

**Vlissingen Pilot
Study: Report in
Support of the
Maritime Atlas**



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1. Introduction

The Vlissingen scheme is one of seven pilot sites within the SARCC project that are developing Nature Based Solutions to coastal management in urban settings along the 2Seas coasts. More details on the Vlissingen scheme are provided on the SARCC website: <https://www.sarcc.eu/pilots/vlissingen>. This report concentrates on presenting details in support of the Maritime Atlas which considers how data from archaeology, paleoenvironmental material, historical sources, art, charts, maps and photographs can provide vital information on long term coastal change. This, in combination with datasets on storms, flooding patterns and sea-level changes, ensures schemes incorporating Nature Based Solutions for coastal management have the full benefit of hind-sight when planning for future changes.

Humans have interacted with the environment and landscape for thousands of years during which time the coastline has changed and evolved. The coast has been attractive for human use due to a wide range of social and economic reasons which include trade and defence, and in the last few centuries tourism and leisure activities. The resulting construction of settlements which have grown into urban centres and conurbations and their shoreside harbours, facilities and buildings have then required the establishment of coastal defences to prevent flooding and damage.

Many coastal defence structures have sought to fix the position of the coastline to protect adjacent homes, businesses and infrastructure. However, increased erosion, instability and flooding problems mean that options for defending the coast that work with nature rather than installing hard defences are increasingly being reviewed as options, which is the case at Vlissingen.

This report introduces the pilot area with Section 1 providing data on geomorphology, coastal processes and environmental impacts. The results of the results of the archaeological and palaeoenvironmental study and scoring are then presented (Section 2), followed by the maps and charts (Section 3) and then the pictorial resources – art and historic photographs (Section 4). The analysis of these results in combination as applied to a number of areas along the Newlyn frontage then demonstrate the scale and rate of coastal change and are presented in Section 5.

1.1 Introduction to Pilot Study Area

Vlissingen is a city in the SW Netherlands on the island once known as Walcheren. It has always been an important harbour due to its strategic position between the Scheldt River and the North Sea. The long sandy beach along it's shore, and boasting the longest promenade in the Netherlands, make it a lively seaside resort attracting thousands of visitors each year. Vlissingen, like many areas of the Netherlands has had to learn how to cope with many episodes of devastating floods over the centuries, and develop the best ways to prevent or minimise such occurrences.

The SARCC pilot project in Vlissingen is in an urban area at the mouth of the Westerschelde where the river arm and the North Sea come together (Figure 1). The project provides the design and implementation for a new way of thinking about climate-adaptive public spaces in urban areas by the sea. The objective is to focus on natural and green sustainable measures, which in the long term will protect the urban area against flooding during storms. In addition, research is being conducted into the implementation of nature-based solutions (NBS) in the foreshore and in the primary sea defences. The measures in the pilot are implemented in a street and as part of an area development in "De Spuikom". The implemented measures must contribute to the natural appearance of the urban area.



Figure 1: The location of the Vlissingen Pilot Study area, inset map shows Vlissingen (red) and the other SARCC Pilot Sites (green).

1.2 Geology, Geomorphology and Topography of the Pilot Area

To understand the long-term changes that have occurred to this area of the coast in the past and likely future impacts it is necessary to have a wider understanding of the geology that under-pins the area and geomorphological changes that have taken place.

When the sea level rise slowed, around 5,000 years ago, the balance changed from landscape inundation to progradation where new land was created by high levels of sediment deposition from the rivers and estuaries. Barrier bars grew to protect the land from the sea and riverbanks evolved into saltmarsh around the Rhine, Meuse and Scheldt estuarine complexes from the beginning of the 3rd millennium BC (Vos and Van Heeringen 1997; Vos et al 2011; Weerts 2013).

Progradation of the coastal zone in the region continued until the end of the first millennia BC when sea level rise slowed. A stable equilibrium might then have been established if it were not for human influence. Peat extraction, primarily by the Romans, removed the surface deposits, drained the land, compacted the soil and lowered ground levels to reverse the earlier depositional processes. The peat was an important source of fuel and used in the process of marine salt manufacture (Lascaris and De Kraker 2013).

Following the departure of the Romans, the salt industry faltered and 361 land management practices declined. By 450 AD the sea had advanced into the depleted coastal peat lands and the estuaries opened into wide channels (Ervynck et al 1999). This reconfigured landscape was now less attractive for settlement. However, this was to change, as the natural build-up of fluvial sedimentation along the waterways and the expansion of salt marsh during the Medieval period reintroduced spaces for grazing and small-scale dwellings. Insights into the occupation of the coastal marshes can be found in written sources and in the form of archaeological remains (Mol 2013; Tys 2013). As early as 707 AD, contemporary records show that twelve

marisci or grazing meadows in the saltmarshes by Aardenburg close to Sluis, were donated to the Abbey of St Peters near Ghent (Tys 2013, p 208).

In time, engineering solutions advanced and larger dikes were built. This gave people more confidence to move to the places with increased protection. However, in Flanders and the Netherlands, many of these areas were now several metres below sea level as a result of the earlier compaction, peat exploitation and drainage. Consequently, when the dikes did collapse, the impacts of floods were more devastating than the inundations that had occurred before they were built (Vos et al 2014). Even where the natural forces were held back by stronger dikes, the inherent vulnerability was exploited by invading or occupying armies. This weakness was widely exploited during the 80 Years War of Dutch independence from Spain between 1568 and 1648 where defences were breached to flood strategic areas (Missiaen et al 2014), (Figure 2). The damage took decades to repair, but with independence from Spanish rule a more strategic plan was put into place. Over the next three hundred years protection around the southern North Sea was largely successful, until the storm surge of 1953 that killed thousands and flooded almost ten percent of Dutch farmland. This tragic event precipitated the building of new coastal defences that have prevented further catastrophes. This is reassuring, but the continued building of traditional grey coastal defence infrastructures does not necessarily solve the challenge in the long term and the SARCC pilot project of a nature based solution is trialling a new approach for Vlissingen.



Figure 2: Historical representations of the calamities that befell Amsterdam following the breaching of the St Anthony Dikes in 1651. (Metropolitan Museum of Art, CCO, via Wikimedia Commons).

1.3 Storms and Flooding Patterns

The estuaries of the Dutch coast have been continually reshaped over the centuries by extreme weather events interacting with tidal dynamics. The low-lying land with large inlets protected by dikes and dunes are vulnerable to westerly and north-westerly gales. Storm surges have been the most common cause of flooding, but not exclusively. It is the flooding caused by human impact, through land reclamation and particularly during warfare when areas were intentionally flooded, that has had the greatest impact on the environment. The review of significant flooding events below includes many storms and events which have caused significant damage along the coastal frontage. The list which inevitably has more detail from when written records are available, serves to show that the risk and impact of storms and the associated flooding is something that has been experienced by human populations through millennia.

Early records

- During the Roman and Medieval periods, large scale peat extraction caused flooding, with some areas remaining flooded for centuries.
- The earliest recorded flood occurred on the 26th December 838 AD and flooded the entire Dutch coastal area. Two contemporary sources record the devastation. Bishop Prudentius of Troyes reported that the whole of 'Frisia' was flooded by the sea. People, animals and houses were devoured by the water. The water rose as high as the dunes. According to the counts there were 2,437 victims. The 'Annales Xantenses' of the same date record a 'heavy tornado' that caused water to surge over the coasts with flooding destroying a large number of settlements.
- A flood on the 29th September 1014 is thought to have been the first breach of the virtually closed coastline of the Low Countries. Walcheren in particular suffered heavy damage and the Chronicle of the Quedlinburg Abbey in Saxony recorded that thousands of people had died. The same flood also struck the Flanders and the coast of England.
- In 1134 a major storm surge enlarged the creeks in Zeeland, turning Zeeland into an archipelago.
- In 1288, the Saint Agatha's day flood occurred on the 5th February, thousands of victims were reported throughout Zeeland and South Holland.

14th and 15th Centuries

- In 1318, flooding in Walcheren led to the appointment of 'Dike Counts' and the first organised form of joint dike monitoring.
- The St. Clemens Flood, 23rd November 1334, struck the southwestern Netherlands, Zeeland and Holland, and the coast of Flanders, and the coast of England. As a result Walcheren flooded. The island of Wulpen was hit first by this storm surge. The St. Elisabeth flood in 1404 was the final blow for this island; the last remains of this island disappeared during the All Saints' Flood of 1570. Thousands of victims were reported.
- The second St. Mark's Flood or First Great Mandränke (great drowning of people) took place from January 15 to 16, 1362. All countries adjoining the North Sea were affected. In the Netherlands, dikes broke all along the coast resulting in most of the Netherlands being flooded and thousands of victims reported.
- A storm in 1374 and two in October and November 1375 again caused widespread flooding in Zeeland and Flanders, many villages disappeared and the Western Scheldt was widened.
- Three catastrophic storm events were recorded in the early 15th century. All occurring on St Elisabeth's day, the 19th November 1404, 1421 and 1424. Each lasted around 36 hours and caused wide-spread flooding in large parts of Flanders, Zeeland and Holland. The 1421 floods are ranked 20th in the list of the worst floods in history. The storm caused the dikes to break and the flooding destroyed villages and killed between 2-10,000 people. The survivors of Dordrecht, where 23 villages were submerged, created an altarpiece depicting the disaster (Figure 3), which can be seen displayed in the Rijks museum.
- The storm flood of 27th September 1477 affected the Netherlands, Belgium and Germany. Walcheren in Zeeland was flooded as a result of several dike breaches along the coast.



Figure 3: The St Elisabeths Day flood altarpiece (Source Master of the St. Elizabeth Panels, Public domain, via Wikimedia Commons).

16th and 17th Centuries

- On November the 5th, 1530, the Saint-Felix day floods again washed away large parts of Zeeland with more than 100,000 people killed. Many more villages in Zeeland were lost due to sea level rise following storm surges in 1532 (The first All Saints Day flood) and the Saint Pontius Flood (1552).
- Despite the first ever flood warning being issued, little could be done to prevent the national disaster caused by the second All Saints Day flood on the 1st November, 1570. A prolonged period of stormy weather swept the water along the Dutch and Flemish coast to unprecedented heights. Numerous dikes on the Dutch coasts collapsed, resulting in wide-spread flooding. Deaths were estimated in excess of 20,000 with tens of thousands more left homeless, their livestock and winter supplies destroyed. The Duke of Alva informed King Phillip II that ‘no less than five sixths of Holland were underwater’. This remains the worst flood disaster in the history of the Netherlands.
- The weather during the 16th century was particularly stormy. At least seven storm surges were recorded: 1509, 1511, 1530, 1532, 1552, 1570, 1594. All had a devastating effect, particularly to the left bank of the Westerschelde.
- The Storm Flood of 1682, the result of a spring tide and a north-westerly storm combined, resulted in flooding in South Western Netherlands, including Zeeland, and Flanders.

19th and 20th Centuries

The storm that hit Zeeland in January 1808 was most felt in Vlissingen, where houses collapsed and 31 people were killed. The flooding around Wijnberg quay and Palingstraat in Vlissingen, were depicted in paintings by Johannes Hermanus Koekoek (Figures 4 and 5), the originals are held in the Rijksmuseum.



Figure 4: Flood in 1808, surrounding Wijnberg quay. Source <https://artsandculture.google.com/asset/doorbraak-van-de-wijnbergse-kaai-te-vlissingen-1808-izaak-jansz-de-wit-joannes-pieter-visser-bender-johannes-hermanus-koekkoek/kQHRqsuCZroGsQ> accessed 10/06/2021



Figure 5: Overstroming in de Palingstraat te Vlissingen, 1808, Izaak Jansz. de Wit, after Johannes Hermanus Koekkoek, 1808 <https://www.rijksmuseum.nl/en/collection/RP-P-OB-61.108> Public Domain accessed 10/06/2021

A large storm surge on the 12th March 1906 caused considerable damage in Zeeland and Flanders, with very high-water levels recorded in Vlissingen, only exceeded by the 1953 flood. Several postcard images show the water levels and damage in the Oude Market, Kleine Market in the city centre (Figure 6). As the flood occurred during daylight hours few victims were recorded. In an attempt to protect the area in the future, parts of the docks were dammed up (Koopmans Harbour and Achter Harbour (today Bellamypark and Spuistreet) and Potte Quay (today Wilhelminastreet and Hendrikstreet).



Figure 6: Oude Market, Vlissingen. 12th March 1906. Published by G C Reyers Jr. Source Ebay.co.uk Copyright Unknown. Accessed 10/06/2021

In 1944, during the Second World War, the Island of Walcheren was deliberately flooded by the Allies who bombed the sea dikes at Vlissingen (Nolle dijk), Veere and Fort Rammekens to drive the Germans out of the area and open up access to the Port of Antwerp. Allied amphibious landings commenced on the 1st November 1944. The dike repairs took until February 1946. The flooding had displaced thousands of residents. This was not the first-time strategic flooding had been employed. During previous periods of warfare, such as the 80 years war of Dutch independence 1568-1648, flooding was used by both occupying and invading armies to restrict access.

The storm on the 31st January 1953, produced the highest flood levels ever recorded in Vlissingen, 3m above the highest, high tide. The storm surge combined with high spring tides, developed along the coasts of the UK, Belgium and the Netherlands, causing the North Sea to rise to extreme heights. The impact was most felt between Vlissingen and Hook of Holland. In the Netherlands 1,836 lives were lost, 200,000 cattle lost, 187 km of sea defences damaged and over 135,000 hectares of fertile land inundated. This would be the greatest natural disaster to occur in the Netherlands in the 20th century. As a result of the 1953 flood, the Delta Committee was established.

Flooding continues to be an issue in the 21st Century and in just one example, on 6 December 2013 the water levels rose and part of the port of Vlissingen was flooded.

1.4 Current Environmental Impacts/ Threats & Management Approaches

A large part of the Netherlands lies below sea level which make it vulnerable to flooding. The Delta Works makes up the largest flood defence system in the Netherlands, work began on it the year after the Great Flood of 1953 and it was completed in 1997. It is made up of three locks, six dams and four storm surge barriers and was voted the most prestigious hydraulic engineering project in the world in 2013.

The principal purpose of the Delta Works is to protect the country against flooding, but the flood barriers also have other benefits:

- The dams allow the flow of water to be manipulated to admit fresh water and release polluted water, thus improving the quality of the water.
- They ensure a larger supply of fresh water on the landward side which benefits agriculture.

- They improve access to large parts of the province of Zeeland for inland shipping, for example by mitigating the impact of tidal movements.
- They have helped to create new nature reserves and recreational areas. The Oosterschelde National Park, for instance, has been created from exposed sand and mud flats, while new bodies of water are popular with visitors for the walking and cycling paths or water sports.

In Vlissingen itself the right balance must be sought between coastal defence and urban development. The addition of Nature Based Solutions creates new opportunities for a new way of spatial development. There are a variety of forms of coastal defence in Vlissingen (beach, concrete barrier, green dyke), while the Dutch coastal strip is primarily designed as a sandy coast. If no measures are taken in the area of the Vlissingen pilot, the dike will eventually have to be raised by three meters. This has a very large negative impact on the urban quality of Vlissingen.

The proposed design of the public space protects the inner city of Vlissingen from damage caused by flooding and wave overtopping. Green barriers absorb seawater and carry it off naturally to the urban water system. This limits the chance of damage to property and people. As part of an area development, 'De Spuikom' is being made suitable for responding to sea level rise in the long term. Innovative concepts of urban development (climate adaptation and spatial adaptation) will be applied here. Green, quality, urban development and adaptive coastal defence will be combined within this coastal city.

2. Archaeology & Palaeoenvironmental Resource Scoring

This section provides initial background to the palaeoenvironmental, archaeological and historic development of the area surrounding the Pilot Project to put its development into longer term context. It then presents the results of the scoring of a range of sites, buildings and features within the pilot study area to identify those which provide the most potential for informing on the scale and pace of coastal change.

2.1 Archaeology and History of the Pilot Study Area

Evidence from prehistoric periods through to modern day includes a wide range of traces of the environmental changes through preserved deposits and land surfaces in addition to the many finds, traces of buildings and burials through to historic development of coastal hamlets then towns. This evidence provides the long-duree of human use and occupation at the shore, including how people have both influenced coastal change through structures and have themselves been impacted through storms and coastal changes.

Evidence of a number of important Prehistoric and Roman sites have been found within a 30km radius of Vlissingen, though Vlissingen would not emerge as a town until the 13th century.

Prehistory

A single Neolithic flint blade is the only prehistoric evidence from Walcheren. It is likely that prehistoric evidence is hidden by the deep Pleistocene deposits, or has been eroded away through tidal action or peat extraction. Findspots of worked flints, representative of nomadic hunter-gatherers, have been found in the surrounding areas such as in the dunes at Cadzand (15km south-west). Some evidence of their temporary dwellings exists at at Zaamslag (30km southeast), The Meester van der Heijden Groeve at Nieu-namen (45km south-east) and at Aardenburg (20km south-west) (Besuijen, 2008).

Offshore archaeology has been recovered by shell fishing trawlers, fishing amongst the Zeeland ridges, parallel to the coast. Flint tools and waste products, worked antler and bone, and even a fragment of 40,000-year-old Neanderthal skull, have been found in their nets or discarded in the waste heaps of shells, discarded at the wharves. Similarly, the dredging of sand and gravel from the North Sea for coastal reinforcements and land reclamation off the Dutch coast has also revealed many prehistoric artefacts, indicating that in the Prehistoric period, people were living on land which is now submerged by the North Sea.

Evidence of Bronze age occupation exists at Meester van der Heijden Groeve, the highest point on Zeeland (6m). The absence of Bronze Age finds elsewhere reinforces the theory that the majority of Zeeland was flooded and uninhabitable at that time. Human activity increases again in the early and middle Iron Age (800-250 BC) as people start to settle on the coastal ridges and on the older dune formations. These higher elevated peat areas were drained and the peat extracted at a large scale for industrial purposes. Salt marshes were increasingly used for grazing and sea salt extraction.

Roman Period

Ancient authors such as Strabo, Caesar, Pliny the Elder and Ptolemy, refer to people living along the modern Belgium coast as belonging to the Menapii tribe. Ceramic and numismatic evidence point to the first Roman occupation in Zeeland occurring from AD 50. Under Roman rule, the landscape of Zeeland was greatly modified with the construction of shoreline defences, towns, ports and harbours. Salt and peat extraction was increased to an industrial scale, that would cause devastating flooding, leaving much of Zeeland uninhabitable.

As Roman occupation along the coast increased from the 2nd century AD, large settlements developed in the area around Vlissingen, namely at Ellewoutsdijk (18km south-east) and Brabers (29km north-east). The growing Roman population started to draw interest from Germanic tribes across the North Sea, and so Roman military forts, part of the *Litus Saxonicum*, were built along the coast, including at Aardenburg, Oudenburg and Maldegem-Vake. Other small fortifications and watch towers were likely to have been constructed along the coast on the older dune formations, though coastal erosion has destroyed all trace of these. At the same time as the Franks were attacking, in the 3rd century, the sea was also transgressing and many towns and coastal areas were lost to the sea.

Coastal protection bought about a period of unprecedented economic activity and prosperity. The town of Domburg (16km north of Vlissingen) and Ganuenta, developed as important Roman trade centres. Ganuenta was an important lay-over town for merchant ships bound for Britain. Roman temples devoted to Nehalennia, the celtic/germanic goddess of seafaring and trade, have been discovered in both towns. Erosion of the dunes in Domburg by a storm in 1647 uncovered the remains of Roman temple. An event recorded by the artist Hendrik van Schuylenburgh, recreated again in 1805 by A C Bonn (see Figure 7 below).



Figure 7: An Illustration of the discovery of a Nehalennia temple in 1645 in Domburg, Netherlands, by A.C. Bonn, 1805 after Hendrik van Schuylenburgh - *Geschiedenis Zeeland*) (Public domain Source:

https://upload.wikimedia.org/wikipedia/commons/0/02/Nehalennia_Domburg.jpg accessed 17/06/2021)

In the 1970's fishermen discovered altar stones in the river Scheldt, believed to originate from Ganuenta, a town just north of Colijnsplaat that was lost to the sea around 300 AD. Archaeological work in 1970, 1971 and 1974 recovered 240 altars and statues, votive stones and the remains of a Roman building. In 1999, Archaeologists mapped the seabed around the location where the temples disappeared and in 2004 a reconstruction of the Gallo-Roman temple was built in Colijnsplaat (Figure 8).



Figure 8: Source Wikipedia creative commons

[https://commons.wikimedia.org/wiki/File:Tempel_van_Nehalennia_Colijnsplaat_\(2\).JPG](https://commons.wikimedia.org/wiki/File:Tempel_van_Nehalennia_Colijnsplaat_(2).JPG) Accessed 17/06/2021

The Roman fort of Rodanum (modern Aardenburg, 22km to the south-west of Vlissingen), existed between 170-273 AD. Archaeological excavations from the late 1950's to the late 1980's, concluded that the Roman town was at least as big as the modern settlement on the site today. The fort was abandoned in 274 after an attack by the Franks. At that time, salt extraction from the marshes was causing flooding, and no doubt added to the decision not to re-inhabit the fort until the middle ages when it was rejuvenated as a monastic centre.

By 350 AD, continued peat and salt extraction caused widespread flooding of Zeeland, resulted in the loss of towns and leaving large areas uninhabitable for the next 300 years. This can be seen in the archaeology of places in Zeelandic-Flanders, such as Zaamslag for example, where several metres of sediment separate the prehistoric and Roman layers from the next phase of occupation in 1000 AD.

Medieval Period

In the medieval and early modern periods, the population grew and the number and size of coastal settlements increased, aided by reclamation and the building of walls and dikes. These alterations exacerbated the widespread flooding caused by storms and tidal surges that are common in this area. Whole cities were flooded and destroyed.

The first mention of Vlissingen is recorded in the Dutch Chronicles of 620 AD. The Chronicles mention dwellings of fisherfolk and a ferry to Flanders. During the 8th-10th centuries, trade, primarily in wool, resumed with England. Vlissingen lies at an essential trade junction between the North Sea and the Schelde River, controlling access to Antwerp, which nurtured the growth of Vlissingen from a small fishing hamlet into a flourishing city. This economic and strategic location attracted much interest throughout history. Despite successfully rebelling against Spanish rule in 1572, Vlissingen would later fall under the rule of other European powers (Britain 1585-1616, France 1795–1814 and Germany 1939-1944).

The first reliable records of Vlissingen date back to an episcopal charter dated 28 May 1247. Old Flushing was situated within the line Boulevard Bankert, Strandweg, Julianalaan-Vrijdomweg (end) straight on to Boulevard Evertsen. The original coastline is said to have stretched from the wind organ on Nolledike parallel

to the fairway as far as Roeiers mole. As the town and trade grew, larger harbour facilities were required and the new town emerged in 1315 and quickly grew. Three new harbours were built: Voorhaven (the current Pilots berth), Koopmanshaven (Bellamy park) and Archerhaven (Spui 5 street). Once completed the old harbour was diked up, forcing the fishermen to move to the new town. In 1439 the present Marine Parade was transformed from back-dike into sea defence wall, resulting in the loss of much land. Further harbour extensions were completed in 1443. These harbours still exist today. Vlissingen traded with England, France and the Baltic, exporting Herring and salt and returning return for coal, wool, timber, pitch and tar. After a raid in 1485, the city was fortified. Figure 9 shows a map of the city in 1588 by Guicciardini shows the form of the harbours and layout of the streets.

The 15th and 16th centuries were particularly stormy, with flooding impacting Vlissingen. Three occurred on St Elisabeth's day, the 19th November 1404, 1421 and 1424, at least seven further storm surges were recorded: 1509, 1511, 1530, 1532, 1552, 1570, 1594. Each storm caused flooding and damage in the city.

17th and 18th Centuries

Throughout the 17th century, considered the Dutch Golden Age, ships sailed from Vlissingen to various outposts of the Dutch colonial empire. Between 1609 and 1614 the harbours were extended again, with the construction of the Ooster Harbours. At the same time, the fortifications were strengthened. These changes are visible in Blaeu's map dated 1649 (Figure 10). This was a period of great prosperity for the town with the successful fisheries trade, and the East India Company sending merchant ships from Flushing to Guinea, the Amazon and Orinoco, and out to trading posts in the West Indies, America and West Africa. Vlissingen was also a centre of the slave trade. Of 42 vessels sailing to Guinea in 1769, 22 were from Vlissingen, 18 to collect salves and four to collect gold. It is during this period that Vlissingen acquired its historical English name of Flushing.



Figure 9: Source: <https://www.ebay.com/itm/Antique-Map-VLISSINGEN-NETHERLANDS-Guicciardini-1588-/233780544161> Copyright Unknown. Accessed 17/06/2021



Figure 10 Vlissingen 1649 (ID 347) Blaeu, J, Public domain, via Wikimedia Commons 1645
https://commons.wikimedia.org/wiki/File:Vlissingen_1649_Blaeu.JPG Accessed 20/06/2021

In the 18th century, Napoleon established Vlissingen as a French Naval Base. Under French domination, trade was halted and as prosperity declined, Vlissingen decayed. A privateer fleet of 3500 became established in Vlissingen. In 1802 pilotage was exclusively entrusted to French pilots and in 1803 the French proclaimed martial law in Flushing caused by the outbreak of war with England as the struggle for world domination between Napoleon and England continued. The storm that hit Zeeland in January 1808 was most felt in Vlissingen, where houses collapsed and 31 people were killed. The French period ended in 1814, but the consequences for the town and its inhabitants following this period was immense poverty. Harbour activities and trade had stagnated, and the population greatly diminished.

19th Century Revival and 20th Century Challenges

The second half of the 19th century was a period of rebuilding and economic revival. Industrialisation and technical advances led coastal engineers to build larger harbours and installations out into the sea. Despite the advances, these too would have a negative impact on coastal dynamics and further add to coastal erosion. In 1868, the railway arrived in Vlissingen, further harbour works were completed and in 1875 the shipbuilding company, De Schelde was established there. The creation of the bathing pavilion in Vlissingen in 1872, was the first step towards Vlissingen becoming a tourist destination. The Zeeland Steamboat company brought visitors from England, and the tram and railroad connections brought visitors from mainland Europe. Other key facilities were added in the coming years - The Grand Hotel des Bains (later Britannia) built in 1886, the bandstand in 1906 and the lion staircase built in 1907 provided easier beach access. The extension of the Boulevard to 2km long was the showpiece of Vlissingen. Horse drawn beach coaches brought tourists from the transport links to the beach where they hired thatched beach chairs and were entertained by musicians playing in the bandstand, with kiosks providing refreshments.

A large storm surge on the 12th March 1906 caused considerable damage in Zeeland and Flanders, with very high-water levels recorded in Vlissingen. Postcard images show the water levels and damage in the city centre. In an attempt to protect the area in the future, parts of the docks were dammed up (Koopmans Harbour and Achter Harbour (today Bellamy Park and Spuistreet) and Potte Quay (today Wilhelminastreet and Hendrikstreet)).

By 1919 Vlissingen was a mature seaside resort and ranked in the top five in the Netherlands. The 1930's saw a drive to increase the economy through tourism, the harbour and industry. The harbours were expanded and the pier and pavilion were built. Vlissingen was very successful in attracting tourists, as shown in the postcard below, sent in 1941 (Figure 11).



Figure 11: Postcard Vlissingen Zeeland Nederlande, Partie am Strand Source

<https://www.akpool.co.uk/postcards/29271123-postcard-vlissingen-zeeland-niederlande-partie-am-strand> accessed 10/06/2021

Just as Vlissingen was recovering again, World War Two broke out. Vlissingen was the most shelled city in the Netherlands. The port and surrounding areas were bombed several times, and most of the buildings and infrastructure, were badly damaged or destroyed (Figure 12). The pier was demolished to prevent allied landings, and the Grand Hotel Britannia was commandeered by the Germans and heavily fortified. The strategic flooding of the Walcharen in 1944 by the allies, to rout the Germans and open up access to Antwerp, led to further destruction and an almost total evacuation of the city. With machines and materials in short supply, post war reconstruction was a slow process. Having only just recovered again, Vlissingen was hit hard by the 1953 flood disaster which killed more than 1,800 people. This flood led to the Delta Project, to dam the major sea channels and connect the islands with one another and the mainland.



Figure 12: WW2 Damage Vlissingen Boulevard Source: <https://www.pinterest.co.uk/pin/48273027241225433/>
Copyright unknown. Accessed 17/06/2021

Having overcome many catastrophes throughout its history, Vlissingen has always rebuilt and revitalised itself and to this day remains an important commercial port, fishing harbour, seaside resort and naval base, with approximately 50,000 ships from all over the world passing through every year.

2.2 Results of Archaeology scoring

This section outlines the results of the archaeological and palaeoenvironmental scoring from the Newlyn study area, followed by a discussion of the results. The scoring methodology applied is detailed in *SARCC Maritime Atlas: Methodology Report* (MAT, 2022). It should be noted that the scoring is not providing any measurement of historic or cultural significance of a site, only its potential to inform on coastal change.

Within the Pilot Area data was obtained from Archis3, the online database of the Dutch Cultural Heritage Agency, this provided detailed information on archaeological excavations and finds recovered from them with many sites having large numbers of data entered for a single excavation, these were assessed and grouped under a summary entry to the database. There were few standing buildings in the dataset, information on a limited number of these was also added to the data set.

The highest combined scoring sites are shown in Figure 13 and listed in the table below, the total score has been normalised to give each site a score out of 100. It is possible for a site to score highly in one of the three scoring categories and still be important for informing on coastal change over time. The combined approach identifies those scoring highly across the scoring categories.

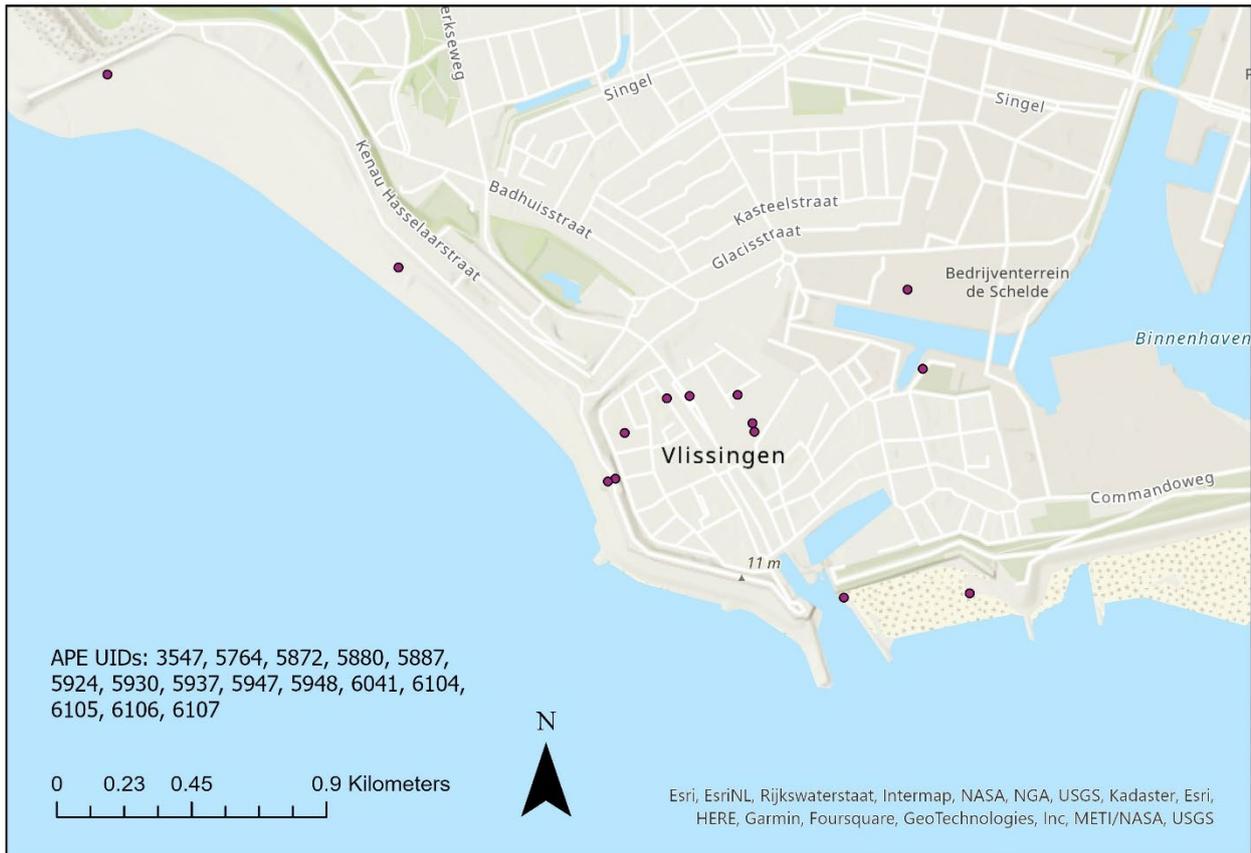


Figure 13: Distribution of the highest scoring archaeology and palaeoenvironmental sites in the Vlissingen study area.

ID	Site Name	Period	Score – sea level	Score – Environmental	Score – Temporal Continuity	Total Score
5764	Settlement/Port	Multi period	High	High	High	100
6105	Pier at Vlissingen	20th Century	High	High	High	100
6107	Harbour	Medieval	High	High	High	100
6104	Gevangentoren (Prison Tower) - Vlissingen	Medieval	High	High	Medium	88
6106	Hotel des Bains	19th Century	Medium	High	High	88
3547	Wreck Vlissingen Strand	Early Medieval	Medium	High	Medium	77
5948	Inhabitation, Embankment and Cesspit	New Age Late	Medium	Medium	Medium	66
6041	Late Medieval Camp Westpoort	Late Middle Ages B	Medium	Medium	Medium	66
5872	Gravesite	Late Middle Ages A	Low	Medium	Medium	55
5880	Embankment layer: ash layer	Late Middle Ages A	Medium	Medium	Low	55
5887	Settlement with urban character and Findspots	Middle Ages	Medium	Medium	Low	55
5924	Wharf/unloading ramp	Late Middle Ages B	Medium	Medium	Low	55
5930	Tombstone	Late Middle Ages B	Medium	Medium	Low	55

5937	Habitation (including defence) indefinite	New Age	Low	Low	High	55
5947	Grave site	Late Middle Ages B	Low	Medium	Medium	55

2.3 Discussion of Scoring Results

The table of highest scoring sites includes a range of sites, features and landscape deposits. Those scoring the maximum include a site with evidence of human occupation from prehistoric times through to modern, demonstrating the importance of being situated close to the marine environment for past cultures. Other high scoring sites include those with a very direct relationship to sea level – the Harbour and Pier. The developing harbour complexes reflect not only the expansion of the town, but also adapting to being adjacent to the water.

Further evidence how people were adapting to living in a low lying area close to the sea, which has the added threats from invasion comes from sites which include embankments, defensive walls or the Prison Tower.

A range of other sites which scored lower as a total score feature within the dataset. It is possible for a site to score highly on one of the categories and within that still have the potential to help understand changes over time.

2.4 Photography Survey of High Scoring Features

Some of the sites and features that scored highly are in existence today and can be viewed/ visited. A site visit was undertaken to capture current day images of a number of the archaeological and historic features, a range of key examples are included below (Figures 14 – 16). These can now be used to directly compare with other available resources to demonstrate the extent to which there have been changes to the coastal frontage.



Figure 14: Looking along Boulevard Evertsen, the area of frontage adjacent to the SARCC Pilot area. The position of the Hotel Britannia [ID:6106] (prior to demolition) can be seen.



Figure 15: The Prison Tower, directly adjacent to the beach frontage [ID: 6104]



Figure 16: Looking out of the Old Harbour Entrance

3. Maps and Charts

This section provides a background to the development of maps and charts over time which have relevance for the area surrounding the Pilot Project. It then presents the results of the scoring of a range of maps and charts which cover the pilot study area with details that allow them to help demonstrate changes to the coastline over time.

3.1 Maps and Charts Background/ Map Progression

Prior to the Middle Ages, early maps were little more than a sketch of a small area, accompanied by a more detailed written report. In the fifteenth and sixteenth centuries, more traditional maps began to appear, but were usually drawn by artists and were of a pictorial nature. Focusing on the location of towns, castles and fortifications, rivers, lakes and woods, these large works were commissioned to be displayed in palaces and castles. It wasn't until the mid-sixteenth century when systems of survey and measurement were introduced, that the potential of maps as reliable tools for a variety of purposes was realised.

The earliest map?

Jacob van Deventer and Jean Surhon were commissioned by the government to create manuscript topographical plans for all the cities of the low countries. The earliest map of Vlissingen is thought to have been drawn by J van Deventer in 1550 (Figure 17). It is a simple, coloured topographical view. Vlissingen also appears on Deventer's map of Zeeland of 1547.



Figure 17: Jacob van Deventer, Vlissingen 1550. An early topographical map. Source

https://en.wikipedia.org/wiki/File:Vlissingen_1550_v_Deventer_min.jpg public domain. Accessed 17/06/2021

Pictorial Maps

Two maps, both dated 1588 exist. Robert Adams (1540-1595) was an English architect, draughtsman, military engineer and mapmaker who rose to be Surveyor of works to Queen Elizabeth. Robert Adams's Plan of Flushing is a watercolour and pen and ink map drawn on parchment in 1588, whilst Flushing was under English occupation. The original is held by the British Library. It shows Vlissingen at low water and contains fine pictorial details of the buildings, ships and even gardens. The fortifications and coastal features are clearly marked. It is thought that the amount of detail on the map, in the early European style, indicates that it may have been intended for presentation to Lord Burghley or Elizabeth I. Subsequent prints were coloured differently.



Figure 18: Plan of the town of Flushing, drawn by Robert Adams (d. 1595) Source: <https://www.bl.uk/collection-items/plan-of-flushing> Public domain Accessed 17/06/2021

A map of Vlissingen was created by Lodovico Guicciardini (1521-1589) (Figure 19), an Italian merchant of aristocratic descent, living in Antwerp from 1542. This map was published in a 1558 edition of his work 'Discriptione di tutti i Paesi Bassi' (Description of the Low Countries), an influential account of the history and the arts of the Low Countries, accompanied by city maps by various leading engravers. Again in the pictorial style, it contains similar details of the town, the fortification and the coastline, but has added detail in the fields where animals, crops and a farmer ploughing can be seen. Men can also be seen on the ships and in the rowing boats. After Guicciardini's death, his work was continued by Joannes Janssonius (Arnhem, 1588-1664), including an update to the Vlissingen map in 1652. Janssonius was a rival to the Blaeu family.

Commercial mapping (which largely continued to be pictorial) began in the seventeenth century, with maps drawn as part of atlases for publication. One of the most famous is the *Civitates Orbis Terrarum*, or the "Braun & Hogenberg" published in 1610 (Figure 20), which contains a copper engraving of Vlissingen titled "The well-fortified town of Vlissingen in Zeeland, safe harbour for merchants and mariners".

This six-volume town atlas is considered the greatest book of town views and plans ever published and was one of the best-selling works of the late 16th century. The plate was engraved after the original drawing by Joris Hoefnagel in 1596. Frans Hogenberg, was a German/Flemish painter, engraver and map maker. Georg Braun, a theologian, wrote commentaries on the backs of the works. Both worked in Cologne. Drawn at an elevated angle, this map provides a good overview of the whole town, with details of the ships at jetties, in the inner harbour and out at sea. The ruined citadel and even the gallows can be seen to the right of the town.



Figure 19: Source: <https://www.ebay.com/itm/Antique-Map-VLISSINGEN-NETHERLANDS-Guicciardini-1588-/233780544161> Copyright Unknown. Accessed 17/06/2021



Figure 20: Vlissingen, by Georg Braun and Frans Hogenberg. c. 1610 Source: <https://sanderusmaps.com/our-catalogue/antique-maps/europe/netherlands-cities/antique-map-bird-s-eye-plan-of-vlissingen-by-braun-hogenberg-24597> Copyright Unknown. Accessed 17/06/2021

Other famous map makers and publishers of this time were the Blaeu family. After the death of his father Willem in 1638, Joan Blaeu expanded the family business to become the largest printing house in Europe. Like his father, Joan was appointed map maker and supplier of charts for the Dutch East India Company. In 1649 he published *Toonneel der Steden van de ... Nederlanden* (*Atlas of Holland*). Blaeu was considered the greatest master of pictorial cartography, and included fine detail in his map. Blaeu's map of Vlissingen is no exception, featuring rows of neatly arranged red tiled houses, ships, windmills, churches, planted garden plots and woods (Figure 21).



Figure 21: (ID 347) Vlissingen (Flushing) 1649 by Joan Blaeu Source: <https://www.cartahistorica.com/our-catalogue/europe/benelux/netherlands-cities/vlissingen-flushing/> Copyright unknown. Accessed 17/06/2021

Topographical Maps

From the early seventeenth century, the development of accurate methods of measurement led to the emergence of topographical maps as reliable tools for land accounting, water management and military strategy. Under Spanish rule the Emperor Charles V (1506 to 1555), commissioned strategic surveys of virtually all the towns in the low counties to be carried out by geographers loyal to the crown. The Spanish mapping focuses on campaigns, sieges, acquisitions, and new fortifications. Meanwhile, topographical mapping began at provincial levels. A Dutch phenomenon, known as Waterschap mapping, emerged, as provinces began to undertake their own surveys of the waterways in their territory for water management purposes.

Figure 22 is a 1750 map of Vlissingen (creator unknown) which shows the Docks at Vlissingen, shortly after they closed at the end of the first Navy period in 1645 and prior to the early nineteenth century rebuilding. Created through measured survey, it still contains a much of the detail captured in the pictorial maps of the sixteenth century, building outlines etc, but is entirely two dimensional.



Figure 22 Source: 1750 map of Vlissingen (Hattinga, Public Domain, Wikimedia Commons).

A map of Flushing by William Faden (the English Royal Geographer to King George III), dated 1809 was produced to show the boundary of the French territory as determined by the Treaty of Fontainbleau, that marked the end of Napoleonic rule. This map can be found on the Royal Collections Trust website (<https://militarymaps.rct.uk/napoleonic-wars-1803-15/flushing-1809-plan-of-the-environs-of-flushing-from>). Topographic maps as tools continue to be produced into the present day, made ever easier as new technology emerges.

3.2 Results of Scoring

The ranking system for maps and sea charts as set out in SARCC Maritime Atlas: Methodology Report (MAT, 2022) and has been applied within the Vlissingen pilot area. A range of historical maps and charts of the area, were assessed as part of the project, with some dating back over 500 years.

The study of maps and charts has utilised a range of online resources, it has been designed to show the potential of this type of resource for coastal change, but it is not an exhaustive study as other examples are likely exist within archives, museums and libraries. Sixty-nine maps and charts were analysed through the scoring system, the top scoring examples, which scored above 50 are detailed below:

MAP _uid	Title	Year	Score Chronometric Accuracy	Score Topographic Accuracy	Score Detail in non-coastal area	Score Geometrical Accuracy	Total Map Score
403	Blankenberge and Vlissingen C18.	1621 ?	100.00	50.00	100.00	66.67	79.17
410	Belgian Coast plus Vlissingen.		100.00	50.00	66.67	66.67	70.83
179	Chart of Vlissingen 1965	1965	100.00	41.67	66.67	66.67	68.75

411	Zeebrugge to Vlissingen 1913.		100.00	41.67	66.67	66.67	68.75
412	Vlissingen 1297 representation.		100.00	38.89	66.67	66.67	68.06
178	Chart of Vlissingen 1951	1951	100.00	33.33	66.67	66.67	66.67
245	Vlissingen 1730 map	1730	100.00	27.78	100.00	33.33	65.28
244	Vlissingen 1730 map	1730	100.00	27.78	100.00	33.33	65.28
172	Map of Vlissingen 1939	1939	100.00	58.33	66.67	33.33	64.58
347	Blaeu 1645 - Eastern part of German Flanders	1645	100.00	52.78	66.67	33.33	63.19
169	Map of Vlissingen 1645	1645	100.00	50.00	66.67	33.33	62.50
176	Map of Vlissingen 1970	1970	100.00	16.67	66.67	66.67	62.50
375	Map of the Flemish coast 17th century	1600s	100.00	41.67	33.33	66.67	60.42
170	Map of Vlissingen 1588.		100.00	41.67	66.67	33.33	60.42
304	Vlissingen 1972	1972	100.00	30.56	66.67	33.33	57.64
305	Vlissingen 1994	1994	100.00	30.56	66.67	33.33	57.64
266	Zeeland with flooded areas 1808	1808	100.00	50.00	33.33	33.33	54.17
387	Map of Flanders 1539. Gerardus Mercator	1539	90.91	20.83	33.33	66.67	52.94
167	Map of Vlissingen 1893	1893	100.00	41.67	33.33	33.33	52.08
343	Flanders (Vlaanderen)	1641	100.00	38.89	33.33	33.33	51.39

Table: Top scoring maps and charts of the Vlissingen Pilot Area.

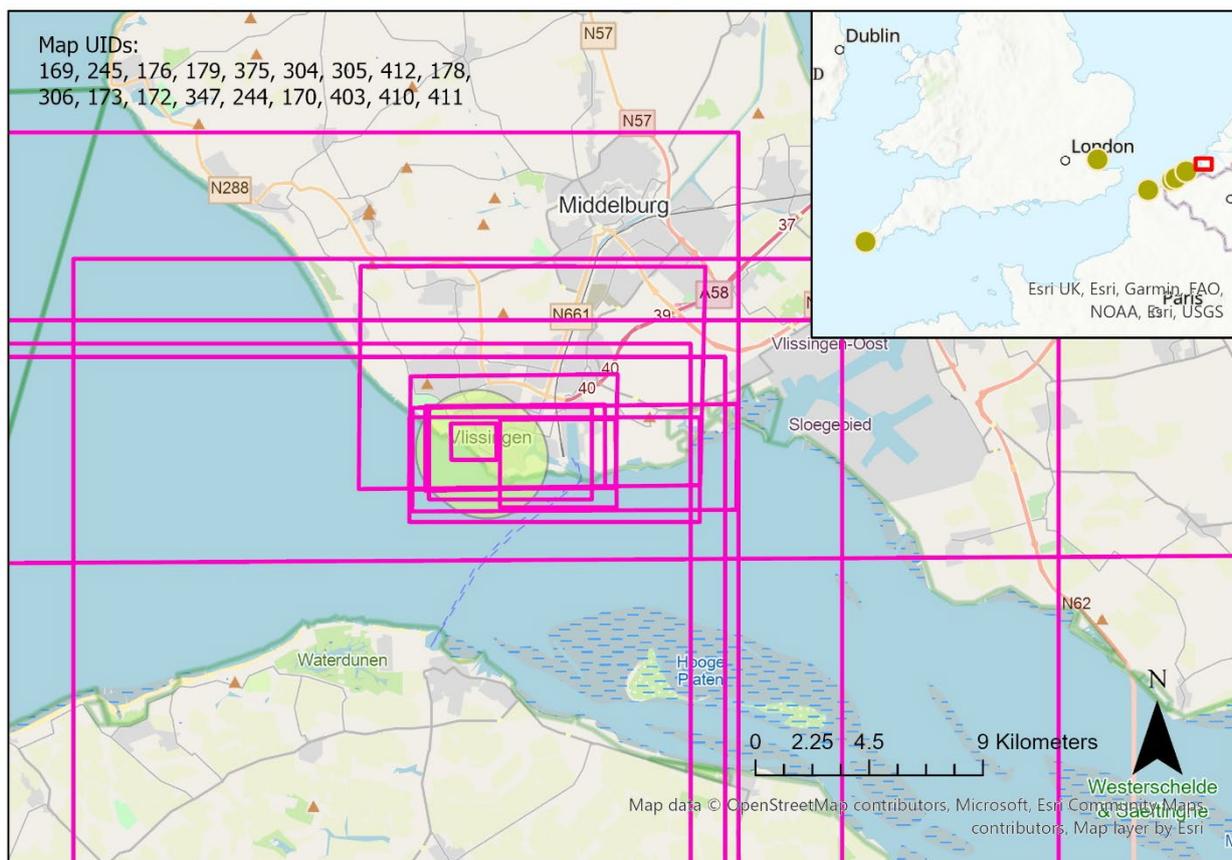


Figure 23: Distribution of highest scoring maps and charts.

3.3 Discussion of Scoring Results

Vlissingen is often included on maps and charts which cover 'Flanders' often appearing on the far east of the maps/ charts, one example of this is Mercator's map of Flanders (Figure 24).

The strategic maritime importance of Vlissingen has meant a long history of map and chart production, some of these have been related to documenting defensive structures, with Vlissingen having been fought over on multiple occasions. Other maps show the development of the harbours with growing capacity for shipping and trade. Section 3.1 has outlined the key developments in mapping and those responsible for creating some of the most detailed of Vlissingen.

The changes to the coastline adjacent to the SARCC pilot area can be seen through the maps. The Deventer map of 1550 (ID 443) (see Figure 17 in Section 3.1) shows that the new town of Vlissingen is now firmly established. The old town harbour has been diked up and all fishing activity diverted to the new harbour. In the pilot area, two jetties are visible and only a couple of buildings are visible along the coastline towards the new town. By 1649, Blaeu's map (ID 347) (see Figure 21 in Section 3.1) shows the coastal area of the old town – adjacent to the pilot area, is now in agricultural use, with a few domestic buildings connected to agricultural plots visible. A row of buildings and two jetties have been built further along the coast towards the new harbour. The seafront adjacent to the pilot area began to develop as a tourist destination in the late C19th. The first tourist building was the Grand Hotel des Bains built in 1886, later renamed the Grand Hotel Britannia. The hotel and baths are shown as the only buildings on the Boulevard in the 1893 map (ID 167). By 1970 (ID 176), the map shows buildings almost completely filled the entire length of the boulevard. Buildings had also been inserted in the dune area to the west of the hotel too. By 1970, no dunes remained.

There are several examples of Admiralty charts which appear in the high scoring table with the charts from 1965 [ID179] and 1951 [ID178], being the top seven highest scores. By these dates the practice of charting the coastline had developed significant accuracy and these can be relied upon for their depictions of the coastline and the near and offshore hydrography. They chart the offshore seabed features and channels in great detail as these features had to be negotiated by ships.



Figure 24: Extract from Mercator's map of Flanders with Vlissingen shown on the north of the map. (Mercator, Public Domain, Wikimedia Commons)

4. Pictorial Resources Scoring

This section presents the results of the research, scoring and analysis of artistic images and historic photographs. The scoring approach for these resources has been developed to take account of the various styles, approaches and potential subjectivity (particularly of art images), and the potential of the resources to provide information on coastal change.

Artistic resources provide a similar time-depth to maps and charts in terms of the periods over which they have been produced, with photography being available for periods from the mid – late 19th century. Whereas maps and charts were designed to be as accurate as possible in producing ‘plan views’ which include the coast, art and photography provide a range of landscape and oblique views which give a different type of evidence of coastal change.

4.1 Artistic Images

The use of artistic images to help understand coastal processes, measure coastal change and inform approaches to coastal management has been developed over the past 20 years. Initial reports focused on the use of art resources to demonstrate coastal change in relation to issues for life and for economic assets (McInnes & Stubbings 2010, 2011; McInnes & Benstead, 2013, 2013, 2015). They demonstrated the potential for the resource to provide more data on other aspects of coastal management. The use of art images alongside archaeology and heritage data was further developed through the Arch-Manche project (<https://archmanche.maritimearchaeologytrust.org/>) which focused on long-term coastal change and included the assessment of artwork, cartography and photograph for more recent periods.

This section briefly outlines the development of coastal art history relevant for the Pilot Area before looking in detail at the high scoring art works and what these examples show us.

4.1.1 Summary of Art History of the Channel Coast

The development of coastal artistic representations across the area of the SARCC Pilots has a common history which reflects broader trends in social and economic development and their impacts on art and artists. This brief review of developing trends draws on the work of Professor Robin McInnes within the Arch-Manche Project and is a summary of the background to the art of the Channel-Southern North Sea Region from the Arch Manche Technical Report (McInnes 2014). It provides a review of the development of coastal art applicable across the Channel coast SARCC pilot areas, with additional detail on further research related to the specific pilot area.

The beginnings of coastal art

It wasn't until the early 17th century that the work ‘landscape’ started to be used in English to describe scenery, it came from the Dutch word ‘landschap’ (an area of cultivated land). But the origins of landscape painting date back to the 15th century when scenery was included in paintings of early artists such as Leonardo de Vinci. In the 16th century in the Netherlands Pieter Brueghel the Elder (1525/30-1569) painted scenes which included the countryside and coast. However, for much of the 16th and 17th centuries portrait painting was the most common work produced.

During the fifteenth to seventeenth centuries Flanders produced some of Europe's leading artists. “Artists from the Netherlands, Flanders and Belgium played a significant role in the development of landscape art, particularly in relation to the coastal and marine environments”, these included Pieter Bruegel the Elder, Rubens and Van Dyck. This encouraged other European artists to their centre of activity and Flemish Baroque painting flourished, particularly in the Antwerp School, but also in Brussels and Ghent. Following the Siege of Antwerp in 1584-85, Flanders became separated from the Dutch Republic and many artists fled to Holland, leading to the development of the ‘Dutch Golden Age’ of painting, which spanned the 17th century. A more naturalistic style of painting developed which included landscape depictions, with important artists being Esias Van De Velde (1587-1630), who painted landscape, genre and shipping subjects and Hendrick Avercamp

(1585-1634) who painted some of the first Dutch landscape paintings. Seascapes became more popular with Hendrik Vroom (1566-1640) being one of the earliest seascape painters.

The Dutch economy was heavily based on maritime trade which was captured through paintings, as was naval conflict and dangerous sea condition. Many of these paintings included detail of the coast, beaches and harbours.

Strong European trading networks meant Dutch and Flemish painters and paintings were exported, including the famous Willem Van De Velde (c.1611-1693) and his son, also Willem (1633-1707), who moved to London in 1672. Their expertise in depicting ships and the sea dominated marine painting in England and inspired a generation of English marine painters. Dutch art was particularly influential on the 'Norwich School of artists' (1803-33).

"The influential role of Dutch, Flemish and Belgian artists on the development of land and seascape paintings cannot be underestimated. In particular, the prosperity of the Dutch Republic created an opportunity for strong trade links with the rest of Europe and this in turn enabled works of art, and, therefore, artistic styles, to permeate into Great Britain".

The fashion for monied young men to take the 'Grand Tour' in the late 17th and 18th centuries developed appreciation for classical remains and Renaissance art, particularly of Italy and Greece. Those returning often commissioned art work and were particularly impressed by the landscape paintings. While 'on tour' they were able to purchase engravings and paintings of coastal scenes that had been painting for the 'tourist trade'. Some travellers were accompanied by their own artists and later photographers to capture their sights while on tour.

Throughout the 18th century there was growing appreciation of landscape and subsequent interest in landscape painting including through watercolour drawings and through publication of richly illustrated aquatinted plates.

19th Century Developments

In the 19th century artists continued to follow the Dutch tradition of creating very detailed depictions of the coast capturing developing coastal settlements which developed into resorts. "This era of coastal landscape painting relied not just on the skills of the original artists in the field, but also a number of remarkably fine craftsmen, engravers and colourists, who produced illustrations through a range of techniques such as aquatint and lithography".

In particular the mid-19th century Pre-Raphaelite Brotherhood became influential in landscape painting – they wished to capture nature in its precise detail and beauty and they painted the smallest of details in their quest for realism. Their works and those of their followers coincided with developing interest in the natural and earth sciences and the development of geology. Many important geological exposures have been painted by Pre-Raphaelite artists and their attention to detail means these works can be of particular importance for studying the chronology of physical, environmental and social change around the coast.

The influence of the Pre-Raphaelites was felt throughout the art world, and many artists were inspired by their methodical approach to depicting the natural world. Although there are many example of Pre-Raphaelite coastal paintings from Britain, many artists worked in a range of countries. For example Edward William Cooke RA (1811-1880) took a keen interest in depicting the geology of the coastline with great accuracy and precision and produced works of the English, French and Dutch coastlines.

Coastal Art Colonies

A number of 'artistic schools' developed around the coastline in the 19th century and thrived until the early 20th century. They often centred on particularly aesthetic locations where artists worked together developing particular styles. In the post Napoleonic War years and after the European-wide revolutions of the early 1800s there began a gradual movement of artists towards the coastal towns of Europe. This trend continued until the outbreak of the First World War.

Art colonies grew in size throughout the 1800s. There were over eighty art communities around the Channel-Southern North Sea coasts of different types including villages with transient and fluctuating artist populations, for example Honfleur on the French coast and Katwijk on the Dutch coast; villages with semi-permanent visiting and residing artists, for example, Concarneau in France, St Ives on the Cornish coast and Bonchurch, Isle of Wight; and villages with mainly stable groups of artists in residence, for example, Egmond on the Dutch coast and Newlyn in Cornwall and Walberswick in Suffolk, East Anglia.

Painting by the coast was seen as a means of reverting to a simpler way of life away from the industrialisation of many European cities. The artists of the colonies shared a common aspiration to paint en plein-air (i.e. out of doors), they embraced descriptive realism and were eager to paint out of doors in front of the subject and capture the subject in its natural setting.

The presence of a coastal art colony often means there is a large legacy of paintings for the surrounding coast, many of which can contribute to understanding of changes to the coast over time.

Art and the Development of Tourism

From the mid 18th century visitors were drawn to the coast for health and leisure. In the 19th century with the expansion of the railway network and road building the numbers visiting developing seaside resorts from growing urban centres increased rapidly. The building of promenades, piers and hotels followed and fuelled this demand on both sides of the Channel coast.

Visitors wanted a record of the areas of the coast they had visited and before photography this was achieved through artworks, or copies of these. Even after the invention of photography works of art were still high in demand as they provided colour views when photographs were still black and white. For this reason paintings of the coast continue to be important for records of coastal change into the 20th century.

Early guidebook publications were highly illustrated with engravings, however, in the mid 19th century they could not be printed in large enough numbers to meet demand. However, the invention of chromolithography and colour plate reproduction allowed larger print runs to be developed. Artists were commissioned to write and illustrate books which covered all part of the European coast to meet the demands of travellers and tourists. From the 1890s onwards postcards became popular with tourists, many of them featured coastal scenes. Artists were commissioned to create paintings for use as postcards.

4.1.2 Results of Art Scoring

The development of the scoring system for works of art is described in SARCC Maritime Atlas: Methodology Report (MAT, 2022). Details of each artwork have been entered into the project database, including information on artwork type, medium, subject matter, time period and other parameters, the database was then able to calculate the scores for works of art from the pilot study site. 16 artworks were scored and analysed for the project, 8 scored over 51 (Figure 25):

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



Figure 25: Distribution of the highest scoring art works within the Vlissingen Pilot Study Area.

4.1.3 Discussion of Scoring Results

A large number of the art works are panoramic views of Vlissingen Harbour from the sea captured during the 1600's. Landmarks such as the Voorhaven harbour entrance, the Powder Tower, windmills and St James the Great Church have great temporal continuity and can be seen in the top seven scoring art works.

As many of the art scored were views from the sea, it has not been possible to take comparative modern photographs of the same view. One high scoring art work was the painting [ID 430] by Johannes Christiaan Klinkenberg 'Arnhemuiden fisherwomen returning from the market in Vlissingen' which features the Prison Tower, which a comparative modern photograph was collected for. This painting is in private ownership, a copy from the auction catalogue can be viewed online: <https://www.sothebys.com/en/auctions/ecatalogue/2008/19th-century-paintings-am1049/lot.198.html>

Oil painting 'Vlissingen in volgelvlucht', [ID 432], by Petrus Segars, painted in 1669 is the only image to capture the whole of Vlissingen, from the Pilot area in the west to the docks in the east (Figure 26). Other paintings from the 17th century which capture a similar view of Vlissingen and show the entrance to the harbour with the Prison Tower and church clearly visible include Bouttats 'View of Vlissingen' of 1616 [ID396] (Figure 27), Petrus Segars 'Zicht op Vlissingen vanuit zee door' of 1662 [ID636] (Figure 28), and Cornelisz Vroom's The Arrival at Vlissingen of the Elector Palatinate Frederick V of 1632 [ID369] (Figure 29).



Figure 26: 'Vlissingen in volgelvlucht', [ID 432], by Petrus Segaers, 1669 (Segaers, Public Domain, Wikimedia Commons).



Figure 27: Bouttats 'View of Vlissingen' of 1616 [ID396]



Figure 28: ID 636 *Zicht op Vlissingen vanuit zee door*, 1662 (Petrus Segars, Public domain, via Wikimedia Commons)



Figure 29: ID 369 *The Arrival at Vlissingen of the Elector Palatine Frederick V* (Hendrick Cornelisz Vroom, Public domain, via Wikimedia Commons)

Painting ID 368 by an unknown artist, is a different view and is titled 'Panoramic view of the Bombardment of Flushing during Walcheren's Expedition 1809'. This time the view is from the land out to sea, with the windmills and St James the Great Church visible in the distance (Figure 30).



Figure 30: 'Panoramic view of the Bombardment of Flushing during Walcheren's Expedition 1809'

Two art works capture the flooding of Vlissingen on 15th January in 1808, both lithographs which show the town with water levels half way up the buildings, debris floating in the water and boats being used on the streets to rescue people (Figure 31 and 32). A remarkably similar flooded street scene was captured in a photograph during the 1953 floods.



Figure 31: (Left) ID366 Lithograph depicting the floods of 1808 (unknown artist).

Figure 32: (Right) ID 397 Lithograph showing the floods from 15th January 1808 (Public Domain, National Archive Netherlands).

4.2 Photographs

Photographs are an invaluable resource to support coastal change studies because they represent true depictions of the landscape; there is not the need to rank them in the same way as artworks (where views may be susceptible to interpretation and variation). For photographs to be used to assess how they can support studies of coastal change the two key issues are the content (in terms of what the image tells us) and the quality of the image. Because of the dynamic nature of this coastline historic photographs can be a particularly valuable resource with many historic photos containing depictions of the shore and sea front with recognisable heritage features nearby, including buildings, quays and bridges. These can be compared to the modern situation and from this an accurate idea of the rate of erosion since the date of the photograph can be gained.

A total of 37 historic photos were assessed as part of the project, images include those from locations within the pilot area where historic paintings and archaeological sites were also known. The photographs were collected and then scored using the methodology outlined in *SARCC Maritime Atlas: Methodology Report* (MAT, forthcoming). The study and scoring of historic photographs highlight the potential for historic photos to provide information on coastal change. Sources and archives used included a range of national, regional and locally based resources that are available online.

4.2.1 Results of Photograph Scoring

This pilot area has a wealth of available historic photographs and postcards many of which depict the aftermath of storms. 37 photographs were entered into the project database, those images which scored 77 and over have been included below within the ‘high scoring’ results. Figure 33 shows the distribution of the images and the table has the detail of their subjects and scores.

Image ID	Title	Year	Purpose	Score Heritage View	Physical Image State	Total Score
1317	Hole in the bank 1953	1953	Unknown	Detailed	Good	100
1356	Pier at Vlissingen	1934	Unknown	Detailed	Good	100
1357	Vlissingen Boulevard Badhuisstraat 1979 Aerial view	1979	Unknown	Detailed	Good	100
1405	Land reclamation 1973	1973	Unknown	Detailed	Good	100
1315	Boulevard Eversen and the beach	1924	Tourist	Identifiable Period	Good	77
1316	Torpedo boat G1	1917	Unknown	Identifiable Period	Good	77
1314	Flood 1953	1953	Unknown	Identifiable Period	Good	77

1320	Strengthening	1958	Unknown	Identifiable Period	Good	77
1321	A dam is being constructed Vlissingen	1945	Unknown	Identifiable Period	Good	77
1392	Vlissingen Beach Coloured Postcard		Tourist	Identifiable Period	Good	77
1323	Flushing aerial view		Unknown	Identifiable Period	Good	77
1325	High waves on the boulevard 1953	1953	Unknown	Identifiable Period	Good	77
1393	Vlissingen Boulevard seascape	1900	Unknown	Identifiable Period	Good	77
1352	Å Vlissingen Netherlands Boulevard Zeevaartschool Pier and beach	1939	Tourist	Identifiable Period	Good	77
1353	Vlissingen Boulevard Bankert	1939	Tourist	Identifiable Period	Good	77
1354	Vlissingen Boulevard Blankart 1965	1965	Tourist	Identifiable Period	Good	77
1355	WW2 damage to Vlissingen Boulevard	1939	Unknown	Identifiable Period	Good	77
1394	Vlissingen strand with pier	1949	Tourist	Identifiable Period	Good	77
1399	Bouldevard Vlissingen in the flying storm of 1990	1990	Unknown	Identifiable Period	Good	77
1403	Destruction of the swimming pool by 1953 flood	1953	Unknown	Identifiable Period	Good	77
1402	Flood of 1953	1953	Unknown	Identifiable Period	Good	77

Table: The highest scoring historic photographs within the Vlissingen Pilot Study Area



Figure 33: Distribution of high scoring photographs and postcards across the Vlissingen study area.

4.2.2 Discussion of Scoring Results

Having developed as a tourist destination, it is not surprising that tourism is the focus of many of the high scoring historic photographs and postcards. Six of the top scoring photographs capture tourist scenes in Vlissingen, such as the pier (images 1356 (copyright restricted) and 1394 (Figure 35)) and beach views (images 1315 (copyright restricted), 1392 (Figure 37), 1393 (Figure 34) and 1354 (Figure 36)).



Figure 34 (left) ID 1393 Vlissingen Boulevard

Figure 35 (right) ID 1394 Vlissingen Pier and Strand Beach

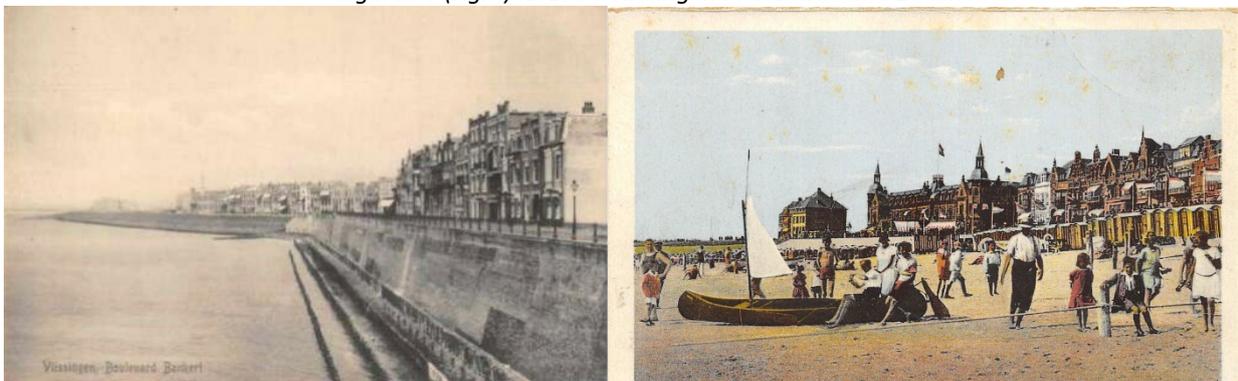


Figure 36 (left): [ID 1354] Vlissingen Boulevard

Figure 37 (right): [ID 1392] Hotel Britannia and the Strand Beach

Five of the top scoring images feature the damage inflicted by the 1953 storm - the greatest natural disaster to occur in the Netherlands in the 20th century. The images belong to the Spaarnestad and Elsevier Collections at the Dutch National Archives and are copyright restricted. The top scoring image [ID1317], shows workers repairing a 150m hole in Boulevard Bankert. Further round on Boulevard Evertsen, image ID1403 shows the total destruction of the sea swimming pool, and image ID1325 shows high waves continuing to batter Boulevard Vlissingen. The last two images show the flooding in the city centre. Image ID1402 shows people in Walstraat being carried to safety through knee-deep water. Others are being evacuated by wooden rowing boat. Similarly, image ID1314 shows people in another city centre street being rescued out of first floor windows above shops, by uniformed men into a rowing boat in the flooded street below. Image ID1399, also in this collection, shows Boulevard Vlissingen in the flying storm of 1990, as people bend double against the wind and crouch behind walls for shelter close to the Prison Tower.

4.2.3 Field Survey of Photograph Locations

A site visit was undertaken to capture current day images of a number of the views shown on historic photographs and postcards, a number of these are included below (Figures 38 - 44). These images show a number of the archaeological and historic sites and features which have been captured at different dates. These can now be used to directly compared with other available resources to demonstrate the extent to which there have been changes to the coast.

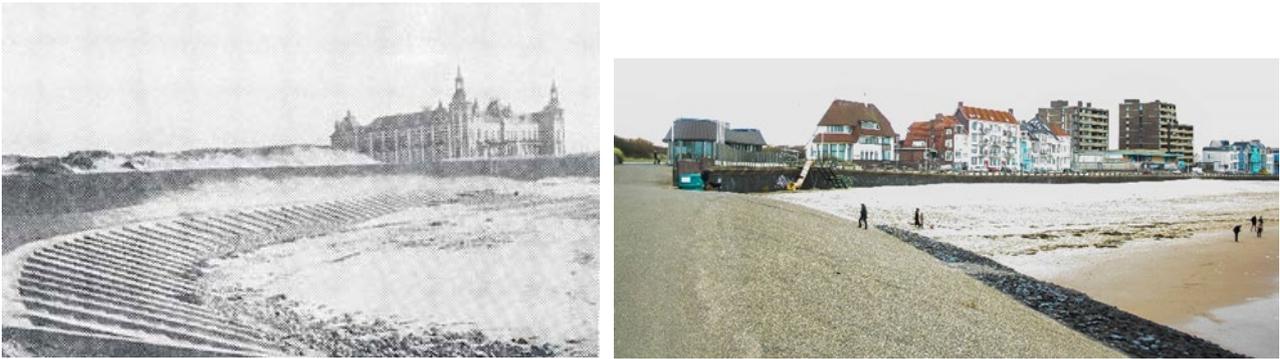


Figure 38: Historic photograph of the frontage near the Pilot Study showing the Grand Hotel des Bains (ID 866, copyright unknown), and comparative modern view from 2021.



Figure 39: ID 526 The Strand Beach (Source: <https://nl.geneanet.org/prentbriefkaarten/view/7703123#0> Accessed 01/06/2021 Creative Commons), and comparative modern view from 2021.

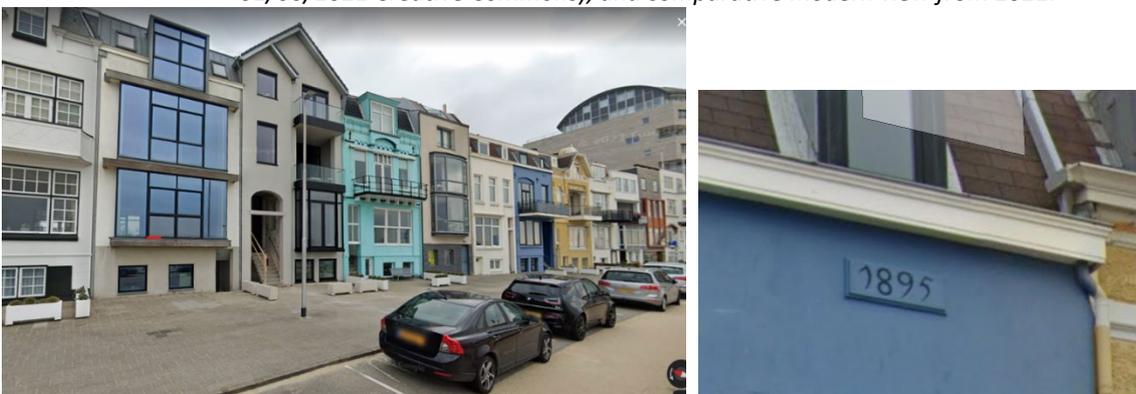


Figure 40: Boulevard Evertsen (Google Maps) Number 26 has the date 1895 stamped at the top – the other buildings with balconies in this row look to be of the same age.



Left Figure 41 ID 376 Vlissingen Pier c1939 Source: copy of post card which is available online (copyright unknown), and comparative modern view from 2021.



Figure 42 ID 378 The Prison Tower, Vlissingen Boulevard 1964 (Source: copy of postcard available online (copyright unknown)), and comparative modern view from 2021.



Figure 43 ID 530 Source <https://ansichtkaartenbeurs.nl/kaarten/vlissingen-zeepad-boulevard-met-gevangentoren11716> accessed 01/06/2021 copyright unknown, and comparative modern view from 2021.



Figure 44: Boulevard de Ruyter with the lighthouse and statue – ID 525 Approx 1950/60, and comparative modern view from 2021.

5. Combined Application for Analysis of Coastal Change

The above sections have demonstrated the potential of each type of resource – archaeological, palaeoenvironmental, artistic, maps and charts and photographs – to be assessed and analysed to inform on the scale and pace of coastal change. When these resources are utilised together to look at particular areas or features this provides an exceptionally powerful set of data to be able to understand the long-durée of the coastline. In addition to the frontage that is directly adjacent to the Pilot Area there are a number of other features in nearby areas which help show and understand how the local shoreline has changed. These are explored further here.

5.1 Frontage Adjacent to Pilot Study Area

Why selected for detailed study: as this area is directly related to and adjacent to the SARCC Pilot Project and will be impacted by the scheme it has been reviewed in detail using all the available resources. This analysis can show the long-term changes and development of the area.

Detail from scoring of available resources:

As significant physical features so closely linked to the development of the town the Vlissingen seafront appears across the range of scored resources. Figures 45 - 48 include a combination of these resources to show changes over time.

- Archaeology – The site of the Hotel Des Bains scored 88 in the Archaeology analysis. Although the site is currently cleared ready for the construction of a new hotel, this site has always been occupied by a hotel building and will continue to do so. This signifies the popularity of this area as a tourist destination since the 1880's.
- Maps/ Charts – Four of the top scoring maps chart the development of this frontage and are discussed in detail below, they date from 1550 (ID 443), 1649 (ID 347), 1893 (ID 167) and 1970 (ID 176).
- Art – only one image by Segaers 1669 (ID 636) could be found directly showing the pilot area. The other artworks are often focused further east, on the new harbour area.
- Photographs - A number of the top scoring photographs show the hotel and The Strand Beach as a popular tourist destination (ID 526). In contrast, several of the top scoring images show the destruction caused during World War Two (ID 535) and by the 1953 storm (ID 537).

How the combined resources inform on coastal change:

Figure 45 provides a map progression of the development of the coastal frontage. The Deventer map of 1550 (ID 443) shows that the new town of Vlissingen that had emerged in 1315, is now firmly established. The old town harbour has been diked up and all fishing activity diverted to the new harbour. In the pilot area, two jetties are visible and only a couple of buildings are visible along the coastline towards the new town. By 1649, Blaeu's map (ID 347) shows the coastal area of the old town – adjacent to the pilot area, is now in agricultural use, with a few domestic buildings connected to agricultural plots visible. A row of buildings and two jetties have been built further along the coast towards the new harbour. Segaers painting of 1669 (636) captures this view (Figure 46). The seafront adjacent to the pilot area began to develop as a tourist destination in the late C19th. The first tourist building was the Grand Hotel des Bains built in 1886, later renamed the Grand Hotel Britannia (Figures 47 and 48). The hotel and baths are shown as the only buildings on the Boulevard in the 1893 map (ID 167). The site demonstrates good temporal continuity as although having been rebuilt several times, it still remains the site of the grandest hotel in Vlissingen.

The Strand Beach became a popular bathing beach and shops and facilities along Boulevard Evertsen provided for the tourists needs. By 1919, Vlissingen was in the top five tourist destinations in the Netherlands. Several of the top scoring historic postcards and photographs show tourists enjoying the beach (ID 526), though one of the top scoring historic photos (ID 537) shows the destruction caused in this area by the Second World War (ID 535 shows the hole in the Nolle) and the 1953 storm. Despite this, several of the original buildings dated 1895 still remain. By 1970 (ID 176), the map shows buildings almost completely filled the entire length of the boulevard. Buildings had also been inserted in the dune area to the west of the hotel too. By 1970, no dunes remained. In the 1990's the Boulevard was completely renewed with the addition of covered shopping centres. Although the frontage here has remained stable in terms of position and shape, tourism has had an enormous impact on the character of the coastline, transforming it from a natural dune landscape into a city encased in modern materials.



Figure 45: Progression of maps showing the development of the frontage adjacent to the pilot area from 1550 through to 1970. Top Left, Jacob van Deventer, Vlissingen 1550 [ID443] (Deventer, Jacob van ; Smulders & Co, Public domain, via Wikimedia Commons). Top Right, Blaeu Vlissingen 1649 [ID347] (Blaeu, J, Public domain, via Wikimedia Commons). Lower left, P.G. De Vey Mestagh and sons 1893 [ID167], with hotel and bath house the only buildings on the boulevard surrounded by dunes. Lower right, 1970 map [ID176], showing extent of development, no dunes remain.



Figure 46: Close up of painting Topografische afbeelding van Vlissingen uit 1669 [ID636] (Petrus Segaeers, Public domain, via Wikimedia Commons). In the background, the frontage adjacent to the pilot area can be seen.

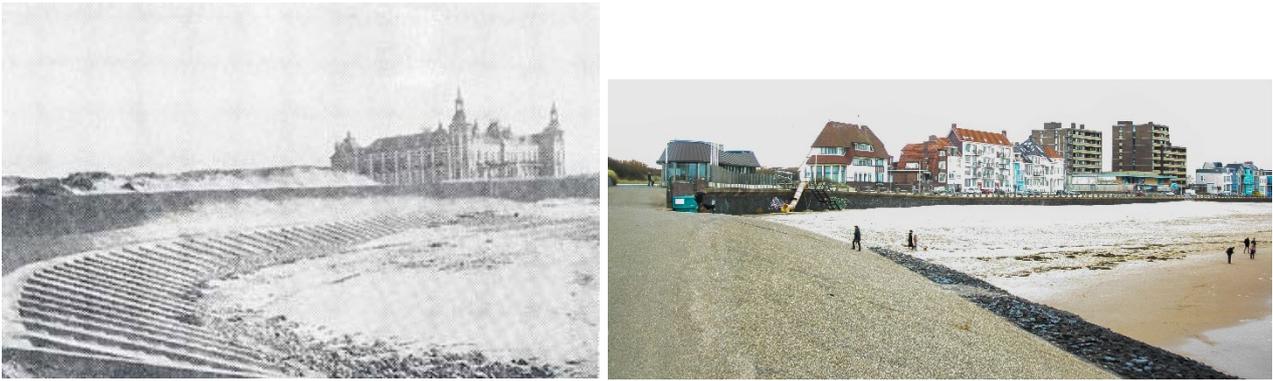


Figure 47: (left) Historic photograph of the frontage near the Pilot Study showing the Grand Hotel des Bains (ID 866), copyright unknown), (right) Comparative photograph from 2021.



Figure 48: (left) ID 526 Source: <https://nl.geneanet.org/prentbriefkaarten/view/7703123#0> Accessed 01/06/2021 Creative Commons, (right) Comparative photograph from 2021.

5.2 Vlissingen Pier

Why selected for detailed study: Vlissingen pier was chosen for detailed study as it was situated on the Strand Beach, adjacent to the pilot area and was a significant coastal feature in the early 20th century, although short-lived, it had a direct relationship with the development of the frontage and importance to tourism.

Detail from scoring of available resources:

The pier, although short-lived appears in most of the scored resources.

- Archaeology – The pier does not feature in the archaeological scoring due to its total destruction in 1939.
- Maps/ Charts – Only one map dated 1939 shows the pier (ID 445).
- Art – No art works have been found showing the pier.
- Photographs – Two of the top scoring photos feature the pier, one from each side (ID 1356 and ID 1394). Another photograph (ID 380 (copyright restricted)) is an aerial view.

How the combined resources inform on coastal change:

Vlissingen pier and pavilion were built on the Strand Beach as a tourist attraction in the 1930's. Two black and white photographs taken in the 1930's show the pier from both sides. An aerial photo (ID 1356) dated 1939 shows the pier and the pavilion on the end from above. The popularity of the Strand Beach is clear to see. However, with the onset of World War II and the German occupation of the city, the pier was demolished to prevent allied landings. The 1939 map captures the position of the pier shortly before it was destroyed. Although this area was rebuilt after the war and continued to be a tourist destination, the pier was never replaced. The short lifespan of the pier is useful for dating historic images, it also accounts for the lack of art and maps. As a coastal feature it also has a direct relationship with the coastal frontage and the water levels at the time as it would have been designed in relation to tidal levels and expected storms.

Vlissingen Pier

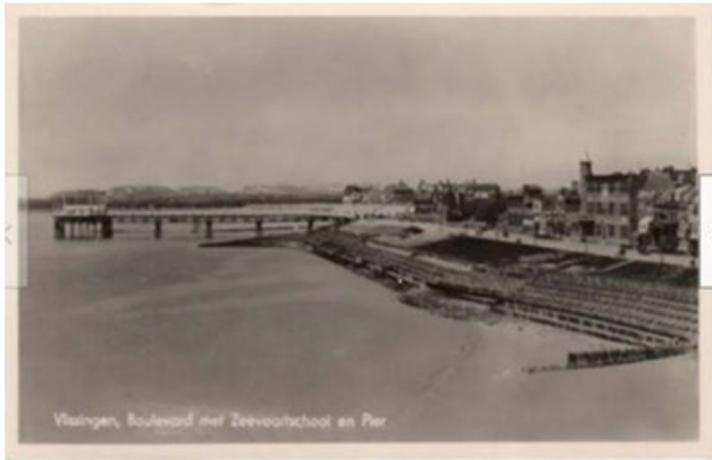
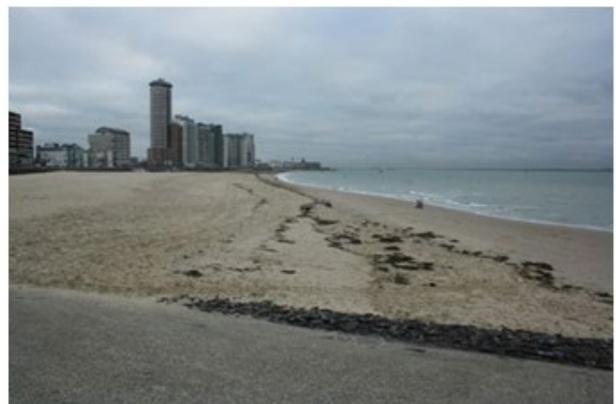


Photo (Left): Vlissingen Pier c.1939 [ID 1356] (Source online, copyright unknown)



Map (left): 1939 Map of Vlissingen [ID445], showing the pier.



Historic photo (left) [ID1394] Vlissingen Strand and Pier (Source <https://nl.geneanet.org/prentbriefkaarten/view/7776722#0> (CC-BY_NC_SA 2.0 Creative Commons license), and comparison with modern view (MAT, 2021)

Figure 49: Combined resources showing Vlissingen Pier in relation to the coastal frontage.

5.3 Prison Tower

Why selected for detailed study: The Prison Tower was selected because it is a historic coastal feature that has stood here since the 15th century and appears in many historic resources. Its position and changing use reflects the development of Vlissingen as a port.

Detail from scoring of available resources:

As such a key historic building along the frontage at Vlissingen the Prison Tower appears across the range of scored resources (Figure 50).

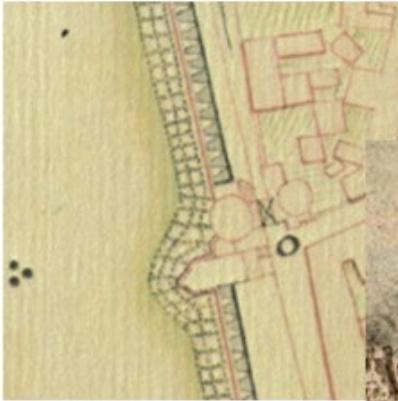
- Archaeology – The Prison Tower (UID 6104) scored 88 in the Archaeology and Palaeoenvironmental analysis. Today, the granite apartment buildings behind the tower retain the name Westpoort.
- Maps/ Charts – The position of the Prison Tower can be seen in most maps. Hattinga’s 1750 map (ID 246) records the position of the two towers, side by side with the gate in-between. Blaeu’s map (ID 446) shows a good early graphical representation.
- Art – The tower appears in most of the top scoring art works. The clearest views are seen in the works of Segaers (ID 636), painted in 1669 and Adriaen De Venne in 1618 (ID 365).
- Photographs - The tower features in several of the top scoring photographs and is a popular subject for photos.

How the combined resources inform on coastal change:

Today, the Prison Tower is all that remains of the former Westpoort; the most important city gate prior to the expansion of the new town. The tower, known locally as ‘De Gervangtoren’ stands at 1 Boulevard de Ruyter. The brick and stone tower with a pointed roof was built around 1491 and known initially as the Westtoren. The Westpoort was formed of two towers with a gate in between. The other smaller tower, built on the landward side, was known as the Powder Tower which stood until 1811. Our knowledge of the appearance of the Westpoort comes from art works and maps, as this was the pre-photographic era. Maps such as Hattinga’s 1750 map (ID 246) record the position of the two towers, side by side with the gate in-between. Blaeu’s map (ID 446) shows a good early graphical representation. Artists such as Segaers and Adriaen De Venne captured more detail of the buildings.

Archive sources reveal how the Prison Tower has survived a number of threats over the years. In the mid 16th century, Vlissingen was rapidly expanding to the east and when the Middelburg gate was built in 1563, it effectively made the Westpoort redundant. From 1610, The Westtoren gained a new lease of life as a prison, hence its modern name. The tower was damaged by shelling in the English attack of 1809 but was saved from demolition when the rest of the Westpoort was demolished in 1811. To protect it from future attacks the tower was lowered, and the roof replaced with an earth dome to make it bombproof. When Vlissingen came under Dutch control in 1815, the Dutch army used the tower as a military prison until 1890. In the late 19th century, the tower was considered an obstacle in the development of the boulevard and was saved from proposed demolition by the Vlissingen Chamber of Antiquities and in 1895 was reopened as a museum. Following the floods in 1953, the Delta plan marked the area where the tower stands as a weak spot, and once again it faced demolition, but was saved by the city council. When the dike was reinforced in 1958, it was decided to reinstate the higher floor and pointed gabled roof to once again give it an imposing appearance over its surroundings (ID 534 shows the tower in 1953 prior to being raised and ID 530 shows it afterwards). Today the tower functions as a restaurant.

The Prison Tower



Art (above left): Close up of painting dating to 1669 [ID636] (Petrus Segaers, Public domain, via Wikimedia Commons). Map (above right) from Blaeu, 1649 (Blaeu, J, Public domain, via Wikimedia Commons).



Photo (below): 1953, shows shorter tower [ID534]

Map (above): 1750 Map [ID246] (Hattinga, public domain, Wikimedia Commons);

Art (above, right) Arrival at Flushing 1618 [ID365] <https://www.watercolourworld.org/painting/untitled-arrival-flushing-vlissingen-study-print-tww00d2b5> (Copyright British Museum, (CC BY-NC-SA 4.0).



Historic photo (left) [ID530] (Source <https://ansichtkaartenbeurs.nl/kaarten/vlissingen-zeebad-boulevard-met-gevangentoren11716>, (copyright unknown) and comparison with modern view (MAT, 2021)

Figure 50: Combined resources showing the Prison Tower in relation to the coastal frontage.

5.4 Vlissingen Harbour

Why selected for detailed study: The Harbour was chosen for detailed study as its shifting position, expansion and changing roles, reflect the growth of Vlissingen through time. Each stage has impacted the coastline of Vlissingen. By combining the information from maps, artwork and historic images, it is possible to chart the progression of changes through to the present day. The first harbour was likely a natural harbour and only small in size. It had little impact on the coastline. In contrast, the modern docks are humanly-made, and encased in concrete. Their construction and maintenance has required dredging and flushing. The morphology of this area has seen many changes through time with the addition of lock gates, dry docks, slipways and harbour arms, all having an impact on sediment transportation, scour and wave energy.

Detail from scoring of available resources:

The development of the new harbours from 1315 is clear to see in the maps and charts. The harbours have not attracted artists and photographers as keenly as the seafront, but some good sources have been found. Figure 51 includes a combination of these resources to show changes in the new harbour and docks over time.

- Archaeology – The Dutch Chronicles record dwellings of fisherfolk at Vlissingen in 620 AD, with official records beginning after the episcopal charter was granted in 1247. The original harbour no longer exists having been superseded by later development, although archaeological traces are preserved under ground. Site UID 6107 is the origin of the modern harbour and dock developments that exist today.
- Maps/ Charts – The top scoring maps together with archive sources chart the growth of Vlissingen and the expansion of its harbours and dock facilities. Later maps, such as 1882, 1912 and 1944 show large scale developments in the docks as their role evolves through time.
- Art – No images of the first harbour have been found. Views of the new harbours are plentiful, particularly in the early 1600's and the top five scoring artworks are all good examples of Vlissingen harbour as seen from ships approaching. The only land-based view found was by artist Jan Arends who drew the view across the inside of the Admiralty shipyard in 1780, capturing the dock, lockgate and a warship under construction on a slipway.
- Photographs – A number of historic images were found, two are included below.

How the combined resources inform on coastal change:

Only archaeological evidence remains for the first harbour. Expansion of the city necessitated a bigger harbour. The earliest found map of Vlissingen by Deventer in 1550 shows that the old town harbour is no longer in use for ships and has been sealed off from the sea by a dam. All maritime activity has been diverted to the new harbours. In later maps, this trapped body of water is named the Mill Pond (Adams, 1595) or the Platten Dijk and Molenwater (Hattinga, 1750). The shape of this body of water changes over time (see maps in frontage section) until eventually it was reclaimed. In a photograph of the pier dated 1939 (ID 1356), these areas can still be seen to be flooded. Today the site of the former harbour is marked by Duinpoortweg and is now infilled with a green space and carparking.

As Vlissingen grew and trade increased, expansion led to the development of a new city centre and harbours to the east of the old town from 1315. The development of the new harbours can be seen in the top scoring Maps/charts and art works (see Figure 51 combined resources). Three new harbours were built: Voorhaven (the current Pilots Berth, see images below), Koopmanshaven (Bellamy Park) and Archerhaven (Spui 5 street). Once completed the old harbour was diked up, forcing the fishermen to move to the new town. In 1439 the present Marine Parade was transformed from back-dike into sea defence wall, resulting in the loss of much land. Further harbour extensions were completed in 1443. Archive evidence reveals that at that time, Vlissingen traded with England, France and the Baltic, exporting Herring and salt and returning for coal, wool, timber, pitch and tar.

When the city walls were expanded in the early 17th century, some of the defensive canals were brought inside the walled city, and room was made to build the Oosterhaven, an open tidal harbour. A sea lock with a bridge over 'Sasbrug' and a dry dock were also constructed between 1609-1614. Quays were added in the 1620's. Problems with the functioning of the lock necessitated the building of a bigger and wetter dock for the fleet of the Dutch Republic. Blaeu's map of 1649 (ID 347) shows the Sasbrug and Oosterhaven.

The new dock was built between 1687-1693. The Rammekenspoort was demolished and the Admiralty shipyard and number of private shipyards removed and relocated around the Voorhaven. The Sasbrug was removed and replaced with a floating bridge. A sea lock closed off the new dock, which was much wider and deeper and so able to shelter a large fleet. To maintain a good depth, it had to be dug out regularly and in 1810 it is recorded that the French dug out the dock to 4.7m below low tide.

The first dry dock of the Netherlands 'Perry's Dock' was built adjacent to the dock in 1704-5. Due to its location between two bodies of water, a horse-mill was needed to pump it dry. However, water continued to ingress and combined with damage by shipworm the dry dock fell into disrepair in the 1740's. Almost a hundred years later, the dry dock was restored and enlarged and through the use of new technologies was able to accommodate the largest Dutch warships of the time. A map dated 1750 (ID 246) shows the dams that were created to repair the sea dock. The Voorhaven, the stretch of water between the sea lock and the sea, required regular high-speed flushing out of the accumulated sand and sediment to maintain its depth.

The second Admiralty shipyard with four slipways was relocated just outside the new dock, to the east of Voorhaven. It suffered a fire in 1748 that almost entirely destroyed the many associated buildings, but it was quickly rebuilt. Artist Jan Arends drew a view across the Admiralty shipyard in 1780 that captures the dock behind the lock gate and a warship under construction on a slipway. It was virtually destroyed again following an English raid in 1809, the French rebuilt it as a naval base, but did not require shipbuilding facilities, as this function now fell to Antwerp. A Painting of Vlissingen by Segaers in 1669 (ID 636) and a map by Blaeu dated 1649 show the old Westpoort before it was demolished in 1811.

After regaining independence in 1814, the Dutch began to build a new shipyard 'The Rijkswerf' at the far end of the dock. Once complete, this new site quickly superseded the old naval base site and became the national shipyard as shipbuilding was moved from Antwerp to Vlissingen. The new yard was immediately responsible for reequipping the Dutch fleet. The end of the Rijkswerf came in 1867 when the Dutch government decided to move the armouring facilities to Amsterdam. The site was purchased by Shipyard De Schelde and naval shipbuilding has continued on this site. Today, the yard now known as Damen Schelde Naval Shipbuilding is the only yard to still build major warships for the Dutch navy.

As well as shipbuilding, Vlissingen remains an important commercial port, fishing harbour, seaside resort and naval base, with approximately 50,000 ships from all over the world passing through every year.

Vlissingen Harbour



Maps showing the development of the harbours: (right) Blaeu 1649 [ID446] (public domain, Wikimedia Commons); (middle) 1750 [ID246] (Hattinga, public domain, Wikimedia Commons); (right) 1893, De Vey Mestagh & sons [ID 444].

Paintings (top left) Topografische afbeelding van Vlissingen uit 1669 [ID636] (Petrus Segaeers, Public domain, Wikimedia Commons, (top right) View of Vlissingen, print by Caspar Bouttats [ID643] (National Archives (nationaalarchief.nl), public domain)). Photos, (lower left) Unknown date and creator [ID1439], and (lower right) comparison with modern view (MAT, 2021)

Figure 51: Combined resources showing changes to Vlissingen Harbours

6. Conclusions

The detail, scope and variety of available sources for the Vlissingen Pilot Study has fully demonstrated the potential of the SARCC scoring approach that has been applied to identify those resources of particular importance for understanding the long-durée of the coast.

Evidence from archaeological investigations and historic buildings and structures provide evidence from prehistoric periods through to the Second World War. Through a better understanding of how Vlissingen frontage became what it is today coastal managers will be better placed in planning for the future.

Combining the archaeological and palaeoenvironmental data with artistic resources, including historic maps, charts, photographs and artworks can allow us to understand change from prehistory up to the present day. Maps have been particularly valuable tools in understanding the nature and changes related to the development of Vlissingen, the harbours and the frontage adjacent to the SARCC Pilot Area.

The artwork study and scoring has demonstrated the value of examining a sequence of artworks over time by different artists in terms of providing a record of long-term changes. They allow detail and accuracy to be compared across artists and artworks to improve confidence in the reliability of the depictions in addition to the value of the information they impart. The strategic maritime importance of Vlissingen and its harbours mean many artistic representations show these features within the large number of artworks available for study.

The combination of the various available sources of data have provided detail on the form and scale of change over time – particularly with the development of new harbour structures, formalisation of sea defence dikes and development and use of the area of frontage adjacent to the Pilot Area, which is popular for tourism. This information is of importance to the coastal scientist when planning for future changes, allowing historical changes and responses of the coast to inform new plans.

This pilot study helps explain the rate of change over past centuries as a result of sea level changes, human construction and the relationship of this with apparent periods of increased storm frequency. These data can supplement existing and future monitoring of trends and can support predictions for the future.

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