining 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.	• Substratum loss; directly as a result of land claim or developments, or indirectly as a result of sedimentation processes; • Smothering of organisms as a result of deposition of material on top of them and/or their habitat; • Changes in suspended sediment; resulting in changes to the extent and nature of intertidal habitats; • Changes in water flow rate; likely to lead to increased sediment erosion or accretion in certain areas. Activities likely to lead to such changes include construction activity, groynes, beach replenishment, sea walls/breakwaters, port developments, and aggregate extraction; • Changes in wave exposure; as a result of coastal defence structures, shipping, and possibly aggregate extraction; • Abrasion and physical disturbance; most likely caused by activities including beach replenishment, bait digging, maintenance dredging, aggregate extraction, land-based recreation, and archaeology. Boating, anchoring, trampling or use of vehicles may cause physical disturbance; • Toxic contamination; including from synthetic compounds, non-synthetic compounds, and hydrocarbons; • Changes in nutrient loading; indicated on mudflats by growth of green seaweeds. Increased nutrient loading in addition to reduced oxygenation may lead to anaerobic conditions within sediment, which can lead to dominance of pollution tolerant species;
Estuaries	The Severn Estuary is the largest example of a coastal plain estuary in the UK, and one of the largest estuaries in Europe. It contributes approximately 30% of the UK Natura 2000 resource for estuaries, by area. The extent of the estuary feature is 73678 ha.		
Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats	The intertidal part of the Severn Estuary supports extensive mudflats and sandflats. These cover an area of approximately 20,300 ha - the fourth largest area in a UK estuary and representing approximately 7 % of the total UK resource of this habitat type (approximately 10% of the UK Natura 2000 resource for Intertidal mudflats and sandflats, by area).		
Reefs	The Severn Estuary has areas of biogenic reefs, formed by the tube-dwelling polychaete worm *Sabellaria alveolata*. *Sabellaria alveolata* reefs in the UK are predominantly an intertidal habitat but the Severn Estuary is one of the few places where *Sabellaria alveolata* reefs occur extensively in the subtidal, as well as the intertidal.		

Interest features	Quality and Importance	Conservation Objectives	Vulnerabilities
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*); Atlantic salt meadows	The Severn Estuary holds the largest aggregation of saltmarsh in the south and south-west of the UK. It covers approximately 1,400 ha, representing about 4% of the total area of saltmarsh in the UK.		• Changes in thermal regime; temperature can affect biological, physical and chemical geochemical processes within the water column. Activities which can cause changes in temperature can include thermal discharges. • Changes in salinity; resulting from land/waterfront run-off and riverine inputs; • Changes in oxygenation; resulting from maintenance dredging, aggregate extraction, industrial effluent discharge, land/waterfront runoff, and sewage discharge; • Introduction of microbial pathogens; most likely through sewage discharges; • Desiccation and changes in emergence regime; may be induced by activities including the construction of coastal and flood defences and other activities which change the tidal regime and water flow characteristics of the estuary; • Changes in grazing management; altering the vegetation composition and structure of saltmarsh habitats; and, • Introduction of non-native species; for example saltmarsh cordgrass (*Spartina anglica*).
Annex II species that are a primary reason for selection of the site			
Sea Lamprey (*Petromyzon marinus*)	Considered one of the best areas in the UK for this species	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining 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;	• Noise; high frequency vibration can be a barrier to migration, preventing fish reaching spawning areas, and in some circumstances can be fatal. • Toxic contamination; decrease in water quality can impede migration of fish to spawning grounds and affect food supply. • Changes in nutrient loading; changes in nutrient levels may affect food supply of shad and lamprey. • Changes in thermal regime; water temperature is thought to trigger shad to migrate upstream for spawning. • Changes in turbidity; it is unknown whether migratory fish are sensitive to changes in turbidity within the Estuary. High background levels of turbidity mean it is unlikely any changes will have significant impact on the Annex II species when in estuarine waters.
River Lamprey (*Lampetra fluviatilis*)	Considered one of the best areas in the UK for this species		
Twaite shad (*Alosa fallax*)	Considered one of the best areas in the UK for this species		

Interest features	Quality and Importance	Conservation Objectives	Vulnerabilities
		• The populations of qualifying species; and • The distribution of qualifying species within the site.	• Changes in salinity; changes in salinity are assumed to affect the distribution of mysids (a prey species of juvenile twaite shad). • Changes in oxygenation; the Annex II fish species may be vulnerable to changes in oxygenation resulting from operations within the Estuary. • Introduction of microbial pathogens; assessment of effects has not been undertaken, but there is potential for high exposure.

4.1.2 Severn Estuary SPA

Table 3 Features of the Severn Estuary SPA, together with a summary of conservation objectives and vulnerabilities. Detailed conservation objectives are included in Appendix C.

Interest features	Quality and Importance	Conservation Objectives	Vulnerabilities
Bewick's swan (*Cygnus colombianus bewickii*)	The site regularly supports 3.9% of the wintering population in Great Britain (1991/2 -1995/6 5-year peak mean)	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Favourable Conservation Status of its Qualifying Features, by maintaining 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; and • The populations of qualifying species; and • The distribution of the qualifying species within the site.	• Public access and recreation (including third party activities) may have an impact on bird species sensitive to disturbance; • Modification to water courses and barriers to Annex II migratory fish in the tributary rivers are preventing completion of the life cycle and potentially altering the hydrodynamics of the site; • Impacts of planned development within and adjacent to the Estuary; • Coastal squeeze, causing loss of habitat and having impacts on species dependent upon those habitats; • Changes in management and use of grassland and saltmarsh habitat within and bordering the estuary; • Changes in species distributions due to climate change and other man-made and natural modifications; • Water pollution (diffuse and direct); • Air pollution, particularly atmospheric nitrogen deposition; • Cumulative impacts of marine extraction, dredging and associated waste; • Recreational and commercial marine and estuarine fisheries; • Invasive non-native species including the Australian barnacle (*Austrominius modestus*), Mitten crab (*Eriocheir sinensis*), and the Pacific Oyster (*Crassostrea gigas*); and • Marine litter.
Gadwall (*Mareca strepera*)	The site regularly supports 0.9% of the wintering population in North-western Europe (1991/2 -1995/6 5-year peak mean)		
White-fronted Goose (*Anser albifrons*)	The site regularly supports 0.4% of the wintering population in North-western Siberia and Northern Europe (1991/2 -1995/6 5-year peak mean)		
Dunlin (*Calidris alpina*)	The site regularly supports 3.3% of the wintering population from Northern Siberia, Europe and Western Africa (1991/2 -1995/6 5-year peak mean)		
Redshank (*Tringa tetanus*)	The site regularly supports 1.3% of the wintering population in the Eastern Atlantic (1991/2 -1995/6 5-year peak mean)		
Shelduck (*Tadorna tadorna*)	The site regularly supports 1.1% of the wintering population in North-western Europe (1991/2 -1995/6 5-year peak mean)		
Assemblage of wintering birds (regularly supports over 20,000 waterfowl)	Over winter the area regularly supports in excess of 84,000 waterfowl (5 year peak mean 01/04/1998 = 84317) including the above species and wigeon (*Mareca penelope*), lapwing (*Vanellus vanellus*), teal (*Anas crecca*), mallard (*Anas platyrhynchos*), shoveler (*Anas clypeata*), pochard (*Aythya farina*), tufted duck (*Aythya fuligula*), grey *plover (Pluvialis squatarola*) and whimbrel (*Numenius phaeopus*).		

4.1.3 Severn Estuary Ramsar

Table 4. Features of the Severn Estuary Ramsar, with a summary of conservation objectives and vulnerabilities. Detailed conservation objectives are included in Appendix C.

Interest features	Quality and Importance	Conservation Objectives	Vulnerabilities
Sites containing representative, rare or unique natural and near-natural wetland types with the biogeographic region (Criterion 1)	Due to the immense tidal range (second largest in the world), this affects both the physical environment and biological communities and includes: • Sandbanks which are slightly covered by sea water all the time • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Atlantic salt meadows	The conservation objective for the qualifying features of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition.	The Information Sheet on Ramsar Sites[23] identifies the following pressures and threats to the Severn Estuary Ramsar Site: • Dredging • Erosion • Recreational / tourism disturbance Given overlapping qualifying features with Severn Estuary SPA and SAC, the key sensitivities of those sites are also assumed applicable here.
Sites supporting populations of plants and/or animals important for maintaining the biological diversity of the biogeographic region (Criterion 3)	Unusual estuarine communities of reduced diversity and high productivity		
Sites supporting plant or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions (Criterion 4)	This site is important for the run of migratory fish between the sea/estuaries and freshwater rivers. Species include salmon (*Salmo salar*), sea trout (*Salmo trutta*), sea lamprey, river lamprey, allis shad (*Alosa alosa*), twaite shad (*Alosa fallax*) and eel (*Anguilla anguilla*). It is also of particular importance for migratory birds during spring and autumn.		
Sites regularly supporting in excess of	70,919 waterfowl (5 year peak mean 1998/9 – 2002/2003)		

[23] JNCC. (1995). Information Sheet on Ramsar Wetlands (RIS). https://jncc.gov.uk/jncc-assets/RIS/UK11081.pdf

Interest features	Quality and Importance	Conservation Objectives	Vulnerabilities
20,000 waterfowl (Criterion 5)			
Sites regularly supporting 1% of the individuals in a population of one species or subspecies of waterfowl (Criterion 6)	Bewick's Swan – 2.8% of the winter population in Great Britain (5 year peak mean 1998/9 – 2002/2003) White-fronted goose – 35.8% of the winter population in Great Britain (5 year peak mean 1998/9 – 2002/2003) Shelduck – 1% of the winter population (5 year peak mean 1998/9 – 2002/2003) Gadwall – 1.4% of the winter population in Great Britain (5 year peak mean 1998/9 – 2002/2003) Dunlin – 1.8% of the winter population (5 year peak mean 1998/9 – 2002/2003) Redshank – 1% of the winter population (5 year peak mean 1998/9 – 2002/2003) Lesser black backed gull (*Larus fuscus graellsii*) has been identified subsequent to designation for possible future consideration; 4167 apparently occupied nests, representing an average 2.8% of the breeding population (Seabird 2000 Census).		
Sites containing an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks depend (Criterion 8)	Over 110 species of fish have been recorded within the whole estuarine and river system. Salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and eel use the estuary as a key migration route to their spawning grounds in the many tributaries of the Severn. The site is also an important feeding and nursery ground for many fish species, particularly allis and twaite shad which feed on shrimps within the estuary.		

5. Stage 1 Screening Assessment

5.1 Consideration of Effects of Significance

Severn Estuary SPA, SAC and Ramsar (Severn Estuary EMS) has been screened into this assessment due to the proximity to the proposed works and the hydrological linkages present particularly through run-off.

5.2 Potential Effects of the Project

Annex II fish species are known to be vulnerable to noise (high frequency vibration) and toxic contamination. Sensitive bird species associated with the sites may be vulnerable to increased disturbance from public access and recreation (including third party activities). Bird species and Annex I habitats sensitive to water pollution (diffuse and direct); air pollution, particularly atmospheric nitrogen deposition and potential increase in marine litter.

These potential effects are considered in more detail in Table 5.

Table 5 Pathways under consideration and assessment of Likely Significant Effects

Pathways Under Consideration	Potential Construction Effects of the Project	Potential Operational Effects of the Project	Likely Significant Effects During Construction	Likely Significant Effects During Operation
Toxic contamination, including water pollution, sediment run-off and air pollution	It is not anticipated that the works would result in an increase in nutrient or associated waste inputs into the River Ely during construction, which may adversely affect the Severn Estuary EMS. It is proposed that a new high-level surface water overflow will be installed through the sheet piled wall close to the existing surface water outfalls (diameter approximately 450mm). No works are proposed directly within any waterbody, it is assumed that construction of the boardwalk will take place from the land or from a floating platform with nothing being installed into the river. Minor works are proposed to the sheet pile wall to install a new high level surface water outfall. It is proposed that these works are undertaken from a floating pontoon and will be carefully managed to minimise the risk of pollution to the watercourse. During the construction phase, there could be an increased risk of pollution from sedimentation and contaminants entering the watercourses that are hydrologically connected to the Severn Estuary SAC, SPA and Ramsar. There is limited potential for changes in air quality during the construction stage due to the size of the development, although it is not possible to rule out adverse effects to the River Ely from dust etc during construction in the absence of mitigation. However, such changes in air quality are likely to be localised and not adversely effect any qualifying features of the Severn Estuary EMS. Due to the close proximity of the site to the River Ely likely significant effects from the construction phase from changes in water quality cannot be ruled out without mitigation and will be scoped into the appropriate assessment. It is acknowledged however that any pollution or run-off into the River Ely, would be significantly diluted before it reaches the Severn Estuary EMS.	The site currently does not produce any foul flow. Foul water will connect to the existing foul water public sewer network located to the north of the site. within the vicinity of the site. As stated in 2.2.1, a pre-development enquiry has been sent to Welsh Water on accommodation of Plot 1 output to the foul water capacity of the existing network. It is not anticipated that the works would result in an increase in nutrient or associated waste inputs into the River Ely during operation, however the impact of any foul flow resulting from the development is excluded from this HRA, as well as the EcIA, as details are to be confirmed through consultation with Welsh Water. It is assumed that the receiving Waste Water Treatment Works will adhere to any existing regulatory standards which are in place to protect the environment. It is likely that operational runoff rates will be reduced from the existing brownfield runoff rate, and they will discharge unattenuated and unrestricted into the River Ely as per the existing situation. It is proposed that all surface water runoff is discharged to the River Ely via suitable oil, petrol and silt interception devices up to Environment Agency Class 1 Standards. The surface water attenuation requirements to be provided on site will be confirmed with the SuDS Approval Body (SAB). The proposed uses of the site along with the SuDS measures proposed will ensure that water leaving the site by the piped system to any waterbodies will be of good quality. It is expected that during the operational phase, there will be a betterment in water quality compared to the baseline, due to treatment through SuDS, rather than seepage through contaminated land (current baseline). SuDS features will aim to intercept the majority of small rainfall events. Although the site is close to a Source Protection Zone, the necessary measures will be undertaken to ensure that groundwater will be protected from any potential pollution. Changes in air quality through increased traffic during the operational stage is unlikely to be significant since the car park is used regularly.	There is a potential Likely Significant Effect (LSE), to the Severn Estuary EMS and its qualifying features, as a result of changes to water and air quality during the construction phase in absence of mitigation.	No Likely Significant Effect (direct or indirect) to the Severn Estuary EMS and its qualifying features, during operation.
Visual, vibration and noise disturbance to Annex II species and other migratory species in the assemblage, including increased public access/recreation, including increase of marine litter	Generally, noise levels are unlikely to be significantly higher than the existing baseline during construction, although certain activities, such as piling, will generate more significant levels of noise and vibrations. It is assumed that the piling will be driven cast in-situ piling and continuous flight auger piling. No percussive piling is currently proposed. As summarised in Table 1, the noise report shows baseline noise levels of 46 to 47dB LAeq at the edge of the River Ely, and noise levels of 74 to 75 dB LAeq, 10hr during site preparation and construction, including landscaping. It calculates piling peak vibration levels at the edge of the River Ely during construction of the substructure as 7mm/s. The noisiest activities during construction are anticipated to be breaking activities, cutting slabs and loading/unloading of materials, and general construction vehicle noise. These noises are temporary and no further mitigation other than the embedded mitigation of maintaining noise levels to a minimum can be taken forward. ***Fish*** Twaite shad and the remaining species within the full migratory assemblage (including Allis shad, salmon, sea trout and eel) are to be considered and may be affected by noises. Blast simulation data indicates that PPV causing 10% mortality in salmon eggs (considered the most sensitive salmonid egg to vibration impact) ranged from 145mm/s to 838 mm/s[24]. However, the guidelines for the use of explosives in or near Canadian fisheries waters recommend a far lower threshold of no	Operational noise levels are not anticipated to be similar to the baseline, given that the baseline was a car park. *Marine litter* Litter derived from residential use is not anticipated to increase further to the existing levels. Litter during operation isn't expected to have an adverse impact upon the Severn Estuary SAC SPA and Ramsar sites due to distance from the site. *Lighting* The lighting strategy for the site has minimised lighting as much as possible, focussing on retention of a dark corridor along the water edge, and minimising light spill out of the development boundary. However, during the operational stage, the car park and amenity areas will still need to be lit throughout the hours of darkness. Further screening will be provided through landscaping, strategically placing trees to further reduce light spill and visual impacts where possible. ***Birds*** The site has been subject to wintering bird surveys and breeding bird surveys. Results from these surveys indicate that the site and adjacent habitats are not suitable for significant numbers of wintering or breeding birds associated with the Severn Estuary SPA and Ramsar site. Displacement of birds is considered below in the *disturbance/ displacement to faunal species* pathway for consideration.	No direct or indirect Likely Significant Effect from disturbance on the Severn Estuary EMS and qualifying features during construction.	No direct or indirect Likely Significant Effects from disturbance on the River Severn EMS and qualifying features during operation.

[24] Jenson (2003). New mechanical shock sensitivity units in support of criteria for protection of salmonid eggs from blasting or seismic disturbance. Fisheries & Oceans Canada, Pacific Region, Science Branch, Pacific Biological Station.

Pathways Under Consideration	Potential Construction Effects of the Project	Potential Operational Effects of the Project	Likely Significant Effects During Construction	Likely Significant Effects During Operation
	greater than 13 mm/s in a spawning bed during the period of egg incubation[25]. This threshold of 13 mm/s has also been provided by the Environment Agency during written consultation on previous projects involving piling[26]. As the maximum level of vibration at the water edge is 7mm/s, it is well below the threshold for sensitive species such as salmon (13mm/s). Values below 13mm/s could cause avoidance behaviour however if transmitted to the water column. However, due to the difference in impedance between land and water when vibration reaches the waterline it will not transmit efficiently between the shore and the river. Consequently, the magnitude of vibration in the river will be significantly lower than the worst-case value given of 7 mm/s. The river channel at this point is 140m wide and the edges are shallow and do not provide suitable spawning habitat due to being silted. There is an existing level of disturbance within the water at the site location from the Cardiff Bay Yacht Club from boats motoring in and out of moorings, which are located adjacent to floating walkways just south of the site boundary, and small watercraft originating from Cardiff White Water Centre. It is assumed that any transmittal of vibration from construction to the water column would be minimal, and quickly dissipate in the water column. Furthermore, the channel width is sufficient that migratory fish could easily move past undisturbed within the main deep channel which is (anticipated to be at around 70-100m from the edge of Plot 1). Therefore, it is considered that the level of vibration within the water will be minor and temporary and is unlikely to cause any significant change and therefore impact to the fish assemblage using the river channel. The maximum noise during the construction phase at the closest part of the River Ely will be 75 dB, which is an increase compared to the baseline, however as sound doesn't transfer efficiently through the land/water interface the impact is considered to be negligible. Further, it is likely that sufficient distance is present between the site and suitable habitat for migrating fish (i.e. the southern section of the river (>30m from site) to avoid any significant disturbance to Annex II fish, which could be migrating along this stretch of the River Ely. As such, although fish species differ in sensitivity to vibration, it is reasonable to conclude that that there is no risk of significant disturbance during construction to any Annex II fish or the species forming part of the fish assemblage. *Lighting* Construction works will typically take place during daylight hours. If any task lighting or security lighting is required during construction, it will be directional and temporary and be away from the riparian corridor. ***Birds*** The site has been subject to wintering bird surveys and breeding bird surveys. Results from these surveys indicate that the site and adjacent habitats are not suitable for significant numbers of wintering or breeding birds associated with the Severn Estuary SPA and Ramsar site. Displacement of birds is considered below in the *disturbance/ displacement to faunal species* pathway for consideration.			

[25] Wright, D.G. and Hopky, G.E. (1998) Guidelines for the use of explosives in or near Canadian fisheries waters. Fisheries and Oceans Canada

[26] A66 Northern Trans-Pennine Project, Habitats Regulations Assessment (HRA) Stage 2 Statement to inform Appropriate Assessment (p60).

Pathways Under Consideration	Potential Construction Effects of the Project	Potential Operational Effects of the Project	Likely Significant Effects During Construction	Likely Significant Effects During Operation
Annex I habitat degradation and degradation of habitat used by Annex II species **Disturbance/ displacement to faunal species**	***Annex I habitats*** The proposed works will not reduce the extent of Annex I habitats associated with the Severn Estuary European Sites. Potential degradation impacts, albeit unlikely due to the small-scale of works and dilution effect of Cardiff Bay in the event of run-off, are discussed in a separate section above (*Toxic contamination, including water pollution, sediment run-off and air pollution* pathway under consideration). ***Fish*** The habitats around the marina are not considered to be suitable spawning habitat for Annex II fish species. During construction, disturbance to fish is considered minor and temporary, confined to areas directly adjacent to the sheet piles, any migratory fish that may be using areas adjacent to the site, if affected would have space within the wider channel of the River Ely, and this should not significantly affect their migration into/out of the river. No works are proposed directly within any waterbody, it is assumed that construction of the boardwalk will take place from the land or from a floating platform with nothing being installed into the river. Minor works are proposed to the sheet pile wall to install a new high level surface water outfall. It is proposed that these works are undertaken from a floating pontoon and will be carefully managed to minimise the risk of disturbance of fish and associated habitats within the watercourse. ***Birds*** As described above, the site has been subject to wintering bird surveys and breeding bird surveys. Results from these surveys indicate that the site and adjacent habitats are not suitable for significant numbers of wintering or breeding birds associated with the Severn Estuary SPA and Ramsar site. During construction, any displacement of qualifying bird species using the adjacent Cardiff Bay is considered unlikely given existing screening at the site however, there is ample habitat within Cardiff Bay and the Severn Estuary to allow temporary dispersal of any birds using the site for foraging or overwintering. The site offered limited suitability for birds associated with the SPA and Ramsar Site, due to small extent of habitat with high levels of existing disturbance due to its use as a car park. As such, during construction, no adverse impacts are anticipated on qualifying bird species of the Severn Estuary SPA and Ramsar Site.	***Annex I habitats*** No potential impacts to Annex I habitats during operation. ***Birds*** The site offered limited suitability for birds associated with the SPA and Ramsar Site, due to small extent of habitat with high levels of existing disturbance due to its use as a car park. As such, during operation, no adverse impacts are anticipated on qualifying bird species of the Severn Estuary SPA and Ramsar Site. Post development lighting to the river will be minimised and maintained as a dark corridor for bats and birds and may reduce disturbance/displacement. Operational noise is not anticipated cause any additional disturbance to birds compared with the baseline which is a car park. Due to the provision of green roofs, this may also provide roosting opportunities for lesser black backed gulls and render the site more suitable to support this species.	No direct or indirect Likely Significant Effects on the Severn Estuary EMS and qualifying features (Annex I habitats, and Annex II species) during construction	No direct or indirect Likely Significant Effect on the Severn Estuary EMS and qualifying features (Annex I habitats, and Annex II species) during operation of the site.

5.3 Identification of Other Plans and Projects

Future applications for the Cardiff Peninsula site are likely to be forthcoming, however, these will require separate assessments for their impacts to any designated sites. Where any temporal overlap is realised this will be assessed within the future applications and associated HRAs.

Several planning applications were identified near the project within a 500m radius from the site boundary from the past year, however these all comprised minor applications relating to changes to signage and replacement of building cladding, and an amendment to a planning application for a small extension to southern and western sides of the Yacht Club approximately 330m south-east of the site (23/00969/NMA).

The MWU Phase 1 is being submitted to planning (as per 30/05/2024) as part of the wider development to the site. The potential in-combination effects derived from pollution, air quality, noise during construction and operational stages all to be mitigated against within the embedded design and best practice construction measures. Additionally, current proposed construction phases do not overlap. It is therefore unlikely that any significant in-combination effects would be realised.

Given the minor nature of the other identified plans and projects, it is considered unlikely that a significant in-combination effect would be realised.

6. Stage 2 - Appropriate Assessment

Where screening in Stage 1 has determined that the potential for a Likely Significant Effect on European Sites cannot be ruled out, an Appropriate Assessment is required. The Appropriate Assessment is detailed below and considers mitigation and residual effects (if any) on the Severn Estuary EMS. These have been considered with regard to NRW's conservation objectives for the Severn Estuary EMS.

6.1 Water quality effects

As shown in Table 5, the potential for Likely Significant Effects has only been identified during construction, and from toxic contamination (including water pollution, sediment run-off) of hydrologically connecting watercourses (the River Ely) which could adversely affect the River Severn EMS's qualifying features. Therefore, only mitigation for water quality during construction is detailed below.

6.1.1 Mitigation

During construction, accidental pollution events from construction activities such as spillages or similar are to be mitigated against through the production and implementation of a detailed Construction Environmental Management Plan (CEMP).

The CEMP will contain the following best practice methods to ensure all activities in proximity to the watercourse are controlled and are in accordance with relevant legislation and undertaken in compliance with the relevant Guidance for Pollution Prevention (e.g. GPP5[27]) and industry best practice (CIRIA , CIRIA C741[28]), measures include:

- The storage and use of hazardous chemicals would be in accordance COSHH Regulations (1998);
- Environmentally friendly products will be used where possible;
- All waste materials will be disposed of in designated skips/areas;
- Constant monitoring of dust levels and adopting effective methods of work to prevent dust becoming airborne at the source for example; using wet sweeping methods to prevent accumulation of dust and mud and using effective exhaust ventilation and filtering to minimise potential dust pollution.
- Emergency spill kits are to be maintained at every work location or be easily accessible at all times from a centralised location. In the event of a pollution incident, work should cease in the vicinity of the incident and contaminants must be cleaned up immediately;

Equipment to be stored on designated drip trays/bundied areas;

- All refuelling operations are to be undertaken at the site compound, at least 10m from the watercourse;
- Refuelling operations must always be manned, never left alone, or the fuel trigger jammed open and carried out in accordance with the approved procedures;
- All plant and equipment will be checked, be in good working order and free of defects / leaks, if any defect or leaks found must be corrected prior to commencing / re-commencing works.
- Plant will be located as far as reasonably practicable away from ecology features, and will be shut down when not in use.;
- If a spill should occur, the following should be used: stop, contain and notify; and
- Emergency response plan will be implemented should there be an incident.

[27] https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf

[28] Environmental good practice on site guide (fifth edition) (C811). https://www.ciria.org

With best practise construction measures in place to manage any runoff during groundworks, dust during breaking out and construction activities, and air quality, the risk of pollution events will be minimised.

The ecological sections of the CEMP are to be reviewed by a suitably qualified and experienced ecologist.. Projects will secure best practice construction measures including adherence to relevant Guidelines for Pollution Prevention, including GPP5: works or maintenance in or near water. Application of the GPPs is considered sufficient to manage potential effects.

6.1.2 Effects following Mitigation

It is considered that the preparation of this CEMP document will mitigate for potential impacts to the Severn Estuary SAC, SPA and Ramsar (Severn Estuary EMS) which could occur during construction pollution events/surface run-off. As such, with the detailed measures in the CEMP (as outlined above) being followed during construction, any adverse effects on the Severn Estuary SAC, SPA and Ramsar can be ruled out either alone or in-combination with other plans and projects.

It should be noted however that the conclusion is based upon the current design proposals. If there are any changes to the proposed works design, then this HRA will need to be updated accordingly.

7. Conclusion

Ove Arup and Partners Limited (Arup) has been appointed by Orion Land & Leisure Limited to undertake ecological surveys and reporting to inform a Habitats Regulations Assessment (HRA) in relation to the Plot 1 site, part of a proposed development of land at Cardiff Peninsula.

The report considers the potential effects on the European Sites in relation to the conservation objectives for the features of the European Sites and any identified potential pathways for effects. Three European Sites were identified located 1.2km south-east of the site comprising the Severn Estuary SPA, SAC and Ramsar (all forming the wider Severn Estuary EMS designation), notified for their Annex 1 habitats, migratory fish species and important bird populations.

In the absence of mitigation, the Screening Assessment has identified a potential pathway to produce a Likely Significant Effect on the Severn Estuary EMS as a result of toxic contamination; water pollution and sediment run-off. The screening has not identified any further pathways to produce Likely Significant Effects.

Best practice mitigation for potential effects on water quality and adverse effects on the hydrological connecting European Sites (Severn Estuary SAC, SPA and Ramsar) have been outlined in the Appropriate Assessment. With the implementation of this mitigation, there will be no adverse effects on the integrity of the European Sites (Severn Estuary SAC, SPA and Ramsar) and their features, either alone or in-combination with other plans and projects.

This report is produced solely for the benefit of Orion Land & Leisure Limited and no liability is accepted for any reliance placed on it by any other party. This report is prepared for the proposed uses stated in the report and should not be used in a different context.

Figures

Figure 1 Site Location Plan

Red line boundary

A3

09/05/2024 09:49

Coordinate System:

British National Grid

Metres

0 30 60 120

Rev	Date	By	Chkd	Appd	Authd
01	15/03/2024	NW	RC	PC	--

ARUP

4 Pierhead Street
Capital Waterside
Cardiff
CF10 4QP
United Kingdom
www.arup.com

Client

Orion Land & Leisure Limited

Project Name

Plot 1

Drawing Title

Site Location

Scale at A3

1:2,500

Role

Ecology

Suitability

For Information

Project Number

299826

Rev

01

Drawing Number

Figure 1

\\global\europe\CardiffJobs\299000\299826-004 Internal Project Data\4-80 GIS\4-82 Working Data\ENV_Environment\ecology GIS\plot 1\HRA and EclA\P1 HRA and EclA.aprx

Figure 2 Designated Sites Plan

A3

09/05/2024 09:42

- Red line boundary
- 10km Buffer
- 2km buffer
- Severn Estuary SAC
- Severn Estuary SPA
- Severn Estuary Ramsar
- SSSI

Coordinate System:

British National Grid

Metres

0 1,000 2,000 4,000

Rev	Date	By	Chkd	Appd	Authd
01	13/03/2024	NW	RC	PC	--

ARUP

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Client

Orion Land & Leisure Limited

Project Name

Plot 1

Drawing Title

Internationally And Nationally Designated Sites

Scale at A3

1:80,000

Role

Ecology

Suitability

For Information

Project Number

299826

Rev

01

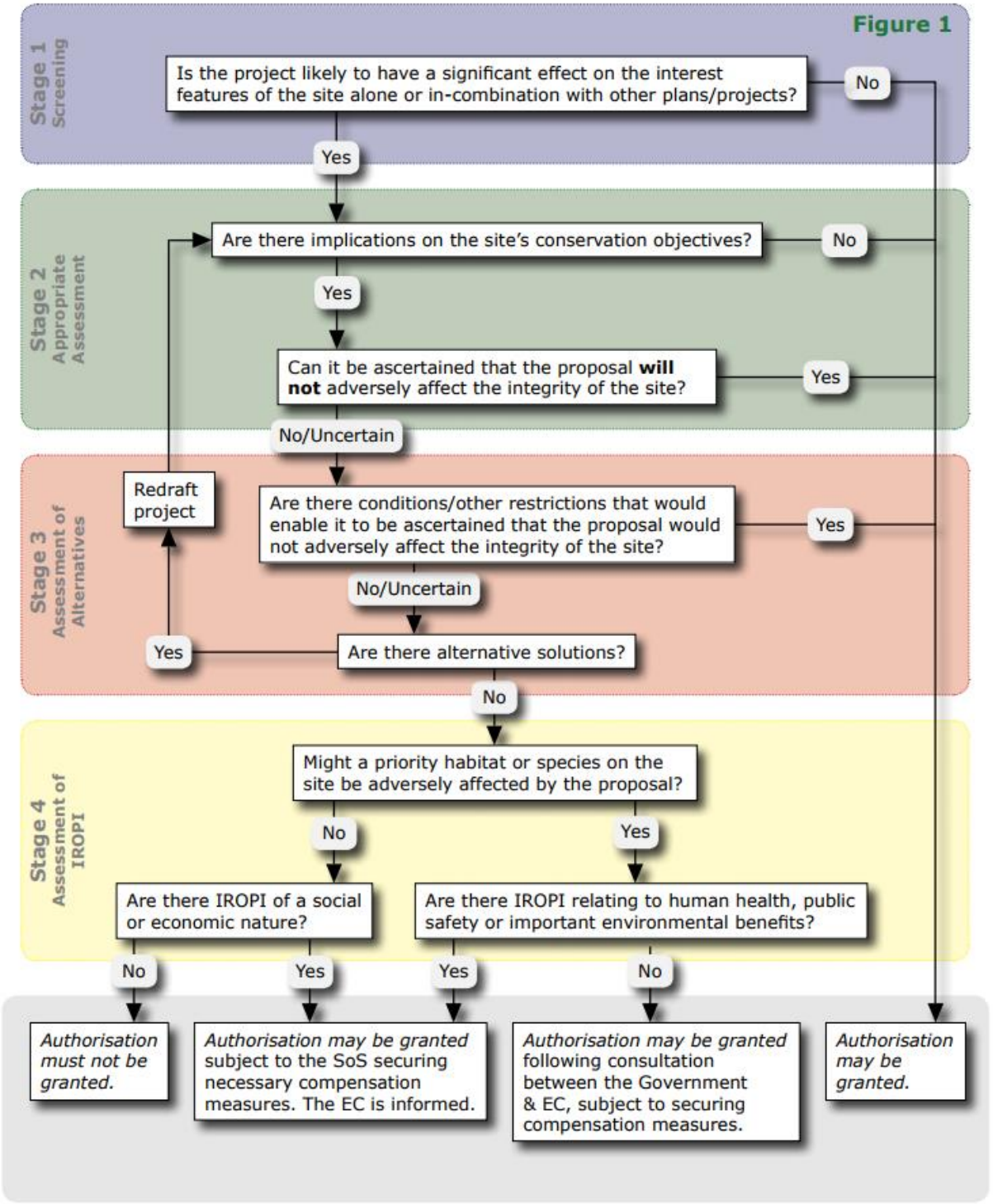
Drawing Number

Figure 2

\\global\europe\Cardiff\Jobs\299000\299826-00\4 Internal Project Data\4-80 GIS\4-82 Working Data\ENV_Environment\ecology GIS\plot 1\HRA and EcIA\P1 HRAand EcIA.aprx

Appendix A

Habitats Regulations Assessment Process



Appendix B

Severn Estuary European Marine Site Conservation Objectives

SAC Feature 1: Estuaries

The conservation objective for the "estuaries" feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met

i. the total extent of the estuary is maintained;

ii. the characteristic physical form (tidal prism/cross sectional area) and flow (tidal regime) of the estuary is maintained;

iii. the characteristic range and relative proportions of sediment sizes and sediment budget within the site is maintained;

iv. the extent, variety and spatial distribution of estuarine habitat communities within the site is maintained;

v. the extent, variety, spatial distribution and community composition of hard substrate habitats and their notable communities(v) is maintained;

vi. the abundance of the notable estuarine species assemblages is maintained or increased;

vii. the physico-chemical characteristics of the water column support the ecological objectives described above;

viii. Toxic contaminants in water column and sediment are below levels which would pose a risk to the ecological objectives described above.

ix. Airborne nutrient and contaminant loads are below levels which would pose a risk to the ecological objectives described above

SAC Feature 2: Subtidal sandbanks

The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

i. the total extent of the subtidal sandbanks within the site is maintained;

ii. the extent and distribution of the individual subtidal sandbank communities within the site is maintained;

iii. the community composition of the subtidal sandbank feature within the site is maintained;

iv. the variety and distribution of sediment types across the subtidal sandbank feature is maintained;

v. the gross morphology (depth, distribution and profile) of the subtidal sandbank feature within the site is maintained.

SAC Feature 3: Mudflats and sandflats

The conservation objective for "mudflats and sandflats" feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

i. The total extent of the mudflats and sandflats feature is maintained;

ii. the variety and extent of individual mudflats and sandflats communities within the site is maintained;

iii. the distribution of individual mudflats and sandflats communities within the site is maintained;

iv. the community composition of the mudflats and sandflats feature within the site is maintained;

v. the topography of the intertidal flats and the morphology (dynamic processes of sediment movement and channel migration across the flats) are maintained.

SAC Feature 4: Atlantic salt meadow

The conservation objective for the "Atlantic salt meadow" feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

i. the total extent of Atlantic salt meadow and associated transitional vegetation communities within the site is maintained;

ii. the extent and distribution of the individual Atlantic salt meadow and associated transitional vegetation communities within the site is maintained;

iii. the zonation of Atlantic salt meadow vegetation communities and their associated transitions to other estuary habitats is maintained;

iv. the relative abundance of the typical species of the Atlantic salt meadow and associated transitional vegetation communities is maintained;

v. the abundance of the notable species of the Atlantic salt meadow and associated transitional vegetation communities is maintained;

vi. the structural variation of the salt marsh sward (resulting from grazing) is maintained within limits sufficient to satisfy the requirements of conditions iv and v above and the requirements of the Ramsar and SPA features;

vii. the characteristic stepped morphology of the salt marshes and associated creeks, pills, drainage ditches and pans, and the estuarine processes that enable their development, is maintained.

viii. Any areas of Spartina anglica salt marsh (SM6) are capable of developing naturally into other saltmarsh communities

SAC Feature 5: Reefs

The conservation objective for the "reefs" feature of the Severn Estuary SAC is to maintain the feature in a favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

i. the total extent and distribution of Sabellaria reef is maintained;

ii. the community composition of the Sabellaria reef is maintained;

iii. the full range of different age structures of Sabellaria reef are present;

iv. the physical and ecological processes necessary to support Sabellaria reef are maintained

SAC Feature 6: River Lamprey

The conservation objective for the river lamprey *Lampetra fluviatilis* feature of the Severn Estuary SAC is to maintain the feature in a favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

i. the migratory passage of both adult and juvenile river lamprey through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality;

ii. ii the size of the river lamprey population in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;

iii. the abundance of prey species forming the river lamprey's food resource within the estuary, is maintained.

iv. Toxic contaminants in the water column and sediment are below levels which would pose a risk to the ecological objectives described above.

SAC Feature 7: Sea lamprey

The conservation objective for the sea lamprey Petromyzon marinus feature of the Severn Estuary SAC is to maintain the feature in a favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

i. the migratory passage of both adult and juvenile sea lamprey through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality;

ii. the size of the sea lamprey population in the Severn Estuary and the rivers which drain into it, is at least maintained as is at a level that is sustainable in the long term;

iii. the abundance of prey species forming the sea lamprey's food resource within the estuary, is maintained.

iv. Toxic contaminants in the water column and sediment are below levels which would pose a risk to the ecological objectives described above.

SAC Feature 8: Twaite shad

The conservation objective for the twaite Shad *Alosa fallax* feature of the Severn Estuary SAC is to maintain the feature in a favourable condition, as defined below: The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

i. the migratory passage of both adult and juvenile twaite shad through the Severn Estuary between the Bristol Channel and their spawning rivers is not obstructed or impeded by physical barriers, changes in flows or poor water quality;

ii. the size of the twaite shad population within the Severn Estuary and the rivers draining into it is at least maintained and is at a level that is sustainable in the long term.

iii. the abundance of prey species forming the twaite shad's food resource within the estuary, in particular at the salt wedge, is maintained.

iv. Toxic contaminants in the water column and sediment are below levels which would pose a risk to the ecological objectives described above.

SPA interest feature: Internationally important population of regularly occurring Annex 1 species : Bewick's swan

The conservation objective is to maintain the Bewick's swan population and its supporting habitats in favourable condition, as defined below

The interest feature Bewick's swan will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

(i) the 5 year peak mean population size for the Bewick's swan population is no less than 289 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh at the Dumbles is maintained;

(iii) the extent of intertidal mudflats and sandflats at Frampton Sands, Waveridge Sands and the Noose is maintained;

(iv) the extent of vegetation with an effective field size of >6 ha and with unrestricted bird sightlines > 500m at feeding, roosting and refuge sites are maintained;

(v) greater than 25% cover of suitable soft leaved herbs and grasses in winter season throughout the transitional saltmarsh at the Dumbles is maintained;

(vi) aggregations of Bewick's swan at feeding, roosting and refuge sites are not subject to significant disturbance.

SPA interest feature 2: Internationally important population of regularly occurring migratory species: wintering European white-fronted goose

The conservation objective is to maintain the European white-fronted goose population and its supporting habitats in favourable condition, as defined below.

The interest feature European white-fronted goose will be considered to be in favourable condition2 when, subject to natural processes, each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering European white fronted goose population is no less than 3,002 individuals (ie the 5 year peak mean between 1988/9-1992/3);

(ii) the extent of saltmarsh at the Dumbles is maintained;

(iii) the extent of intertidal mudflats and sandflats at Frampton Sands, Waveridge Sands and the Noose is maintained;

(iv) greater than 25% cover of suitable soft-leaved herbs and grasses3 is maintained during the winter on saltmarsh areas

(v) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;

(vi) aggregations of European white-fronted goose at feeding or roosting sites are not subject to significant disturbance.

SPA interest feature 3: Internationally important population of regularly occurring migratory species: wintering dunlin

The conservation objective is to maintain the dunlin population and its supporting habitats in favourable condition, as defined below:

The interest feature dunlin will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering dunlin population is no less than 41,683 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh and associated strandlines is maintained;

(iii) the extent of intertidal mudflats and sandflats is maintained;

(iv) the extent of hard substrate habitats is maintained;

(v) the extent of vegetation with a sward height of 200m at feeding and roosting sites are maintained;

(vi) aggregations of dunlin at feeding or roosting sites are not subject to significant disturbance

SPA interest feature 4: Internationally important population of regularly occurring migratory species: wintering redshank

The conservation objective is to maintain the redshank population and its supporting habitats in favourable condition, as defined below

The interest feature redshank will be considered to be in favourable condition when, subject to natural processes each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering redshank population is no less than 2,013 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh and associated strandlines is maintained;

(iii) the extent of intertidal mudflats and sandflats is maintained;

(iv) the extent of hard substrate habitats is maintained;

(v) the extent of vegetation with a sward height of 200m at feeding and roosting sites are maintained;

(vi) aggregations of redshank at feeding or roosting sites are not subject to significant disturbance.

PA interest feature 5: Internationally important population of regularly occurring migratory species: wintering shelduck

The conservation objective is to maintain the shelduck population and its supporting habitats in favourable condition, as defined below:

The interest feature shelduck will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering shelduck population is no less than 2,892 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh is maintained;

(iii) the extent of intertidal mudflats and sandflats is maintained; the extent of hard substrate habitats is maintained;

(iv) the abundance and macro-distribution of suitable invertebrates3 in intertidal mudflats and sandflats is maintained;

(v) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;

(vi) aggregations of shelduck at feeding or roosting sites are not subject to significant disturbance

SPA interest feature 6: Internationally important population of regularly occurring migratory species: wintering gadwall

The conservation objective is to maintain the gadwall population and its supporting habitats in favourable condition, as defined below:

The interest feature gadwall will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering gadwall population is no less than 330 (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of intertidal mudflats and sandflats is maintained;

(iii) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;

(iv) aggregations of gadwall at feeding or roosting sites are not subject to significant disturbance

SPA interest feature 7: Internationally important assemblage of waterfowl

The conservation objective is to maintain the waterfowl assemblage and its supporting habitats in favourable condition, as defined below:

The interest feature waterfowl assemblage will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

(i) the 5 year peak mean population size for the waterfowl assemblage is no less than 68,026 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh and their associated strandlines is maintained;

(iii) the extent of intertidal mudflats and sandflats (Appendix 8) is maintained;

(iv) the extent of hard substrate habitats (Appendix 8) is maintained;

(v) extent of vegetation of 500m at feeding and roosting sites are maintained;

(vi) waterfowl aggregations at feeding or roosting sites are not subject to significant disturbance.

Ramsar interest feature 1: Estuaries

The conservation objective for the "estuaries" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SAC "estuaries" feature" in so far as these objectives are applicable to the area designated as Ramsar Site and as defined below.

Ramsar interest feature 2: Assemblage of migratory fish species

The conservation objective for the "assemblage of migratory fish species" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes2 , each of the following conditions are met:

i. the migratory passage of both adults and juveniles of the assemblage of migratory fish species through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality;

ii. the size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;

iii. the abundance of prey species3 forming the principle food resources for the assemblage species within the estuary, is maintained.

iv. Toxic contaminants in the water column4 and sediment are below levels which would pose a risk to the ecological objectives described above.

Ramsar interest feature 3: Internationally important populations of waterfowl : Bewick's swan

The conservation objective for the "Bewick's swan" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA "Bewick's swan " feature

Ramsar interest feature 4 : Internationally important populations of waterfowl : European white-fronted goose

The conservation objective for the "European white-fronted goose" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA "wintering European white-fronted goose" feature

Ramsar interest feature 5: Internationally important populations of waterfowl : dunlin

The conservation objective for the "dunlin" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA "wintering dunlin " feature

Ramsar interest feature 6: Internationally important populations of waterfowl : redshank

The conservation objective for the “redshank” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA “wintering redshank” feature

Ramsar interest feature 7: Internationally important populations of waterfowl :shelduck

The conservation objective for the “shelduck” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA “wintering shelduck” feature

Ramsar interest feature 8: Internationally important populations of waterfowl : gadwall

The conservation objective for the “gadwall” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA “wintering gadwall” feature

Ramsar interest feature 9: Internationally important assemblage of waterfowl

The conservation objective for the “internationally important assemblage of waterfowl” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA “internationally important assemblage of waterfowl” feature – with special reference to the individual species listed and their population figures given in Table 6

Note : This Ramsar Site feature incorporates both wintering and passage populations of some birds and hence some species are included more than once in lists given in Table 6