Interreg

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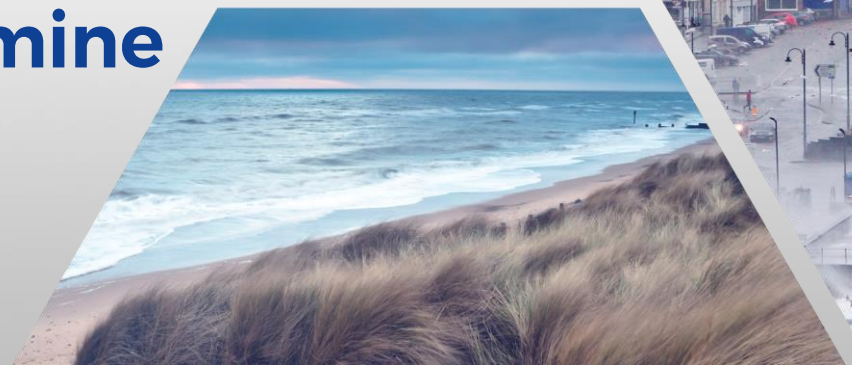
SARCC

European Regional Development Fund

Implementation of a the WP1 longue durée Maritime Atlas

Garry Momber, Julie Satchell, Jasmine Noble-Shelly, Jan Gillespie and Brandon Mason



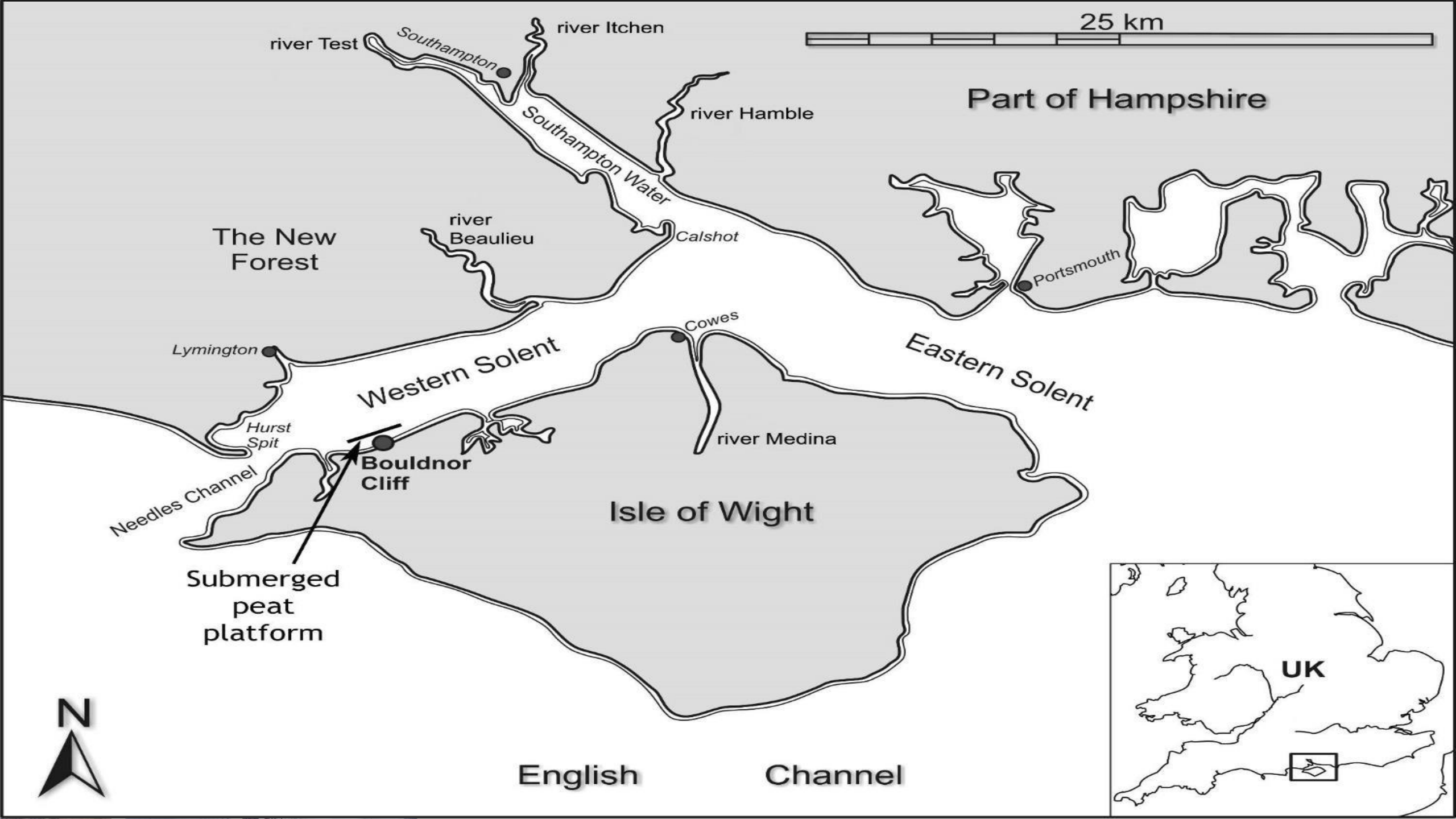
Introduction

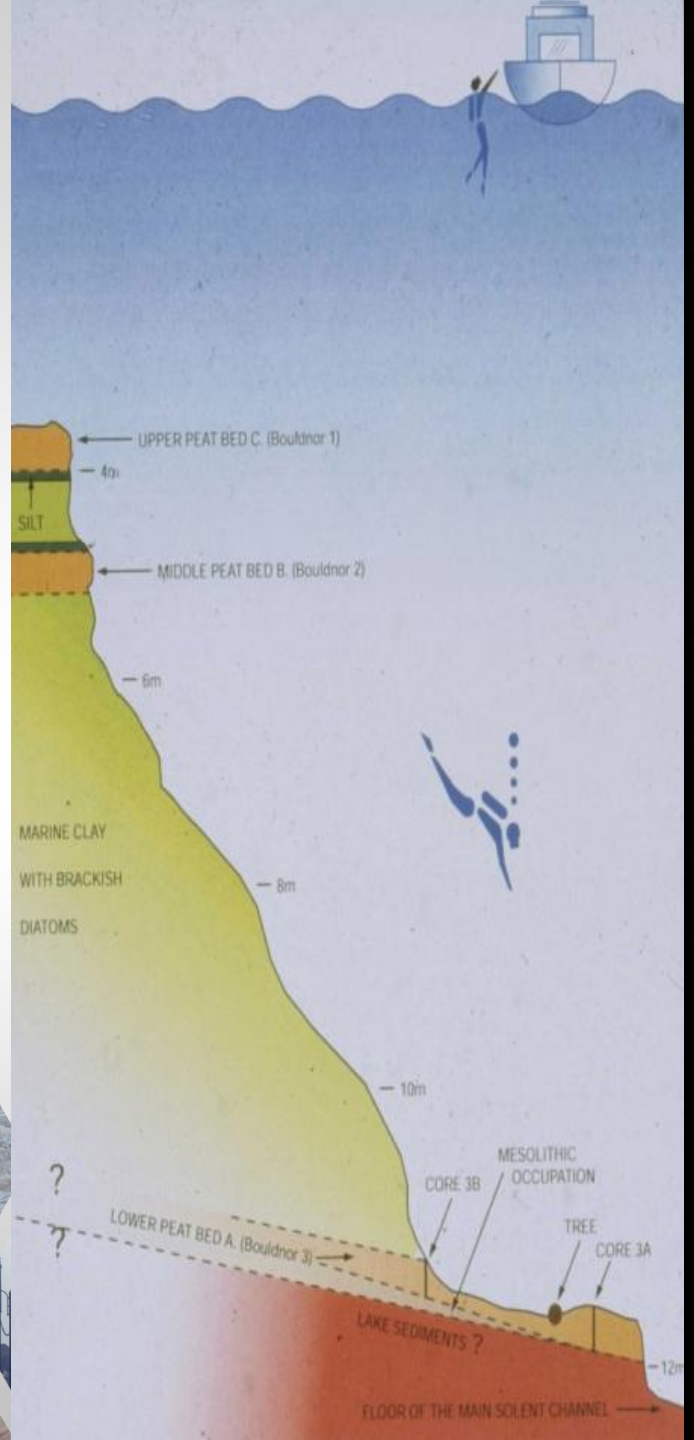
- Why is long term coastal change relevant?
- What data can we use to help us understand coastal change?
- Assessing data and validating data sets
- Contribution to spatial planning

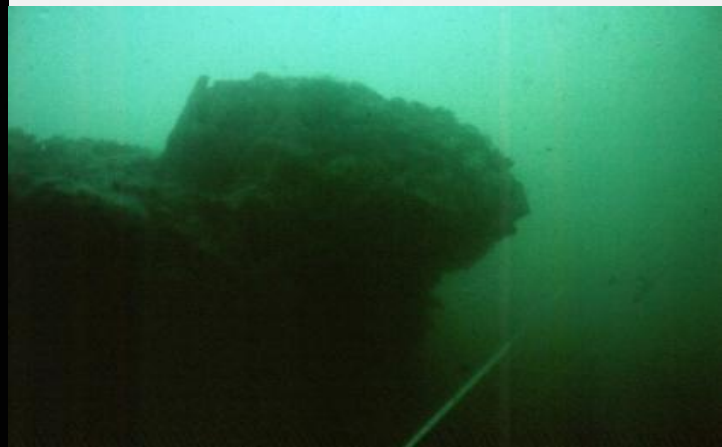
Why is long term coastal change relevant?

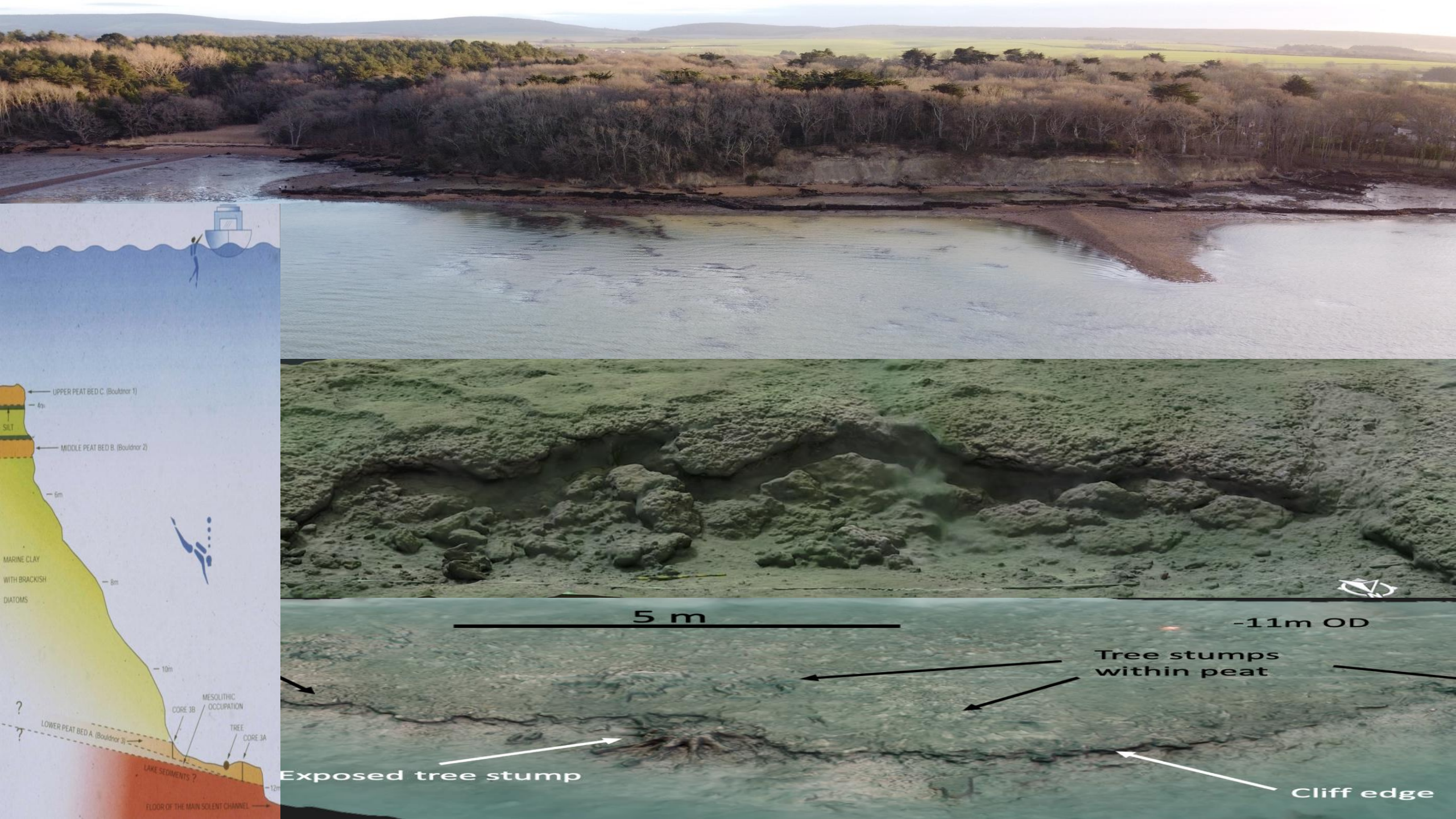
What data can we use to help us understand coastal change?

- Palaeo-environmental data and archaeology
- Art
- Maps and charts
- Historical documents and photographs


25 km
river Test
Southampton
river Itchen
river Hamble
Southampton Water
Part of Hampshire
The New Forest
river Beaulieu
Calshot
Portsmouth
Lymington
Cowes
Western Solent
Eastern Solent
Hurst Spit
Needles Channel
Bouldnor Cliff
river Medina
Isle of Wight
Submerged peat platform
N
English Channel
UK


UPPER PEAT BED C. (Bouldnor 1)
4m
SILT
MIDDLE PEAT BED B. (Bouldnor 2)
6m
MARINE CLAY
WITH BRACKISH
DIATOMS
8m
10m
MESOLITHIC
OCCUPATION
CORE 3B
TREE
CORE 3A
?
?
LOWER PEAT BED A. (Bouldnor 3)
LAKE SEDIMENTS ?
12m
FLOOR OF THE MAIN SOLENT CHANNEL




UPPER PEAT BED C. (Bouldnor 1)
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8m
10m
MESOLITHIC
OCCUPATION
CORE 3B
TREE
CORE 3A
LOWER PEAT BED A. (Bouldnor 3)
LAKE SEDIMENTS ?
12m
FLOOR OF THE MAIN SOLENT CHANNEL
5 m
-11m OD
Tree stumps
within peat
Exposed tree stump
Cliff edge

Examples of Ranking Results

The following examples demonstrate how a range of different sites and deposits ranked against the criteria.

Bouldnor Cliff: A sequence of stratified prehistoric landscapes including Mesolithic occupation evidence.

Criteria	Score	Notes
Sea Level Change	**3**	Long sequence of deposits demonstrating changing sea levels over 10,000 years.
Environmental Change	**3**	Contains dated and analysed evidence of changing environment including associated human occupation evidence.
Temporal Continuity	**3**	Sequence of prehistoric landscapes and associated inundation are directly related to each other.
Site Status	**EB**	Site exists and is below ground
Coastal Context	**1**	Marine (below low water)

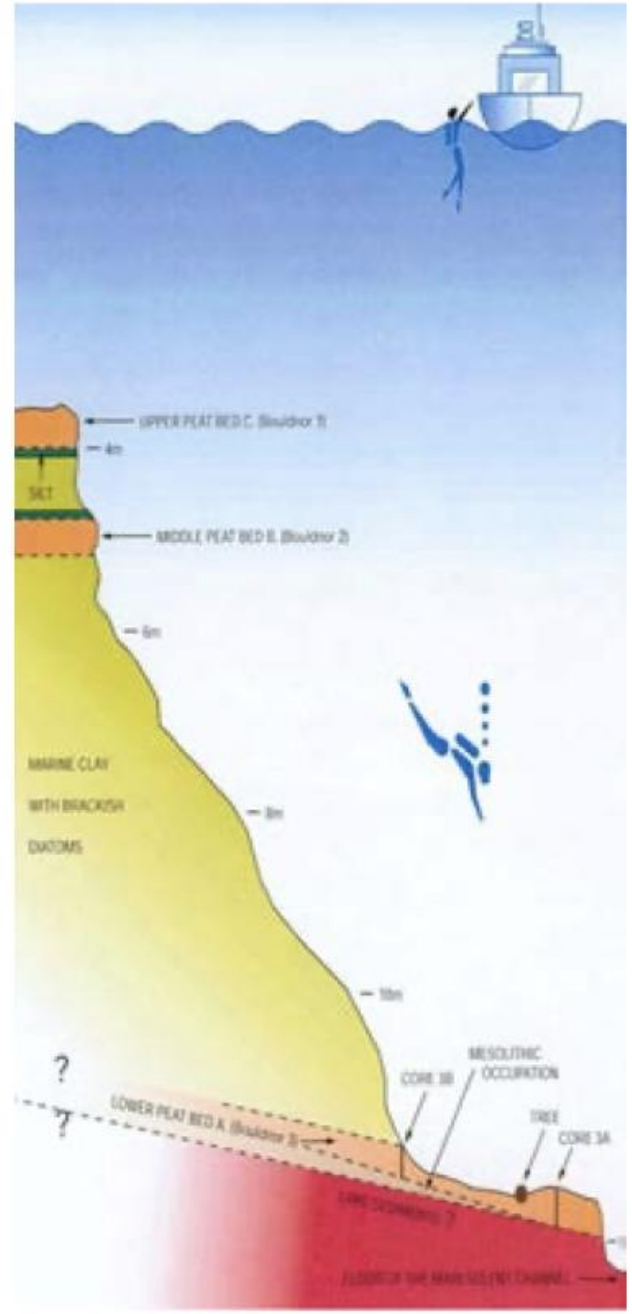
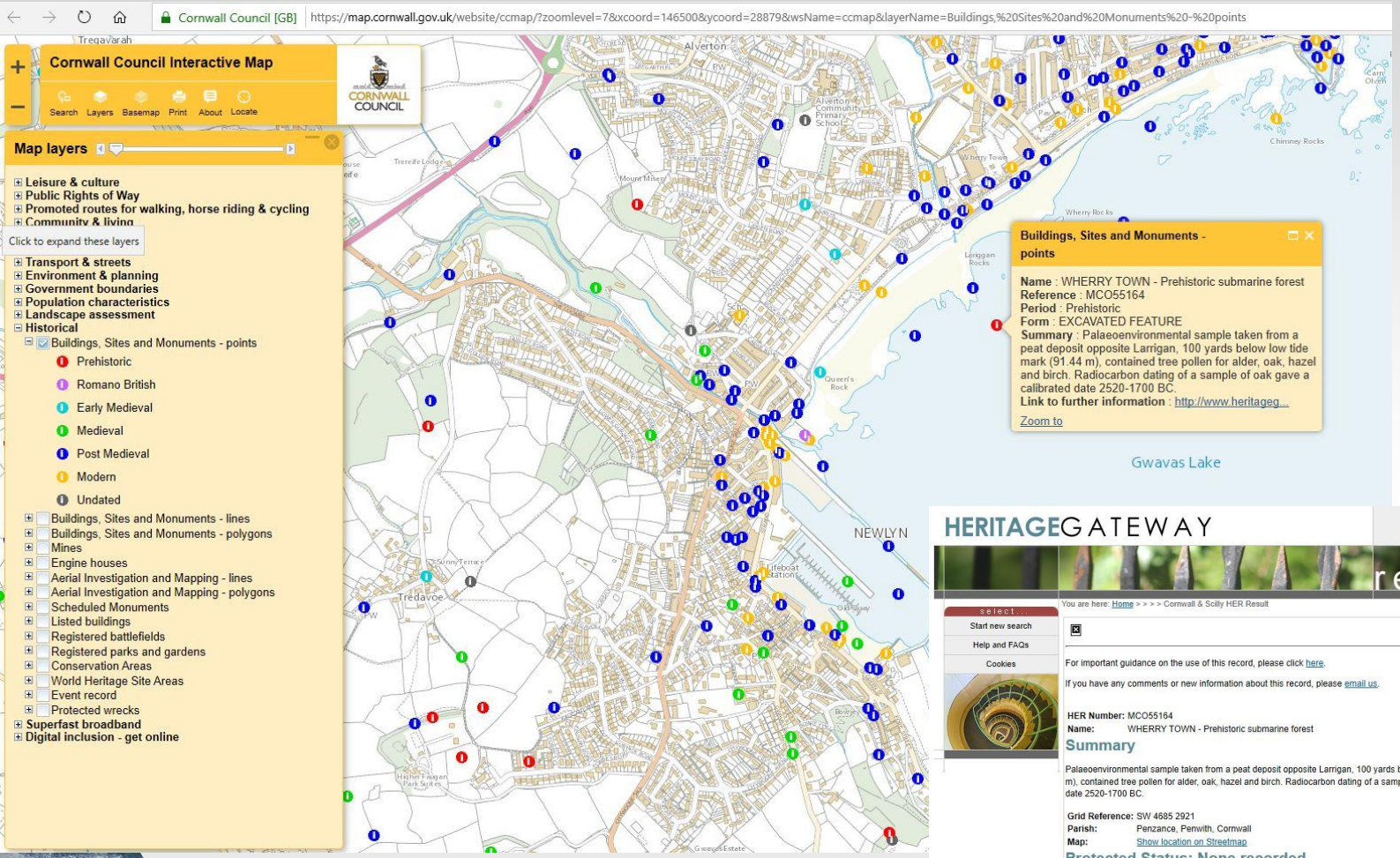
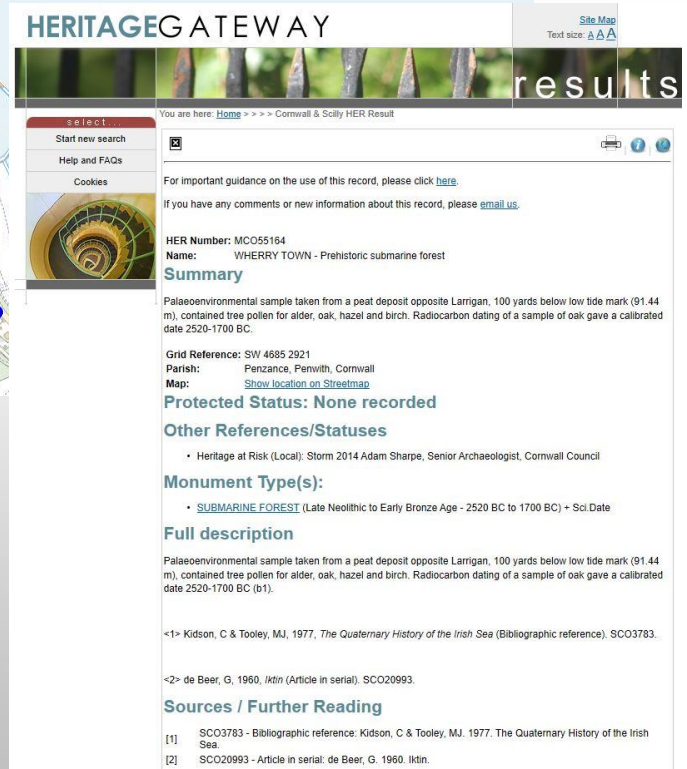


Diagram showing cross section through the submerged prehistoric landscapes at Bouldnor Cliff off the NW Coast of the Isle of Wight (courtesy SCOPAC).

Newlyn: Archaeological, Historical and Palaeoenvironmental Data Sets





DATABASES/ HERITAGE ARCHIVES

- Local Historic Environment Record (Cornwall)
- National Historic Record (Heritage Gateway)
- Linked regional heritage data (via Heritage Gateway)
- Archaeology Data Service
- Wreck data – Wrecksite.eu
- Historic England Peat database

STUDIES & PUBLICATIONS

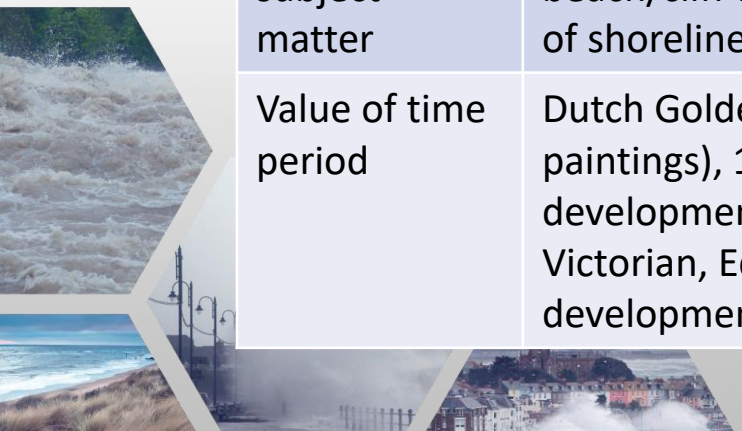
- Rapid coastal zone assessment
- Proceedings of the Cornwall Archaeology Society
- South West Archaeological Research Framework

Highest scoring sites based on total score

ID	Site Name	Site Type	Period	Score – sea level	Score – Environmental	Score – Temporal Continuity	Total Score	Coastal Context
3313	Wherry Town - Prehistoric submarine forest		Prehistoric	High	High	High	100	Marine (below low water)
3305	Newlyn - Early Medieval peat deposits & Post Medieval sea defences		Early Medieval	High	High	Medium	88	Inter tidal
3540	Tolcarne Bridge (Old)		Saxon	Medium	High	High	88	Above high water
3541	Heritage bridge at Tolcarne (New Road)		Post-Medieval	Medium	High	High	88	Above high water
3542	Newlyn Post Medieval South Pier		Post-Medieval	Medium	Medium	Medium	66	Inter tidal
3543	Newlyn Post Medieval North Pier		Post-Medieval	Medium	Medium	Medium	66	Inter tidal
3273	Penzance/ Newlyn - Neolithic working site		Neolithic	High	Medium	Low	66	Exposed bedrock
3279	Newlyn - Medieval wreck		Medieval	Medium	Low	Medium	55	Inter tidal
3282	Newlyn - Medieval harbour		Medieval	Medium	Low	Medium	55	Inter tidal

Art

Criteria	Description
Accuracy of Artistic Style	Caricaturist and Genre works, Picturesque Landscapes, Marine and Shipping Subjects, Topographical Artworks including beach and coastal scenery, and Topographical Artworks with a Pre-Raphaelite influence.
Most advantageous medium	1: 'Copper Plate Engravings' 2: 'Oil Paintings' 3: 'Oil Paintings - Norwich School & Pre-Raphaelite' 4: 'Steel Plate Engravings and Aquatints' 5: 'Lithographs, Pencil drawings and Watercolour Drawings'. 6: 'Watercolour Drawings by Pre-Raphaelite Artists & Followers'.
Value of subject matter	General coastal views, detailed view of the beach/cliff etc, very detailed appreciation of shoreline position
Value of time period	Dutch Golden Age (17th century paintings), 1840-1880 (Victorian coastal development period), 1880-1930 (Late Victorian, Edwardian and later coastal development period)



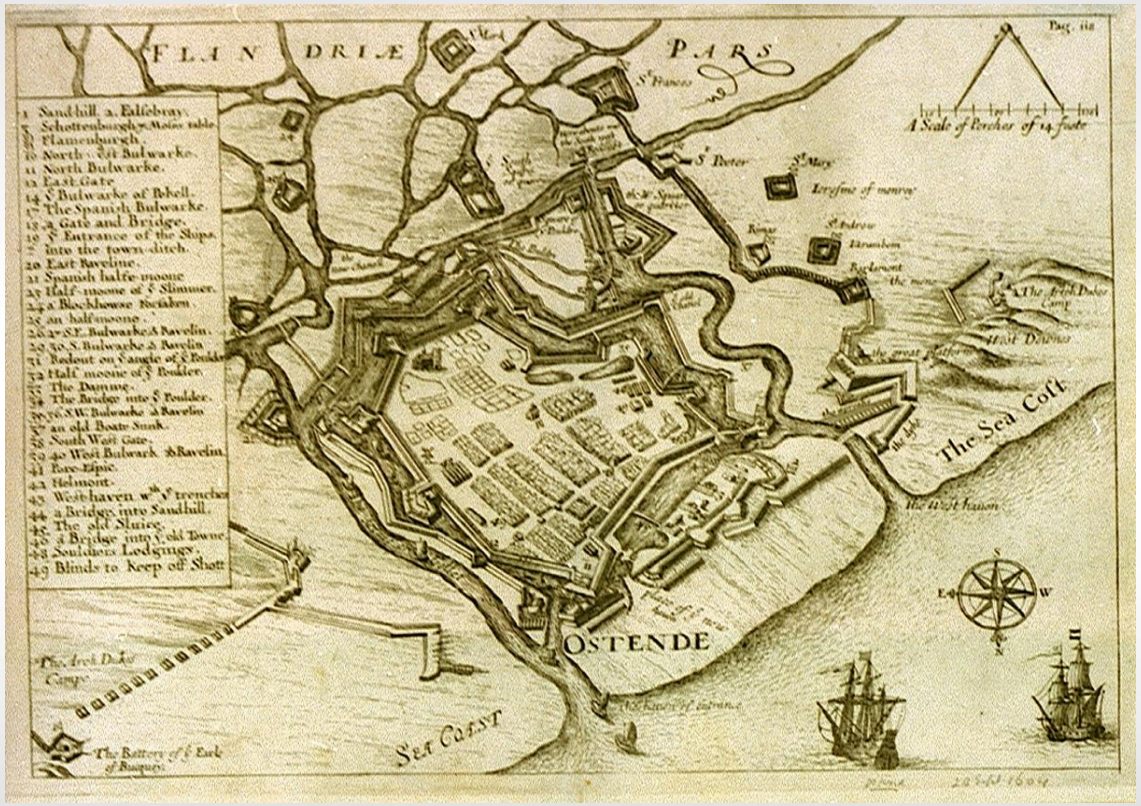
Landslip Cliff Town, Southend on Sea c.1870

Art UID	Source Title	Artist	Date	Score medium	Score period	Score style	Score heritage	Score environ	Total Score
365	Arrival at Flushing	Adriaen Van De Venne	1618	Watercolour	Before 1770	Picturesque landscape	Contributes detailed understanding	General coast view	85
432	Vlissingen in volgelvlucht 1669	Petrus Segaers	1669	Oil Painting	Before 1770	Marine/ shipping subjects	Supports understanding of change	Detail of shoreline position	77
370	Vlissingen town and harbour	Petrus Segars	1662	Watercolour	Before 1770	Picturesque landscape	Suggests position of coast	General coast view	70
367	Flushing 15 August 1852	Charles John Colville	1852	Watercolour Pre-Raphaelite	1840-1880	Pre-Raphaelite beach/ coastal	Suggests position of coast	General coast view	66
396	View of Vlissingen	Caspar Bouttats after Ioannes Peeters.	1616	Lithograph	Before 1770	Marine/ shipping subjects	Suggests position of coast	General coast view	66
368	Panoramic view looking over the town and waterways and out to sea at approaching ships	Unknown	1809	Watercolour	1770-1840	Marine/ shipping subjects	Suggests position of coast	General coast view	55
369	Arrival at Vlissingen of Frederick V Elector Palatine	Hendrick Cornelisz Vroom	1632	Oil Painting	Before 1770	Marine/ shipping subjects	Suggests position of coast	General coast view	55
366	Flushing through the ages	Unknown	1808	Litho	1770-1840	Topographical/ coast scenery	Suggests position of coast	General coast view	51

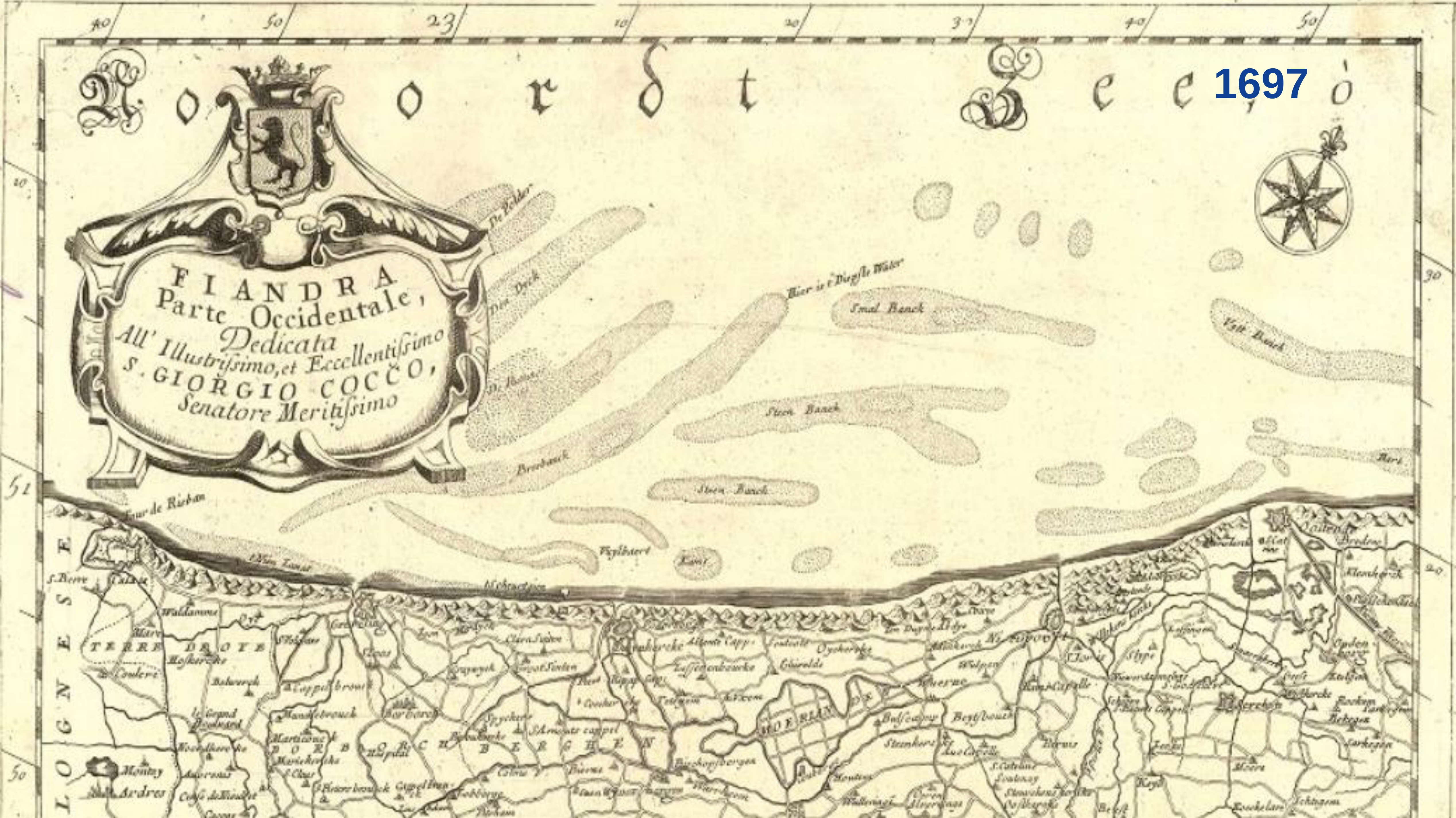
Table: The highest scoring artworks within the Vlissingen Pilot Study Area

Maps and charts

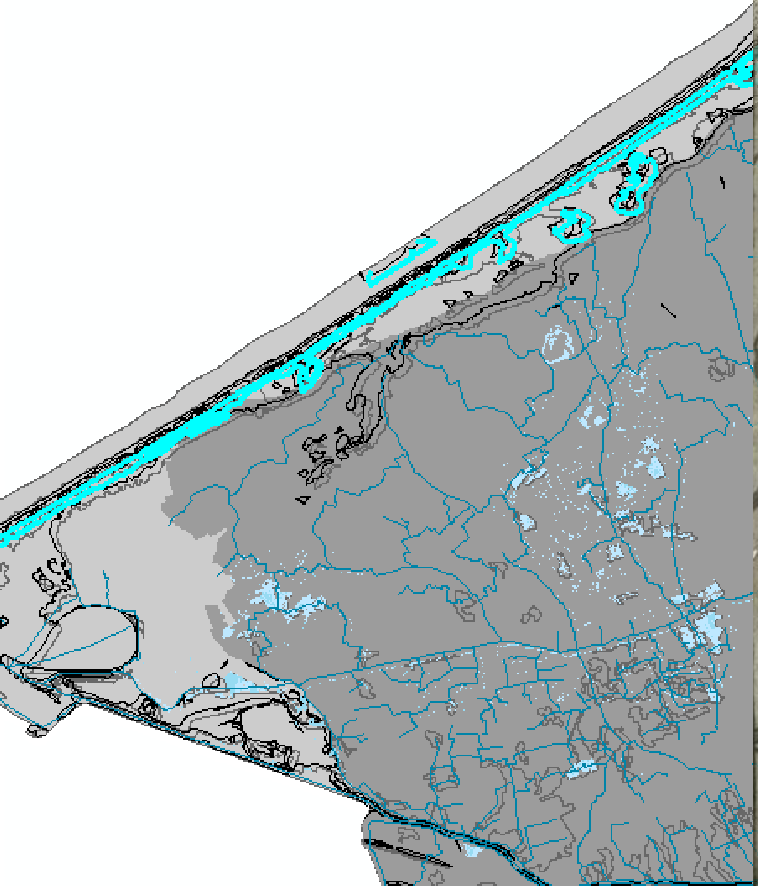
Criteria	Description
Topographic Accuracy	Types and scale of depicted elements. Divided into estuaries (or tidal basins), cliff coasts and sand (or dune) coasts.
Geometric Accuracy	The positioning of a map in a global coordinate system and distances.
Chronometric Accuracy	The date of the map, use of terrain measurements and whether the map is an original or a copy.

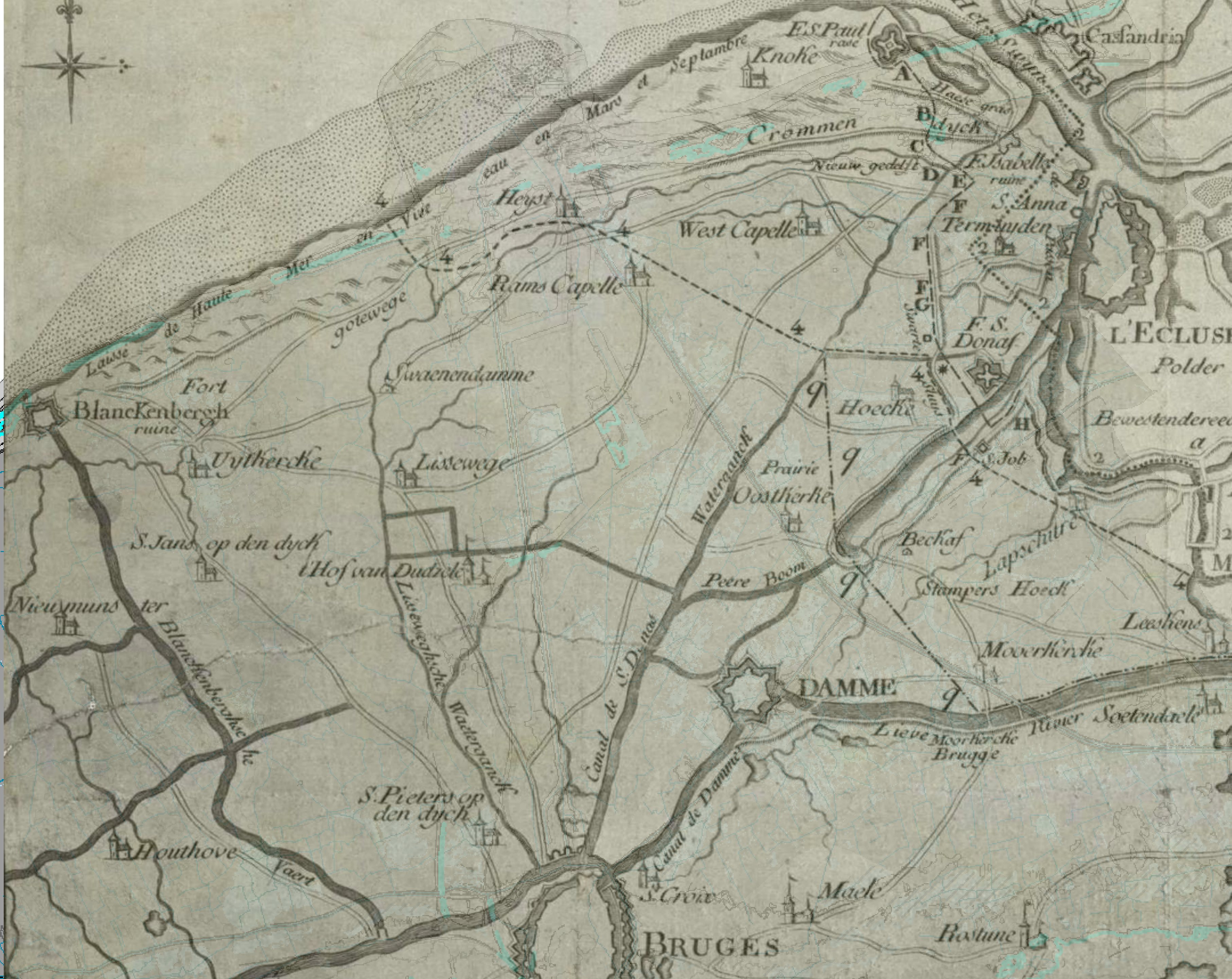


1604


Noordt Zee
1697
FIANDRA
Parte Occidentale,
Dedicata
All' Illustrissimo, et Eccellentissimo
S. GIORGIO COCCO,
Senatore Meritissimo
Smal Banck
Steen Banck
Breebanck
Ostende
Nieuport
TERRE DE OYE
BOLOGNESE

Flanders c.1700 P. Mortier





Casandria
E.S.Paul
rase
Knoke
Crommen
Nieuw gedelft
F.Isabelle
ruine
S.Anna
Termuyden
Heyst
West Capelle
Rams Capelle
L'ECLUSE
Polder
F.S. Donas
goteweghe
Swaenendamme
Fort
BlancKenbergh
ruine
Hoecke
Bewestendereede
Uytkercke
Lissewege
Prairie
Oostkercke
Watergangh
S.Jans op den dyck
l'Hof van Dudzele
Peere Boom
Beckaf
Lapschuure
Stampers Hoeck
Nieuwmunster
Blanckenberghsche Vaert
Lissewegsche Watergangh
Canal de S. Donas
Moerkercke
DAMME
Lieve
River Soetendaele
Moerkercke Brugge
Canal de Damme
S.Pieters op den dych
Houthove
S.Croix
Maele
BRUGES

Schemes
Brugges Polder
www.geopunt.be

MAP _uid	Title	Year	Score Chronometric Accuracy	Score Topographic Accuracy	Score Detail in non-coastal area	Score Geometrical Accuracy	Total Map Score
182	Map of Ostend 1602	1602	100.00	52.78	100.00	66.67	79.86
424	Plan of Oostende 1706.	1706	100.00	50.00	100.00	66.67	79.17
397	Ostende and ships 1706.	1706	100.00	50.00	100.00	66.67	79.17
400	C17 Ostende.	17th Century	100.00	50.00	100.00	66.67	79.17
398	Ostende Plan.		100.00	38.89	100.00	66.67	76.39
184	Old map - birds eye plan of Ostend.	1617	100.00	44.44	66.67	83.33	73.61
214	Ostend 1860.	1878	100.00	27.78	66.67	83.33	69.44
380	Oostende and Middelkerke 1913.	1913	100.00	44.44	66.67	66.67	69.44
390	Siege of Oostende early 1601-1605.	1605	100.00	44.44	66.67	66.67	69.44

PHOTOGRAPHIC SCORING

Criteria	Description
Purpose (non-scoring)	Private, touristic, scientific, unknown
Coastal View	Used if cultural heritage features are **not** depicted, then divided into general view, semi-general view and detailed view
Heritage View	Used if the image does contain heritage features, divided into what it can tell us about chronology
Quality	Current state of the image, poor, medium, good.


1852


1885


1900


Mariakerke-lez-Ostende
Les Hôtels et la Plage.
HOTEL DE BELLE VUE
HOTEL QUITMANN
HOTEL QUITMANN RESTAURANT

Image ID	Title	Year	Purpose	Score Heritage View	Physical Image State	Total Score
1388	Ostende Digue Ostende Mariakerke		4	3	3	100
1330	Ostend beach. National Archief, copyright holder unknown	1950	4	2	3	77
1389	Ostende 1924_La mer	1924	4	2	3	77
1379	1953 Oostende flood	1953	4	2	3	77
1381	Mariakerke Dunes. Geneanet (CC BY-NC-SA 2.0)	1900	4	2	3	77
1383	Mariakerke the beach and the hotels. Geneanet (CC BY-NC-SA 2.0)		4	2	3	77
1385	Mariakerke beach sea and promenade c1950s. Geneanet (CC BY-NC-SA 2.0)		4	2	3	77
1384	Mariakerke beach low tide. Geneanet (CC BY-NC-SA 2.0)		4	2	3	77
1386	Mariakerke, gun observatory on the Promanade. OldThing.de	1916	4	2	3	77
1387	Mariakerke La Digue. Hippostcard.com	1951	4	2	3	77
1380	Mariakerke Bathing Machines and hotels low tide. Geneanet BY-NC-SA 2.0)		4	2	3	77
1408	Flooded city of Oostende		3	2	3	77
1406	Storm of 1953	1953	4	2	3	77
1409	Overtopping in Oostende		4	2	3	77
1279	Oostende First Trading Dock	1900	4	2	3	77
1446	Mariakerke the beach, promenade and the hotels. Geneanet (CC BY-NC-SA 2.0)		4	2	3	77

Assessing data and validating data sets

SARCC - Sustainable and Resilient Coastal Cities - maritime atlas data portal

garry.momber@maritimearchaeologytrust.org

Archaeology & Palaeoenvironmental

Art Evidence

Historic Images

Maps & Charts

Assessing data and validating data sets

Details

Media Files

Organisations

Archaeology & Palaeoenvironmental

« 1 ... 23 ... 63 ... 72 73 74 ... 83 ... 123 ... 128 »

Records 1641 to 1660 of 2552

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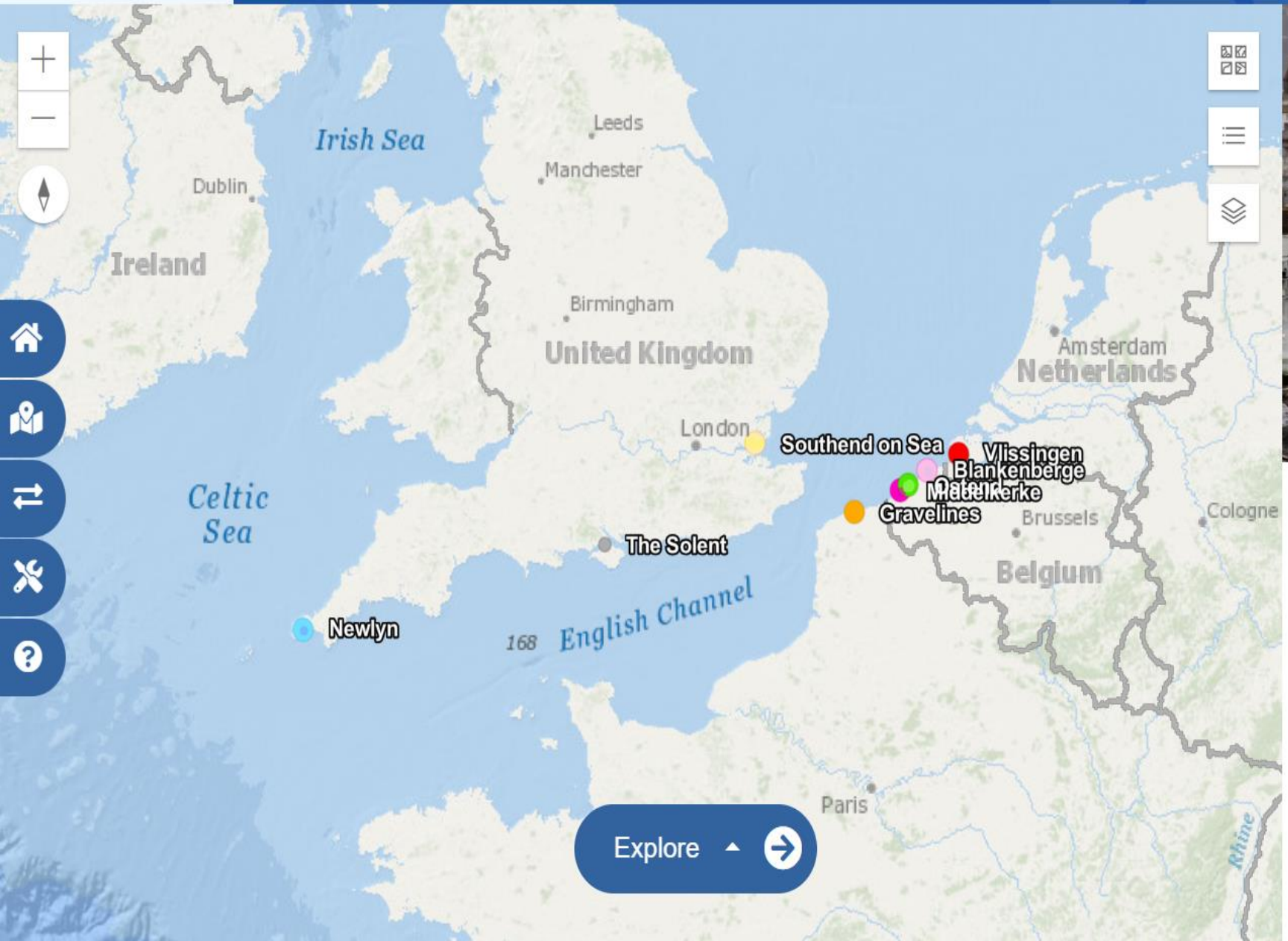
Actions	APE UID	Site Name	Total APE Score	Scored Sea Level Change	Scored Enviro Change	Scored Temporal Continuity	Nonscored Coastal Context	Nonscored Site Status	Site Type	Country	Case Study Area	Location	Latitude WGS84 (e.g. 50.123456)	Longitude WGS84 (e.g. -1.234567)	Restricted?	Period	Broad Enviro Type	Site Condition	Length (m)	Width (m)	Height (m)	Description	Management Notes	Fieldwork	Spatial Data	
	4,985	Burgerhuis	33	Low	Low	Low	Above High Water	EA	Building	Belgium	SARCC Oostende	Oostende	51.216447	2.8794	✗	Pre-WWI	NULL	NULL	NULL	NULL	NULL	Raversijdestraat no. 7. Basement bourgeois house from ca. 1900 in neo-tradi... more	Belgian HER	✗	✓	
	4,986	Duinen nabij Raversijde (Dunes near Raversijde). Agency Immovable Heritage 2021	100	High	High	High	Dunes	EAB	Buried landsurface	Belgium	SARCC Middelkerke	Middelkerke	51.200215	2.8418	✗	Early Medieval	Intertidal	Partially destroyed	NULL	NULL	NULL	Dunes near Raversijde This anchorage extends over the beach and the dunes ... more	Belgian HER	✗	✓	
	4,987	Neoclassicistisch burgerhuis	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	51.170301	2.7754	✗	NULL	NULL	NULL	NULL	NULL	NULL	https://inventaris.onroerenderfgoed.be/erfgoedobjecten/55207	Belgian HER	✗	✓	
	4,988	Blankenbergse dijk	77	High	Medium	Medium	Fine sediment plains	EAB	Submerged landsurface	Belgium	SARCC Blankenberge	Blankenberge	51.265706	3.1636	✗	Medieval	NULL	NULL	NULL	NULL	NULL	Medieval inner dike between Bruges and Uitkerke (Blankenberge), almost 11 k... more	Belgian HER	✗	✓	
	4,989	Villa Pourquoi Pas	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	51.309748	3.1291	✗	NULL	NULL	NULL	NULL	NULL	NULL	https://inventaris.onroerenderfgoed.be/erfgoedobjecten/44913	Belgian HER	✗	✓	
	4,990	Burgerhuis La Frégate in cottagestijl (House La Fregate in cottage style)	33	Low	Low	Low	Above High Water	EA	Building	Belgium	SARCC Middelkerke	Middelkirk	51.172349	2.7794	✗	20th Century	NULL	NULL	NULL	NULL	NULL	Ooievaarslaan no. 17. Zg "LA FRÉGATE" (cf. chiseled inscription). Beautiful... more	Belgian HER	✗	✓	
	4,991	"Résidence d'été", appartementsgebouw	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	51.170205	2.7769	✗	NULL	NULL	NULL	NULL	NULL	NULL	https://inventaris.onroerenderfgoed.be/erfgoedobjecten/55241	Belgian HER	✗	✓	0106000020E6100000010000000
	4,992	Handels- en appartementsgebouw	33	Low	Low	Low	Above High Water	EA	Building	Belgium	SARCC Blankenberge	Blankenberge	51.315416	3.1269	✗	Pre-WWI	NULL	NULL	NULL	NULL	NULL	Located on the corner with Bakkersstraat. Large, iconic commercial and apar... more	Belgian HER	✗	✓	
	4,993	Herenhuis Hotel Mon Rêve	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	51.216728	2.8842	✗	NULL	NULL	NULL	NULL	NULL	NULL	https://inventaris.onroerenderfgoed.be/erfgoedobjecten/56718	Belgian HER	✗	✓	
	4,994	Burgerhuis ontworpen door Alfred Neirynck	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	51.314978	3.1319	✗	NULL	NULL	NULL	NULL	NULL	NULL	https://inventaris.onroerenderfgoed.be/erfgoedobjecten/44861	Belgian HER	✗	✓	
	4,995	La Goëlette, villa in cottagestijl	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	51.170401	2.7776	✗	NULL	NULL	NULL	NULL	NULL	NULL	https://inventaris.onroerenderfgoed.be/erfgoedobjecten/55211	Belgian HER	✗	✓	
	4,996	Burgerhuis van 1893	33	Low	Low	Low	Above High Water	EA	Building	Belgium	SARCC Blankenberge	Blankenberge	51.316392	3.1329	✗	NULL	NULL	NULL	NULL	NULL	NULL	Simple cornice from 1893. Red brick construction delineated by a simple cor... more	Belgian HER	✗	✓	
	4,997	Electriciteitscabine	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	51.312746	3.1355	✗	NULL	NULL	NULL	NULL	NULL	NULL	https://inventaris.onroerenderfgoed.be/erfgoedobjecten/44908	Belgian HER	✗	✓	
	4,998	Steunpunt Seydlitz (Support center Seydiltz)	66	Medium	Medium	Medium	Above High Water	EA	Military installation	Belgium	SARCC Middelkerke	Middelkirk	51.165788	2.7618	✗	Post-WWII	NULL	NULL	NULL	NULL	NULL	Strandlaan z.nr. (also in Westende, Koning Ridderdijk s.nr.). Support point... more	Belgian HER	✗	✓	
	4,999	Handels- en appartementsgebouw	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	51.315186	3.1273	✗	NULL	NULL	NULL	NULL	NULL	NULL	https://inventaris.onroerenderfgoed.be/erfgoedobjecten/45024	Belgian HER	✗	✓	
	5,000	Villa Les Zéphyrs	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	51.169381	2.7755	✗	NULL	NULL	NULL	NULL	NULL	NULL	https://inventaris.onroerenderfgoed.be/erfgoedobjecten/55175	Belgian HER	✗	✓	
	5,001	Bel-etageburgerhuis Villa Jeanne	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	51.308688	3.1365	✗	NULL	NULL	NULL	NULL	NULL	NULL	https://inventaris.onroerenderfgoed.be/erfgoedobjecten/45073	Belgian HER	✗	✓	
	5,002	Hoekresidentie Les Mousses, Les Vagues en Les Flots (Corner residence Les Mousses, Les Vagues en Les Flots)	33	Low	Low	Low	Above High Water	EA	Building	Belgium	SARCC Oostende	Oostende	51.207355	2.8601	✗	20th Century	NULL	NULL	NULL	NULL	NULL	Zeedijk no. 352/ Middenlaan nos. 94-96. resp. so-called "LES MOUSSSES", "LE... more	Belgian HER	✗	✓	
	5,003	Winkelhuis met bovenliggende	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	51.170560	2.7748	✗	NULL	NULL	NULL	NULL	NULL	NULL	https://inventaris.onroerenderfgoed.be/erfgoedobjecten/55145	Belgian HER	✗	✓	

SARCC - Sustainable and Resilient Coastal Cities Interactive Visualisation Tool

https://sarcc.maritimearchaeologytrust.org/



Improving the understanding of Nature-Based Solutions in coastal cities

Why is this project required?

Mean sea level rise (SLR) could increase by **1.5m-2.5m by 2100**, which would see damage caused by coastal flooding in Europe increase from €1.25bn per annum

3. Urban Project: Spatial Planning Decision Making Model

Outline of the urban development processes of the former Dutch Ministry of Spatial Planning (VROM) and the "Decision Model Spatial Plans" (DSMP)[Het Besluitvormingsmodel Ruimtelijke Plannen](2004)

Initiation

Start of the project

In the Initiation phase, general information is processed to be able to make decisions for the project, while creating carrying capacity amongst stakeholders.

- Conduct desk based paleo-environmental and archaeological analysis for Maritime Atlas.
- Look for priority settings of ecosystem services based on the participation process.
- ESS needs to be assessed by specific valuation methodology that considers benefits and costs of ESS

Masterplan

Shaping of the urban project

The master plan (structural plan) is the physical translation of the vision and program at the larger scale of an area. The master plan is normally the result of running different scenarios. After the visioning phase, the stakeholders return to their sectoral visualizations, then the issues are clear and can be developed in a sectoral or bi-sectoral manner.

- Projects can contribute to test the feasibility of NBS approaches for the urban coastal zone.
- Appoint actors as ambassadors to advocate for lessons learned across different admin and sector levels to mainstream NBS
- Calculate ESS in advance across different scenarios, various benefits that can be included in the masterplan.
- Examine the datasets to understand the long term geomorphological and anthropogenic processes that have and will continue to impact the coastline.

Project Design Development Framework

Urban Design

Design of the urban project

As part of the master plan, the urban plan is a detailed phase of development in line with the vision, and is directly connected to spatial quality. At the smaller scale, the information has a high resolution and should become a self-evident part of the urban design.

- Create demarcated learning environment, with a tailor-made process design and ability to organize this as a project on its own.
- Develop narratives on different choices to improve public engagement processes
- Provide the long term context to give insights into historic coastal measures and a justification for the design implementation to stakeholders.
- Incorporate heritage assets, identified during the initiation and masterplan, as a tool to enhance the urban design.

Construction

Building of the urban project

During the building phase, all data and information should be at the table and translated into construction plans.

- Use preliminary results of implementation phase can be leveraged to convince policy makers and general public about the effectiveness of NBS
- Use studies of the Long Duree to minimise impact on heritage during construction.
- Incorporate new discoveries and successes into programme of positive dissemination.

Maintenance

Life of the urban project

Project requires regular maintenance and monitoring effort to regulate performance. Upfront maintenance will be high but require less over time.

- Identify clearly the role and responsibilities for NBS maintenance
- Conduct regular maintenance and monitoring of NBS to improve its performance and prove long term effectiveness of NBS
- Use projects as policy instruments to identify policy gaps in proper maintenance

Feedback

Reflecting of the urban project

Iterative feedback of project performance from technical, ecological and socio-economic criteria is vital in optimizing lifespan and value.

- Integrate the feedback of citizens and other stakeholders into the design of the project
- Assess the physical, cultural and social outcomes of a sea defence that has incorporated the long duress in its design by analysing: sustainability, retained or enhanced heritage value and social satisfaction.
- Evaluate ESS to understand and validate effectiveness
- Use project feedback to prove the effectiveness of NBS for coastal safety, consensus building, increasing local awareness, and replication in other locations

Project Design Development Framework

Masterplan

Longue Durée

Drawing long lines of human nature relationship

Maritime Atlas

Evaluate the geomorphological processes and how human interacted and intervened over time.

Landscape Atlas

Evaluate the Landscape (soil and water) & Urban morphology and Infrastructure (historical dikes) on the regional scale.

Planning Atlas

Historical Assessment of Planning Policies to understand the past decision-making process, impact of the policies on spatial factors of coastline coastal defence.

Urban Project

Analysis of the spatial system

Flood Atlas

Mapping the Bathymetry, Inlet boundary conditions and Coastal roughness feed into numerical simulations (Delft3D) to test spatial solutions.

Urban Atlas

Mapping the heritage of the project area: built heritage, art, photographs, maps and charts. Mapping the urban construction and systems: water, energy, civil construction and ecology. Mapping expected urban trends.

Synergy

Organise multidisciplinary workshops to perform interdisciplinary investigations across coastal and urban areas to inform the vision, strategy and design phases. Drawing the line of time from past to future to anticipate long-term patterns of urban-coastal processes. Drawing the line through scales connecting the regional and urban scale.

Vision

Envisioning new futures with nature

Problem Definition

On the base of the findings of the former phase the problem discovery leads to the common definition of the problem in a multidisciplinary workshop in which discipline prepared their data.

Solution Concepts

The multidisciplinary team has prepared their disciplinary solution concepts and these are discussed in workshop on solution discovery and conceptualization. Alternative approaches are discussed, and assumptions are balanced out.

Synergy

The problem definition and solution concepts leads to the development of a shared vision. The vision is based on the determination of shared assumptions and alternative futures.

Strategy

Guidelines how to get there

Guidelines

In the strategy clear guidelines are derived from the vision of how decisions in space should be taken.

Modeling

This strategy is tested through the flood risk model.

Urban Project

Spatial plan

Flood Atlas

The hydraulic model allows a feasibility assessment and the identification of the detailed spatial conditions necessary for the realisation of the strategy in the project area.

Urban Atlas

The strategy is projected onto the urban atlas (Step 2) and stakeholders are involved with a clear narrative, and the program is developed. Data that concerned sea level rise, future flood risk, and water volumes supported the definition of integrated urban projects.

Design & Assess

The inter-functionality of the area development and willingness 'to do it differently' is processed through an intensive design & assessment process of modelling and spatial strategy, plan and design development.

Design

Spatial design with nature

Alternatives

Public space design that integrates human and nature needs and is legible in this relation over time. Alternatives of high-quality spatial designs are tested.

Integrated Benefits

Social, environmental, economical, values are synergised into the spatial design to enhance spatial quality and legibility

Urban Design

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