

Cardiff Coastal Risk Management Programme Outline Business Case

Preliminary Ecological Appraisal

March 2017

JBA Project Manager

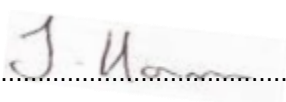
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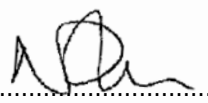
Revision History

Revision Ref / Date Issued	Amendments	Issued to
v1-0 Draft Report / 23 Jan 2017		CCC
v2-0 Draft Report / 3 Mar 2017	Minor Amendments	CCC
v1-2 Final Report 21 March 2017	Minor Amendments	CCC

Contract

This report describes work commissioned by the City of Cardiff Council. Jonathan Harrison and Nicola Darwin of JBA Consulting carried out this work.

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Purpose

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Abbreviations

BAP	Biodiversity Action Plan
BCT	The Bat Conservation Trust
BTO.....	British Trust for Ornithology
CCC	Cardiff City Council
CIEEM	Chartered Institute of Ecology and Environmental Management
CRMP	Coastal Risk Management Programme
EMODnet	European Marine Observation Data Network
EPS.....	European Protected Species
HRA	Habitat Regulations Assessment
HPI	Habitat of Principle Importance
JNCC	Joint Nature Conservation Committee
LNR	Local Nature Reserve
LPA	Local Planning Authority
MAGIC	Multi-Agency Geographic Information for the Countryside
MCZ	Marine Conservation Zones
NERC	Natural Environment and Rural Communities
NNR	National Nature Reserve
ODPM	Office of the Deputy Prime Minister
PAR.....	Project Appraisal Report
PEA.....	Preliminary Ecological Appraisal
PPW.....	Planning Policy Wales
RSPB	Royal Society for the Protection of Birds

SAC.....	Special Area of Conservation
SINC	Sites of Importance for Nature Conservation
SAP	Species Action Plan
SMP	Shoreline Management Plan
SPA.....	Special Protection Area
SPI	Species of Principle Importance
SSSI.....	Site of Special Scientific Interest
TAN	Technical Advice Notes
UKBAP	United Kingdom Biodiversity Action Plan
WCA.....	Wildlife and Countryside Act
WeBS.....	Wetland Bird Survey

1 Introduction

Cardiff City Council (CCC) successfully submitted a proposal for inclusion in the Welsh Government's Coastal Risk Management Programme (CRMP) for a project that would provide flood protection for Lamby Way and Rover Way. This area is at risk of tidal flooding and coastal erosion from the Severn Estuary. Complete grant approval for a Project Appraisal Report (PAR) has now been secured to develop a business case to identify a preferred option for the flood protection of the project areas.

JBA Consulting has been commissioned by CCC to investigate a preferred option for the project, which will culminate in the production of the PAR, this will seek to identify the preferred option for the project and will provide the business case to support its approval to be taken forward to a detailed design stage.

This report presents the results of a Preliminary Ecological Appraisal (PEA) carried out to provide an ecological baseline of the scheme area and highlights likely constraints prior to the development of a preferred option.

The approach to this appraisal follows best practice published by the Chartered Institute of Ecology and Environmental Management (CIEEM) including Guidelines for Preliminary Ecological Appraisal (CIEEM, 2013) and Guidelines for Ecological Report Writing (CIEEM, 2015).

1.1 Background

Existing flood defences are located along the Rhymney River and the Severn Estuary. These defences comprise a mix of sheet-pile walls, earth embankments and rock armour or revetments. However, tidal erosion of these defences has taken place and large sections have either been completely lost or are in very poor condition. The existing defences have been eroded significantly and large sections of the coastline are undefended, presenting a significant flood risk to adjacent areas. Further erosion of the defences is expected in the future and could result in increased flood risk, this is expected to be exacerbated by projected sea level rise.

The Severn Estuary Shoreline Management Plan (SMP) policy for these sections of the coastline is to 'hold the line'. This means that the flood defences should be maintained and upgraded or replaced in their current position. Therefore, substantial new flood defences are required to maintain and improve the level of protection currently provided.

Works to manage this flood risk are considered to be urgent, but the Council first requires an improved understanding of the existing defences, flood risk and environmental sensitivities to identify the most appropriate option. The PAR sets out the preferred option for the project taking into account the full range of economic, engineering and environmental factors.

Land uses within the site include Tremorfa Industrial Estate, a large steel works, the main municipal landfill site for Cardiff, and a number of residential properties.

This issue may be exacerbated due to contaminated land within the study area which could pollute the Severn Estuary if inundated by tidal waters. Figure 1-1 shows the study area.

1.2 Project area

The proposed project encompasses two areas of the city located east and west of the Rhymney River. The eastern area comprises the Lamby Way landfill site. The western half of the study area consists of large areas of 'made ground' and has been remediated and landscaped, whilst the eastern portion of the site is currently undergoing a capping process. The western area of the project comprises a mix of open land, residential, commercial and industrial land use located along Rover Way. Rover Way runs parallel to the foreshore and is an important transport route linking Cardiff city centre with the eastern suburbs of the city and the A48. The extensive Cardiff Waste Water Treatment Works operated by Dwr Cymru are located towards the western boundary of the project area and form part of an industrial park together with a range of recycling and reclamation yards and other manufacturing businesses. The Celsa steelworks plant is located to the west of Rover Way in this area, whilst an adjacent area to the east of Rover Way is used for the storage of waste generated by the plant. The Cardiff Motocross Centre now operates on an area of land located between the waste site and the existing flood defences on the site of a former 'frag tip'.

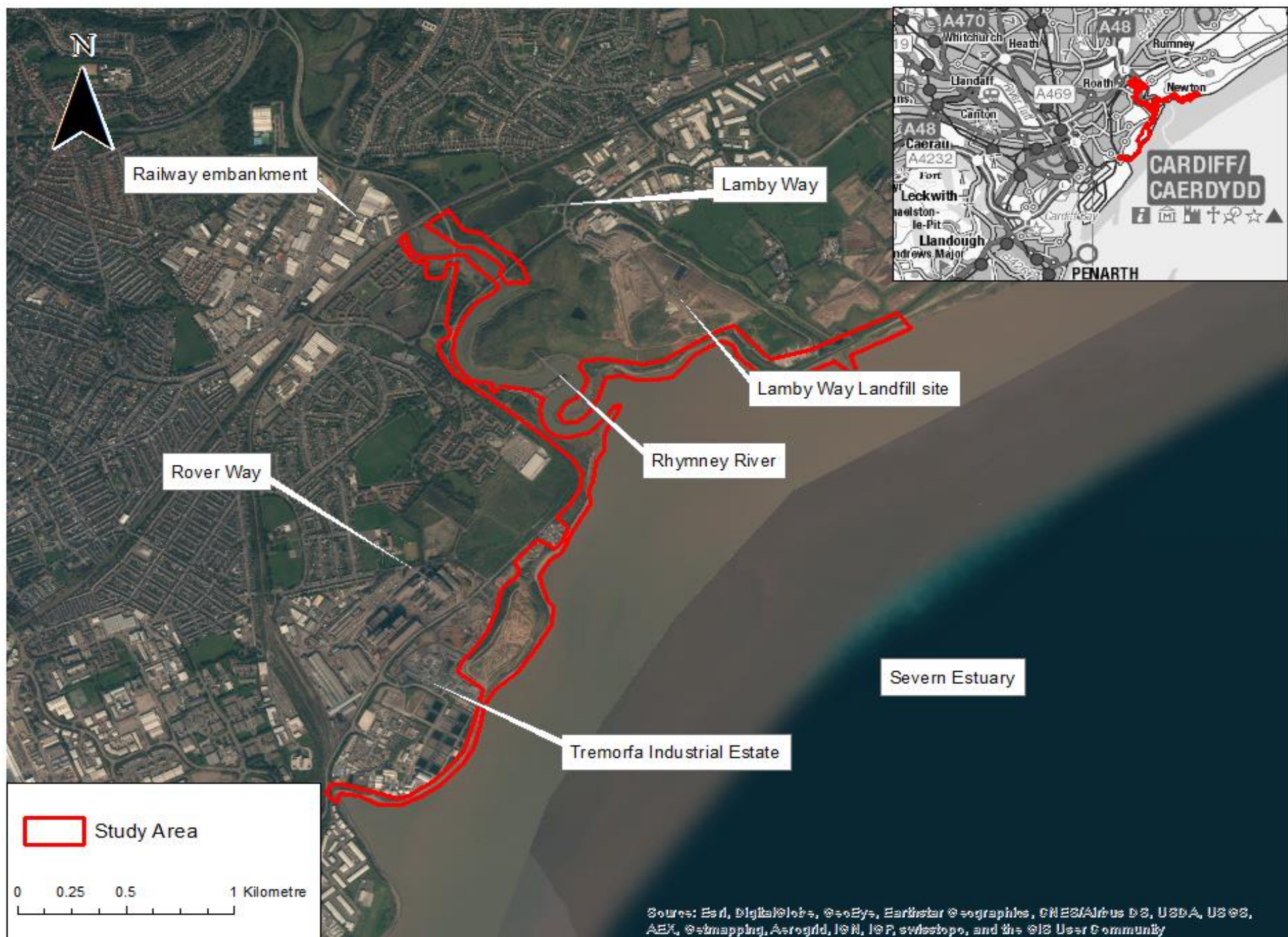


Figure 1-1: Location of Proposed Flood Defence Scheme

2 Policy and legislation

2.1 Planning policy

2.1.1 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 as a whole. 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.

2.1.2 Cardiff Local Development Plan (LDP) 2006 - 2026

Policy KP16: Green Infrastructure

The LDP highlights the need for the protection, enhancement and management of Cardiff's distinctive natural heritage of the green infrastructure across the city, to ensure the integrity and connectivity of this multi-functional green resource is maintained. Protection and conservation of green infrastructure needs to be reconciled with the benefits of development. It states that If development results in overall loss of green infrastructure, appropriate compensation will be required. Rhymney Valley, trees and designated sites and their connectivity for protected species is listed as natural heritage assets that are key to Cardiff's character, value, distinctiveness and sense of place.

"Where development is permitted, planning conditions and/or obligations will be used to protect or enhance the natural heritage network. New developments should incorporate new and / or enhanced green infrastructure of an appropriate size, type and standard to ensure no fragmentation or loss of connectivity."

"Where the benefits of development outweigh the conservation interest, mitigation and/or compensation measures will be required to offset adverse effects and appropriate planning obligations sought."

EN4: River Corridors

The Natural Heritage, character and other key features of Cardiff's river corridors will be protected, promoted and enhanced, together with facilitating sustainable access and recreation:

"This Policy helps to deliver Plan objectives relating to social needs and natural environment together with according with PPW, which values the importance of the natural heritage of Wales including non-statutorily designated sites and seeks to conserve and enhance this heritage in ways which bring benefits to the local community."

Rhymney River is one of three of the city's main rivers that make a unique contribution to the character and form of the city by providing continuous green corridors between the countryside beyond the urban edge of the city and the Severn Estuary. Rhymney Valley also has a specific Action Plan.

EN5: Designated Sites

Unacceptable harm to sites of international or national nature conservation importance as a result of development will not be permitted. Development proposals that could affect locally designated sites of nature conservation and geological importance should maintain or enhance the associated importance of the designation:

"Where development is proposed which may have an effect on a site of international or national importance for nature conservation, sufficient information will be required of all applicants to enable a full assessment of the proposal to be carried out."

"The network of SSSIs/SACs/SPAs and Ramsar Sites alone is not sufficient to maintain the biodiversity of Cardiff. It is therefore important to identify other locally designated wildlife sites such as Sites of Importance for Nature Conservation (SINC's) and Local Nature Reserves (LNR's)."

EN6: Ecological Networks and Features of Importance for Biodiversity

Development will only be permitted if it does not cause unacceptable harm to landscape features of importance for wild flora and fauna, including networks, wildlife corridors and 'stepping stones' which enable the dispersal and functioning of protected and priority species.

EN7: Priority Habitats and Species

If a significant adverse effect is anticipated on the continued viability of legally protected and / or UK Biodiversity Action Plan (BAP) or Local BAP priority habitats and species as a result of development proposals, the development will only be allowed when: the need for development outweighs the nature conservation importance of the site; the developer demonstrates that there is no satisfactory alternative location for the development which avoids nature conservation impacts; and the developer provides effective mitigation measures.

LBAP species likely to be found within the local area include:

- Grass Snake;
- Slow Worm;
- Brown Long-eared Bat;
- Noctule Bat;
- Common Pipistrelle;
- Otter;
- Pied Flycatcher; and
- Water Vole.

Additionally, Species Action Plans (SAPs) have been developed for all bat species, Dormouse and Water Vole.

The River Rhyrnydd Nant Fawr Corridor is also subject to its own Action Plan.

2.2 Legislation

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

The Conservation of Habitats and Species Regulations 2010 (as amended) are the means by which the EC Habitats Directive (92/43/EC) is transposed in England and Wales and updates and consolidates previous legislation.

These Regulations provide protection for European Protected Species (EPS) (animals and plants listed in Annex IV Habitats Directive which are resident in the wild in Great Britain) including bats, Dormouse *Muscardinus avellanarius*, Great Crested Newt *Triturus cristatus* and Otter *Lutra lutra*. The Conservation of Habitats and Species (Amendment) Regulations 2012 placed new duties on public bodies to help "preserve, maintain and re-establish habitat for wild birds".

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

Public bodies (including the Local Planning Authority) have a duty to have regard to the requirements of the Habitats Directive in carrying out their duties i.e. when determining a planning application.

2.2.2 The Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act (WCA) 1981 (as amended)¹ is the primary legislation for England and Wales for the protection of flora, fauna and the countryside. Part 1 of the Act deals with the protection of wildlife.

Most European Protected Species are now covered under the Conservation of Habitats and Species Regulations (as amended) (see above) but some activities are still covered by the WCA such as obstructing access to a bat roost.

¹ Amended by the Countryside and Rights of Way Act 2000

All British birds, their nests and eggs are protected in law. It is an offence to deliberately take, kill or injure any wild bird or to take, damage, or destroy any nest or egg of any wild bird under Section 1 of the Act. In addition, certain species such as the Barn Owl *Tyto alba* are included in Schedule 1 of the Act and are protected against disturbance while nesting and when they have dependent young. Offences against birds listed on Schedule 1 are subject to special penalties.

All species of reptile and amphibian are protected by the WCA. Under Schedule 5, reptiles such as Adder *Vipera berus*, Common Lizard *Lacerta vivipara*, Slow Worm *Anguis fragilis* and Grass Snake *Natrix natrix* are protected against intentional killing, injuring or selling, and Smooth Newt *Lissotriton vulgaris*, Palmate Newt *Lissotriton helveticus*, Common Frog *Rana temporaria* and Common Toad *Bufo bufo* are protected only against sale. Species such as the Smooth Snake *Coronella austriaca*, Sand Lizard *Lacerta agilis* and Great Crested Newt are afforded additional protection by European legislation as described above.

The WCA also provides the mechanism for the designation and protection of SSSIs.

2.2.3 Natural Environment and Rural Communities Act 2006 (NERC)

The Natural Environment and Rural Communities Act (NERC) requires all public authorities, including planning authorities to have regard to the purpose of conserving biodiversity whilst carrying out their normal functions. The NERC Act includes lists of Habitats and Species of Principal Importance (HPIs and SPIs) to the conservation of biodiversity (Section 42) which should be considered in the implementation of duties under the NERC Act. In line with government circular 06/2005 (ODPM, 2005) which provides supplementary guidance, the presence of a Priority species may be a material consideration when a planning authority is considering a development proposal.

The HPI and SPI listed under the NERC Act are largely also UK BAP Priority habitats and species. The UK Post-2010 Biodiversity Framework succeeds the UK BAP partnership; though its list of Priority species and habitats agreed under the UK BAP still form the basis of much biodiversity work in the UK. Although the UK BAP has been succeeded, Species Action Plans (SAPs) developed under the UK BAP still remain important and valuable reference sources for background information on Priority species under the UK Post-2010 Biodiversity Framework.

2.2.4 Protection of Badgers Act (1992)

Badgers *Meles meles* are protected by the Protection of Badgers Act (1992) and the Wildlife and Countryside Act 1981 (as amended), Schedule 6. Under the Wildlife and Countryside Act it is illegal to intentionally kill, capture, injure or ill-treat any badger. Under the Protection of Badgers Act it is an offence to obstruct, destroy or damage a badger sett or disturb badgers within a sett. Disturbance is defined, for development purposes, as any activity that could damage a sett or be greater than what Badgers commonly tolerate.

2.2.5 Invasive Non-native Species

Certain invasive non-native (INNS) plant species are listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to plant them in the wild or otherwise cause them to grow in the wild. The Wildlife and Countryside Act 1981 (Variation of Schedule 9) (England and Wales) Order 2010 added a number of plant species to the list including Himalayan Balsam *Impatiens glandulifera*, Montbretia *Crocodymia x crocosmiiflora*, Rhododendron *Rhododendron ponticum* and Wall Cotoneaster *Cotoneaster horizontalis*.

The Environmental Protection Act 1990 has limited provisions for non-native invasive species, but is included here due to the classification of soil and other waste containing viable propagules of invasive non-native plant species as controlled waste. This has been applied to Japanese Knotweed *Fallopia japonica* and Giant Hogweed *Heracleum mantegazzianum* with the result that waste containing these species must be disposed of in accordance with the duty of care set out in section 34 of the Act.

2.2.6 Marine and Coastal Access Act 2009

The Marine and Coastal Access Act 2009 presents a strategic marine planning system to agree and clarify marine objectives and priorities for the future and to steer sea users and decision-makers towards more efficient, sustainable use and protection of our marine resources.

Part of this strategic process is the designation of Marine Conservation Zones (MCZs) in the territorial waters adjacent to England and Wales and in UK offshore waters. The purpose of this is

to provide an ecologically coherent network of protected marine and coastal sites with the aim of providing protection to species and habitats of national importance.

3 Methodology

This PEA comprises an Extended Phase 1 Habitat Survey following Joint Nature Conservation Committee (JNCC) survey methods (JNCC, 2010). This was extended to include consideration of notable / protected habitats and species.

3.1 Desk study

A desk study was undertaken in December 2016 to review existing ecological baseline information available in the public domain and to obtain ecological records held by third parties.

For the purposes of the desk study, the study area was defined to be the site and a 2km radius around the site.

Information was requested from Cardiff County Council including records of non-statutory designated nature conservation sites, legally protected species and species of conservation concern.

In order to inform this study, a request was made to the British Trust for Ornithology (BTO) for data from the Wetland Bird Survey (WeBS), a partnership survey between the BTO, the Royal Society for the Protection of Birds (RSPB) and the JNCC (the last on behalf of the statutory nature conservation bodies: Natural England, Natural Resources Wales, Scottish Natural Heritage and the Department of the Environment Northern Ireland) in association with the Wildfowl and Wetlands Trust. A request was made for data for the compartment that cover the areas of the proposed scheme, namely Rhymney Estuary and Great Wharf, this area is shown in Figure 3-1.

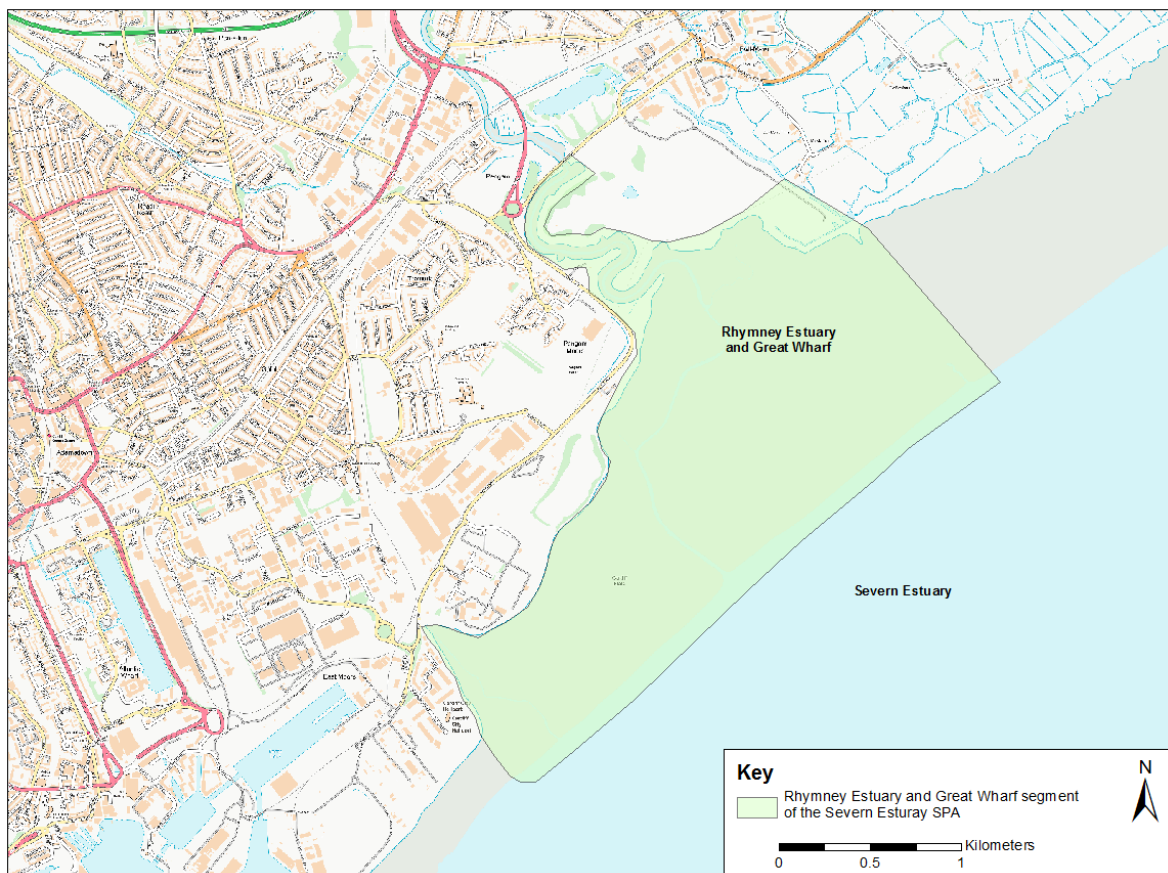


Figure 3-1: Rhymney Estuary and Great Wharf WeBS compartment

In addition, the MAGIC website which provides geographic information about the natural environment from across government, was searched for statutory designated sites within 2km of

the site including SSSIs, National Nature Reserves (NNR) and Local Nature Reserves (LNR). This was extended to 5km for European designated Natura 2000 sites (SACs and SPAs) and internationally designated Ramsar sites.

3.2 Extended Phase 1 Habitat Survey

The PEA field survey was carried out on 23rd November 2016 and was based upon an extended Phase 1 habitat survey, conducted following the JNCC survey method (JNCC, 2010) and extended to include consideration of notable / protected habitats and species such as Badger *Meles meles*, Otter, Dormouse, reptiles, Great Crested Newt and invertebrates (CIEEM, 2013). The Phase 1 habitat survey is a standard technique for classifying and mapping British habitats where the dominant plant species are recorded and habitats are classified according to their vegetation types.

A targeted search for Badger setts was also undertaken, and any evidence of use by Badgers was recorded. The status of Badger setts recorded and the level of use of entrance holes was determined following the approach set out in Cresswell *et al.* (1990).

3.3 Limitations

Site survey

It was not possible to survey the entire study area due to some areas being inaccessible, these areas are identified in the phase 1 habitat map in appendix 1. The eastern bank of the Rhymney River was surveyed from the western bank with binoculars. The intertidal areas were surveyed at low tide from the foreshore with binoculars.

Third party data

Data from biological records centres or on-line databases is historical information, and datasets might be incomplete, inaccurate or missing. It is important to note that even where data is held, a lack of records for a defined geographical area does not necessarily mean that the species is absent; the area may simply be under-recorded. The data represents the information available at the date of the request. An absence of records for any particular species does not demonstrate the absence of a species from the local area; instead it may be that a species is under-recorded.

Lifespan of data

The results and recommendations contained within this report are considered to be valid for up to two years from the date of survey. After that period, an update may be required in order to inform ecological constraints to development proposals and / or support a planning application.

4 Baseline ecology

4.1 Statutory designated sites

There are a number of statutorily designated sites located within 2km of the proposed scheme described below:

The Severn Estuary European Marine Site

The proposed scheme is located immediately adjacent to the Severn Estuary European Marine Site. The Estuary in this area is designated as a, SPA, SAC, Ramsar site.

Qualifying Features of International Importance Severn Estuary SPA

The Severn Estuary is designated as a SPA and qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

Internationally important populations of regularly occurring Annex 1 species [under Article 4.1 of the EU Birds Directive].

- Bewick's Swan *Cygnus columbianus bewickii* (SPA interest feature 1). 222 individuals representing at least 3.2% of the wintering population in Great Britain (5-year peak mean: 2010/11 to 2014/15)

Internationally important populations of regularly occurring migratory bird species [under Article 4.2 of the EU Birds Directive]

- Curlew *Numenius arquata*, 3,654 individuals representing at least 2.6% of the wintering population in Great Britain (5-year peak mean: 2010/11 to 2014/15).
- European White-fronted Goose *Anser albifrons albifrons* (SPA interest feature 2). 307 individuals representing at least 12.8% of the wintering population in Great Britain (5-year peak mean: 2010/11 to 2014/15).
- Dunlin *Calidris alpina alpina* (SPA interest feature 3). 25,220 individuals representing at least 7.2% of the wintering population in Great Britain (5-year peak mean: 2010/11 to 2014/15).
- Pintail *Anas acuta*, 560 individuals representing at least 1.9% of the wintering population in Great Britain (5-year peak mean: 2010/11 to 2014/15).
- Redshank *Tringa totanus* (SPA interest feature 4). 3,995 individuals representing at least 3.3% of the wintering population in Great Britain (5-year peak mean: 2010/11 to 2014/15).
- Shelduck *Tadorna tadorna* (SPA interest feature 5). 3,570 individuals representing at least 5.8% of the wintering population in Great Britain (5-year peak mean: 2010/11 to 2014/15).
- Gadwall *Anas strepera* (SPA interest feature 6). 208 individuals representing at least 0.8% of the of the wintering population in Great Britain (5-year peak mean: 2010/11 to 2014/15).

Internationally important assemblage of waterfowl (wildfowl & waders) [under Article 4.2 of the EU Birds Directive].

Internationally important assemblage of waterfowl (Bewick's swan, European White-fronted Goose, Shelduck, Dunlin, Redshank, Gadwall, Ringed plover *Charadrius dubius*, Whimbrel *Numenius phaeopus*, Teal *Anas crecca*, Pintail, Wigeon *Anas penelope*, Pochard *Aythya ferina*, Tufted Duck *Aythya fuligula*, Grey Plover *Pluvialis squatarola*, Curlew *Numenius arquata*, Spotted Redshank *Tringa erythropus*) (SPA interest feature 7).

Qualifying Features of International Importance Severn Estuary SAC

The Severn Estuary SAC qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting habitats and species of European Importance listed on Annex I and Annex II of the Directive.

Table 4-1: Habitats present as primary and qualifying features of interest of the River Severn SAC

Ref no.	Qualifying interest features
Annex I Habitats: Primary feature of selection	
1130	Estuaries (including habitat and notable estuarine assemblages sub-features) (SAC interest feature 1)
1140	Mudflats and sandflats not covered by seawater at low tide (SAC interest feature 3)
1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) (SAC interest feature 4)
Annex I Habitats: Qualifying feature (not primary selection)	
1110	Sandbanks which are covered by seawater all the time (SAC interest feature 2)
1170	Reefs (SAC interest feature 5)

Table 4-2: Species present as primary reason for site selection

Ref no.	Qualifying interest features
Annex II Species: Primary feature of selection	
1095	Sea Lamprey (<i>Petromyzon marinus</i>) (SAC interest feature 7)
1099	River Lamprey (<i>Lampetra fluviatilis</i>) (SAC interest feature 6)
1103	Twaite Shad (<i>Alosa fallax</i>) (SAC interest feature 8)

Severn Estuary Ramsar - Qualifying Features of International Importance

The site is designated as a Ramsar site due to the presence of the following habitats and species (JNCC, 2008):

Ramsar Interest Feature 1: Estuaries - Habitat communities and species assemblages

Ramsar Criterion 1: Qualifies due to immense tidal range (second-largest in world), this affects both the physical environment and biological communities.

Ramsar Criterion 3: Qualifies due to unusual estuarine communities, reduced diversity and high productivity.

Ramsar Interest Feature 2: Assemblage of migratory fish species

Ramsar Criterion 4: Qualifies as an important run of migratory fish between the sea and river via the estuary. Species present include Salmon *Salmo salar*, Sea Trout *S. trutta*, Sea Lamprey *Petromyzon marinus*, River Lamprey *Lampetra fluviatilis*, Allis Shad *Alosa alosa*, Twaite Shad *A. fallax*, and European Eel *Anguilla anguilla*. It is also of particular importance for migratory birds during spring and autumn.

Ramsar Criterion 8: The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. Salmon, Sea Trout, Sea Lamprey, River Lamprey Allis Shad, Twaite Shad and European Eel use the Severn Estuary as a key migration route to their spawning grounds in the many tributaries that flow into the estuary. The site is important as a feeding and nursery ground for many fish species particularly Allis Shad and Twaite Shad which feed on mysid shrimps in the salt wedge.

Ramsar Interest Feature 3: Bewick's Swan

Ramsar Interest Feature 4: European White-fronted Goose

Ramsar Interest Feature 5: Dunlin

Ramsar Interest Feature 6: Redshank

Ramsar Interest Feature 7: Shelduck

Ramsar Interest Feature 8: Gadwall

Ramsar Criterion 6: Qualifies as it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Ramsar Interest Feature 9: Internationally important assemblage of waterfowl

Species are as follows: Bewick's Swan, European White-fronted Goose, Shelduck, Dunlin, Redshank, Gadwall, Ringed Plover, Whimbrel, Teal, Pintail, Wigeon, Pochard, Tufted Duck, Grey Plover, Curlew, and Spotted Redshank

Ramsar Criterion 5: Qualifies as it supports an assemblage of international importance - (1998/99-2002/2003 5-year peak mean was 70,919 waterfowl)

Ramsar Criterion 6: Qualifies as it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Other National Statutory Designated Sites

A further six statutorily designated sites are located within 2km of the scheme area. The location of these are shown in figure 4-1.

Gwent Levels

Gwent Levels are a series of SSSIs located between Chepstow and Cardiff. They are situated along the foreshore of the outer Severn Estuary, on site. It consists of an extensive network of drainage ditches that form the largest area of reclaimed wet pasture in Wales. The varying ditch types and their varying management, allow for a rich diversity of rare plants and plant communities, including the open water emergents such as Arrowhead *Sagittaria sagittifolia*. The site therefore supports a highly diverse aquatic and terrestrial invertebrate assemblage, including *Haliphus mucronatus* and *Hydrophilus piceus*. The area is nationally important for its snails and dragonflies and includes the species *Physa heterostropha* and *Brachytron pratense*. Two sections of the Gwent Levels SSSI are included in the desk study below:

Rumney and Peterstone SSSI

Part of the Gwent Levels network of SSSIs, this site supports several important plant species including the nationally rare Brackish Water-crowfoot *Ranunculus baudotii* and several regional rarities including the Pondweed *Potamogeton berchtoldii* and is a stronghold for the Flowering Rush *Butomus umbellatus*. Nationally notable invertebrates recorded here include the water-beetle *Plateumaris braccata* and the Variable Damselfly *Coenagrion pulchellum*. Approximately 800 metres of the proposed scheme area is within this SSSI.

St Brides SSSI

Part of the Gwent Levels network of SSSIs, this site has notable plant species growing in this area include Thread-leaved Water-crowfoot *Ranunculus trichophyllus* and Small Pondweed *Potamogeton berchtoldii*, as well as regionally notable Grass Vetchling *Lathyrus nissolia* and Common Meadow-rue *Thalictrum flavum*. Nationally notable marshland invertebrates have also been recorded here, including the true fly *Chrysogaster macquarti* and the beetle *Hydaticus transversalis*.

Rumney Quarry SSSI

This is a Geological SSSI located approximately 1km to the north of the site. It is an exposure of the Wenlock Series of Silurian mudstones, which are approximately 425-430 million years old. Important fossil collections have come from this site and have been used worldwide in comparative dating of similar rocks.

Rhymney River Section SSSI

This is another Geological SSSI which is located approximately 1.3km to the north of the site. Its geological exposures that show Silurian strata containing the local Wenlock succession, Rumney Grit, Ludlow Series and Old Red Sandstone laid down about 420 million years ago.

Penylan Quarry SSSI

This is Geological SSSI located approximately 2km to the north west of the site. It consists of geological exposures that show the Pen-y-lan mudstones and a wealth of marine fossils including fossil Trilobites and Silurian Brachiopods.

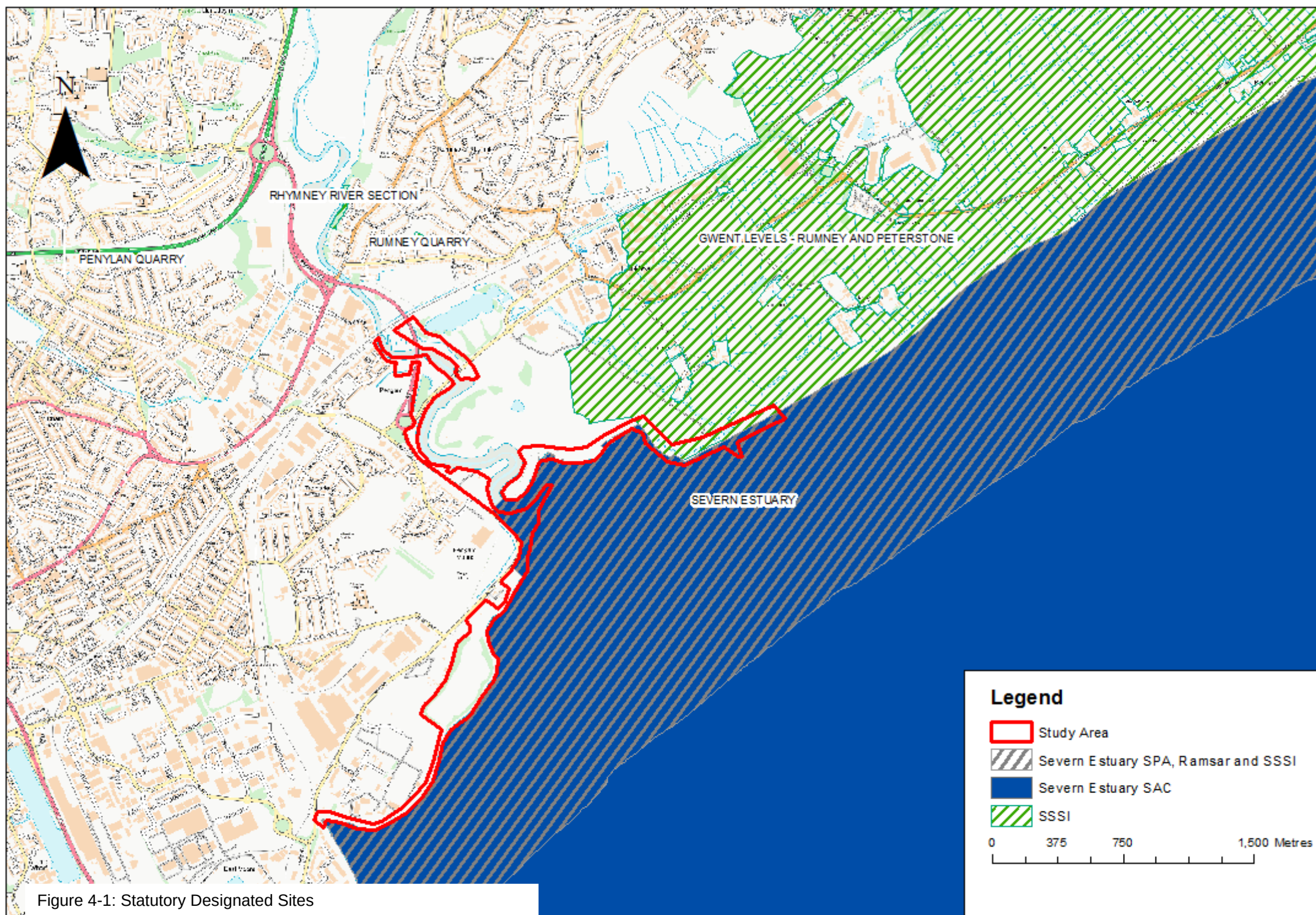


Figure 4-1: Statutory Designated Sites

4.2 Non-statutory designated sites

Five non-statutory designated sites are located within 500m of the scheme area. In Cardiff these are referred to as Sites of Importance for Nature Conservation (SINC), and are of Local value. Table 4-3 details these sites and the location is shown in figure 4-2.

Table 4-3: SINC within 500m of the proposed works

Site	Location	Description
Lamby North SINC	ST213782	An area of inland saltmarsh located on the eastern bank of the Rhymney River immediately adjacent to the scheme area.
Lamby Salt Marsh SINC	ST220775	An area of salt marsh located on the eastern banks Rhymney River and fringing the Severn Estuary.
Lamby Way SINC	ST220784	An area of damp semi-improved neutral grassland which supports Grass Snake <i>Natrix natrix</i> and Cetti's Warbler <i>Cettia cetti</i> , located immediately to the south of Parc Tredelerch, 150m to the east of the scheme area.
Rhymney Grassland East SINC	ST212784	An area of neutral semi-improved grassland with some calcareous semi-improved grassland located on the western bank of the Rhymney River immediately to the north of the scheme area.
The Rhymney River SINC		The Rhymney River is designated for its importance for migratory fish, Otters, wildfowl and bankside vegetation it also acts as a wildlife corridor for bats, Dormice and Grass Snakes. Eel and trout have also been recorded in the River

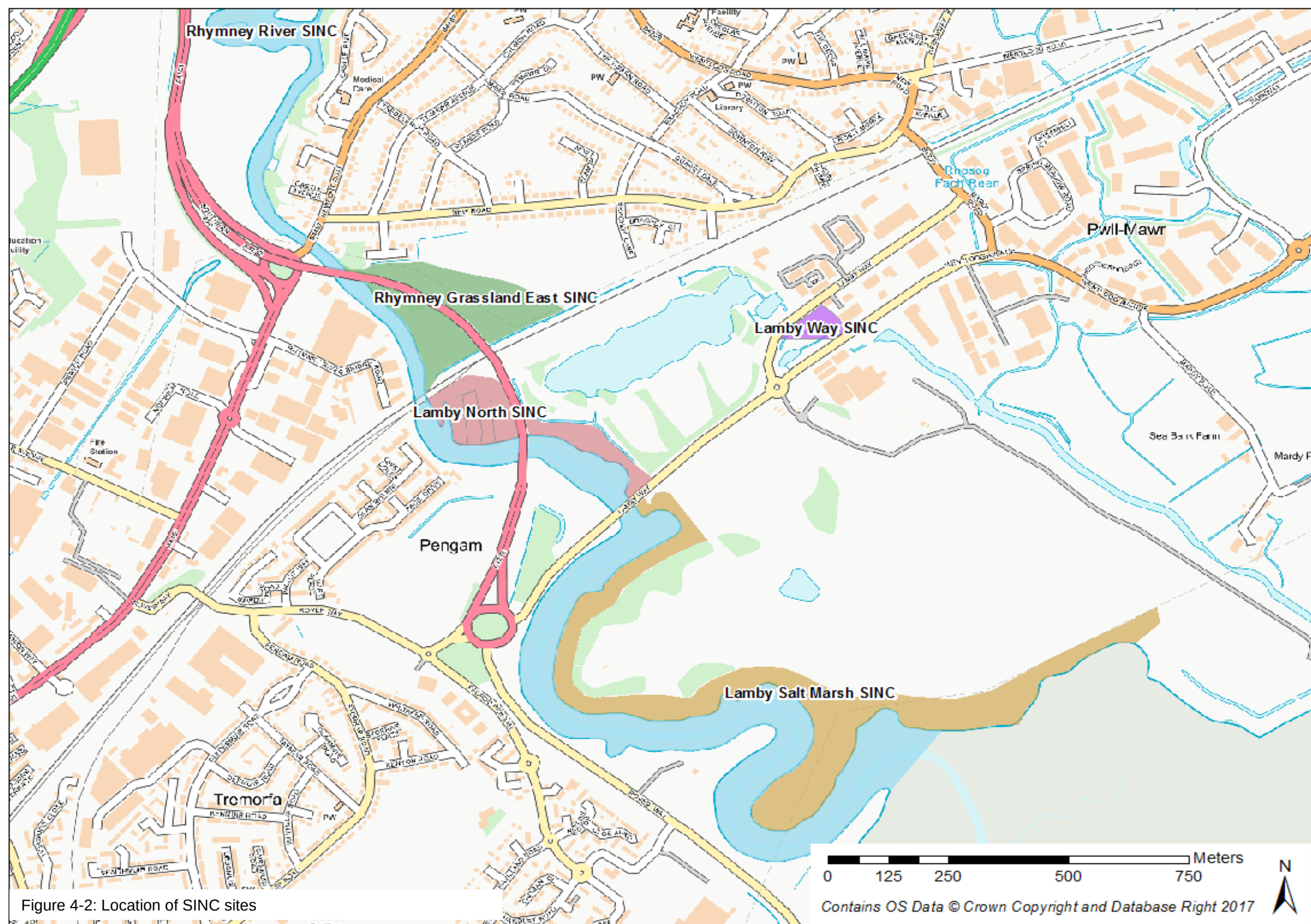


Figure 4-2: Location of SINC sites

4.3 Phase 1 Habitat Survey

Running water

The Severn Estuary is immediately adjacent to the proposed works. In the area of the works the estuary is fully tidal and experiences a tidal range in the order of 10 metres. The Estuary is subject to freshwater inflows from approximately 600 watercourses. This has resulted in an environment of highly mobile sediments and extensive subtidal sandbanks and mudflats in the area of the works.

The study area also includes the Rhymney River from its confluence with the Severn Estuary to approximately 500m upstream. The river in this section is also fully tidal and subject to the same tidal range as the Severn Estuary. It is relatively slow flowing resulting in a number of large meanders.

Intertidal mudflats

The Severn Estuary coastline in the scheme area faces south east/upstream into the Severn Estuary, meaning that the coastline is moderately sheltered from the prevailing wave direction. This, along with the large tidal range, has allowed extensive intertidal mudflats to develop throughout the extent of the scheme, with mudflats up to 2km into the Severn Estuary channel exposed at low tide.

Intertidal mudflats are also present along each bank of the Rhymney River, with large areas exposed at meanders in the river at low tide.

Mudflats are considered highly productive areas, which help support large numbers of fish and birds. They provide feeding and resting areas for internationally important populations of migrant and wintering waterfowl, and are also important nursery areas for fish.

The mudflats are predominantly littoral sandy mud that, for the most part, support a community of Ragworm *Hediste diversicolor*, salt water clams *Limecola balthica* and bivalve *Scrobicularia plana* (European Marine Observation Data Network (EMODnet)). However, within close proximity of the scheme a range of mudflats of varying sediment sizes provide opportunities for other invertebrate assemblages. The muddy sandy shores at the western extent of the scheme are dominated by polychaete worms and bivalves. Whilst further out into the estuary littoral gravelly sandy mud support assemblages of *Hediste diversicolor* and polychaete worm *Streblospio shrubsolii*.

Intertidal boulders/cobbles

A small amount of rocky habitat is present within the foreshore area to the west of the Rhymney River (Target Note 1). This habitat consists of a band approximately 5 metres wide immediately above the intertidal mudflats and is in the form of boulders or historic waste material; the communities present are consistent with those found on sheltered upper eulittoral bedrock with Spiral Wrack *Fucus spiralis* most common. Common Limpet *Patella vulgata* and the Periwinkles *Littorina saxatilis* and *Littorina littorea* were recorded in very small numbers. Higher up the shore. Channel Wrack *Pelvetia canaliculata* dominates where suitable rocky habitat persists.

To the east of the Rhymney River fucoid species have settled on the toe of the existing armour stone flood defences (Target Note 16), with Spiral Wrack again abundant.

Coarse sand above the high tide mark

Immediately to the east of the River Rhymney small pockets of barren littoral sand are present (Target Note 18). Sand casts, most likely from Ragworm were locally common within these areas during the survey.

Shingle/gravel above high-tide mark

Shingle and gravel forms a narrow band along much of the coastline to the west of the Rhymney River. For the most part this was formed from eroded frag tip material and other disposed materials. This area was largely devoid of plant life and the highly mobile nature of the coarse material means that this area is unlikely to support large numbers of macroinvertebrates (Target Note 2).

Boulders/rocks above high-tide mark

The existing flood defences located along the Estuary, consist of a mixture of formal armour stone and reused building materials. In some areas a community of yellow and grey lichens have colonised within the splash zone (Target Note 15). To the west of the Rhymney River this habitat

consists of exposed tip waste and the remnants of historic flood defences, the majority of this material is devoid of plant or animal life with only a very sparse number of lichens recorded (Target Note 4).

Salt Marsh

Atlantic salt marsh meadow was recorded on the banks of the Rhymney Estuary and fringing the existing flood defence along the Severn Estuary to the east of the Rhymney.

The largest single sections of salt marsh were recorded bordering the Rhymney River, with the largest of these located on the first two meanders of the river (Target Note 7). These sections were grazed and consisted predominantly of species indicative of mid to upper saltmarsh communities with Common Saltmarsh Grass *Puccinellia maritima* and Red Fescue *Festuca rubra* locally common. Common Cord-grass *Spartina angelica* is common around the fringes of the area and is present on areas of mud that have been eroded and fallen onto the foreshore. A number of drainage channels provided opportunities for salt marsh herb species with Sea Beet *Beta vulgaris subsp. maritima* most common. Within the saltmarsh, saline reed-beds were also present on the eastern side of the river, consisting predominantly of Common Reed *Phragmites australis* (Target Note 10).

To the east of the Rhymney, saltmarsh fringes the existing Severn Estuary flood defence and forms a band approximately 10m wide. The community present is again indicative of mid to upper saltmarsh communities with cord grasses present closer to the seaward side and on sections of soil that has fallen onto the foreshore. The area is interspersed with boulders and small pools are abundant.

Scattered fragments of saltmarsh vegetation is also present beyond the flood defence where the ground is still high enough not to have become completely inundated by the tide (Target Note 19).

Dense Scrub

Dense Scrub is present along the roadsides of Rover Way and Lamby Way, dominated by Bramble *Rubus fruticosus* agg., with Hawthorn *Crataegus monogyna*, Dog Rose *Rosa canina* and Sycamore *Acer pseudoplatanus* saplings. Buddleia *Buddleia davidii* is also abundant with locally dominant areas of Japanese Knotweed. A ground covering of Ivy *Hedera helix* is present where the scrub thins out.

Dense Scrub consisting predominantly of Buddleia separates the industrial areas to the west of the River Rhymney from the coastline.

To the west of the River Rhymney dense scrub in the form of Hawthorn, *Willow Salix sp.*, Bramble, scattered Gorse *Ulex sp.* and large areas of Buddleia is present on the steep sloping ground behind the foreshore area (Target Note 3). This area forms a mosaic of habitats with tall ruderal, and grassland habitats also present.

Semi-natural broad-leaved woodland

Broadleaved trees line both Rover Way and Lamby Way, these consist predominantly of poplar sp. and Sycamore. To the east of the River Rhymney areas of broadleaved woodland have been planted at the base of the Lamby Way tip, these areas were surveyed from approximately 500m away on the opposite side of the river (Target Note 9), however, Silver Birch *Betula pendula* and Oak *Quercus robur* were identified as being dominant.

Coastal Grassland

Coastal grassland is present in transitional areas behind areas of saltmarsh. Grassland indicative of the coastal environment is also present within the areas of scrub and tall ruderal habitats along Lamby Way and Rover Way.

Tall Ruderal

Lining the roadsides of Lamby Way and Rover Way, tall ruderal species have colonised less disturbed areas and pavements and include common species such Willowherbs *Epilobium sp.*, Creeping Thistle *Cirsium arvense*, Common Nettle *Urtica dioica* and False Oat-grass *Arrhenatherum elatius*. This habitat forms a mosaic of habitats with areas of dense scrub and grassland within the area.

4.4 Species

Invertebrates

The intertidal and subtidal mudflats described provide suitable habitat for a range of macroinvertebrate species. The range of sediment sizes present mean that a diversity of macroinvertebrate communities has been able to develop, which in turn provide an important food source for bird and fish species associated with the Severn Estuary.

Honeycomb Worm *Sabellaria alveolata* reefs have been recorded approximately 2km into the channel (EMODnet). This polychaete worm constructs tubes from sand or shell fragments in tightly packed masses which form a honeycomb appearance and these reefs provide habitats for a variety of other invertebrates. The reefs recorded in this area are subtidal and none were recorded in the intertidal zone during the survey.

Saltmarsh within the project area can also provide habitat for a number of invertebrate species, with typical assemblages consisting of a range of marine and freshwater benthic species as well as terrestrial species. Saltmarsh in the South Wales area has been identified as important habitat for a number of rare bee species including the Shrill Carder Bee *Bombus sylvarum* and Large Carder Bee *Bombus muscorum*. Saltmarsh provides a corridor to suitable habitats in the wider area.

Fish

The Severn Estuary European Protected Site is designated for a range of migratory fish species, a number of these are for migratory species that are likely to spawn further up river including rare Shad species. Over 100 species of fish have been recorded within the estuary. Migratory fish such as Trout *Salmo trutta* and Eel *Anguilla anguilla* have also been recorded within the Rhymney River catchment and it is likely that these species migrate through the works area to the Severn Estuary.

Birds

The intertidal mudflats and areas of saltmarsh provide foraging and roosting habitat for a range of wintering wildfowl and wading bird species, many of which are qualifying features of the Severn Estuary European Marine Site. WeBS data from the BTO revealed a total of 34 wading, wildfowl and gull species have been recorded utilising the habitats within the compartment. This data shows that the mudflats in the scheme area support significant populations of wintering birds associated with Severn Estuary protected site. Table 4-4 details the numbers of individuals of bird species which are qualifying features for the Severn Estuary SPA and considers the numbers present within the compartment compared to the overall Severn Estuary population. Only the most recent data was assessed, with all count data was taken from 5-year peak mean individual counts taken between 2010 and 2015.

Table 4-4: WeBS data

Species	Five Year Annual Peak Counts		Proportion of counts (%)	Article & Seasonality
	Rhymney Estuary and Great Wharf*	Entire Severn Estuary SPA**		
Bewick's Swan <i>Cygnus columbianus bewickii</i>	-	222	-	Over winter
Ringed Plover <i>Charadrius hiaticula</i>	11	1,190	0.92	On passage
Curlew <i>Numenius arquata</i>	4	3,654	0.11	Over winter
Dunlin <i>Calidris alpina alpina</i>	1,250	25,220	4.96	Over winter
Pintail <i>Anas acuta</i>	137	560	24.46	Over winter
Redshank <i>Tringa totanus</i>	1,167	3,995	29.21	Over winter
Shelduck, <i>Tadorna tadorna</i>	368	3,570	10.31	Over winter

*All Rhymney Estuary and Great Wharf data taken from BTO WeBS surveys, using 5-year peak mean individual counts taken between 2010 and 2015.

**All Severn Estuary Counts taken from WeBS report online app, using 5-year peak mean individual counts between 2010 and 2015.

The data demonstrates that Rhymney Estuary and Great Wharf section of the Severn Estuary supports substantial percentages of wetland birds including 29.21% of all Redshank and 24.46% of all Pintail populations.

Table 4-5 details the populations of bird species which form part of the qualifying assemblage of the the Severn Estuary SPA and considers the numbers present within the compartment compared to the overall Severn Estuary population.

Table 4-5: Additional waterfowl WeBS data of the Rhymney Estuary and Great Wharf and the wider Severn Estuary SPA

Species	Five Year Annual Peak Counts		Proportion of counts (%)
	Rhymney Estuary and Great Wharf	Entire Severn Estuary SPA***	
Gadwall <i>Anas strepera</i>	8	208	3.8
Wigeon <i>Anas penelope</i>	2	7,220	0.03
Lapwing <i>Vanellus vanellus</i>	164	11,739	1.40
Teal <i>Anas crecca</i>	52	6,182	0.84
Mallard <i>Anas platyrhynchos</i>	76	2,847	2.67
Shoveler <i>Anas clypeata</i>	57	483	11.80
Pochard <i>Aythya ferina</i>	-	471	-
Tufted Duck <i>Aythya fuligula</i>	1	793	0.13
Grey Plover <i>Pluvialis squatarola</i>	-	318	-
White-fronted Goose <i>Anser albifrons albifrons</i>	-	307	-
Whimbrel <i>Numenius phaeopus</i>	-	193	-

***Frost, T.M., Austin, G.E., Calbrade, N.A., Holt, C.A., Mellan, H.J., Hearn, R.D., Stroud, D.A., Wotton, S.R. and Balmer, D.E. (2016). Waterbirds in the UK 2014/15: The Wetland Bird Survey. BTO/RSPB/JNCC. Thetford. Available at: <<http://www.bto.org/volunteer-surveys/webs/publications/webs-annual-report>> [Accessed January 2017].

This data demonstrates that the largest proportion of waterfowl found in this area are Shoveler and comprise 11.80% of the total Shoveler population using the Severn Estuary SPA.

A large number of records were provided for terrestrial species including Cetti's Warbler and Kingfisher *Alcedo atthis*, with Cetti's Warbler having been recorded in the reed beds adjacent to the scheme area (Target Note 10). The saltmarsh and surrounding scrub habitat provides nesting and foraging opportunities for a range of bird species. Whilst the saltmarsh provides potential for ground nesting species such as Lapwing *Vanellus vanellus*.

Amphibians

No records for Great Crested Newt were provided within 2km of the proposed scheme. However, suitable terrestrial habitat for Great Crested Newt was recorded in the form of scrub grassland mosaic located along Rover Way and Lamby Way. Two ponds were identified at the eastern extent of the scheme area (Target Note 14) these were considered to hold potential for Great Crested Newt, with suitable terrestrial habitat located to the north of this area. Parc Tredelerch also provides suitable habitats as well as a number of ponds that provide potential breeding opportunities for Great Crested Newt.

Records within 2km of the scheme area were provided for Common Frog *Rana temporaria*, Common Toad *Bufo bufo* and Palmate Newt *Lissotriton helveticus*. The closest record for each of these was located approximately 200m to the north west of the scheme area. The grassland scrub mosaics as well as some areas of the salt marsh all provide habitat for these species.

Natterjack Toads *Epidalea calamita* breed in saline pools, where the saline conditions have flushed most predators away. Whilst pools within the saltmarsh area do provide some potential for this species, the surrounding habitat offers low potential for other stages of their lifecycle and it is considered that the presence of Natterjack Toads is unlikely. No records for Natterjack Toad within 2km of the proposed scheme were provided.

Reptiles

There are records for Grass Snake and Slow Worm within the 2km of the scheme area, with records for Slow Worm located between the Rhymney River and the Lamby Way Tip. Areas of scrub grassland mosaic bounding the river has the potential support a number of species of reptiles. The habitats within Parc Tredelerch also have the potential to support a range of reptile species. Species such as Grass Snake are also known to utilise salt marsh habitats.

Badger

There are no records of Badger within 2km of the proposed works. No signs of Badger were recorded, however habitat suitable for badger to excavate setts was recorded within the dense scrub located along Lamby Way and Rover Way as well as the habitats within Parc Tredelerch. These areas also provide foraging potential for Badger. There is also the potential for setts to be excavated within the steep scrub areas located to the west of the Rhymney.

Otter

Otter have been recorded within 2km of the scheme area and are known to be present within the Rhymney River catchment and it is likely that Otter will commute through the works area. Due to the exposed nature of the mudflats it is unlikely that Otter will utilise the banks of the river for resting or holt sites. However, the dense scrub that lines the river as well as areas of reed bed within the saltmarsh has the potential to provide resting and holt sites for Otter. Habitats located within Parc Tredelerch have the potential to provide holt sites in some of the areas of denser vegetation and reed beds.

Water vole

A sin 2km of the scheme extent were provided for Water Vole *Arvicola amphibius* with the closest records located within drainage ditches 200m to the east of the scheme extent. A drainage channel to the east of the Lamby Way tip was considered suitable for Water Vole (Target Note 17), although no evidence was recorded during the survey. A drainage ditch that runs along the southern border of the Lamby Way Tip site (Target Note 13) was considered to have low potential for Water Vole, however, high levels of green algae suggested that the ditch was subject to pollution from the tip site. Using aerial imagery, it appears that these ditches are connected to watercourses where Water Vole have been recorded.

Bats

No buildings suitable for roosting bats were identified within the scheme area. Broadleaved woodland located adjacent to the scheme area was predominantly of a young age and therefore is unlikely to provide potential roosting features such as cracks, knot holes and lifted bark, however, given the large size of the study area no specific tree surveys were carried out.

The scheme area is likely to provide foraging habitat for bats, with the potential for a large number of invertebrate species associated with the estuary habitats. It is also likely that the rail corridor provide commuting opportunities.

Marine mammals

A number of marine mammals are known to commute and forage within the Severn Estuary, and there are records for Common Porpoise and Grey Seal within 2km of the scheme area.

Invasive non-native species

Japanese Knotweed is abundant along the roadside verges of Lamby Way and Rover Way.

5 Assessment of impacts and recommendations

5.1 Protected sites

There is the potential for the construction of the flood defences to impact upon the features of the Severn Estuary European Marine Site through direct loss of habitats, disturbance or changes in water quality. Any impacts to habitats outside of the site boundary also has the potential to impact upon features of the site and this should be considered by any subsequent scheme.

It is likely that the scheme will require the completion of a Habitat Regulations Assessment (HRA) with regards to the Severn Estuary European Marine Site.

Any project will need to demonstrate no significant effect on the qualifying features of the European designated sites. If an effect is identified, the scheme would have to demonstrate no alternative options and would then need to demonstrate that there are Imperative Reasons of Overriding Public Interest (IROPI) before consideration of habitat compensation can be made.

Maintaining the existing alignment of the coastline through the provision of new hard defences has the potential to cause coastal squeeze. By renewing the defence in this area, it can be considered that a 'hold the line' approach is being taken. As sea levels rise intertidal habitats 'migrate' landwards, there is the potential that this will lead to intertidal habitats being 'squeezed' against the hard defence and eventually lost. Should a significant impact on qualifying features of the Severn Estuary European Marine Site be identified as a result of this issue, then appropriate compensation habitat would be required in order to enable the project to proceed. Further consideration of this issue will be required at subsequent stages of the project to inform its detailed design and consenting. It is recommended that consultation with Welsh Government and NRW should be carried out outlining a plan for the provision of compensatory habitat. Modelled future sea levels should be used to inform which marine habitats and biotopes have the potential to be affected.

The scheme area overlaps with Rumney and Peterstone SSSI, as shown in Figure 4-2. It is considered unlikely that the proposed works will have a significant impact upon the interest features of the site; however, consultation should be carried out with NRW prior to works being carried out.

The Rhymney River is designated as a SINC for a range of migratory fish, Otter and bankside habitats. Any subsequent scheme should seek to minimise impacts to migratory fish and Otter, and these are considered further in the following sections. Consultation with CCC is recommended should impacts to bankside habitats be identified.

Several SINCs are located on the eastern bank of the Rhymney River including an area of saltmarsh habitat at the southern extent of the river. Should the project impact upon these habitats consultation with the CCC is recommended to further understand any mitigation requirements needed in relation to these impacts.

5.2 Habitats

There is the potential that a project will directly result in the loss of intertidal habitats, including intertidal mudflat and intertidal rocky shore habitat. Intertidal habitat is a Priority habitat nationally and is also a feature of the Severn Estuary SAC. It is recommended that the amount and nature of intertidal habitat to be lost is calculated and discussions with Welsh Government, NRW and Cardiff County Council undertaken on the requirement for the provision of compensatory habitat.

Given the smaller scale of these intertidal habitats within the River Rhymney it is recommended that efforts are made to impact upon as little habitat as possible.

Further to this, there is the potential that the renewing of flood defences will further separate areas of saltmarsh from the intertidal areas. There is, therefore, the potential for the saltmarsh community to evolve to a community more indicative of upper salt marshes or to be lost altogether. Saltmarsh and intertidal habitats have been identified both nationally and within the Cardiff Local Plan as priority habitats and it is likely that any impacts to these habitats within or outside of the European Marine Protected Sites will have to be effectively mitigated or compensated for.

There is the potential for the project to result in disturbance or loss of rocky habitat situated above the high tide mark. The majority of this habitat is the result of erosion of the material deposited during previous land uses, predominantly the frag tip with other building material scattered throughout. For the most part these areas are devoid of plant or animal life, with the exception of scattered communities of yellow/black lichens higher up the shore and the loss of these habitats in their present state is not considered significant. Should the provision of rock armour and revetments be considered for flood defences in this area, it is recommended that the enhancement of these habitats is considered.

Due to the current and historic land use in the area, there is a significant risk of ground contamination. There is the potential that areas of contaminated land are already in direct continuity with ground waters and in some cases the estuary waters. There is the potential for any project to facilitate the creation of additional pathways for contamination migration, either from soils or

impacted ground waters, to adjacent waters. The project will need to demonstrate no adverse impact on water quality and associated ecology as a result of increased contamination.

An aim of the proposed works is to prevent further contaminated material from being eroded and entering the surrounding waters.

In order to protect water quality, and therefore riverine and estuary habitats, appropriate control measures would need to be adopted during the delivery of any scheme to ensure that the risk of any impact during to the mobilisation of contaminated materials is effectively managed.

Invertebrates

The intertidal mudflats in this area support a range of macroinvertebrate assemblages which provide a food source for a range of bird and fish species. Should the works cause the direct loss of this habitat, the loss of these assemblages should be considered in the provision of compensatory habitat detailed above.

Fish

The Severn Estuary and Rhymney River SINC are designated for a range of migratory fish species including, a number of these were for migratory species that are likely to spawn further up the Rhymney River or in other rivers higher up in the Severn Estuary.

Should the project propose any disturbance or damage to sub-tidal areas there is the potential for impact to fish species. However, should this become necessary it is likely that in-river construction works within may only be permitted between June and September (inclusive) before the fish spawning season starts.

There is, however, the potential risk of disturbance to migratory fish should any project involve working practices that will cause vibrations within the water column. Should this be the case mitigation will need to be incorporated that will effectively mitigate this. These measures should be included within the EAP and have been agreed in advance with the NRW Fisheries team.

Birds

The intertidal mudflats and areas of saltmarsh provide foraging and roosting habitat for a range of wintering wildfowl and wading bird species, many of which are qualifying features of the Severn Estuary protected site. Data obtained from the BTO and detailed in section 4.3 indicate that the mudflats and saltmarsh surrounding the works area are utilised by significant populations of bird species that are qualifying features of the Severn Estuary protected sites. There is therefore the potential to disturb these species should the project impact upon the foreshore areas.

In order to completely avoid impact to these species it would be recommended that works are undertaken outside of the wintering and passage period, August to April inclusive. Should the project be carried out during this time potential impacts on birds as a result of damage to supporting habitats and disturbance during construction will need to be considered.

A HRA is likely to be required to further assess the potential for a significant effect on the bird qualifying features of the European designated sites.

Any clearances to terrestrial scrub and woodland habitats to facilitate the construction should be undertaken outside of the bird nesting season March to September inclusive or first checked by a suitably qualified ecologist.

Amphibians

No records for Great Crested Newt were provided for within 2km of the proposed scheme. Suitable terrestrial habitat for Great Crested Newt was recorded in the form of dense and scattered scrub located along Rover Way and Lamby Way, whilst Parc Tredelerch provides a number of ponds that provide potential breeding opportunities for Great Crested Newt. It is assumed that habitat suitable for amphibians will not be removed or disturbed as part of these works, however, should it be necessary to clear terrestrial areas for access tracks or site compounds, it is recommended that these areas are surveyed for the potential to support Great Crested Newt or other amphibian species. Alternatively, an ecologist should advise on the best location for access track locations.

The works will not impact upon the ponds identified at the eastern extent of the scheme area (target note 15) or any of the surrounding suitable terrestrial habitat. If this should change it is

recommended that surveys are carried out in order to ascertain the presence of Great Crested Newt.

Reptiles

There are records for Grass Snake and Slow Worm within the 2km of the scheme area, with records for Slow Worm located between the River Rhymney and the Lamby Way Refuse Site. Areas of dense scrub bounding the river have the potential support a number of species of reptiles. The habitats within Parc Tredelerch also have the potential to support a range of reptile species. It is likely that impacts to these areas will be limited to the construction of access tracks. Should this be the case it is recommended that the presence of reptiles is assumed and avoidance measures taken. This may include destructive habitat searches and exclusion measures to prevent reptiles from entering the site during construction, or translocation of reptiles from the scheme area to a nearby receptor site.

It is recommended that an ecologist is consulted with detailed designs so that further recommendations can be made with regards to reptiles.

Badger

There are no records of Badger within 2km of the proposed works. No signs of Badger were recorded, however habitat suitable for badger to excavate setts was recorded within the dense scrub located along Lamby Way and Rover Way as well as the habitats within Parc Tredelerch. It is recommended that a targeted walkover survey is undertaken prior to the construction of any access tracks through these areas.

Otter

It is likely that Otter will commute through the works area. Scrub and reed bed habitat set back from the Rhymney River and within Parc Tredelerch has the potential to provide resting sites and holt sites for Otter.

If any works to these areas are proposed it is recommended that a targeted Otter survey is undertaken during the detailed design phase to identify the presence of Otter holts or lying-up areas. Further mitigation measures will then be developed and agreed as required. In addition, a further Otter survey should be undertaken prior to any works being carried out along the Rhymney River. This should seek to identify whether there are any newly established Otter field signs, holts and resting places along the river.

Should the survey identify the potential for otter then further mitigation may be required to minimise any adverse effects. This mitigation would be determined as the project progresses and further information is available on the scale, nature and delivery of the preferred option.

Water vole

A number of drainage channels located within close proximity to the proposed works have the potential to support foraging and burrowing Water Voles, it is considered unlikely that these drainage channels will be impacted upon by the works, however, should it become apparent that works will affect these areas either directly or through changes in flow it is recommended that a survey is carried out to ascertain the presence of Water Vole.

Bats

A specific tree survey was not carried as part of these surveys, therefore, in the unlikely event that it becomes necessary to remove trees as part of the works these should first be inspected by a licensed bat ecologist for bat roosting potential. It is not considered that there will be a loss of foraging habitat as a result of the works.

Therefore, it is considered that impacts to bats will be limited to the construction phase of the project and can be mitigated with good construction practices. Where possible, works should be carried out in daylight hours between late March and October to avoid affecting foraging bats. Bats have been shown to be easily disturbed by the use of artificial lights. If works must be carried out during this period at night, any worksite lighting should be minimised. Any floodlights should be fitted with a directional cowl to avoid light-spill.

Marine mammals

Records for Common Porpoise and Grey Seal suggest that a limited number of these species commute or forage infrequently in the area of the works, with the potential for other species of marine mammal within the wider Severn Estuary. Although the mudflats have the potential to be utilised by seals for hauling out and basking, this is considered unlikely due to the highly industrial and noisy nature of the area.

Impacts from the works are therefore likely to be restricted to temporary noise disturbance to a few foraging and commuting individuals. However, research has shown that seals hearing can be damaged by piling operations, it is therefore recommended, should piling operations be carried out, that a 'soft start' carried out each day on any piling works as this will move seals and cetaceans away from the area.

Invasive non-native species

Japanese Knotweed is abundant along the roadsides of Lamby Way and Rover Way. It is anticipated that the risk of the spread of this species will be limited to any access tracks constructed along the western bank of the River Rhymney. It is therefore recommended that the extent of Japanese Knotweed is mapped prior to works being carried out in this area. To avoid the spread of Japanese Knotweed as a result of the construction works in this area, a Japanese Knotweed Management Plan should be produced to include removal and/or treatment of Japanese knotweed through excavation/disposal or herbicidal treatment.

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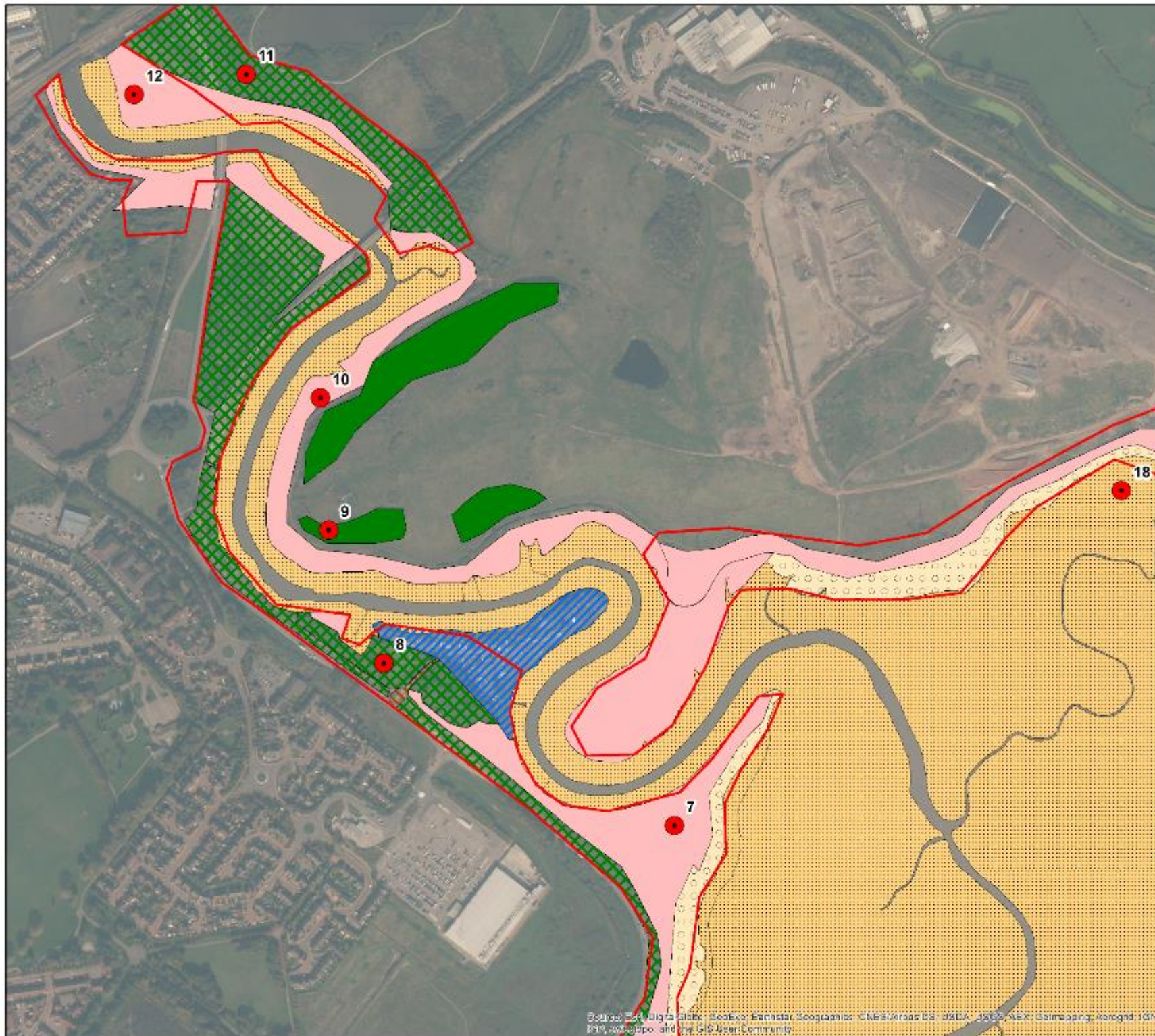
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Appendices

A Phase 1 Habitat Map



Rhymney Estuary Extent

KEY



- Study Area**
- Habitat**
- Broadleaved Semi-natural Woodland
 - Dense Scrub
 - Tall Ruderal
 - Intertidal Mudflat
 - Salt Marsh
 - Intertidal Cobble or Shingle
 - Area Not Surveyed
 - Target Note

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Scale: 1:1,000	Drawn: JH	23/12/2016
	Checked: ND	23/12/2016
Original @ A3	Approved: NJ	23/12/2016

Digital File Name:	2016s3921_phase 1 habitat		
Drawing Number:	Sheet No.:	Status:	Rev.: A
2016s4360_001	1 of 1		

B Target Notes

Target Note

Photograph

1. A mixture of expelled frag tip material and other waste rock has formed an area of cobbles and shingle that has been colonised by fucoid seaweeds in the intertidal area.



2. A barren shingle foreshore exists above the high tide mark.



3. Scrub habitat consisting of Bramble, Hawthorn and willow is present on a steep slope immediately behind the foreshore.



4. To the west of the Rhymney River historic frag tip material has been exposed, with boulders and cobbles expelled onto the foreshore. This area was mostly devoid of animal or plant communities.



5. Exposed barren sand/shingle



6. A small area of scrub borders the foreshore immediately to the west of the Rhymney River



7. The largest areas of salt marsh were present on the first two meanders of the Rhymney River.



8. Stands of Japanese Knotweed are present along much of Rover Way and Lamby Way on the western bank of the Rhymney River.



9. Broadleaved woodland has been planted to screen the Lamby Way Tip Site



10. A saline reedbed is present within the saltmarsh on the western bank of the Rhymney River. Cetti's Warbler has been recorded here.



11. A number of reed beds located at the western edge of Parc Tredellerch provide habitat for bird species as well as potential for resting otter.



12. A large area of salt marsh is present on the eastern bank of the Rhymney River, a large drain provides opportunities for saltmarsh herb species.



13 Fringing saltmarsh is present along much of the foreshore to the east of the Rhymney River. It is located behind the current flood defences.



14. Two ponds located behind the existing flood embankment were considered to have low potential for breeding Great Crested Newt



15. Armour stone above high tide distinctive yellow line yellow/grey lichen community



16. Rock armour and expelled rock material in the intertidal area has fucoid communities present consistent with moderate energy rocky shore habitats.



17. A drainage ditch provides habitat for Water Vole, although none were recorded during the survey.



18. Casts from marine macroinvertebrates were locally common in areas of bare sand.



19. Scattered saltmarsh plants.



20.

A motorbike track has been developed on the area of historic frag tip. This area now consists of bare ground with areas of scattered scrub.



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