



**AQUIND Limited**

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# **AQUIND INTERCONNECTOR**

## **Environmental Statement – Volume 3 – Appendix 8.3 Intertidal Survey Report**

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(a)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

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**AQUIND Limited**

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Appendix 8.3 Intertidal Survey Report

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Units 5 & 10  
Stephenson House,  
Horsley Business Centre  
Horsley,  
Northumberland,  
NE15 0NY  
England, UK

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Author	Peter Berney	20/9/2017
Checked	Stuart McCallum	28/9/2017
Approved	Jane Lancaster	20/11/2018

### Client Details

#### Contact

Client Name AQUIND Ltd

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#### Local Office:

Units 5 & 10, Stephenson House  
Horsley Business Centre  
Horsley  
Northumberland  
NE15 0NY  
Tel: +44 (0) 1661 312 100

#### Registered Office:

The Natural Power Consultants Limited  
The Green House  
Forrest Estate, Dalry  
Castle Douglas, Kirkcudbrightshire  
DG7 3XS

Reg No: SC177881  
VAT No: GB 243 6926 48

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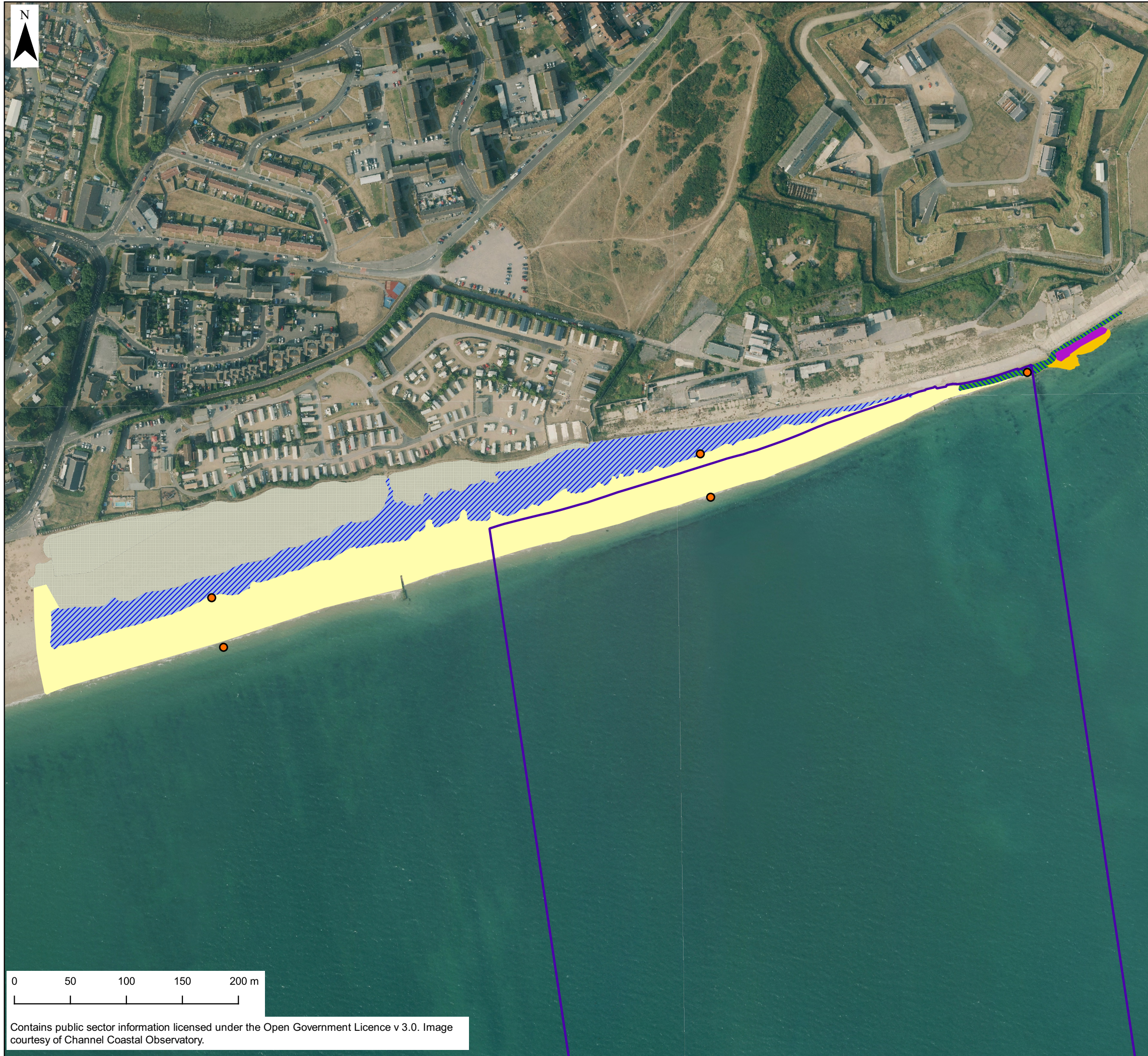
## 1. Introduction

Intertidal surveys were performed at the landfall location for the AQUIND Interconnector in order to characterise the habitats present to inform the Environmental Impact Assessment (EIA).

The proposed UK landfall of the AQUIND Interconnector was located at Eastney beach south of the city of Portsmouth, on Portsea Island, sitting between the inlets of Portsmouth and Langstone Harbours. The landfall was expected to come ashore close to Fraser Range (a disused naval gunnery school and RADAR testing facility) and the Southsea Leisure Park (Figure 1) and at this stage of the design, it was considered appropriate to undertake an intertidal survey.

Further optioneering has taken place since however, and it is now proposed that the marine cables will make landfall through the use of Horizontal Directional Drilling (HDD) methods which will travel underneath the intertidal areas at Eastney from an exit/entry point in the marine environment approximately one kilometre (km) offshore from the transition joint bays located in the car park behind Fraser Range.

The results of the intertidal survey are presented here for completeness for reporting of surveys undertaken during the iterative design process for the AQUIND Interconnector.



**AQUIND Interconnector**

- Marine Cable Corridor\*
- Soft sediment station

**Biotope**

- LR.LLR.FVS.FspiVS
- LR.FLR.Eph.EntPor
- LS.LCS
- LS.LSa.MoSa
- IR.MIR.KT.LsacT
- Vegetated shingle

\*Marine Cable Corridor clipped to MHWS

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**natural power**

The Natural Power Consultants Limited, The Green House  
Forrest Estate, Dalry, Castle Douglas, DG7 3XS, UK  
Tel: +44 (0)1644 430008 www.naturalpower.com

CLIENT:

**AQUIND**

PROJECT:

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Figure 1 Habitats Identified During the Intertidal Walkover

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## 2. Survey methodology

Intertidal surveys were performed by two experienced surveyors on low spring tides, with dates chosen to maximise daylight over the low water period.

The extent and distribution of biotopes in the vicinity of the proposed cable route (500 m either side) were recorded. The methodology used was taken from the Marine Monitoring Handbook (Davies *et al.*, 2001), specifically Procedural Guidance No 3-2 - *in situ* ACE biotope mapping techniques, Procedural Guidance No 3-1 - *in situ* biotope recording techniques (and the Handbook for Marine Intertidal Phase 1 Biotope Mapping Survey (Wyn *et al.*, 2000). This survey method allows both rocky shore areas and shingle / sediment shores to be surveyed.

In any areas of rocky or hard substrata found within the boundaries of the survey area, faunal and algal species were identified to species wherever possible (identified in the field), with abundances recorded on the SACFOR scale<sup>1</sup>. The extents of biotopes or habitats identified were recorded using a hand-held GPS (Garmin eTrex HC) and marked on OS maps / aerial photographs of the shore.

In areas of sediment, sampling stations were positioned along three transects running perpendicular to the shore in the vicinity of the cable landfall. Along these transects, sampling stations were selected which were representative of upper, mid and lower shore environments. In addition, sampling stations were also taken where there were obvious changes in sediment type. The exact locations of each sampling station were recorded using a hand-held GPS device (Figure 1).

The sedimentary areas were surveyed by digging-over an area of 1 m<sup>2</sup> at each sampling station (avoiding areas of standing water). At each sampling station, sediment characteristics and any infauna present were recorded in situ, as well as the coordinates of the station and time of sampling. This methodology does not require samples, therefore no samples were taken.

All data collected during the intertidal surveys were transcribed and information on habitats and species collated in an excel spreadsheet.

Intertidal biotopes (Connor *et al.*, 2004) were assigned from the walk over surveys and infaunal data depending on the substrate sampled using expert judgement and JNCC comparative tables<sup>2</sup>. The data was examined in order to identify any species or habitats of conservation interest For the UK this includes, Habitats Directive Annex I habitats, UK Priority Marine Habitats and Species<sup>3</sup> UKBAP List species, rare/scarce species and habitats).

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<sup>1</sup> SACFOR (Superabundant, Abundant, Common, Frequent, Occasional, Rare) JNCC 1990 <http://jncc.defra.gov.uk/page-2684>

<sup>2</sup> Available from <http://jncc.defra.gov.uk/page-3249>

<sup>3</sup> Available from [http://www.doeni.gov.uk/niea/biodiversity/sap\\_uk/priority\\_species.htm](http://www.doeni.gov.uk/niea/biodiversity/sap_uk/priority_species.htm)

### 3. Results

The survey was undertaken by two surveyors on 26<sup>th</sup> July 2017 at during the low water period of a spring tide, which was a 0.6 m low water (Figure 2).

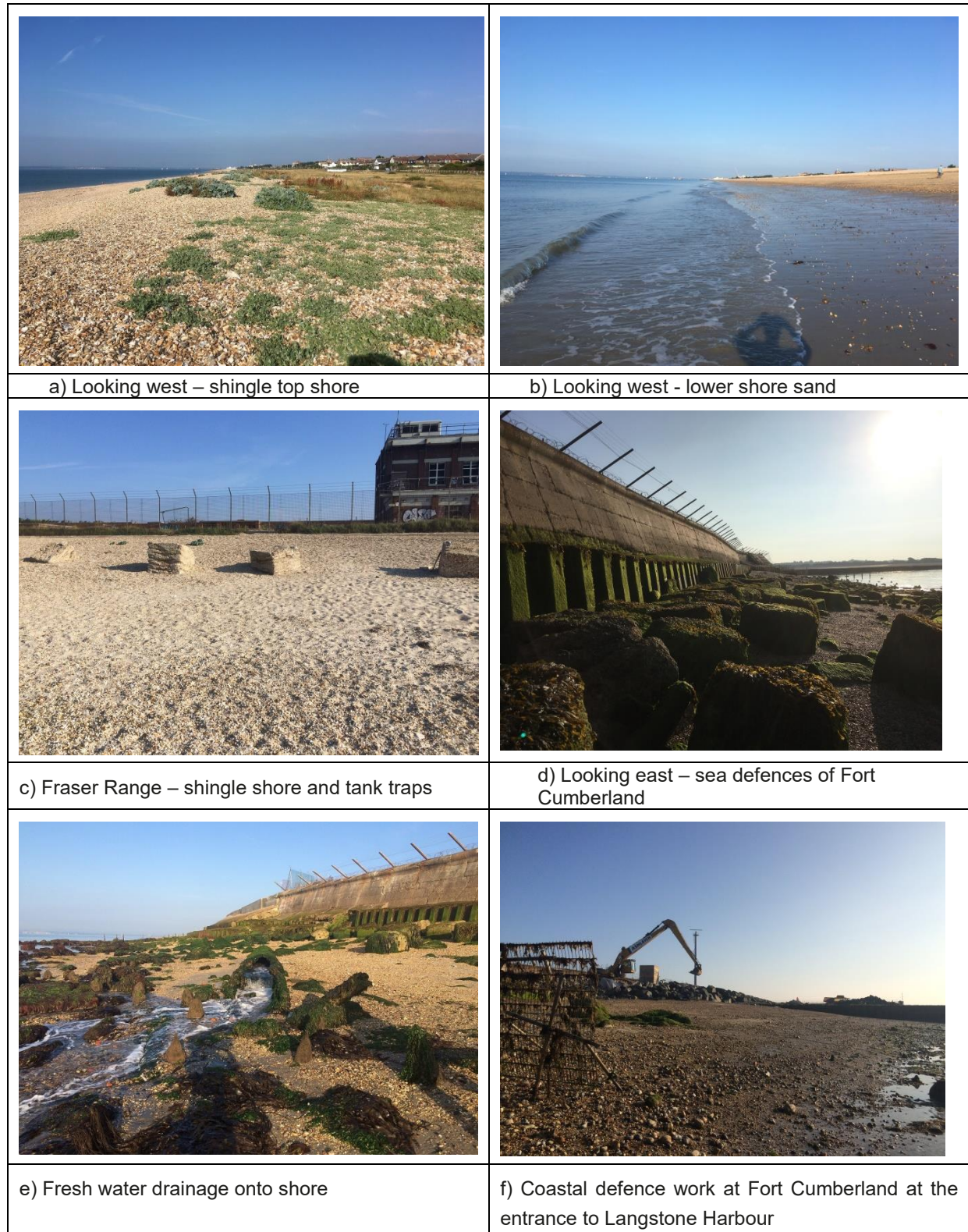


Figure 2: Eastney Beach



The majority of the one km stretch of shore surveyed was made up of shingle top shore backed by Eastney Esplanade and Southsea Leisure Park (Figure 2a). Beneath this, there is a steep bank of shingle which on spring tides gives way to a sandy shore (Figure 2b). The exception to this is the far north-east corner, beyond Fraser Range (Figure 2c) as Eastney beach turns north into the entrance to Langstone Harbour, where the shingle bank is replaced with the sea defences of Fort Cumberland (2d). Here, the shore is very narrow (only 20 m wide) and made up of a mixture of coarse sand overlaid with patches of boulders which appeared to be sections of old sea defences, with some posts (the remains of an old jetty/groins) extending into the sea (Figure 2e). At the time of the survey, work was being undertaken to repair the sea defences at Fort Cumberland by Southern Water (Figure 2f). A fresh water drain was also found discharging water onto the mid shore at this far eastern edge of Eastney Beach (Figure 2g).

Four distinct habitats were found on this shore, vegetated shingle (above the mean high water mark), loose shingle (on the upper / mid shore), sediment (mid and lower shore), and rocky shore. These are described in detail below and mapped on Figure 1, a full species list is presented in Table 2 and descriptions of the biotopes identified are presented in Appendix 1.

### **Vegetated shingle:**

Where shingle is found on the top shore (along the majority of Eastney beach) this can be classified as vegetated shingle (Figure 3).

To the west of the proposed landfall above the high water mark, a shingle plateau was present colonised by a variety of vegetated shingle species, such as sea kale (*Crumbe martima*), sea pea (*Cathyrus japonicus*), curled dock (*Rumex crispus ssp. Littoreus*), sea radish (*Raphanus raphanistrum ssp maritimus*), sea beet (*Beta vulgaris spp maritima*), sticky groundsel (*Seneco viscosus*), viper's-bugloss (*Echium vulgare*), oraches (Arhplee spp.), and sea mayweed (*Tripleurospermum maritimum*). At its widest point, this shingle plateau is approximately 60 metres and is backed by a caravan park, although as it trends landward, grass species gradually appear and increasingly dominate the flora.



**Figure 3:** Vegetated Shingle located west of the marine cable corridor centre line

### Shingle shore:

On the shingle upper shore, a strand line of washed up seaweed (sugar kelp and sea bootlace) was found, some seaweed flies were seen, but no evidence of sand hopper was present.

This habitat corresponded with the biotope LS.LCS - Littoral coarse sediment.

### Sediment habitats:

The lower edge of the mid shore and lower shore areas along much of the length of Eastney Beach were made up of sediment strewn with pebbles. The exception to this was at the east end of the transect where the mid shore was rocky and sediment was restricted to small pockets of sediment on the lower shore between boulders.

Sediment characteristics were examined only in areas where sediment was present, at a total of five stations (Figure 1; Table 1). At these mid and lower shore stations the sediment was found to be a relatively thin veneer of sand (medium to coarse sand) of only 2-10 cm deep over shingle. No obvious signs of marine organisms were found at any in the sediment stations that were dug over, and no anoxic layer was seen.

The biotope this most closely corresponded to was LS.LSa.MoSa - Barren or amphipod-dominated mobile sand shores.

**Table 1: The sediment shore stations locations and their position on the shore at Eastney**

Area	Position on shore	Latitude/longitude
Mid landfall point	Low water	50°47.148'N, 001°02.179'W
	Mid shore	50°47.169'N, 001°02.186'W
West 500m limit	Low water	50°47.204'N, 001°01.936'W
	Mid water	50°47.106'N, 001°02.560'W
East 500m limit	Lower shore	50°47.082'N, 001°02.552'W

### Rocky shore:

Moving further east, the beach becomes narrower towards the entrance to Langstone Harbour. At the narrowest point, the shore is only 20 m wide and backed by sea defences. Here, beneath the sea walls of Fort Cumberland there were isolated patches of rocks and boulders interspersed with coarse sediment.

Much of the sea defence walls and large boulders of the upper and mid shore were covered with sea lettuce, (*Ulva lactuca*), and purple laver (*Porphyra purpurea*), with the bases of the boulders generally bare due to sand scour (Figure 4a). This most closely corresponded with the biotope LR.FLR.Eph.EntPor - *Porphyra purpurea* and *Enteromorpha spp.* on sand-scoured mid or lower eulittoral rock.

Further down in the mid-shore zone, boulders were covered with spiral wrack, with an understorey of barnacles (*Semibalanus balanoides* and *Balanus crenatus*) and limpets (*Patella vulgata*) (Figure 4b). This biotope most closely resembled LR.LLR.FVS.FspiVS - *Fucus spiralis* on sheltered variable salinity upper eulittoral rock.

Entering the lower shore, there were patches of boulders as well as wooden posts (potentially the remains of an old jetty or groin), which extended into the shallow sublittoral (Figure 4c). These boulders were covered in a carpet of red algae, predominantly *Polysiphonia sp.*, Irish moss (*Chondrus crispus*), false Irish moss (*Mastocarpus stellatus*), and sea lettuce many of which were covered by the epiphytic bryozoans, with sugar kelp (*Saccharina latissimi*) and bootlace weed (*Chorda filum*) growing in gaps between the rocks. These boulders had a surprisingly diverse under boulder community with sponges, such as breadcrumb sponge (*Halichondria panacea*), hydroids (*Dynamena pumila*) and a variety of ascidians, including the colonial ascidian *Botrylloides leachii* (Figure 4d). The upper sections of the wooden posts were covered in barnacles, green algae and red algae (*Ulva sp.* and *Porphyra purpurea*) with *Polysiphonia*, sugar kelp with an assortment of hydroids, sponges, ascidians and anemones. These

included, colonial ascidians, breadcrumb sponge, and sea squirts (such as *Ascidia conchilega*) (Figure 4e). A number of the invasive leathery sea squirt (*Styela clava*) were also found on these posts (Figure 4f).

This lower shore community most closely corresponded to the biotope - IR.MIR.KT.LsacT - *Laminaria saccharina* with foliose red seaweeds and ascidians on sheltered tide-swept infralittoral rock.

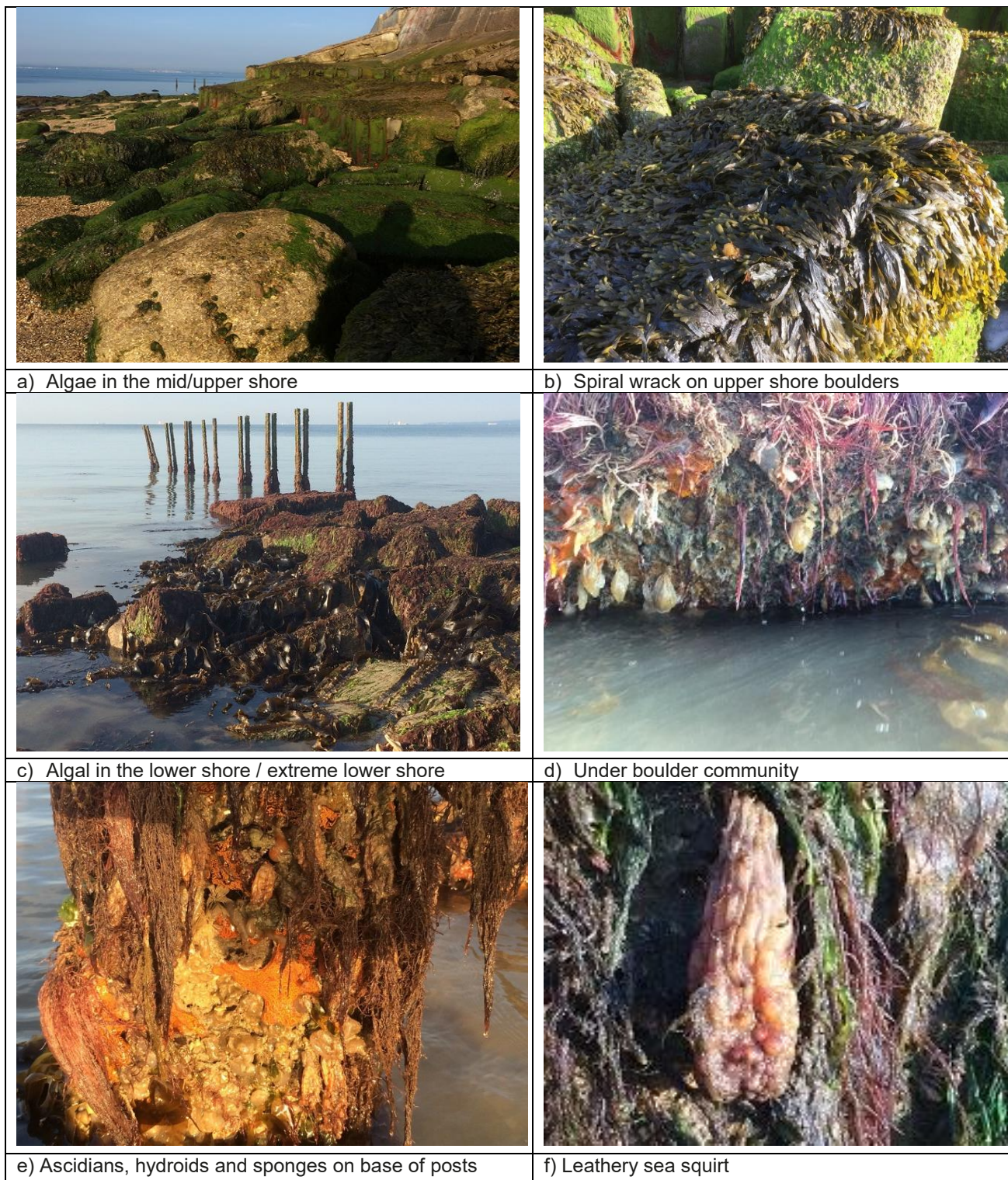


Figure 4: Rocky shore habitats

### 3.1.1. Species list

Table 2: Eastney beach - species presence and abundance (SACFOR\*)

Latin Name	English Name/ description	Lower	Mid	Upper	Vegetated shingle
<i>Halichondria panicea</i>	Breadcrumb sponge	C			
<i>Aplysilla rosea</i> ,	Red sponge	C			
<i>Dynamena pumila</i>	Hydroid	F			
<i>Actiniaria sp.</i>	Anemone	C			
<i>Calliostoma zizyphinum</i>	Painted top Shell	R			
<i>Mytilus edulis</i>	Edible mussel		O		
<i>Urosalpinx cinerea</i>	American sting wrinkle	O			
<i>Patella vulgata</i>	Common limpet		O		
<i>Crepidula fornicata</i>	Slipper limpets	O			
<i>Semibalanus balanoides</i>	Acorn barnacle	C			
<i>Balanus crenatus</i>	Barnacle	F	F		
<i>Carcinus maenas</i>	Shore crab	R			
<i>endeis spinosa</i>	Sea spider	R			
<i>Asterias rubens</i>	Common starfish	O			
<i>Electra pilosa</i>	Hairy sea mat	C			
<i>Flustrellidra hispida</i>	Hairy sea mat	C			
<i>Alcyonidium sp</i>	Encrusting bryozoan	O			
<i>Asciella scabra</i>	Sea squirt	C			
<i>Ascidia conchilega</i>	Opaque sea squirt	C			
<i>Botrylloides leachii</i>	Colonial ascidian	F			
<i>Styela clava</i>	Leathery sea squirt	C			
<i>Alcyonidium diaphanum</i>	Sea chervil	C			
<i>Gobiidae sp</i>	Goby	O			
<i>Ulva linza</i>	Enteromorpha	C	C	C	
<i>Ulva lactuca</i>	Sea lettuce	C	C		
<i>Cladostephus spongiosus</i>	Brown seaweed	O			
<i>Chorda filum</i>	Sea bootlace	F	F		
<i>Dictyota dichotoma</i>	Delicate brown algae	O			
<i>Fucus serratus</i>	Toothed wrack	O			
<i>Fucus spiralis</i>	Spiral wrack		O	O	
<i>Saccharina latissima</i>	Sugar Belt	F			
<i>Sargassum muticum</i>	Japanese wireweed				
<i>Chondrus crispus</i>	Irish moss	F			
<i>Mastocarpus stellatus</i>	Red algae	O			
<i>Palmaria palmata</i>	Dulse	O			
<i>Polysiphonia spp.</i>	Filamentous red algae	A			

Latin Name	English Name/ description	Lower	Mid	Upper	Vegetated shingle
<i>Porphyra umbilicalis</i>	Laver	C	C		
<i>Crumbe martima</i>	Sea kale				0
<i>Cathyrus japonicus</i>	Sea pea				0
<i>Rumex crispus ssp. Littoreus</i>	Curled dock				0
<i>Raphanus rufanistrum ssp maritimus</i>	Sea radish				0
<i>Beta vulgaris spp maritima</i>	Sea beet				0
<i>Seneco viscosus</i>	Sticky groundsel				0
<i>Echium vulgare</i>	Vipers bugloss				0
<i>Arhplee spp.</i>	Oraches				0
<i>Tripleurospermum maritimum</i>	Sea mayweed				0

\* SACFOR (Superabundant, Abundant, Common, Frequent, Occasional, Rare) JNCC 1990 <http://jncc.defra.gov.uk/page-2684>

## 4. Discussion and Summary

### 4.1.1. Species and habitats of conservation importance

Vegetated shingle is an Annex I habitat, however Eastney Beach is not part of an Special Area of Conservation (SAC), hence while it is a notable feature it is not protected under any SAC. This area is however designated for its coastal vegetated shingle as part of the Eastney Beach Local Wildlife Site (LWS).

No intertidal species or habitats of conservation importance were found. The intertidal area was found to be typical of a shingle shore sandy beach, with a surprisingly diverse, but limited in area, rocky shore area at the east end of the beach.

### 4.1.2. Invasive species

A number of invasive, non-native, species were found on this survey. These included American slipper limpets, *Crepidula fornicata*, the leathery sea squirt, (*Styela clava*), the American sting wrinkle (*Urosalpinx cinerea*) and Japanese wireweed (*Sargassum muticum*). All of these species have been recorded in the south coast area previously (NBN atlas<sup>4</sup>), and their presence on Eastney beach is not surprising given the proximity to the major ports of Portsmouth and Southampton and the amount of shipping activity.

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<sup>4</sup> <https://nbnatlas.org/>

## 5. References

Connor, D. W., Allen, J.H., Golding, N., Howell, K.L Lieberknecht, L.M., Nothern K.O. and Reker, J.B (2004) The Marine Habitat Classification for Britain and Ireland Version 04.05. In: JNCC (2015) The Marine Habitat Classification for Britain and Ireland Version 15.03 [Online].

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## Appendix 1

Table A1: Biotopes Present at Eastney beach

Biotope Code/ Name	Description (as per Connor <i>et al.</i> , 2004)
LS.LCS Littoral coarse sediment	Littoral coarse sediments include shores of mobile pebbles, cobbles and gravel, sometimes with varying amounts of coarse sand. The sediment is highly mobile and subject to high degrees of drying between tides. As a result, few species are able to survive in this environment. Beaches of mobile cobbles and pebbles tend to be devoid of macroinfauna, while gravelly shores may support limited numbers of crustaceans, such as <i>Pectenogammarus planicrurus</i> .
LS.LSa.MoSa Barren or amphipod-dominated mobile sand shores	Shores consisting of clean mobile sands (coarse, medium and some fine-grained), with little very fine sand, and no mud present. Shells and stones may occasionally be present on the surface. The sand may be duned or rippled as a result of wave action or tidal currents. The sands are non-cohesive, with low water retention, and thus subject to drying out between tides, especially on the upper shore and where the shore profile is steep. Most of these shores support a limited range of species, ranging from barren, highly mobile sands to more stable clean sands supporting communities of isopods, amphipods and a limited range of polychaetes. Species which can characterise mobile sand communities include <i>Scolecopsis squamata</i> , <i>Pontocrates arenarius</i> , <i>Bathyporeia pelagica</i> , <i>B. pilosa</i> , <i>Haustorius arenarius</i> and <i>Eurydice pulchra</i> .
IR.MIR.KT.LsacT <i>Laminaria saccharina</i> with foliose red seaweeds and ascidians on sheltered tide-swept infralittoral rock	Sheltered, tide-swept rock in south-western Britain tends to be restricted to estuarine conditions, where variable salinity and increased turbidity have a significant effect on the biota. Due to the turbidity of the water, the infralittoral zone is restricted to very shallow depths. Unlike the tide-swept channels in sealochs, which support a mixed kelp canopy, the rock in these estuaries is characterised by <i>Laminaria saccharina</i> alone, occurring in relatively low abundance (Frequent). The brown alga <i>Desmarestia ligulata</i> can occur in this biotope, though never dense, along with the non-native brown seaweed <i>Sargassum muticum</i> . Beneath the sparse kelp, cobbles and boulders, often surrounded by sediment, are encrusted by fauna and often a dense turf of red seaweed. The foliose red seaweeds associated with this biotope include <i>Callophyllis laciniata</i> , <i>Nitophyllum punctatum</i> , <i>Kallymenia reniformis</i> , <i>Gracilaria gracilis</i> , <i>Gymnogongrus crenulatus</i> , <i>Hypoglossum hypoglossoides</i> , <i>Rhodophyllis divaricata</i> , <i>Chylocladia verticillata</i> , <i>Cryptopleura ramosa</i> and <i>Erythrogllossum laciniatum</i> as well as the filamentous <i>Ceramium nodulosum</i> and <i>Pterothamnion plumula</i> . Green seaweeds <i>Ulva lactuca</i> , <i>Bryopsis plumosa</i> and <i>Cladophora</i> spp. may be locally abundant. The dominating faunal species vary from site to site but include sponges such as <i>Halichondria panicea</i> , <i>Esperiopsis fucorum</i> , <i>Dysidea fragilis</i> and <i>Hymeniacion perleve</i> as well as ascidians, particularly <i>Dendrodoa grossularia</i> and <i>Morchellium argus</i> , which can cover the rocks. Also present is the anthozoan <i>Anemonia viridis</i> , the barnacle <i>Balanus crenatus</i> and the tube-building polychaete <i>Pomatoceros triqueter</i> . The hydroid <i>Plumularia setacea</i> can cover rocks and seaweed fronds. Of the range of solitary ascidians found in the north-west, only <i>Asciidiella aspersa</i> tends also to be present in these south-western inlets. There is also a general absence of echinoderms. Where there is vertical rock present, it tends to support more fauna, including barnacles <i>Balanus crenatus</i> , the ascidians <i>Clavelina</i>



Biotope Code/ Name	Description (as per Connor <i>et al.</i> , 2004)
	<i>lepadiformis</i> and <i>Botryllus schlosseri</i> and sometimes the featherstar <i>Antedon bifida</i> . Where soft rock allows, such as the limestone in Plymouth Sound, rock-boring organisms such as <i>Polydora</i> sp. may be locally abundant. Sheltered, tide-swept rock is generally restricted to the narrows or tidal rapids of marine inlets. The clear tide-swept waters of Scottish sealochs are significantly different to the marine inlets of south-west Britain. This biotope deals with the latter.
LR.LLR.FVS.FspiVS <i>Fucus spiralis</i> on sheltered variable salinity upper eulittoral rock	Sheltered to extremely sheltered upper eulittoral bedrock or mixed substrata (boulders, large cobbles or shells on mud) in variable salinity conditions characterised by a band of the spiral wrack <i>Fucus spiralis</i> . The ephemeral green seaweed <i>Enteromorpha intestinalis</i> is usually found in this species poor biotope. The barnacles <i>Semibalanus balanoides</i> and <i>Elminius modestus</i> can be found where suitable substrata are available, while gammarids can be found underneath the fronds of <i>F. spiralis</i> and/or underneath the boulders and cobbles. Also found underneath the fronds and among the boulders are the winkles <i>Littorina saxatilis</i> and <i>Littorina littorea</i> and the crab <i>Carcinus maenas</i> .
LR.FLR.Eph.EntPor <i>Porphyra purpurea</i> and <i>Enteromorpha</i> spp. on sand-scoured mid or lower eulittoral rock	Exposed and moderately exposed mid-shore bedrock and boulders occurring adjacent to areas of sand which significantly affects the rock. As a consequence of sand-abrasion, wracks such as <i>Fucus vesiculosus</i> or <i>Fucus spiralis</i> are scarce and the community is typically dominated by ephemeral red or green seaweeds, particularly the foliose red seaweed <i>Porphyra purpurea</i> and green seaweeds such as <i>Enteromorpha</i> spp. Under the blanket of ephemeral seaweeds, the barnacles <i>Semibalanus balanoides</i> or <i>Elminius modestus</i> and the limpet <i>Patella vulgata</i> may occur in the less scoured areas, along with the occasional winkles <i>Littorina littorea</i> and <i>Littorina saxatilis</i> . Few other species are present.

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Forrest Estate, Dalry,  
Castle Douglas, DG7 3XS  
SCOTLAND, UK

#### Stirling, Scotland

Ochil House,  
Springkerse Business Park,  
Stirling, FK7 7XE  
SCOTLAND, UK

#### Inverness, Scotland

Suite 3, Spey House,  
Dochfour Business Centre,  
Dochgarroch, Inverness,  
IV3 8GY, SCOTLAND, UK

#### Dublin, Ireland

Suite 6, The Mall, Beacon  
Court, Sandyford, Dublin 18,  
D18 83W8  
IRELAND

#### Aberystwyth, Wales

Harbour House,  
Y Lanfa, Aberystwyth,  
Ceredigion, SY23 1AS  
WALES, UK

#### London, England

WeWork, Moorgate,  
1 Fore Street Avenue,  
London, EC2Y 9DT  
ENGLAND, UK

#### Newcastle, England

Unit 8, Horsley Business  
Centre, Horsley,  
Northumberland, NE15 0NY  
ENGLAND, UK

### Europe

#### Paris, France

4 Place de l'Opéra,  
75002 Paris,  
FRANCE

#### Nantes, France

1 boulevard Salvador Allende,  
44100 Nantes  
FRANCE

#### Ankara, Turkey [Agent]

re-consult Bagı's Plaza  
-Muhsin Yazıcıoğlu Cad. 43/14  
TR / 06520 Balgat-Ankar  
TURKEY

### The Americas

#### New York, USA

63 Franklin St,  
Saratoga Springs, NY 12866  
USA

#### Seattle, USA

2701 First Avenue, Suite 440,  
Seattle, WA 98121  
USA

#### Valparaiso, Chile [Agent]

Latwind Energías Renovables  
Lautaro Rosas 366,  
Cerro Alegre Valparaiso,  
CHILE



[naturalpower.com](http://naturalpower.com)

[sayhello@naturalpower.com](mailto:sayhello@naturalpower.com)



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