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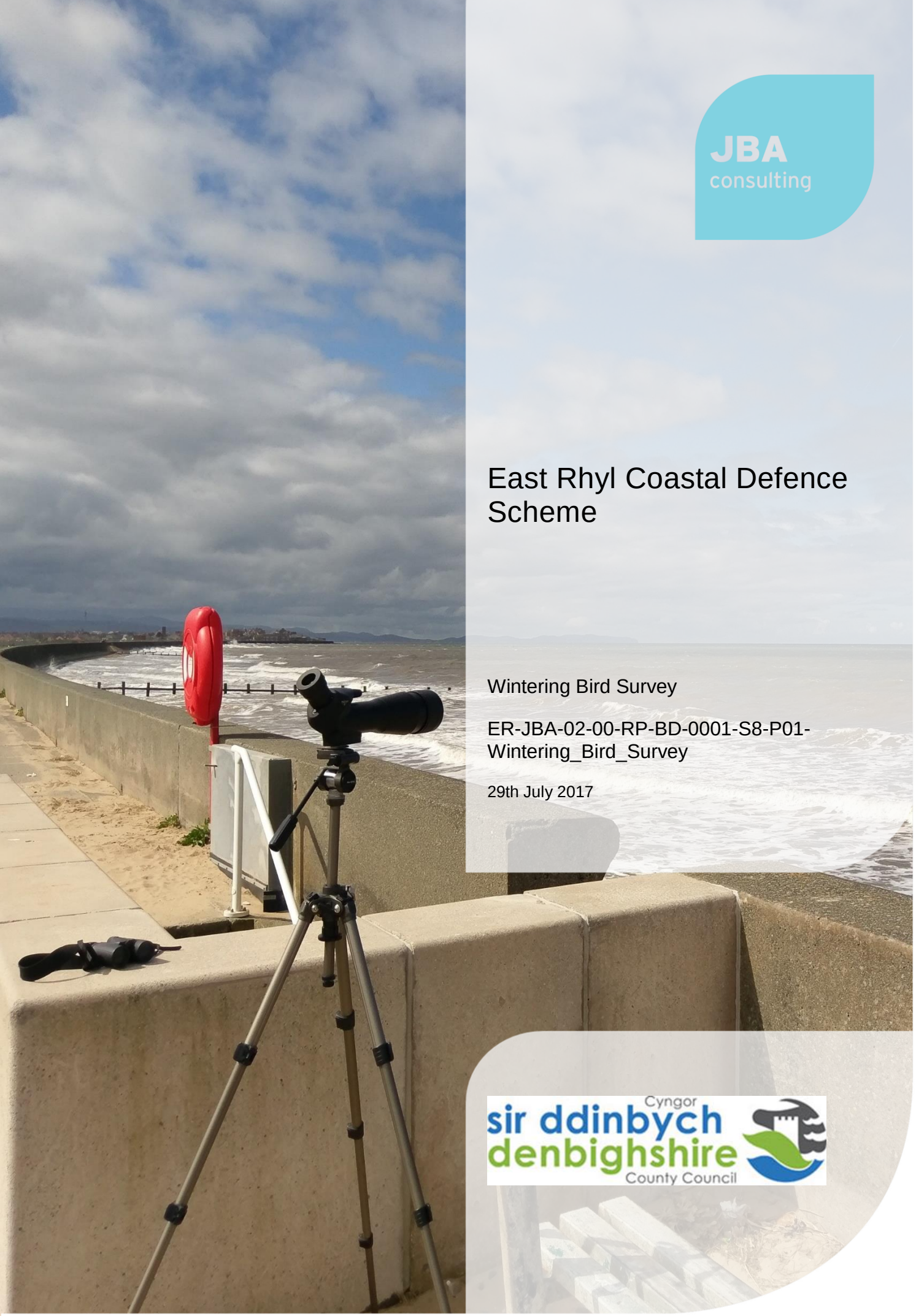

East Rhyl Coastal Defence Scheme

Wintering Bird Survey

ER-JBA-02-00-RP-BD-0001-S8-P01-Wintering_Bird_Survey

29th July 2017

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Revision History

Revision Ref / Date Issued	Amendments	Issued to
v1.0 14/07/2017		Denbighshire CC/Balfour Beatty
V1.1 02/08/2017	Minor edits	Denbighshire CC

Contract

This report describes work commissioned by Denbighshire County Council (DCC), as a preliminary action in advance of the wider SCAPE contract between DCC and Balfour Beatty. Jonathan Harrison and Christopher Toop of JBA Consulting carried out this work.

Prepared by .....Jonathan Harrison BSc MSc
Ecologist

Reviewed by .....Christopher Toop BSc
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Purpose

This document has been prepared as a Draft Report into the over-wintering bird use of Frith Beach for Balfour Beatty. JBA Consulting accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

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Contents

List of Figures

List of Tables

Abbreviations

BTO ..... British Trust for Ornithology
CBC ..... Common Bird Census
DCC ..... Denbighshire County Council
EC ..... European Commission
EU ..... European Union
JNCC ..... Joint Nature Conservation Committee
PAR ..... Project Appraisal Report
PPW ..... Planning Policy Wales
SAC ..... Special Area of Conservation
SPA ..... Special Protection Area
SSSI ..... Site of Special Scientific Interest
TAN ..... Technical Advice Note
WeBS ..... Wetland Bird Survey

1 Introduction

This report provides details of the wintering bird survey that was carried out between October 2016 and April 2017 at the East Rhyl foreshore. It will be used for the detailed design development for the East Rhyl Coastal Defence scheme. The report provides the background to the scheme, the survey findings and recommendations going forward.

The surveys have been carried out to inform whether the proposed scheme has potential for likely significant effects on the qualifying features of the Liverpool Bay Special Protection Area (SPA). Numbers of birds recorded utilising the foreshore in the area of the proposed scheme, has been collected to inform the baseline in advance of Habitats Regulation Assessment (if required) at a later stage.

1.1 Project Background

The East Rhyl Coastal Defence project is a proposed new coastal defence scheme to be constructed to protect the east of Rhyl primarily from flooding caused by wave overtopping of the existing seawall. The scheme will be designed to protect the Garford Road area of East Rhyl, from Splash Point to the Rhyl Golf Course**Error! Reference source not found.**.

Rhyl is a seaside resort town on the coast of Denbighshire, North Wales. The town has been protected from coastal flooding in the past by a range of defence structures which are now exceeding their performance standards and design lives. In East Rhyl, the existing defences have overtopped significantly in recent history causing significant damage and disruption to the residential and commercial properties.

1.2 Proposed Options

A preliminary appraisal report (PAR) has identified a number of options to be considered for scheme. Figure 1-1 shows the footprint of all of the options that are being considered.

The wintering bird surveys recorded bird species utilising the foreshore area throughout the entire scheme area and it is therefore deemed that the recommendations in this report can be applied to any of the options taken forward.

1.2.1 Option 3 – Offshore breakwater

An offshore breakwater works on the principles of reducing wave energy in the lee of the structure, so that the wave overtopping over the existing defences is reduced.

1.2.2 Option 4 – Rock revetment with minimal beach

Option 4 seeks to place rock armour over the existing concrete stepped structure to dissipate wave energy arriving at the structure. This would also include a small beach recharge and would require further maintenance recharges in the future.

The existing sea wall is considered to be in fair condition, but further analysis is required to estimate the residual life. Deterioration in the existing stepped revetment profile through the design life of the structure can be accommodated by the rock revetment due to is natural adaptability. However, the upstand recurve wall is necessary to offer protection from wave overtopping.

1.2.3 Option 5 – Rock revetment with amenity beach

Option 5 is similar to Option 4, however, it seeks to create an amenity beach and will require the placement of further imported material. This will also require the construction of a number of new groins designed to hold the new material in place.

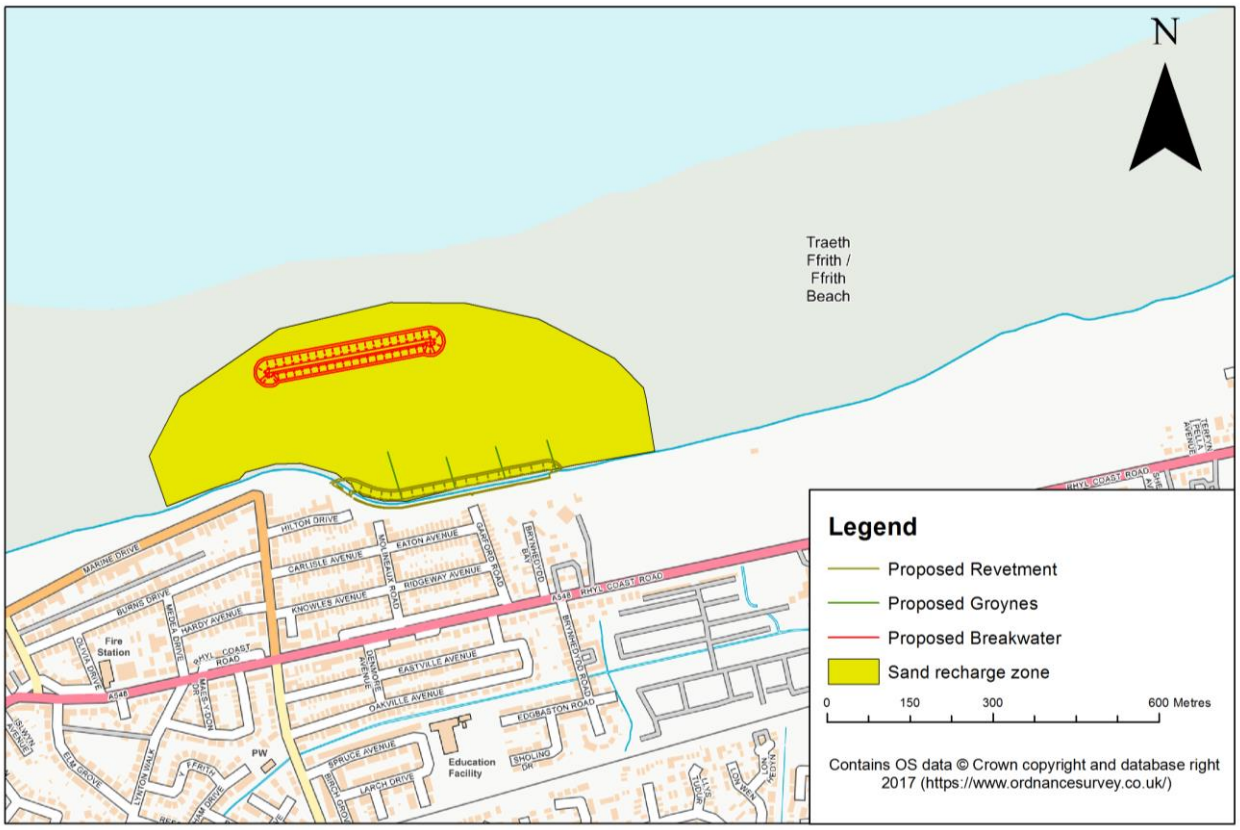


Figure 1-1 Location of proposed works

2 Legislation

2.1 Planning Policy Wales (Edition 9, July 2016)

Planning Policy Wales (PPW) sets out the broad principles for the operation of the planning system in Wales. The document contains general commitments to sustainable development, the protection of biodiversity and protection of the environment. It is supplemented by a series of Technical Advice Notes (TAN) and Circulars. Together these documents comprise national planning policy in Wales, which should be taken into account by local planning authorities in the preparation of development plans and assessment of planning applications

2.2 European Commission (EC) Birds Directive

The EC Birds Directive provides a framework, encompassing broad objectives, for the management and conservations of wild birds, and their interaction with human activity, within Europe.

Some of the principle provisions of the Directive include:

- The maintenance of the populations of all wild bird species across their natural range with the encouragement of various activities to that end.
- The identification and classification of Special Protection Areas (SPA) for rare or vulnerable species listed in Annex I of the Directive, as well as for all regularly occurring migratory species, paying particular attention to the protection of wetlands of international importance.
- The establishment of a general scheme of protection for all wild birds.
- Restrictions on the trade and husbandry of wild birds.
- Specification of the conditions under which hunting and falconry can be undertaken.
- Prohibition of large-scale non-selective means of bird killing.
- Encouragement of certain forms of relevant research.
- Requirements to ensure that introduction of non-native birds do not threaten other biodiversity.

2.3 The Wildlife and Countryside Act 1981 (as amended)

The EC Birds Directive is transposed into UK legislation under the Wildlife and Countryside Act 1981 (as amended). All birds, their nests and eggs are protected under and, essentially, it is therefore an offence to intentionally or recklessly:

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while it is in use or being built;
- take or destroy the egg of any wild bird, or
- disturb any wild bird listed on Schedule 1 of the Wildlife and Countryside Act while it is nest building, or at a nest containing eggs or young, or disturb the dependent young of such a bird.
- cause adverse impacts to the integrity of European designated sites (including Ramsar sites), and / or qualifying features of these sites (SPA and Special Areas of Conservation (SAC), known as Natura 2000 sites).

2.4 Conservation of Habitats and Species Regulations 2010 (as amended)

Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, known as the 'Habitats Directive' was adopted in 1992. The Directive promotes the maintenance of biodiversity by requiring Member States to take measures to maintain or restore certain natural habitats and wild species at a favourable conservation status, introducing robust protection for those habitats and species of European importance.

The Directive establishes the requirement for a European ecological network of protected sites by designating SACs for habitats listed on Annex I and for species listed on Annex II. These

measures are also applied to SPAs classified under Article 4 of the Birds Directive. Together SACs and SPAs make up the Natura 2000 network.

The Directive is transposed into law in England and Wales through the Conservation of Habitats and Species Regulations 2010 (as amended) ('Habitats Regulations').

The designation and protection of domestic and European sites e.g. Sites of Special Scientific Interest (SSSI), SPA and SAC also falls within these Regulations.

Public bodies (including the Local Planning Authority) have a legal obligation to fulfil the requirements of the Habitats Directive in carrying out their duties e.g. when determining a planning application.

3 Liverpool Bay Special Protection Area

Liverpool Bay SPA consists of an area combining both the English and Welsh Coastlines from Morecambe to Anglesey, encompassing the Ribble and Dee estuaries in England, and Conwy Bay up to Pont Lynas, Anglesey, in Wales. The site is designated for the international importance of its over-wintering bird assemblages, especially of Red-throated Diver *Gavia stellata* and Common Scoter *Melanitta nigra.* The Liverpool Bay SPA (UK 9020294) is located immediately adjacent to the study site (from mean low water) and qualifies as a SPA under Article 4.1 of the EU Birds Directive, as it supports internationally important populations of regularly occurring Annex I species including (JNCC 2015a):

- Red-throated Diver (Overwinter)

It also qualifies as an SPA under Article 4.2 of the EU Birds Directive in that it supports internationally important populations of regularly occurring migratory species, including:

- Common Scoter (Overwinter)

The area is also designated under Article 4.2 as supporting an internationally important assemblage of waterbirds by regularly supporting at least 20,000 waterfowl.

4 Methodology

The survey programme consisted of 12 vantage point surveys undertaken during the main overwintering and migratory period (August to April inclusive).

The surveys utilised 2 vantage points positioned east and west of the breakwater location from which experienced bird surveyors recorded any bird species utilising the coastal area within the field of view. This approach is in-line with the BTO Common Bird Census (CBC) and Wetland Bird Survey (WeBS) techniques and the 'look-see' methodology (Marchant 1983 & Bibby *et al*., 2000) where a surveyor familiar with the species of interest records all species present (including counts) within a set boundary. The aim of this is to identify the species using the coastline at East Rhyl and provide sufficient information on species location, habitat usage and behaviour.

The foreshore in this area is predominantly fine littoral sand with small areas of littoral boulders located higher up in the shore in the centre of the survey area, these boulders are dominated by Spiral Wrack *Fucus spiralis*. The survey area represents a 3km strip of intertidal habitat located along a 50km stretch of similar coastline.

Figure 4-1 shows the location of the two vantage points and the area surveyed, together with the areas of proposed works.

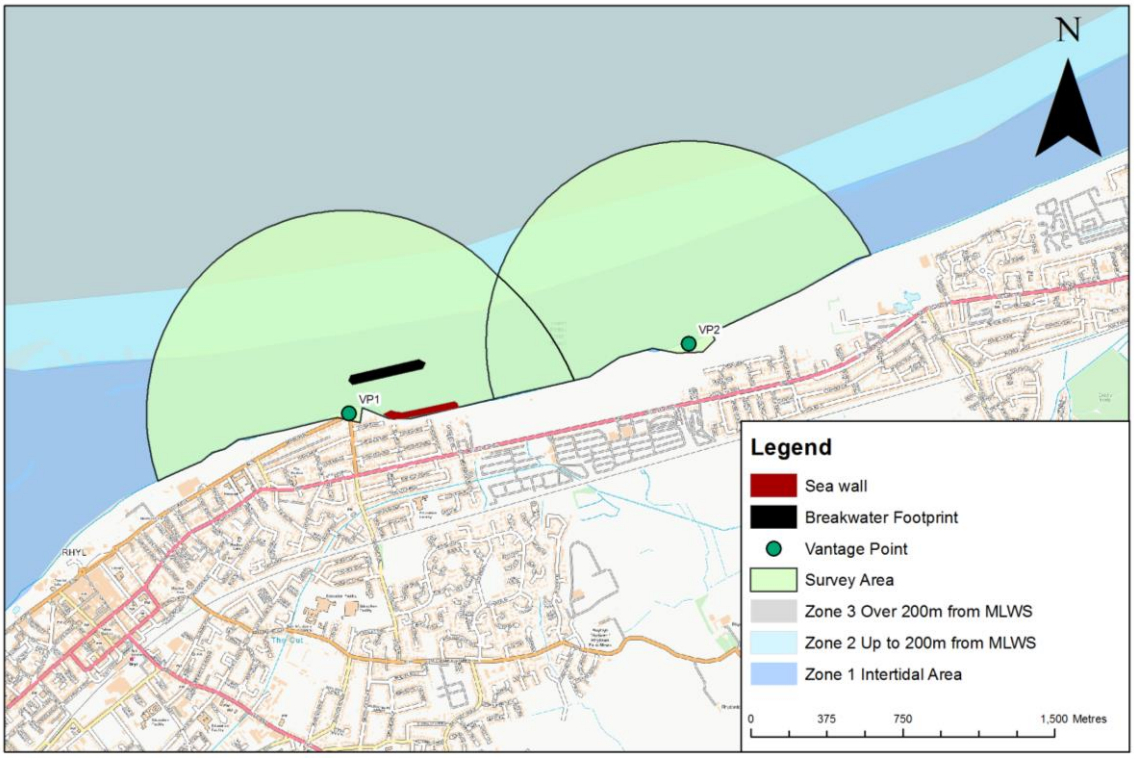


Figure 4-1 Location of the two vantage point surveys contains Contains OS data © Crown copyright and database right 2017 (https://www.ordnancesurvey.co.uk/)

Table 4-1 shows the dates, tidal state and the prevailing weather conditions that the surveys were carried out in.

Table 4-1 Survey dates and conditions

Survey date	Tidal State	Weather Conditions
22nd August 2016	Rising tide	Cloudy and windy 20°C
16th September 2016	Low to mid tide	Light rain, light wind15°C
21st October 2016	High to mid tide	Sunny, calm 7°C
25th November 2016	High to mid tide	Misty, calm 4°C
9th December 2016	Mid to high tide	Scattered clouds, light wind 14°C
15th December 2016	High to mid tide	Cloudy, light wind 9°C
12th January 2017	High spring to mid tide. (Storm surge assisted)	Scattered cloud, windy 7°C
26th January 2017	High to mid tide	Light rain, strong winds 4°C
17th February 2017	Low to mid tide	Light rain, light wind 3°C
27th February 2017	High to mid tide	Stormy with snow in the surrounding area, strong wind 2°C
26th March 2017	Mid to low tide	Sunny spells, windy 12°C
13th April 2017	Low to mid tide	Sunny spells, light winds 10°C

5 Results

5.1 Site Summary

The foreshore at Rhyl was utilised predominantly by wading and gull species with a total of 36 species recorded during the survey. These were usually in low numbers and generally concentrated at the eastern extent of the study area, approximately 1000m from the proposed options. Peak numbers of birds were recorded on falling tides when the receding tide provided the best foraging opportunities. This was especially the case following storm surges when large numbers of food species such as starfish were revealed on the receding tide and heavily predated by gulls.

The table in appendix 1 lists the species recorded during the survey, detailing the peak counts, the number of times the species was recorded, where it was recorded (using the zones illustrated in appendix 2) and where appropriate details of behaviour.

5.2 Common Scoter

Flocks of 5 - 6 Common Scoter were recorded within 200m of the proposed works at high tide, foraging when the area was covered by water. Flocks of up to, and over, 1000 were recorded over 1000m offshore.

5.3 Red-throated Diver

Small numbers of Red-throated Diver were mostly recorded commuting past the site or occasionally foraging approximately 500m out to sea.

5.4 Waterbird Assemblage

A total of 34 further species of wading, wildfowl and gull species were recorded during the survey with a number of these species forming part of the qualifying assemblage for which Liverpool Bay SPA is designated.

A peak count of wader numbers was recorded on the 9th of December where approx. 500 Oystercatcher, 20 Sanderling, 70 Dunlin, 5 Curlew, 120 Redshank and 10 Turnstone were recorded over the survey area. These birds were subject to frequent disturbance from dogwalkers and were flushed into the air continually before settling on another part of the beach. These coincided with a falling tide providing the best foraging opportunities.

6 Conclusions

6.1 Birds

Bird numbers throughout the study period varied considerably, and often for no readily discernible reason. The period immediately following a high tide often held the greatest numbers of birds, possibly due to the limited open beach available for foraging or loafing birds and a fresh food supply. Often gulls would gather in large numbers on the sea at high tide before taking advantage of starfish and similar organisms in the shallow receding waters. However, this was by no means certain to occur on each high tide, and on other occasions gulls were present in only small numbers. Wader numbers also varied significantly during the survey period. Of note were several survey days where over 1000 Oystercatcher were present across the tideline and large numbers of Cormorant assembled in extensive roosts to either side of the study area. Due to the extensive sands available at low water, birds dispersed over a very large area and the reduction in bird concentration was very marked during these surveys.

It is assumed that it will be necessary for the works to be carried out at low tide. And although Common Scoter and Red-throated Diver were recorded during the surveys, these species were generally seen to forage in open water and were largely observed in flight, and in low numbers. It is therefore considered that these species are not likely to be disturbed by the proposed works. The scheme will not result in a net loss of habitat for these species post-works.

Fewer bird numbers were recorded at low tide, partly due to the large area of intertidal habitat revealed and available. At this time, any foraging birds have approximately 50km of similar habitat adjacent to the scheme.

Use of the beach by large numbers of people walking dogs or undertaking other leisure activities caused large amounts of temporary disturbance on the beach. In these events birds would be flushed from areas used for foraging or loafing, but would generally fly less than 50m before re-settling. When flushed continually along a beach, birds would return to their original areas after 150-200m. Given that the birds present are already habituated to large amounts of disturbance, and the availability of alternate nearby intertidal habitat, it is not considered that disturbance due to the works will result in a significant impact upon the wintering birds that form part of the qualifying assemblage of the Liverpool SPA. Birds were not recorded in high densities, and given that the works will likely be carried out at low tide, it is considered that there is ample alternative foraging and loafing habitat available nearby.

Given the availability of similar habitat locally, it is not considered that the construction of the breakwater or revetment will have a significant impact upon wading species. It should also be noted that relatively few birds were observed utilising the footprint of the proposed breakwater, although, Great Crested Grebe were recorded foraging at high tide in this location regularly. It is not considered that the loss of this habitat will have a significant impact upon Common Scoter or Red-throated Diver.

However, it is recommended that biodiversity enhancements are made to the rock structures in order to provide a net gain in biodiversity value at the site as well as provide a good study example for the utilisation of biological enhancements in reef structures.

The beach recharge option has the potential to decrease the available foraging area to a larger extent. The recharge may smother intertidal benthic communities, causing the potential temporary loss of feeding grounds for waders.

If the beach is recharged with a grain size larger than is currently present, this may also affect the ability for benthic communities to recolonise the area as larger grain sizes often do not provide the stable environment that many benthic invertebrates require.

There is also the potential that any fine silts imported with the recharge material will be gradually washed out, causing short-term damage to nearshore benthic communities.

Therefore, should the beach recharge option be undertaken, it is recommended that benthic invertebrate surveys are undertaken within the works footprint prior to the works taking place so that a better understanding of the benthic assemblage can be gained. This data will inform the need to carry out surveys following the works so that any change in the benthic community can be documented and if necessary compensation measures can be investigated.

It should be noted that this survey does not assess any impacts to birds further down the coast that may occur as a result in changes in sediment transportation.

Appendices

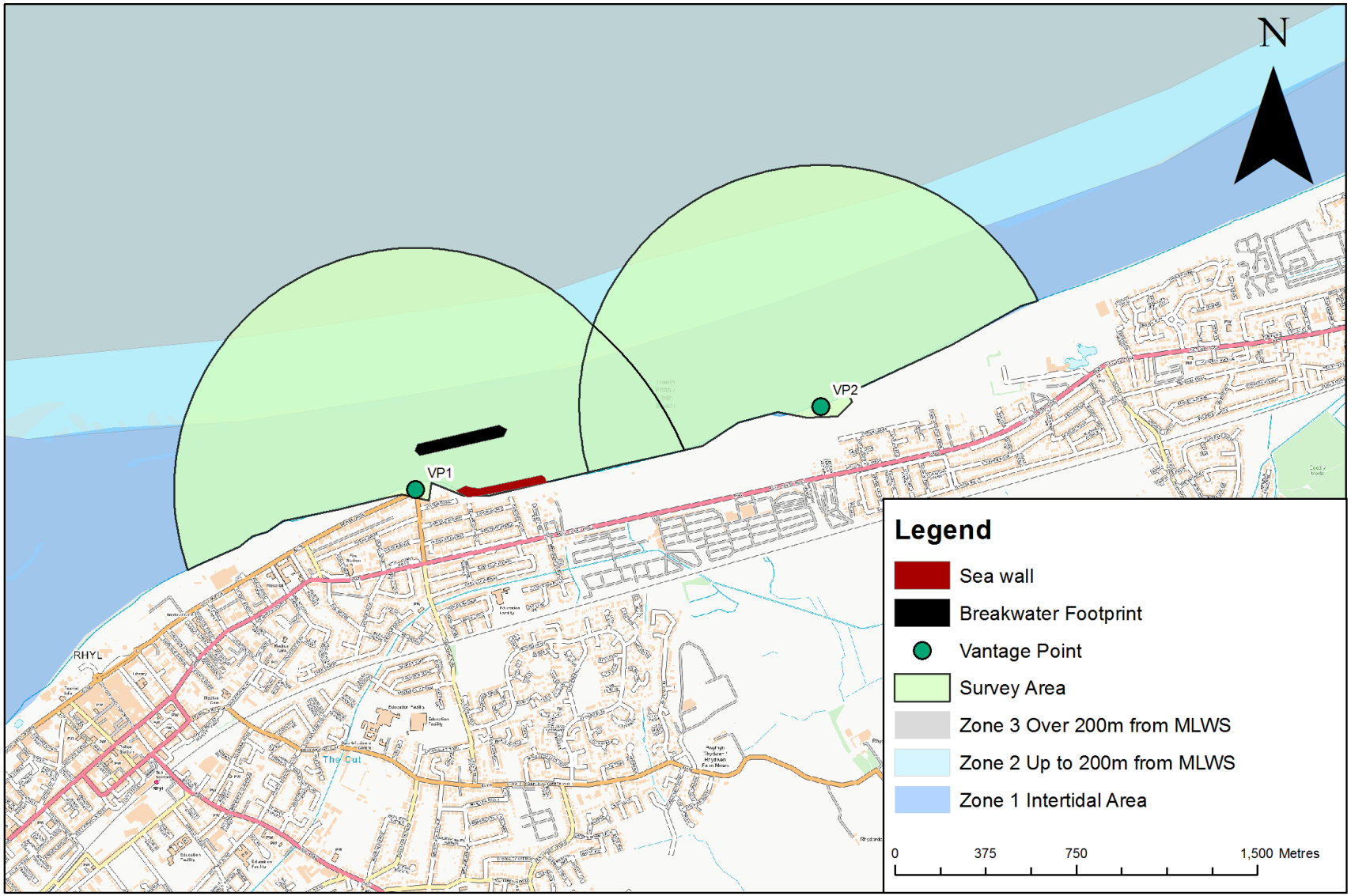
A Appendix - Summary table of bird species recorded and behaviours

Species	Scientific Name	Peak Counts	Number of times recorded	Behaviour
Shelduck	*Tadorna tadorna*	2 (March) Zone 2	5 Zones 2, 3	Commuting through zone 2
Eider	*Somateria mollissima*	1 (Sept). Zone 3	1 Zone 3	Single male commuting through zone 3
Common Scoter	*Melanitta nigra*	6 (December and January) within Zone 1 1000+ Zone 3	10 Zones 1,2,3	6 recorded foraging within 200m of the proposed breakwater at high tide. Flocks of 1000+ observed foraging approximately 1000m offshore
Red-breasted Merganser	*Mergus serrator*	28 (Aug). Zone 2	4 Zones 2,3	Commuting through zone 2.
Red-throated Diver	*Gavia stellata*	Groups of 3-4 (April) Zone 2	3 Zone 2,3	Small groups foraging in zone 2 and 3 approximately 500m offshore. Groups commuting through zone 3.
Fulmar	*Fulmaris glaciaris*	1 (April) Zone 3	1 Zone 3	Single bird recorded commuting through Zone 3
Gannet	*Morus bassanus*	25 (April) Zone 3	3 Zone 3	Group foraging over water 500+ metres offshore
Cormorant	*Phalacrocorax carbo*	10 Zone 1 (December) 100+ 1000m+ away (December).	10 Zones 1,2,3	A peak count of 10 recorded loafing in the intertidal area with 2 individuals within 50m of the proposed works. 1000+ individuals commuting through Zone 3
Shag	*Phalacrocorax aristotelis*	4 (April) Zone 1	2 Zone 1	4 birds loafing within the interidal area
Little Egret	*Egretta garzetta*	2 (October).Zone 1	3 Zone 1	Foraging within intertidal area.
Grey Heron	*Ardea cinerea*	1 (February) Zone 1	1 Zone 1	Foraging on the beach within intertidal area.
Great Crested	*Podiceps cristatus*	3 (October and	5	Small groups regularly foraging within 100m of the proposed breakwater on the

Grebe		April) Zone 1	Zones 1,2	water at high tide.
Oystercatcher	*Haemotopus ostralegus*	Up to 1,100 (November) Zone 1	12 Zones 1,2	Species regularly recorded foraging on the beach in the intertidal area. Usually in small groups of approximately 20 individuals foraging in the intertidal zone.
Ringed Plover	*Charadrius hiaticula*	30 (January) Zone 1	8 Zone 1	Small numbers recorded regulary foraging on the groins within the intertidal zone
Little Ringed Plover	*Charadrius dubius*	3 (September) Zone 1	2 Zone 1	Small numbers recorded irregularly foraging on the beach in the intertidal zone
Curlew	*Numenius arquata*	15 (February) Zone 1	5 Zone 1,2	Small numbers recorded irregularly foraging on the beach in the intertidal zone
Bar-tailed Godwit	*Limosa lapponica*	7 (August)	2 Zone 1	Small number recorded foraging on the beach within the intertidal zone
Turnstone	*Arenaria interpres*	25 (Jan)	6 Zone 1	Small number recorded foraging on the beach within the intertidal zone
Knot	*Calidris canutus*	500 (November) Zone 1, 2	5 Zone 1	Usually recorded in small groups averaging 20 individuals foraging on the beach in the intertidal zone. Recorded once in high numbers (500+)
Curlew Sandpiper	*Calidris ferruginea*	1 (March) Zone 1	1 Zone 1	Recorded once resting on the beach within the intertidal zone during passage
Sanderling	*Calidris alba*	10 (February) Zone 1	5 Zone 1	Small numbers recorded irregularly foraging on the beach in the intertidal zone
Dunlin	*Calidris alpina*	70 (December) Zone 1	4 Zone 1	Recorded irregularly foraging on the beach in the intertidal zone
Purple Sandpiper	*Calidris maritima*	1 (Sept) Zone 1	1 Zone 1	Recorded once foraging on the beach within the intertidal zone
Redshank	*Tringa totanus*	400 (November) Zone 1	9 Zone 1,2	Usually recorded in small groups averaging 20 individuals foraging on the beach in the intertidal zone. Recorded once in high numbers (400+)
Guillemot	*Uria aalge*	1 (August, October) Zone 2,3	2 Zone 2,3	Recorded once commuting through zones 2 and 3
Sandwich Tern	*Sterna sandvicensis*	4 (March)	1 Zone 2	Recorded once commuting through zone 2
Common Tern	*Sterna hirundo*	14 (August)	1	Recorded once commuting through zone 2
Arctic Tern	*Sterna paradisaea*	2-3 (August)	1	Recorded once commuting through zone 2
Commic' Tern		2-3 (August)	1	Common or Arctic Tern recorded once commuting through zone 2

Black-headed Gull	*Chroicocephalus ridibundus*	Up to 1000, (November) Zones	10 Zones 1,2,3	Regularly recorded loafing on the beach in the intertidal zone
Little Gull	*Hydrocoleus minutus*	1, (April) Zone 1	1 Zone 1	Recorded once flying through zone 1
Mediterranean Gull	*Larus melanocephalos*	2 (November) Zone 1	2 Zone 1	Recorded twice flying through zone 1
Common Gull	*Larus canus*	250 (November) Zone 1	6 Zones 1,2	Recorded loafing on the beach within the intertidal zone.
Lesser Black-backed Gull	*Larus fuscus*	150 (November) Zone 1	9	Regularly recorded loafing on the beach in the intertidal zone
Herring Gull	*Larus argentatus*	1000-4000 (November) Zone 1	11 Zones 1,2	Regularly recorded loafing on the beach in the intertidal zone
Great Black-backed Gull	*Larus marinus*	30 (October) Zone 2	10 Zones 1,2	Regularly recorded loafing on the beach in the intertidal zone

B Survey Area



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East Rhyl Coastal Defence Scheme

Habitat Regulations Screening Assessment

October 2018

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Revision history

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05/10/2018	Draft Report	Balfour Beatty/ Denbighshire County Council
v1.0 / 17/10/2018	??	Balfour Beatty/ Denbighshire County Council

Contract

This report describes work commissioned by Balfour Beatty, on behalf of Denbighshire County Council, Jonathan Harrison of JBA -Consulting carried out this work.

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Purpose

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Contents

List of Figures

List of Tables

Abbreviations

AA	Appropriate Assessment
AOD	Above Ordnance Datum
DCLG	Department of Communities and Local Government
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
IROPI	Imperative Reasons of Overriding Public Interest
HRA	Habitat Regulations Assessment
MHWS	Mean High Water Springs
NGR	National Grid Reference
SAC	Special Area of Conservation
SCI	Site of Community Importance
SPA	Special Protection Area

1 Introduction

JBA Consulting are acting on behalf of Denbighshire County Council to undertake regulatory, design and environmental activities associated with the development of a flood risk management scheme for East Rhyl, which lies within the Dee Estuary, Denbighshire (see Figure 1 1). Part of the requirements of the scheme is to undertake an assessment of impacts on sites designated under the 'Habitats Directive' (see Section 1.2). This report presents the results of screening the project under the Habitats Directive to enable the competent authority (Denbighshire County Council) to decide about the likely need for an Appropriate Assessment of the project.

1.1 Project summary

The proposed development seeks to improve the standard of coastal flood protection to the community of East Rhyl in Denbighshire, North Wales. The proposed defences comprise a new 600m section of rock revetment together with works to increase the height of a 550m long section of existing sea wall, located between Splash Point (NGR: SJ020825) and the western boundary of Rhyl Golf Course (NGR: SJ026825). Figure 1-1 shows the location of the proposed scheme between Splash Point and Rhyl Golf Club.

Rhyl is a seaside resort town located East of the Clwyd Estuary. The existing coastal flood defences, which comprise a concrete seawall, concrete stepped revetment and section of rock armour revetment around Splash Point, are subject to wave overtopping, which causes significant damage and disruption to adjacent residential and commercial properties, as well as Rhyl Promenade and the Wales Coast Path, which are important components of the local tourism industry. This became evident in 2013 when deep flooding of 130 residential properties occurred. As the risk of extensive coastal flooding grows due to climate change and associated sea level rise, it is increasingly important that the existing sea defences are upgraded to provide a higher standard of protection.

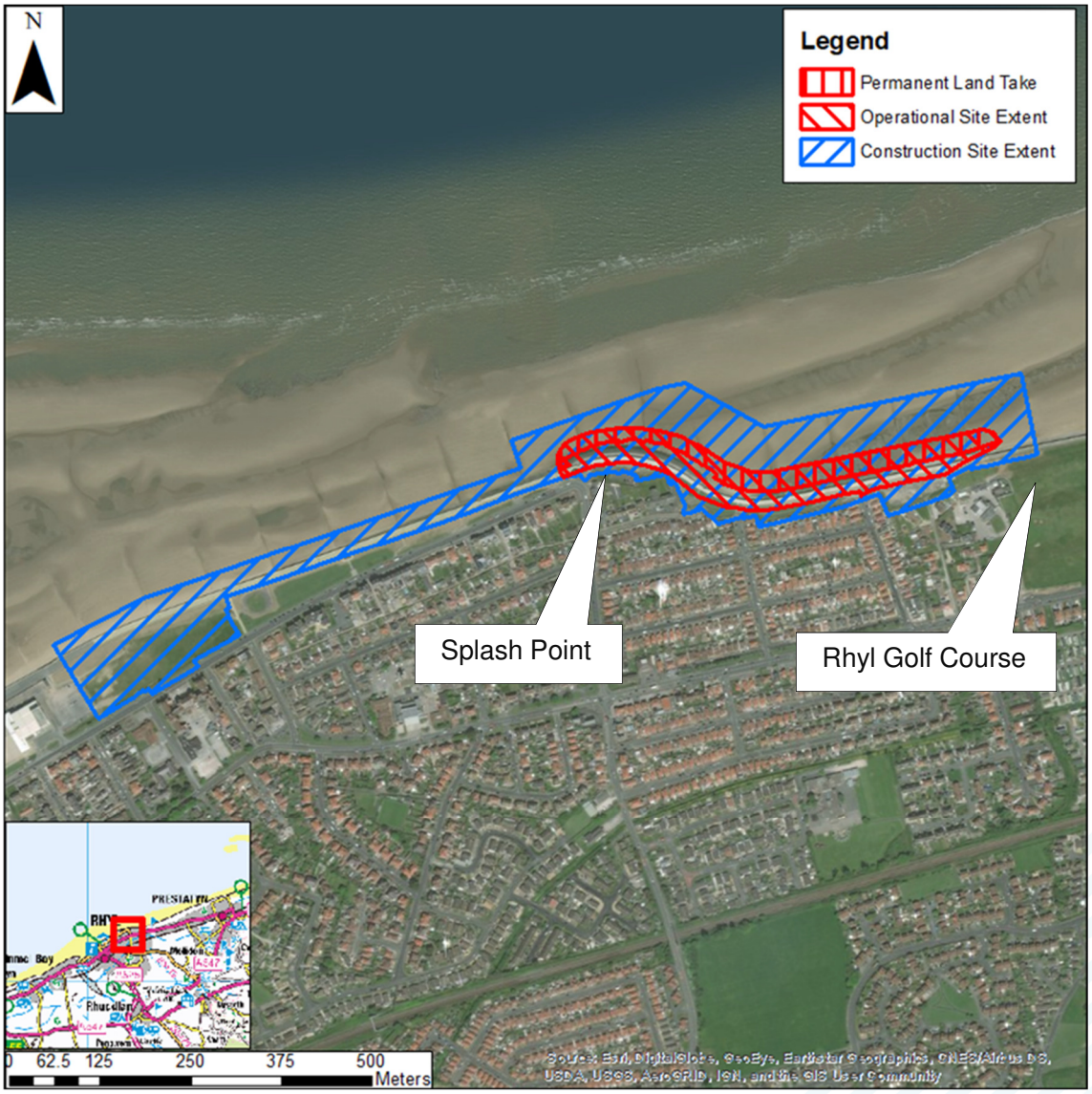

Figure 1-1: Scheme location

Rhyl Beach is a wide sandy beach with an extensive tidal range. It is a popular tourist destination and supports a range of recreational activities. Much of the beach is designated under the EU Bathing Waters Directive with the sub-tidal area designated as part of the Liverpool Bay Special Protection Area (SPA).

Rhyl Beach is located within a 15-mile section of the North Wales coast between Prestatyn and Colwyn Bay that has undergone extensive modification. This has had a significant effect on natural coastal processes with widespread beach lowering occurring throughout the 20th century. Recent survey data shows that onshore and longshore sediment transport processes are approximately balanced (JBA 2018).

1.2 Legislative Context

European Union (EU) Directive 92/43/EEC on the conservation of habitats and of wild flora and fauna (known as the 'Habitats Directive') protects habitats and species of European nature conservation importance. Together with Directive 2009/147/EC on the conservation of wild birds (the 'Birds Directive'), the Habitats Directive establishes a network of internationally important sites designated for their ecological status. SACs and Sites of Community Importance (SCIs) are designated under the Habitats Directive and promote the protection of flora, fauna and habitats. SPAs are designated under the

Birds Directive to protect rare, vulnerable and migratory birds. These sites combine to create a Europe-wide *Natura 2000* network of designated sites, which are generally (and hereafter in this report) referred to as 'European Sites'.

The Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations') incorporate all SPAs into the definition of 'European Sites' and, consequently, the protections afforded to European Sites under the Habitats Directive apply to SPAs designated under the Birds Directive.

In addition to sites designated under European nature conservation legislation, UK Government policy (ODPM Circular 06/2005) states that internationally important wetlands designated under the Ramsar Convention 1971 (Ramsar sites) are afforded the same level of protection as SPAs and SACs for the purpose of considering development proposals that may affect them.

In accordance with Regulation 61 of the Habitats Regulations:

"(1) A competent authority, before deciding to undertake, or give consent, permissions or other authorisation for, a plan or project which –

a. is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and

b. is not directly connected with or necessary to the management of the that site,

c. must make an appropriate assessment of the implications for that site in view of that site's conservation objectives."

1.3 Report Structure

This HRA comprises the following sections:

- Chapter 2: Proposed Works - description of the proposed habitat creation works
- Chapter 3: HRA Methodology - description of the HRA process and methods used
- Chapter 4: European Sites - identification of sites and potential hazards
- Chapter 5: Possible sources of in-combination impacts
- Chapter 6: Assessment of Likely Significant Effects - the recommended screening assessment criteria are individually addressed; within this section consideration is given to other plans in the area which might lead to an 'in combination' effect (if appropriate);
- Chapter 7: Screening Conclusion - establishes whether an Appropriate Assessment is considered necessary.

This report should be read in conjunction with the Environmental Statement (JBA 2018) which includes the results of a Preliminary Ecological Appraisal and Wintering Bird Survey.

2 The project

The proposed development seeks to improve the standard of coastal flood protection to the community of East Rhyl in Denbighshire, North Wales. The proposed defences comprise a new 600m section of rock revetment together with works to increase the height of a 550m long section of existing sea wall, located between Splash Point (NGR: SJ020825) and the western boundary of Rhyl Golf Course (NGR: SJ026825). Figure 1-1 shows the location of the proposed scheme between Splash Point and Rhyl Golf Club.

Rhyl is a seaside resort town located east of the Clwyd Estuary. The existing coastal flood defences, which comprise a concrete seawall, concrete stepped revetment and section of rock armour revetment around Splash Point, are subject to wave overtopping, which causes significant damage and disruption to adjacent residential and commercial properties, as well as Rhyl Promenade and the Wales Coast Path, which are important components of the local tourism industry. This became evident in 2013 when deep flooding of 130 residential properties occurred. As the risk of extensive coastal flooding grows due to climate change and associated sea level rise, it is increasingly important that the existing sea defences are upgraded to provide a higher standard of protection.

Rhyl Beach is a wide sandy beach with an extensive tidal range. It is a popular tourist destination and supports a range of recreational activities. Much of the beach is designated under the EU Bathing Waters Directive with the sub-tidal area designated as part of the Liverpool Bay Special Protection Area (SPA). The beach is located within a wider section of the North Wales coast that has undergone extensive modification. This has had a significant effect on natural coastal processes with widespread beach lowering occurring throughout the 20th century. Recent survey data (JBA 2018) shows that onshore and longshore sediment transport processes are approximately balanced.

2.1.1 Proposed development

The proposed development will improve the standard of coastal flood protection and improve public access from Rhyl Promenade to the beach for both beach users and routine beach/flood defence maintenance activities.

The proposed development will comprise the following activities:

- Removal of the existing 225m long section of rock armour around Splash Point and construction of a new 600m long section of rock armour revetment between Splash Point and the golf course. The new rock armour revetment will extend approximately 30m seaward from the existing sea wall. The revetment will be formed of a double interlocking layer of 3-6 tonne rock armour, sloping from a crest of approximately 15mAOD, at a 1-in-3 gradient to a 5.5m wide toe.
- A 550m section of the existing seawall will be raised by approximately 0.5m. The existing upstand will be removed and replaced with a recurved upstand constructed from precast concrete units. The Promenade, located landward of the seawall, will be raised by 500mm so that views from the walkway out into Liverpool Bay are not obscured.
- Access to the beach will be maintained via three sets of precast concrete steps provided through the concrete upstand and rock armour revetment. These would be placed opposite Tynewydd Road, Hilton Drive, and Garford Road.

The majority of the proposed new rock revetment is located below current Mean High Water Spring (MHWS) tide level.

A full and detailed description of the proposed development is provided in the Environmental Statement (ES) (JBA 2018), which has been prepared to accompany the planning application for the scheme.

2.1.2 Construction methodology

The rock armour revetment will be constructed in 10m to 20m sections per tidal cycle. All site material (rock armour and precast concrete units) will be delivered to the site by road and onto the beach via a temporary slipway located immediately to the west of Splash Point. Temporary storage and sorting of rock will take place on the beach adjacent to where the rock will be placed in the revetment.

Construction of the rock revetment toe will require excavation of the beach to 0mAOD along the revetment toe using an excavator. Excavated sand/shingle will be temporarily stockpiled next to the excavation. A geotextile membrane will then be laid directly over the excavated area, which will then be covered by a thin filter layer of stone. Graded rock armour boulders will then be placed one-at-a-time onto the filter layer using an excavator with a grab attachment. Once the 10m to 20m section of revetment toe is complete, the previously excavated sand/shingle material will be reused to cover over the toe rock to the existing beach level. Construction of the remainder of the rock revetment section to the required crest level will then take place using the excavator positioned on the toe area. The works will progress in this fashion until revetment works are complete (25 months).

Construction of the access steps through the rock armour revetment will require excavation to the required foundation depth (-1mAOD). The foundations will be made using *in-situ* concrete pouring, which will be contained within a temporary sheet pile arrangement or through the use of drag boxes.

Demolition of the upstand of the existing sea wall will take place in sections. All demolition waste will be removed from site and appropriately disposed of. In parallel with demolition of the old sea wall, the new precast upstand will be placed onto the concrete buttress using an excavator.

Construction of the scheme will take approximately 38 months to complete. Following completion of the works, the construction area, including affected areas of Rhyl Beach, will be reinstated to pre-construction conditions.

2.1.3 Breakdown of development aspects

Table 2-1 provides a breakdown of the individual components of the proposed scheme and Figure 2-1 shows the location of these activities. These components will be assessed to determine whether they could cause or contribute to the deterioration in status of a waterbody or inhibit a waterbody from achieving its status objective.

Table 2-1: Breakdown of individual components of the proposed development

Component of the proposed development
Establishment, use and decommissioning of two temporary construction compounds. The main site compound will be located adjacent to the Pavilion Theatre with a smaller satellite compound adjacent to Garford Road. Establishment of site offices and welfare facilities, construction staff car parking, construction material delivery/storage areas, and waste storage facilities. Some vegetation clearance will be required to enable establishment of the main compound.
Temporary diversion of Wales Coast Path/National Cycle Route around construction area.
Establishment of temporary construction access route along Rhyl Promenade, between the main site compound and works area on the beach, including installation of temporary access ramp near Splash Point.
Permanent removal of 3m-long section of existing timber groynes along the line of the new rock revetment to enable construction access to the works' area.
Temporary storage and sorting of rock armour on Rhyl Beach adjacent to works' area.
Construction of concrete buttress for new seawall involving installation of formwork panels and *in-situ* concrete pouring.

Construction of rock revetment including excavation of revetment toe and temporary storage of excavated beach material, laying of new geotextile membrane, placement of rock armour blocks, and backfilling of excavated material.
Construction of new seawall upstand including demolition of existing concrete upstand (using either diamond track saw cutting or using a grinding or pinching excavator attachment) and installation of new pre-cast concrete wave return upstand. All demolition waste to be removed from site for appropriate disposal.
Construction of stepped access points through rock revetment requiring installation of temporary sheet pile cofferdam to create dry working area, excavation of foundation area to -1mAOD, *in-situ* concrete pouring to create foundation, and installation of the pre-cast step units.
Construction of new concrete pavement formed using a 150mm hydraulically bound sub-base and concrete slabs cast *in-situ*.
Re-grading and seeding of the grass bank landward of the Promenade and reinstatement of memorial benches.
Reinstatement of the construction area to pre-construction conditions including removal of temporary access ramp and re-establishment of beach to pre-construction levels (as necessary) using excavated beach material.
Operation of the completed flood defence scheme.
Periodic maintenance of the completed flood defence scheme.

Figure 2-1. Details of the proposed works

3 HRA Methodology

3.1 Introduction

The HRA will follow a three-stage process as outlined in the DCLG guidance "Planning for the Protection of European Sites: Appropriate Assessment". These stages are described in Table 3-1.

Table 3-1: The HRA Process

Stage / Task	Description
Stage 1: Test of likely significant effect	This process identifies the likely significant effects upon a European site of a project or plan, either alone or in combination with other projects or plans and determines whether these impacts are likely to be significant. Following the recent ECJ judgement in the case of "people over wind" (Case C-323/17). Measures that are necessary to avoid or reduce impacts on the European site, even when considered standard environmental best-practice, can only be considered at Stage 2. If no likely significant effect is determined, the project or plan can proceed. If a likely significant effect is identified, Stage 2 is commenced.
Stage 2: Appropriate Assessment	Stage 2 is subsequent to the identification of likely significant effects upon a European site in Stage 1. This assessment determines whether a project or plan would have an adverse impact on the integrity of a European site, either alone or in combination with other projects or plans. This assessment is confined to the effects on the internationally important habitats and species for which the site is designated (i.e. the interest features of the site). If no adverse impact is determined, the project or plan can proceed. If an adverse impact is identified, Stage 3 is commenced.
Stage 3: Assessment where no alternatives and adverse impacts remain	Where a plan or project has been found to have adverse impacts on the integrity of a European site, potential avoidance/mitigation measures or alternative options should be identified. If suitable avoidance/mitigation or alternative options are identified, that result in there being no adverse impacts from the project or plan on European sites, the project or plan can proceed. If no suitable avoidance/mitigation or alternative options are identified, as a rule the project or plan should not proceed. However, in exceptional circumstances, if there is an 'imperative reason of overriding public interest' for the implementation of the project or plan, consideration can be given to proceeding in the absence of alternative solutions. In these cases, compensatory measures will have to be put in place to offset any negative impacts.
Stage 4: Compensatory measures	Stage 4 comprises an assessment of the compensatory measures where, in light of an assessment of imperative reasons of overriding public interest, it is deemed that the project should proceed.

3.2 HRA Task 1 Screening method

The following section details the methodology of the screening assessment undertaken to identify the likely impacts of the project upon European sites, and to determine whether these impacts are likely to be significant and whether an Appropriate Assessment (HRA Task 2) is required.

3.2.1 Methodology

In order to complete the screening assessment, it is necessary to:

- Identify the European sites likely to be affected, reasons for their designation and their conservation objectives
- Describe the project and its aims and objectives and those of other projects or plans that, in combination, have the potential to impact upon the European sites.
- Identify the potential effects on the European sites
- Assess the significance of these potential effects on the European sites.

3.2.2 Assessments, reports and field data

The assessment is based on field visits and assessments carried out as part of the Environmental Impact Assessment for the project. Full details are given in the Environmental Statement, and particular reference was made to the following aspects:

- Coastal Morphology and Hydromorphology chapter (ES Chapter 4)
- Biodiversity and Nature Conservation chapter (ES Chapter 5)
- Cumulative Effects chapter (ES Chapter 12)

These assessments included field visits to record marine biotopes, Phase 1 habitats and winter bird activity.

3.2.3 Precautionary Principle

The Habitats Regulations Assessment (HRA) process is underpinned by the precautionary principle, especially in the assessment of potential impacts and their resolution. Screening takes account of incorporated mitigation measures, which are measures to avoid or reduce adverse effects that are part of the submitted proposal, effective and guaranteed to be delivered. However, if there is any uncertainty, and it is not possible, based on the information available, to confidently determine that there will be no significant effects on a site, then the precautionary principle will be applied, and the project will be subject to an Appropriate Assessment (HRA Stage 2). This represents a precautionary approach to the assessment.

If the Appropriate Assessment cannot determine without reasonable scientific doubt that there will be no adverse effects on site integrity, if no feasible alternative solutions can be found with no or reduced adverse effects, and if there are imperative reasons of overriding public interest (IROPI), compensatory measures are considered. These are distinct from mitigation measures and are required to ensure the coherence of the Natura 2000 network is protected, where adverse effects on site integrity cannot be discounted.

3.2.4 Consultation

It is a requirement of the Habitats Regulations for the competent authority to consult the appropriate statutory nature conservation body. Consultation on the overall project was carried out with Natural Resources Wales and Denbighshire County Council as part of the EIA screening process. Several comments related to beach recharge: this was subsequently dropped from the project. The remaining comments were as follows:

- The effects of increased turbidity should also be assessed in terms of the ability of fish-eating birds to catch their prey. Attention should be paid to the fish-eating features of the SPA – the Little Tern which feed just alongshore (May to August), Red-throated Diver and the water bird assemblage (Cormorant and Red-breasted Merganser).
- The Environmental Statement must consider impact on Little Tern colony at Gronant and carry out suitable assessment.
- Reference to historical mussel beds in the ES.

3.2.5 Limitations and Constraints

This Screening Assessment necessarily relies on some assumptions and it was inevitably subject to some limitations. These did not affect the conclusion but the following points are recorded in order to ensure the basis of the assessment is clear:

- Species territories and ranges change naturally over time. The assessment is based on current knowledge and habitat suitability. This is considered sufficiently robust for the purpose of this assessment.

4 Identification of European Sites

European sites were screened up to 5km from the outer boundary of the proposed development.

The following two sites occur within the screening area:

- Liverpool Bay SPA
- The Dee Estuary European Marine Site; which includes;
  - Dee Estuary SPA
  - Dee Estuary SAC
  - Dee Estuary Ramsar site

The European designated sites are show in relation to the proposed works in Figure 4-1 below.

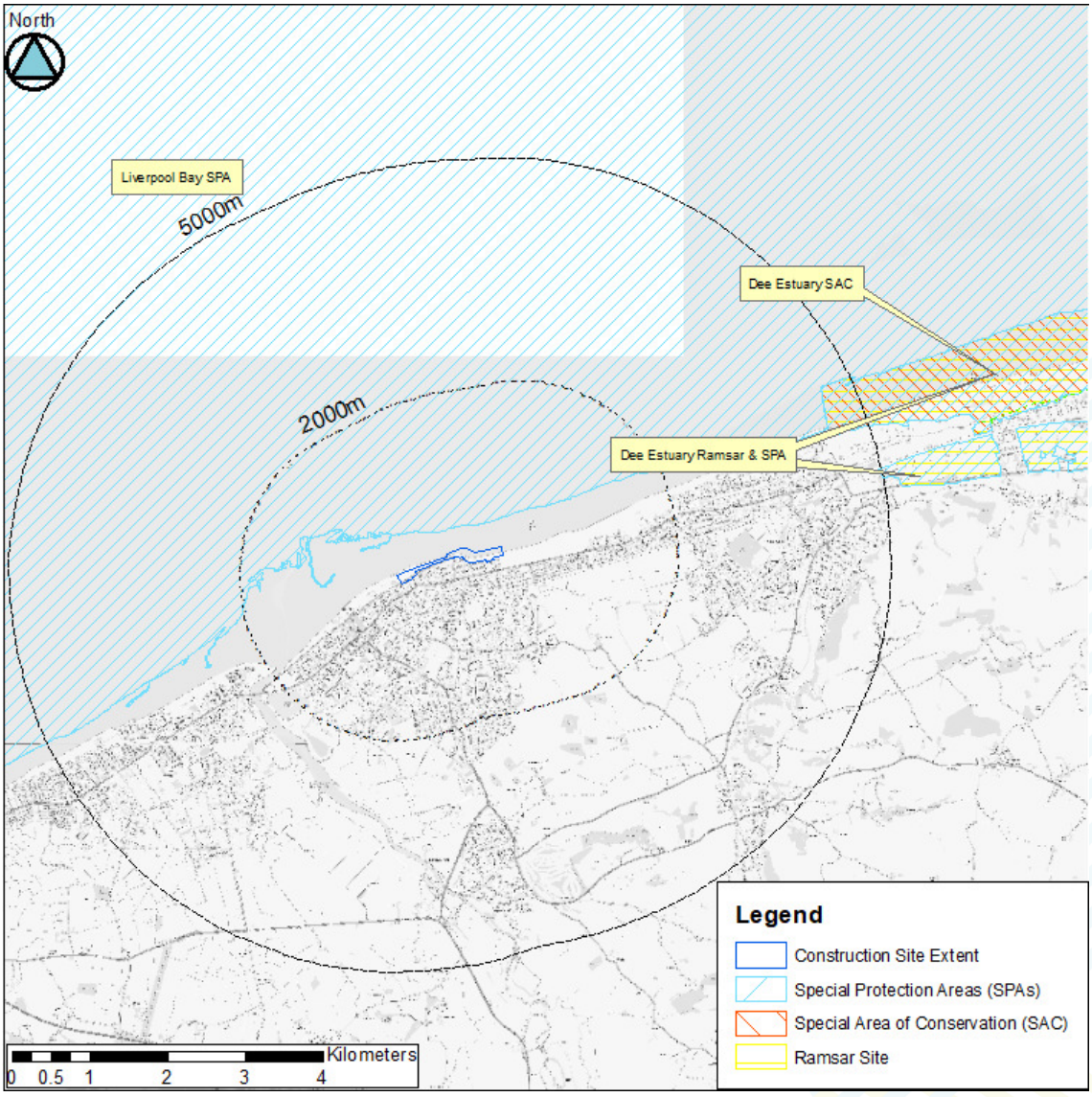

Figure 4-1: European designated sites shown in relation to the proposed works and a 2km buffer [Map derived and reproduced with permission of Denbighshire Council, © Crown Copyright Denbighshire, Wales. Contains

Ordnance Survey data © crown copyright and database right 2018].

4.1 Site Descriptions

4.1.1 Liverpool Bay Special Protection Area

Qualifying Interests

Liverpool Bay SPA is located in the south-eastern region of the northern part of the Irish Sea, bordering northern England and north Wales, and running as a broad arc from Morecambe Bay to the east coast of Anglesey (Natural England 2010). A recent extension to the site has provided protection to foraging Common Tern and Little Tern. The extension is located approximately 3.2km east of the proposed scheme. Following consultation, the extension to the SPA was formally classified on 31 October 2017. The site qualifies for populations of the following species:

- Red-throated Diver *Gavia stellata* (over winter)
- Little Gull *Hydrocoloeus minutus* (over winter)
- Little Tern *Sternula albifrons* (breeding)
- Common Tern *Sterna hirundo* (breeding)
- Common Scoter *Melanitta nigra* (migratory)
- Waterfowl assemblage (over winter)

Conservation Objectives

The conservation objectives for the site are listed as ensuring that the integrity of the site is maintained or restored as appropriate, and ensuring that the site contributes to achieving the aims of the Wild Birds Directive, 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 habitats of qualifying species rely
- The populations of qualifying species, and,
- The distribution of qualifying species within the site.

Vulnerabilities

The key issues for the SPA are identified by Natural England and the Countryside Council for Wales (2012) as:

- Physical habitat loss
- Physical habitat damage
- Non-physical disturbance
- Toxic contamination
- Non-toxic contamination
- Biological disturbance
- Human-induced mortality

4.1.2 Dee Estuary Special Area of Conservation

The Dee Estuary Special Area of Conservation (SAC) (UK0030131) is representative of tidal rivers and intertidal habitats and covers *c.* 15,800ha (JNCC 2015). It is located

4.7km east of the outer limited of the project's maximum works' area. The following Annex 1 habitats are the primary reason for the selection of the site:

- 1140: Mudflats and sandflats not covered by seawater at low tide
- 1310: *Salicornia* and other annuals colonizing mud and sand
- 1330: Atlantic Salt Meadows (*Glauco-Puccinellietalia maritimae*)

In addition, the site also supports the following Annex 1 habitats:

- 1130 Estuaries
- 1210 Annual vegetation of drift lines
- 1230 Vegetated sea cliffs of the Atlantic and Baltic Coasts
- 2110 Embryonic shifting dunes
- 2120 "Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"")"
- 2130 "Fixed coastal dunes with herbaceous vegetation (""grey dunes"")"
- 2190 Humid dune slacks

The following Annex II species are also present as a qualify feature:

- 1095 Sea Lamprey *Petromyzon marinus*
- 1099 River Lamprey *Lampetra fluviatilis*
- 1395 Petalwort *Petalophyllum ralfsii*

For the purpose of the HRA, all of the Annex 1 and Annex II features present in the SAC are treated equally, whether a primary reason for selection or not.

Conservation Objectives

The conservation objectives for the site are to maintain (or restore if in unfavourable condition) the following features in favourable condition:

- Estuaries
- Mudflats and sandflats
- *Salicornia* and other annuals colonising mud and sand
- Atlantic salt meadow
- Annual vegetation of drift lines
- River Lamprey, *Lampetra fluviatilis*
- Sea Lamprey, *Petromyzon marinus*

Vulnerabilities

Threats to the estuary's conservation come from its industrialised shorelines on the Welsh side and the impact of adjacent historic industrial use. These include land contamination from chemical and steel manufacture and localised water quality problems. Remediation works are being undertaken.

Contemporary issues relate to dock development and navigational dredging, coastal defence works and their impact on coastal process, regulation of shellfisheries, and the recreational use of sand dunes and saltmarshes.

4.1.3 Dee Estuary Special Protection Area

The Dee Estuary is designated as a SPA for European waterbirds, providing feeding and roosting sites for ducks and waders in winter, and supports Common Tern and Little Tern during the breeding season. The site qualifies for populations of the following species:

- Common Tern *Sterna hirundo* (breeding)
- Little Tern *Sterna albifrons* (breeding)

- Sandwich Tern *Sterna sandvicensis* (passage)
- Bar-tailed Godwit *Limosa lapponica* (over winter)
- Redshank *Tringa totanus* (passage)
- Black-tailed Godwit *Limosa limosa islandica* (over winter)
- Curlew *Numenius arquata* (over winter)
- Dunlin *Calidris alpina alpina* (over winter)
- Grey Plover *Pluvialis squatarola* (over winter)
- Knot *Calidris canutus* (over winter)
- Oystercatcher *Haematopus ostralegus* (over winter)
- Pintail *Anas acuta* (over winter)
- Redshank *Tringa totanus* (over winter)
- Shelduck *Tadorna tadorna* (over winter)
- Teal *Anas crecca* (over winter)
- Waterbird assemblage

Conservation Objectives

The conservation objectives for the site are listed as ensuring that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- The extent and distribution of 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 habitats of qualifying species rely
- The populations of qualifying species, and,
- The distribution of qualifying species within the site.

Vulnerabilities

The following key vulnerabilities are identified:

- Physical loss (removal and smothering) of nesting, feeding and roosting habitats by removal may be caused directly by infrastructure construction and modification, coastal protection works, and land claim. Also the interruption of sediment transport from coastal defences and dredging of the main channel.
- Physical damage (siltation, abrasion and extraction)
- Non-physical disturbance (noise and visual) from industry, transport (aircraft, marine and rail) and recreational activities. Noise disturbance from boat traffic, leisure craft (and to a lesser degree fishing boats), cockle fishery, dog walking, fishing, motorcycle scrambling, water sports and the flying of model aircraft.
- Toxic contamination (introduction of synthetic compounds and non-synthetic compounds)
- Non-toxic contamination (changes in nutrient loading, organic loading and turbidity) can enter the estuarine environment in large quantities from sewage outfalls and industrial discharges, riverine inputs, agricultural run-off and from dredging works and disposal of dredged materials within the estuary.
- Biological disturbance (introduction of non-native species and translocation and selective extraction of species)

4.1.4 Dee Estuary Ramsar site

The Dee Estuary is also designated as a Ramsar site by meeting Ramsar criteria 1, 2, 5 and 6 as follows:

- Extensive intertidal mud and sand flats (20 km by 9 km) with large expanses of saltmarsh towards the head of the estuary (Criterion 1);
- The presence of the re-introduced Natterjack Toad *Epidalea calamita* (Criterion 2);
- Supporting an overall bird assemblage of international importance (Criterion 5); and
- Supporting the following species at levels of international importance: Shelduck, Oystercatcher, Curlew, Redshank, Teal, Pintail, Grey Plover, Red Knot, Dunlin, Bar-tailed Godwit, Black-tailed Godwit and Turnstone (Criterion 6)

Conservation Objectives

The conservation objectives are the combination of the Dee Estuary SAC and SPA objectives.

Vulnerabilities

The key vulnerabilities are those presented for both the SAC and SPA.

4.2 Grouping of Interest Features for Screening

Due to the large number of qualifying interests they are grouped together for this analysis. The groupings are based on each species' ecology in terms of their likely response to construction impacts, following guidance from the Environment Agency (2013). The grouping of the qualifying interests is given in Table 4-1.

Table 4-1. Details of the grouping of Qualifying Interests for each site.

Designation	Qualifying Interests	Group of Qualifying Interest with EA code
Liverpool Bay SPA	Red-throated Diver (over winter) Little Gull (over winter) Wetland bird assemblage (over winter)	3.10 Birds of open sea and offshore rocks (winter)
	Little Tern (breeding) Common Tern (breeding)	3.8 Birds of coastal habitats 3.9 Birds of estuarine habitats, and 3.10 Birds of open sea and offshore rocks (breeding)
	Common Scoter (migratory)	3.8 Birds of coastal habitats 3.9 Birds of estuarine habitats, and 3.10 Birds of open sea and offshore rocks (migratory)
Dee Estuary SAC and Dee Estuary Ramsar habitats	1140: Mudflats and sandflats not covered by seawater at low tide 1310: *Salicornia* and other annuals colonising mud and sand 1330: Atlantic Salt Meadows (Glauco-Puccinellietalia maritimae)	1.12 Estuarine and intertidal habitats

	1130 Estuaries	
	1210 Annual vegetation of drift lines 1230 Vegetated sea cliffs of the Atlantic and Baltic Coasts 2110 Embryonic shifting dunes 2120 "Shifting dunes along the shoreline with Ammophila arenaria (""white dunes"")" 2130 "Fixed coastal dunes with herbaceous vegetation (""grey dunes"")" 2190 Humid dune slacks 1395 Petalwort	1.10 Coastal habitats, and 1.11 Coastal habitats sensitive to abstraction 2.04 Mosses and Liverworts *2.04 is included as the only species in the SAC, Petalwort, is a species restricted to habitats 2120, 2130 and 2190.*
	1095 Sea Lamprey 1099 River Lamprey	2.05 Anadromous fish
Dee Estuary SPA And Dee Estuary Ramsar bird species	Bar-tailed Godwit (over winter) Black-tailed Godwit (over winter) Curlew (over winter) Dunlin (over winter) Grey Plover (over winter) Knot (over winter) Oystercatcher (over winter) Pintail (over winter) Redshank (over winter) Shelduck (over winter) Teal (over winter) Wetland bird assemblage	3.4 Birds of lowland wet grasslands 3.7 Birds of farmland 3.8 Birds of coastal habitats, and 3.9 Birds of estuarine habitats (winter)
	Little Tern (breeding) Common Tern (breeding)	3.8 Birds of coastal habitats 3.9 Birds of estuarine habitats, and 3.10 Birds of open sea and offshore rocks (breeding)
	Sandwich Tern (passage) Redshank (passage)	3.8 Birds of coastal habitats 3.9 Birds of estuarine habitats, and 3.10 Birds of open sea and offshore rocks (migratory)
Dee Estuary Ramsar (not already included)	Natterjack Toad	Natterjack Toad

4.3 Interest features present near the proposed works

Ecological surveys have been carried out within the area of the proposed works, including a Preliminary Ecological Appraisal, marine biotope survey, benthic invertebrate survey and a wintering bird survey.

The area of works has been identified as barren or amphipod dominated sandy shores with polychaete/amphipod-dominated fine sand shores (LS.LSa.FiSa) surrounding the area (Connor *et al.* 2004).

The wintering bird survey was carried out between August 2016 and April 2017 (JBA 2018) The survey found that bird numbers throughout the study period varied considerably, and often for no readily discernible reason. The period immediately following a high tide often held the greatest numbers of birds, possibly due to the limited open beach available for foraging or loafing birds and a fresh food supply. Wader numbers varied significantly during the survey period. Of note were several survey days where over 1000 Oystercatcher were present across the tideline, and large numbers of Cormorant assembled in extensive roosts either side of the study area. Due to the extensive sands available at low water, birds dispersed over a very large area and the reduction in bird concentration was marked during these surveys.

Common Scoter and Red-throated Diver were recorded during the surveys; however, these species were generally seen to forage in open water and were largely observed in flight, and in low numbers. It is therefore considered that these species are not likely to be disturbed by the proposed works. The scheme will not result in a net loss of habitat for these species post-works.

Fewer birds were recorded at low tide, partly due to the large area of intertidal habitat revealed and available for foraging. At this time, any foraging birds have a 50km length of similar shoreline habitat adjacent to the scheme.

Use of the beach by large numbers of people walking dogs or undertaking other leisure activities caused regular, but temporary, disturbance on the beach. In these events birds would be flushed from areas used for foraging or loafing but would generally fly less than 50m before re-settling.

The closest Little Tern or Common Tern nesting site is the Little Tern colony at Gronant Beach, located approximately 5km to the east of the proposed works. The Little Tern nests on a relatively small section of the shingle ridge on the beach in front of the dunes, rather than in the dunes themselves. Terns forage over open water, plunge-diving for fish and have been recorded foraging along the shoreline between Gronant Dunes and Rhyl.

5 Other Relevant Plans and Projects

It is possible that a series of individually modest effects may, in combination, produce effects that are likely to adversely affect the integrity of one or more European sites. Article 6(3) of the Habitats Directive tries to address this by considering the combination of effects from other plans or projects. The Directive does not explicitly define which other plans and projects are within the scope of the combination provision. Guidance in section 4.4.3 of '*Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*', published by the European Commission, states:

'When determining likely significant effects, the combination of other plans or projects should also be considered to take account of cumulative impacts. It would seem appropriate to restrict the combination provision to other plans or projects which have been actually proposed'.

Table 5-1 gives details of potential in-combination projects is taken from the ES (JBA 2018). Details of the methods used to compile the list are given in the ES.

Table 5-1: Committed developments that could combine with the proposed scheme to create a cumulative impact

Planning/ Marine License Reference Number	Description	Location	Status	Potential for Cumulative Effects	Significance
45/2017/1164	Demolition of existing school buildings and erection of replacement school accommodating 920 pupils incorporating playgroup, nursery, primary and secondary places with associated play space, grass pitch, hard play areas, access and car parking arrangements	Blessed Edward Jones High School and Ysgol Mair Primary School Cefndy Road Rhyl LL18 2EU	Granted	If consented could temporarily increase construction traffic along similar routes but considered too small scale to be significant.	Not significant
43/2017/0947	Prior notification for the demolition of disused Bodnant Infants School	Bodnant Infant School Marine Road Prestatyn LL19 7HD	Demolition prior approval	Could temporarily increase construction traffic along similar routes but considered small scale and unlikely to be significant.	Not significant
40/2017/1058	Change of use of land to caravan storage including amendments to existing access	Blairmore Nurseries St Asaph Road Rhuddlan Rhyl LL18 5UG	Granted	Could temporarily increase construction traffic along similar routes but considered small scale and so unlikely to be significant.	Not significant
45/2016/0740	Demolition of the former 'Sun Centre' and the external	East Parade Rhyl	Granted (committed development)	Works would be completed by the time the East	Not significant – This development is

Planning/ Marine License Reference Number	Description	Location	Status	Potential for Cumulative Effects	Significance
	refurbishment of the adjoining Theatre, Pavilion Theatre (full), erection of Class D2 Exhibition/ events centre as extension to theatre. Erection of detached hotel and restaurants	LL18 3AQ		Rhyl construction phase in May 2019.	at or near to completion and is not expected to coincide with the East Rhyl development
45/2016/1204	Change of use of former WC/café to a KiteSurf School and café/ Change of use of former land train building to retail shop, café/ wine bar and storage ancillary to the kite school and external works including installation of climbing wall and hard landscaping	Pro Kitesurfing School and Land Train Shed East Parade Rhyl LL18 3AF	Granted (committed development)	Could increase tourism related traffic along routes potentially used for the East Rhyl Coastal Defence Scheme. Increased impacts of tourism related disturbance to Liverpool Bay SPA. Scale of the development unlikely to be significant.	Not significant
45/2018/0005	Formation of a skate park and associated works	Bowling Green East Parade Rhyl LL18 3AF	Granted (committed development)	Could temporarily increase construction traffic along similar routes, but unlikely to be of a scale to be considered significant.	Not significant
45/2017/0384	Demolition of existing skate park and ancillary retail huts. Construction of new Waterpark and Leisure Attraction comprising of an indoor leisure pool	Former Drift Park West Parade Rhyl	Granted (committed development)	Could temporarily increase construction traffic along similar routes. Could increase tourism related traffic along routes. Scale of the development unlikely to be considered significant.	Not significant
45/2015/1151	Change of use of playing fields to rugby club including erection of clubhouse, formation of rugby pitches with associated floodlighting and car	Land at Ty Newydd Road Playing Fields Ty Newydd Road Rhyl	Granted (committed development)	Could temporarily increase construction traffic along similar routes to the East Rhyl Coastal Defence Scheme, although the scale of the	Not significant

Planning/ Marine License Reference Number	Description	Location	Status	Potential for Cumulative Effects	Significance
	parking and alterations to existing vehicular access			development is not considered significant.	
45/2013/1510 & 45/2018/0124	Development of 5.3 hectares of land for mixed-use re-development to include provision of a foodstore, large format non-food retail and café/ restaurant units, with associated car parking. Variation of Condition 11 of outline planning permission code no. 45/2013/1510 to permit a maximum of 4,411m^2 of retail floorspace across the development site	Ocean Beach Site Wellington Road Rhyl LL18 1LN	Granted	Could increase retail-related traffic along routes potentially used by construction traffic for the East Rhyl Coastal Defence Scheme. Could temporarily increase construction traffic along similar routes to the East Rhyl Coastal Defence Scheme.	Potentially significant
45/2018/0123	Erection of a retail unit with associated parking, access, servicing and landscaping	Ocean Beach Site Wellington Road Rhyl LL18 1LN	Approved (committed development)	Could increase retail-related traffic along routes potentially used by construction traffic. Could temporarily increase construction traffic along similar routes.	Potentially significant

Planning/ Marine License Reference Number	Description	Location	Status	Potential for Cumulative Effects	Significance
43/2018/0750	Demolition of existing dwellings and outbuildings, erection of 133 dwellings, construction of internal estate roads, sewers, SUDS drainage and open spaces, strategic and hard/soft landscaping and ancillary works in association with 43/2018/0751 for new link road to Fford Talargoch (A547)	Land at Mindale Farm, Meliden, Prestatyn, LL19 8PG	Pending (not committed)	Could temporarily increase construction traffic along similar routes to the East Rhyl Coastal Defence Scheme. Proposed scheme is too far from East Rhyl Coastal Defence Scheme to create cumulative impacts during operation.	N/A
45/2018/0263	Demolition of existing building and redevelopment of land by the erection of 18 apartments and associated works.	Victoria Business Park, Victoria Road, Rhyl	Pending (not committed)	Could temporarily increase construction traffic along similar routes. Could increase general traffic along routes potentially used by construction traffic.	N/A
45/2018/0822	Construction of 41 housing association apartments for local residents over 55 years of age together with new and altered vehicular and pedestrian accesses, associated parking provision and related works	41-42 East Parade, Rhyl, LL18 3AW	Pending (not committed)	Could temporarily increase construction traffic along similar routes. Could increase general traffic along routes potentially used by construction traffic. As the 2 developments would be near one another, noise and light disturbance from both schemes could impact the same residents, if they occur simultaneously.	N/a

Planning/ Marine License Reference Number	Description	Location	Status	Potential for Cumulative Effects	Significance
SC1711	Rhyl Yacht Club Harbour Wall and Flood Defence Renewal	Rhyl	Issued	Disturbance from both projects could adversely affect residents of Rhyl and/or qualifying species of local designated sites, most notably Liverpool Bay SPA. Both works could create airborne dust, noise and light which could create a more substantial effect on Liverpool Bay SPA and local residents. Could temporarily increase construction traffic along similar routes.	Potentially significant
CRML1615	Rhyl Golf Club Water release scheme – Phase 4 outfall	Rhyl	EIA Screening (not committed)	Could temporarily increase construction traffic along similar routes. The scale of the development is not considered large enough to be significant.	Not significant

Planning/ Marine License Reference Number	Description	Location	Status	Potential for Cumulative Effects	Significance
CML1615	Rhyl – Marina Quay redevelopment	Rhyl	EIA Screening (not committed)	Disturbance from both projects could adversely affect residents of Rhyl and/or qualifying species of local designated sites, most notably Liverpool Bay SPA. Both projects could create airborne dust, noise and light which could create a more substantial effect on Liverpool Bay SPA and local residents. Could temporarily increase construction traffic along similar routes.	N/A
BUML1472	Fford Harbour, Rhyl	Rhyl	Dredging Licence Issued (committed development)	Disturbance from both projects could adversely affect residents of Rhyl and/or qualifying species of local designated sites, most notably Liverpool Bay SPA.	Not significant – This application was approved in 2015 and it is therefore assumed that the activity has been completed.

6 Assessment of Likely Significant Effects

6.1 Potential Hazards to European Sites

This section identifies the potential hazards to the European sites that may arise because of the proposed coastal defence scheme at East Rhyl, and then goes on to identify the types of hazards to which the qualifying features present within the sites are particularly sensitive. Potential hazards to these interest features are identified in Table 6-1 below along with possible sources of cumulative impact identified in Table 5-1. Impacts not listed in Table 6-1 are not expected to impact on the European designated sites or their features.

Table 6-1 Potential Hazards to the European Sites

Impact to assess & category	Description	Sources of cumulative impact from Table 5-1
Land-take during construction (physical habitat loss or damage)	Loss of foraging sites causing a reduction in food resource availability for over wintering wildfowl populations.	None identified
Increased sediment mobilised during construction (Physical damage to supporting habitats)	Damage to benthic habitat from suspended sediments.	None identified
Noise and visual disturbance during construction (Non-physical disturbance)	Construction activities will increase the amount of noise and visual activity. This can cause displacement of qualifying species and their prey. This may act in combination with other sources of disturbance.	Rhyl – Marina Quay redevelopment (CML1615) Rhyl Yacht Club Harbour Wall and Flood Defence Renewal (SC1711) New Kitesurf school (45/2016/1204)
Release of harmful chemicals from machinery or works during construction (Toxic contamination)	The release of fuel or oil from machinery or spills of liquid concrete could pollute the ground or water leading to adverse effects.	None identified
Spread of invasive, non-native species (Biological disturbance)	Introduction or spread of non-native species or pathogens can have severe adverse effects.	None identified
Alteration of coastal morphology processes during operation (physical habitat loss or damage)	By altering the coastal processes of erosion and deposition, the new coast defence scheme could change the habitats within the sediment sub-cell	None identified

Table 6-2 presents the assessment whether the potential impacts of the project (Table 6-1) could have a significant effect on the groups of qualifying interested features as set out in Table 4-1.

Table 6-2. Screening for likely significant effects of project impacts on the European sites

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
Liverpool Bay SPA	3.10 Birds of open sea and offshore rocks (winter)	Land-take during construction (physical habitat loss or damage)	No land (or sea) forming part of any designated site would be taken either during construction or operation of the proposed scheme. The site compounds will be in areas of amenity grassland behind the existing sea defence in areas with high levels of human use not used by birds of the open water. The works will result in the loss of 1.5ha of intertidal sand habitat where rock armour is to be placed, compared to 10,000ha of this habitat within the SPA. This habitat will be replaced by the new rock armour that will be placed within the footprint. This habitat was identified as barren or amphipod dominated sandy shores with polychaete/amphipod-dominated fine sand shores, an intertidal habitat will little value for birds of the open sea. **No likely significant effect.**
		Increased sediment mobilisation during construction (Physical damage to supporting habitats)	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m³/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. **No likely significant effect.**
		Noise and visual disturbance during construction (Non-physical disturbance)	Visual impacts from noise and disturbance will be limited to a small working window each day. Works are restricted and can't take place three hours before or after the two high tides each day. The working areas are between the open water and the town, from which there is already regular noise and movement of vehicles on Marine Drive. In addition, at low tide the beach is very popular for dog-walking. Birds in the area are known to be habituated to some disturbance, with flushed birds observed to settle within 50m. Overall the works will cause a negligible increase in the level of visual or noise disturbance relative to the existing levels. Three other projects with the possibility to increase disturbance were also identified. If these project works coincide with the Rhyl Scheme, they would involve small scale construction operations which are unlikely to be significant in combination. The recreation from the boat club would also be negligible in comparison to the overall activity. In combination the construction disturbance and recreational disturbance from new projects will not be significant. **No likely significant effect.**
		Release of harmful chemicals from machinery or works during construction	Any harmful chemicals would be stored in accordance with COSHH within the secure construction compounds which are located above the highest astronomical tide on Marine Promenade. Most chemicals entering the tidal zone will be contained within vehicles, and therefore of small volume. If these chemicals were to spill from a vehicle, the impact would be limited to a tiny area, and contaminants would

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
		(Toxic contamination)	quickly disperse in the high-energy tidal environment. Some sections may require wet concrete to be added below the level of the highest astronomical tide but will involve small quantities of concrete so that accidental spills of the concrete involved would impact on a negligible area of low-quality habitat. **No likely significant effect.** NB. Best-practice environmental mitigation will be included as part of the project to avoid, reduce and contain spills is not necessary to avoid significant effects on the European sites, but its use will further reduce the impact of any accidental spills or leaks.
		Spread of invasive, non-native species (Biological disturbance)	The only invasive non-native species in or near the works footprint is the barnacle *Austrominius modestus*. This species is not thought to be a hazard to the biological condition of the SPA. Even if it were spread further or faster as a result of the works, this would not significantly alter habitats for the bird species of the SPA. **No likely significant effect.**
		Alteration of coastal morphology processes during operation (physical habitat loss or damage)	The assessment of the likely impact on coastal morphological processes concluded that there would be no significant effect on hydrodynamic regimes during the construction or operational phases. In practical terms this means that there will be no change in the main patterns of erosion or deposition but a small amount of material may move differently with the tidal cycles. Coastal processes operating at the scale of the site are limited to the immediate nearshore zone and would therefore not significantly affect any adjacent intertidal habitat within the Liverpool Bay SPA. **No likely significant effect.**
	3.8 Birds of coastal habitats 3.9 Birds of estuarine habitats, and 3.10 Birds of open sea and offshore rocks (breeding) NB. Specifically Little Tern and Common Tern	Land-take during construction (physical habitat loss or damage)	No land (or sea) forming part of any designated site would be taken either during construction or operation of the proposed scheme. The site compounds will be in areas of amenity grassland behind the existing sea defence in areas with high levels of human use where existing disturbance to coastal birds occurs and terns would not be feeding. The works will result in the loss of 1.5ha of intertidal sand habitat where rock armour is to be placed, compared to 10,000ha of this habitat within the SPA. This habitat will be replaced by the new rock armour that will be placed within the footprint. This habitat was identified as barren or amphipod dominated sandy shores with polychaete/amphipod-dominated fine sand shores, an intertidal habitat which is very common and quick to recover from disturbance. This, combined with the high level of human activity normally present in this area, means the land take will not impact on the area of foraging habitat necessary to support terns when breeding. **No likely significant effect.**
		Increased sediment mobilised during	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m^3/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
		construction (Physical damage to supporting habitats)	system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. This means that the ability of terns to plunge-fish will not be compromised by increased sediment mobilisation. **No likely significant effect.**
		Noise and visual disturbance during construction (Non-physical disturbance)	Visual impacts from noise and disturbance will be limited to a small working window each day. Works are restricted and can't take place three hours before or after the two high tides each day. The working areas are between the open water and the town, from which there is already regular noise and movement of vehicles on Marine Drive. In addition, at low tide the beach is very popular for dog-walking. Overall the construction activities for the scheme will cause a negligible increase in the level of visual or noise disturbance relative to the existing levels. Three other projects with the possibility to increase disturbance were also identified. If these project works coincide with the Rhyl Scheme, they would involve small scale construction operations which are unlikely to be significant in combination. The recreation from the boat club would also be negligible in comparison to the overall activity. In combination the construction disturbance and recreational disturbance from new projects will not be significant. **No likely significant effect.**
		Release of harmful chemicals from machinery or works during construction (Toxic contamination)	Any harmful chemicals would be stored in accordance with COSHH within the secure construction compounds which are located above the highest astronomical tide on Marine Promenade. Most chemicals entering the tidal zone will be contained within vehicles, and therefore of small volume. If these chemicals were to spill from a vehicle, the impact would be limited to a tiny area, and contaminants would quickly disperse in the high-energy tidal environment. Some sections may require wet concrete to be added below the level of the highest astronomical tide but will involve small quantities of concrete so that accidental spills of the concrete would impact on a negligible area of low-quality habitat. **No likely significant effect.** NB. Best-practice environmental mitigation that will be included as part of the project to avoid, reduce and contain spills is not necessary to avoid significant effects on the European sites, but its use will further reduce the impact of any accidental spills or leaks.
		Spread of invasive, non-native species (Biological disturbance)	The only invasive non-native species in or near the works footprint is the barnacle *Austrominius modestus*. This species is not thought to be a hazard to the biological condition of the SPA. Even if it were spread further or faster as a result of the works this would not significantly alter habitats for the bird species of the SPA. **No likely significant effect.**
		Alteration of coastal morphology processes during	The assessment of the likely impact on coastal morphological processes concluded that there would be no significant effect on hydrodynamic regimes during the construction or operational phases. In practical terms this means that there will be no change in the main patterns of erosion or deposition but that a small amount of

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
		operation (physical habitat loss or damage)	material may move differently with the tidal cycles. Coastal processes operating at the scale of the site, or limited to the immediate nearshore zone, would therefore not significantly affect any adjacent intertidal habitat within the Liverpool Bay SPA. The works will therefore not change the conditions at tern nesting sites. **No likely significant effect.**
	3.8 Birds of coastal habitats 3.9 Birds of estuarine habitats, and 3.10 Birds of open sea and offshore rocks (migratory)	Land-take during construction (physical habitat loss or damage)	No land (or sea) forming part of any designated site would be taken either during construction or operation of the proposed scheme. The site compounds will be in areas of amenity grassland behind the existing sea defence in areas with high levels of human use not used by birds of the open water. The works will result in the loss of 1.5ha of intertidal sand habitat where rock armour is to be placed, compared to 10,000ha of this habitat within the SPA. This habitat will be replaced by the new rock armour that will be placed within the footprint. This habitat was identified as barren or amphipod dominated sandy shores with polychaete/amphipod-dominated fine sand shores, a very common habitat throughout Liverpool Bay, and quick to recover from disturbance, so the temporary loss of tiny areas will not impact on migrating birds. **No likely significant effect.**
		Increased sediment mobilised during construction (Physical damage to supporting habitats)	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m^3/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. **No likely significant effect.**
		Noise and visual disturbance during construction (Non-physical disturbance)	Visual impacts from noise and disturbance will be limited to a small working window each day. Works are restricted and can't take place three hours before or after the two high tides each day. The working areas are between the open water and the town, from which there is already regular noise and movement of vehicles on Marine Drive. In addition, at low tide the beach is very popular for dog-walking. Birds in the area are known to be habituated to some disturbance, with flushed birds observed to settle within 50m. Overall the works will make a negligible increase in the level of visual or noise disturbance relative to the existing levels. Three other projects with the possibility to increase disturbance were also identified. If these project works coincide with the Rhyl Scheme, they would involve small scale construction operations which are unlikely to be significant in combination. The recreation from the boat club would also be negligible in comparison to the overall activity. In combination the construction disturbance and recreational disturbance from new projects will not be significant. **No likely significant effect.**

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
		Release of harmful chemicals from machinery or works during construction (Toxic contamination)	Any harmful chemicals would be stored in accordance with COSHH within the secure construction compounds which are located above the highest astronomical tide on Marine Promenade. Most chemicals entering the tidal zone will be contained within vehicles, and therefore of small volume. If these chemicals were to spill from a vehicle, the impact would be limited to a tiny area, and contaminants would quickly disperse in the high-energy tidal environment. Some sections may require wet concrete to be added below the level of the highest astronomical tide, but will involve small quantities of concrete so that accidental spills of the concrete involved would impact on a negligible area of low-quality habitat and would not affect foraging or resting places for migratory birds **No likely significant effect.** NB. Best-practice environmental mitigation that will be included as part of the project to avoid, reduce and contain spills is not necessary to avoid significant effects on the European sites, but its use will further reduce the impact of any accidental spills or leaks.
		Spread of invasive, non-native species (Biological disturbance)	The only invasive non-native species in or near the works footprint is the barnacle *Austrominius modestus*. This species is not thought to be a hazard to the biological condition of the SPA. Even if it were spread further or faster as a result of the works this would not significantly alter habitats for the bird species of the SPA. **No likely significant effect.**
		Alteration of coastal morphology processes during operation (physical habitat loss or damage)	The assessment of the likely impact on coastal morphological processes concluded that there would be no significant effect on hydrodynamic regimes during the construction or operational phases. In practical terms this means that there will be no change in the main patterns of erosion or deposition but that a small amount of material may move differently with the tidal cycles. Coastal processes operating at the scale of the site, or limited to the immediate nearshore zone, would therefore not significantly affect any adjacent intertidal habitat within the Liverpool Bay SPA. **No likely significant effect.**
Dee Estuary SAC and the habitats of Dee Estuary Ramsar site.	1.12 Estuarine and intertidal habitats	Land-take during construction (physical habitat loss or damage)	The works are over 3km from the Dee Estuary SAC and Ramsar site so there will be no loss of habitat within the Dee Estuary SAC or Dee Estuary Ramsar site. **No likely significant effect.**
		Increased sediment mobilised during construction (Physical damage to supporting habitats)	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m³/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. The estuarine and intertidal habitats in the Dee Estuary SAC are located over 3 km east of the proposed scheme, so there will be no impact on these habitats.

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
			No likely significant effect.
		Noise and visual disturbance during construction (Non-physical disturbance)	Any noise and visual disturbance from the scheme, or potential sources of cumulative impacts, will not affect habitats in the Dee Estuary SAC and Ramsar site over 3km away. **No likely significant effect.**
		Release of harmful chemicals from machinery or works during construction (Toxic contamination)	Any harmful chemicals would be stored in accordance with COSHH within the secure construction compounds which are located above the highest astronomical tide on Marine Promenade. Most chemicals entering the tidal zone will be contained within vehicles, and therefore of small volume. If these chemicals were to spill from a vehicle, the impact would be limited to a tiny area, and contaminants would quickly disperse in the high-energy tidal environment. Some sections may require wet concrete to be added below the level of the highest astronomical tide but will involve small quantities of concrete so that accidental spills of the concrete involved would impact on a negligible area of low-quality habitat over 3km from the SAC. **No likely significant effect.** NB. Best-practice environmental mitigation that will be included as part of the project to avoid, reduce and contain spills is not necessary to avoid significant effects on the European sites, but its use will further reduce the impact of any accidental spills or leaks.
		Spread of invasive, non-native species (Biological disturbance)	The only invasive non-native species in or near the works footprint is the barnacle *Austrominius modestus*. Even if it were spread further or faster as a result of the works this would not significant alter habitats of the SAC over 3km away. **No likely significant effect.**
		Alteration of coastal morphology processes during operation (physical habitat loss or damage)	The assessment of the likely impact on coastal morphological processes concluded that there would be no significant effect on hydrodynamic regimes during the construction or operational phases. In practical terms this means that there will be no change in the main patterns of erosion or deposition but that a small amount of material may move differently with the tidal cycles. Coastal processes operating at the scale of the site, or limited to the immediate nearshore zone, would therefore not significantly affect any habitats in the Dee Estuary SAC located over 3km away. **No likely significant effect.**
	1.10 Coastal habitats, and 1.11 Coastal habitats sensitive to abstraction, and 2.04 Mosses and	Land-take during construction (physical habitat loss or damage)	The works are over 3km from the Dee Estuary SAC and Ramsar site so there will be no loss of habitat within the Dee Estuary SAC or Dee Estuary Ramsar site. **No likely significant effect.**
		Increased sediment mobilised during	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m³/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
	Liverworts	construction (Physical damage to supporting habitats)	system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. The coastal habitats in the Dee Estuary SAC are located over 3 km east of the proposed scheme, so there will be no impact on these habitats. **No likely significant effect.**
		Noise and visual disturbance during construction (Non-physical disturbance)	Any noise and visual disturbance from the scheme, or potential sources of cumulative impacts, will not affect habitats in the Dee Estuary SAC and Ramsar site over 3km away. **No likely significant effect.**
		Release of harmful chemicals from machinery or works during construction (Toxic contamination)	Any harmful chemicals would be stored in accordance with COSHH within the secure construction compounds which are located above the highest astronomical tide on Marine Promenade. Most chemicals entering the tidal zone will be contained within vehicles, and therefore of small volume. If these chemicals were to spill from a vehicle, the impact would be limited to a tiny area, and contaminants would quickly disperse in the high-energy tidal environment. Some sections may require wet concrete to be added below the level of the highest astronomical tide but will involve small quantities of concrete so that accidental spills of the concrete involved would impact on a negligible area of low-quality habitat over 3km from the SAC. **No likely significant effect.** NB. Best-practice environmental mitigation that will be included as part of the project to avoid, reduce and contain spills is not necessary to avoid significant effects on the European sites, but its use will further reduce the impact of any accidental spills or leaks.
		Spread of invasive, non-native species (Biological disturbance)	The only invasive non-native species in or near the works footprint is the barnacle *Austrominius modestus*. Even if it were spread further or faster as a result of these works this would not significant alter the habitats of the SAC over 3km away. **No likely significant effect.**
		Alteration of coastal morphology processes during operation (physical habitat loss or damage)	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m^3/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. There will be no impact on coastal habitats over 3km away. **No likely significant effect.**

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
	2.05 Anadromous fish	Land-take during construction (physical habitat loss or damage)	The works are over 3km from the Dee Estuary SAC and Ramsar site so there will be no loss of habitat within the Dee Estuary SAC or Dee Estuary Ramsar site. The area of habitat was identified as barren or amphipod dominated sandy shores with polychaete/amphipod-dominated fine sand shores, a common habitat in the area so temporary loss of small areas will have no impact on supporting habitat for these fish. **No likely significant effect.**
		Increased siltation during construction (Physical damage to supporting habitats)	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m³/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. **No likely significant effect.**
		Noise and visual disturbance during construction (Non-physical disturbance)	Any noise and visual disturbance from the scheme, or potential sources of cumulative impacts, will not affect habitats for anadromous fish in the Dee Estuary SAC and Ramsar site over 3km away. **No likely significant effect.**
		Release of harmful chemicals from machinery or works during construction (Toxic contamination of supporting habitat)	Any harmful chemicals would be stored in accordance with COSHH within the secure construction compounds which are located above the highest astronomical tide on Marine Promenade. Most chemicals entering the tidal zone will be contained within vehicles, and therefore of small volume. If these chemicals were to spill from a vehicle, the impact would be limited to a tiny area, and contaminants would quickly disperse in the high-energy tidal environment. Some sections may require wet concrete to be added below the level of the highest astronomical tide but will involve small quantities of concrete so that accidental spills of the concrete involved would impact on a negligible area of low-quality habitat in areas of low importance for anadromous fish. **No likely significant effect.** NB. Best-practice environmental mitigation that will be included as part of the project to avoid, reduce and contain spills is not necessary to avoid significant effects on the European sites, but its use will further reduce the impact of any accidental spills or leaks.
		Spread of invasive, non-native species (Biological disturbance)	The only invasive non-native species in or near the works footprint is the barnacle *Austrominius modestus*. Even if it were spread further or faster as a result this would not significant alter habitats of the SAC over 3km away. **No likely significant effect.**
		Alteration of coastal	The assessment of the likely impact on coastal morphological processes concluded that there would be no significant effect on hydrodynamic regimes during the

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
		morphology processes during operation (physical habitat loss or damage)	construction or operational phases. In practical terms this means that there will be no change in the main patterns of erosion or deposition but that a small amount of material may move differently with the tidal cycles. Coastal processes operating at the scale of the site, or limited to the immediate nearshore zone, would therefore not significantly affect any adjacent intertidal habitat within the Dee Estuary SAC or in supporting habitats in the Liverpool Bay SPA. **No likely significant effect.**
Dee Estuary SPA and birds of Dee Estuary Ramsar site	3.4 Birds of lowland wet grasslands 3.7 Birds of farmland 3.8 Birds of coastal habitats, and 3.9 Birds of estuarine habitats (winter)	Land-take during construction (physical habitat loss or damage)	The works are over 3km from the Dee Estuary SPA and Ramsar site so there will be no loss of habitat within the Dee Estuary SPA or Dee Estuary Ramsar site. The area of habitat was identified as barren or amphipod dominated sandy shores with polychaete/amphipod-dominated fine sand shores, a common habitat in the area so temporary loss of small areas will have no impact on birds of the Dee Estuary SPA/Ramsar site. **No likely significant effect.**
		Increased sediment mobilised during construction (Physical damage to supporting habitats)	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m³/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. **No likely significant effect.**
		Noise and visual disturbance during construction (Non-physical disturbance)	Any noise and visual disturbance from the scheme, or potential sources of cumulative impacts, will not affect habitats in the Dee Estuary SAC and Ramsar site over 3km away. **No likely significant effect.**
		Release of harmful chemicals from machinery or works during construction (Toxic contamination of supporting habitat)	Any harmful chemicals would be stored in accordance with COSHH within the secure construction compounds which are located above the highest astronomical tide on Marine Promenade. Most chemicals entering the tidal zone will be contained within vehicles, and therefore of small volume. If these chemicals were to spill from a vehicle, the impact would be limited to a tiny area, and contaminants would quickly disperse in the high-energy tidal environment. Some sections may require wet concrete to be added below the level of the highest astronomical tide but will involve small quantities of concrete so that accidental spills of the concrete involved would impact on a negligible area of low-quality habitat in areas of low importance for bird species. **No likely significant effect.** NB. Best-practice environmental mitigation that will be included as part of the project to avoid, reduce and contain spills is not necessary to avoid significant effects on the European sites, but its use will further reduce the impact of any

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
			accidental spills or leaks.
		Spread of invasive, non-native species (Biological disturbance)	The only invasive non-native species in or near the works footprint is the barnacle *Austrominius modestus*. Even if it were spread further or faster as a result of the works this would not significant alter the habitats of the SAC over 3km away. **No likely significant effect.**
		Alteration of coastal morphology processes during operation (physical habitat loss or damage)	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m³/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. There will be no impact on bird species or the estuarine and coastal habitats that support them. **No likely significant effect.**
	3.8 Birds of coastal habitats 3.9 Birds of estuarine habitats, and 3.10 Birds of open sea and offshore rocks (breeding) NB. Specifically Little Tern and Common Tern	Land-take during construction (physical habitat loss or damage)	The works are over 3km from the Dee Estuary SPA and Ramsar site so there will be no loss of habitat within the Dee Estuary SPA or Dee Estuary Ramsar site. The area of habitat was identified as barren or amphipod dominated sandy shores with polychaete/amphipod-dominated fine sand shores, a common habitat in the area so temporary loss of small areas will have no impact on birds of the Dee Estuary SPA/Ramsar site. **No likely significant effect.**
		Increased sediment mobilised during construction (Physical damage to supporting habitats)	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m³/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. **No likely significant effect.**
		Noise and visual disturbance during construction (Non-physical disturbance)	Any noise and visual disturbance from the scheme, or potential sources of cumulative impacts, will not affect habitats in the Dee Estuary SAC and Ramsar site over 3km away. **No likely significant effect.**
		Release of harmful chemicals from machinery or works during construction (Toxic contamination	Any harmful chemicals would be stored in accordance with COSHH within the secure construction compounds which are located above the highest astronomical tide on Marine Promenade. Most chemicals entering the tidal zone will be contained within vehicles, and therefore of small volume. If these chemicals were to spill from a vehicle, the impact would be limited to a tiny area, and contaminants would

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
		of supporting habitat)	quickly disperse in the high-energy tidal environment. Some sections may require wet concrete to be added below the level of the highest astronomical tide but will involve small quantities of concrete so that accidental spills of the concrete involved would impact on a negligible area of low-quality habitat in areas of low importance for bird species. **No likely significant effect.** NB. Best-practice environmental mitigation that will be included as part of the project to avoid, reduce and contain spills is not necessary to avoid significant effects on the European sites, but its use will further reduce the impact of any accidental spills or leaks.
		Spread of invasive, non-native species (Biological disturbance)	The only invasive non-native species in or near the works footprint is the barnacle *Austrominius modestus*. Even if it were spread further or faster as a result of the works this would not significant alter the habitats of the SAC over 3km away. **No likely significant effect.**
		Alteration of coastal morphology processes during operation (physical habitat loss or damage)	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m³/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. There will be no impact on bird species or the estuarine and coastal habitats that support them. **No likely significant effect.**
	3.8 Birds of coastal habitats 3.9 Birds of estuarine habitats, and 3.10 Birds of open sea and offshore rocks (migratory)	Land-take during construction (physical habitat loss or damage)	The works are over 3km from the Dee Estuary SPA and Ramsar site so there will be no loss of habitat within the Dee Estuary SPA or Dee Estuary Ramsar site. The area of habitat was identified as barren or amphipod dominated sandy shores with polychaete/amphipod-dominated fine sand shores, a common habitat in the area so temporary loss of small areas will have no impact on birds of the Dee Estuary SPA/Ramsar site. **No likely significant effect.**
		Increased sediment mobilised during construction (Physical damage to supporting habitats)	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m³/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. **No likely significant effect.**
		Noise and visual	Any noise and visual disturbance from the scheme, or potential sources of cumulative impacts, will not affect habitats in the Dee Estuary SAC and Ramsar site

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
		disturbance during construction (Non-physical disturbance)	over 3km away. **No likely significant effect.**
		Release of harmful chemicals from machinery or works during construction (Toxic contamination of supporting habitat)	Any harmful chemicals would be stored in accordance with COSHH within the secure construction compounds which are located above the highest astronomical tide on Marine Promenade. Most chemicals entering the tidal zone will be contained within vehicles, and therefore of small volume. If these chemicals were to spill from a vehicle, the impact would be limited to a tiny area, and contaminants would quickly disperse in the high-energy tidal environment. Some sections may require wet concrete to be added below the level of the highest astronomical tide but will involve small quantities of concrete so that accidental spills of the concrete involved would impact on a negligible area of low-quality habitat in areas of low importance for bird species. **No likely significant effect.** NB. Best-practice environmental mitigation that will be included as part of the project to avoid, reduce and contain spills is not necessary to avoid significant effects on the European sites, but its use will further reduce the impact of any accidental spills or leaks.
		Spread of invasive, non-native species (Biological disturbance)	The only invasive non-native species in or near the works footprint is the barnacle *Austrominius modestus*. Even if it were spread further or faster as a result of the works this would not significant alter the habitats of the SAC over 3km away. **No likely significant effect.**
		Alteration of coastal morphology processes during operation (physical habitat loss or damage)	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m³/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary system naturally carries high loads of sediment, particularly in the high energy system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system. There will be no impact on bird species or the estuarine and coastal habitats that support them. **No likely significant effect.**
Dee Estuary Ramsar	Natterjack Toad	Land-take during construction (physical habitat loss or damage)	The works are over 3km from the Dee Estuary SAC and Ramsar site so there will be no loss of habitat within the Dee Estuary SAC or Dee Estuary Ramsar site. **No likely significant effect.**
		Increased sediment mobilised during construction (Physical damage to	The amount of sediment mobilised by the works, which take place around low tide, is small. Overall the project will disturb around 2% of the 20,000 m³/year that is transported through onshore ridge migration. Only a small proportion of the sediment disturbed during the works is mobilised at each tidal cycle. The estuary system naturally carries high loads of sediment, particularly in the high energy

Site Name	Interest Feature	Potential Hazard	Potential exposure to hazard and mechanism of effect/impact if known:
		supporting habitats)	system around Splash Point. Therefore, any sediment mobilised when working one or two 10m sections at each tidal cycle will be negligible in comparison to the natural volume of sediment in the system and will not impact on Natterjack Toad habitat over 3km away. **No likely significant effect.**
		Noise and visual disturbance during construction (Non-physical disturbance)	The noise and visual disturbance will not affect Natterjack Toad habitats in the Dee Estuary SAC and Ramsar site, over 3km away. Three other projects with the possibility to increase disturbance were also identified and these are also 3km away and will not cause disturbance to Natterjack Toad. **No likely significant effect.**
		Release of harmful chemicals from machinery or works during construction (Toxic contamination of supporting habitat)	Natterjack Toad is a terrestrial species and there is no terrestrial pathway for this species to be impacted by harmful chemicals from the scheme location over 3km away. **No likely significant effect.** NB. Best-practice environmental mitigation that will be included as part of the project to avoid, reduce and contain spills is not necessary to avoid significant effects on the European sites, but its use will further reduce the impact of any accidental spills or leaks.
		Spread of invasive, non-native species (Biological disturbance)	The only invasive non-native species in or near the works footprint is the barnacle *Austrominius modestus*. Even if it were spread further or faster as a result of the works this would not significant alter the habitats of the SAC over 3km away. **No likely significant effect.**
		Alteration of coastal morphology processes during operation (physical habitat loss or damage)	Natterjack Toad is a terrestrial species and so there is no potential for any changes in coastal processes to impact upon this species. **No likely significant effect.**

6.2 Conclusion and Screening Statement

Following initial screening, and based upon best scientific judgement it is concluded that there will be **no likely significant effects** from the East Rhyl Coast Defence Scheme project on the following Natura 2000 sites either alone or in combination with any other plans or projects:

- Liverpool Bay SPA
- Dee Estuary SAC
- Dee Estuary SPA
- Dee Estuary Ramsar

If any changes occur in the design of these works, a new screening assessment will be required.

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