



Cultural Heritage Agency
Ministry of Education, Culture and Science

Rapportage
Archeologische
Monumentenzorg

282

Flotsam, jetsam and lost anchors at Statia's Roads

*An archaeological assessment of site SE-504,
Oranje Bay, St. Eustatius*

**L.F. Derksen, R.W. de Hoop and
M.R. Manders (eds)**

Flotsam, jetsam and lost anchors at Statia's Roads

*An archaeological assessment of site SE-504, Oranje Bay,
St. Eustatius*

L.F. Derksen, R.W. de Hoop and M.R. Manders (eds)

Colophon

Rapportage Archeologische Monumentenzorg 282

Flotsam, jetsam and lost anchors at Statia's Roads: an archaeological assessment of site SE-504, Oranje Bay, St. Eustatius

Authors: L.F. Derksen, J. van Doesburg, R.W. de Hoop and M.R. Manders

Editors: L.F. Derksen, R.W. de Hoop and M.R. Manders

Authorization: B.I. Smit (Cultural Heritage Agency of the Netherlands)

Authorization date: 9 October 2023

Publication date: 7 March 2024

Images and illustrations: M. Haars (BCL-Archaeological support), Cultural Heritage Agency of the Netherlands unless mentioned otherwise.

Proofreading: Thomas Dresscher

Cover image: RCE

Production and design: Xerox/Osage

ISBN/EAN 978-90-76046-89-1

© Cultural Heritage Agency of the Netherlands, Amersfoort, 2024

Cultural Heritage Agency of the Netherlands (Ministry of Education, Culture and Science)

Postbus 1600

3800 BP Amersfoort

www.cultureelerfgoed.nl

Summary	5	5.2.4 Clay pipes	34
Samenvatting	6	5.2.5 Glass	35
1 Introduction	7	5.2.6 Metal	37
1.1 Background	7	5.2.8 Interpretation of the artefacts	40
1.2 Administrative records	7	5.3 Threats	41
1.3 Reading guide	8	6 Interpretation of the site	43
1.4 Acknowledgements	9	6.1 Spatial distribution of artefacts	43
2 Context	11	6.2 Dimensions of the site	43
2.1 Geological and environmental context	11	6.3 Dating	44
2.2 Historical context	11	6.4 Origin	44
2.3 Archaeological context	13	6.5 Complex type	44
3 Objectives and research questions	17	7 Site assessment	45
3.1 Objectives	17	7.1 Introduction	45
3.2 Research questions	17	7.2 Assessment	45
4 Fieldwork	19	7.2.1 Aspects of perception	45
4.1 2021 Fieldwork	19	7.2.2 Intrinsic quality	45
4.2 Setting and dive conditions	19	7.2.3 Physical quality	46
4.3 Fieldwork methods and techniques	20	8 Answers to the research questions	47
4.3.1 2021 Field school	20	9 Conclusion and recommendations	51
4.3.2 Mapping and recording	20	9.1 Conclusion	51
4.3.2 Airlifting	21	9.2 Recommendations	51
4.3.3 Artefact handling	22	Bibliography	53
5 Research results	23	Appendices	55
5.1 Test pits	23	Appendix I KNA valuation of a site	57
5.2 Artefacts	30	Appendix II KNA valuation criteria and parameters	59
5.2.1 Introduction	30	Appendix III Catalogue of artefacts	60
5.2.2 Pottery	30	Appendix IV Specialist report	114
5.2.3 Ceramic construction materials	34		

From 2 to 21 August 2021, the Cultural Heritage Agency of the Netherlands (RCE) and the St. Eustatius Center for Archaeological Research (SECAR) conducted an archaeological assessment at site SE-504, known as the Triple Wreck, situated 800 metres off the coast in the Oranje Bay of St. Eustatius. This site, despite being referred to as a 'wreck', primarily consists of an assemblage of artefacts from the period in which St. Eustatius was a significant trading port. The project aimed to answer a series of research questions pertaining to the site.

Site SE-504 is located at a depth of 18 to 19 metres and spans 61 metres in length and 12 metres in width, oriented north to south. The site's formation and degradation processes are influenced by factors like shipworm activity, natural disturbances such as storms and hurricanes, as well as the movements caused by swells and currents in the bay.

A range of artefacts was discovered, including pottery, glass, metal objects, clay pipe fragments, stones, wooden items, and even a rubber object. These artefacts predominantly date back to the 18th century, with a few from later centuries. Most likely, these items were used along the waterfront and were either discarded or fell from ships in the harbour. Some artefacts, such as pottery, glass, and barrel hoops, are indicative of ship inventory or cargo. There are also fragments of clay pipes and a shoe buckle representing personal belongings.

Iron parts of masts and rudders, gudgeons, anchors and a sounding lead constitute ship's equipment. Ceramic building materials like roof and floor tiles, as well as bricks, might have come from buildings along the seafront or potentially served as cargo or ballast. A cannon may have fallen from a ship, but most probably has been re-used as an anchor weight.

The research team determined that the site holds medium archaeological value. To ensure the protection and preservation of the artefacts and remains, the team recommends maintaining an open pit for divers to explore and enjoy the site. This area could be managed and monitored by STENAPA and the diving school ScubAqua. By educating divers and visitors about the historical significance of the site and implementing proper monitoring, the site's value can be conserved for future generations while offering a unique diving experience.

In summary, the archaeological assessment of the SE-504 site revealed an assortment of artefacts reflecting the vibrant trade and historical context of St. Eustatius. Despite the absence of a distinct shipwreck, the artefacts provide insight into the island's history during its prosperous trading era. By establishing protective measures and educating visitors, the site's historical significance can be preserved while offering an informative and engaging diving opportunity.

Samenvatting

Tussen 2 augustus en 21 augustus 2021 hebben de Rijksdienst voor het Cultureel Erfgoed (RCE) en het Centrum voor Archeologisch Onderzoek St. Eustatius (SECAR) een archeologische waardering uitgevoerd op SE-504, bekend als het Triple Wreck, gelegen op 800 meter uit de kust in de Oranje Baai van St. Eustatius. Deze vindplaats wordt weliswaar een 'wrak' genoemd, maar bestaat voornamelijk uit een verzameling artefacten uit de periode waarin St. Eustatius een belangrijke handelsplaats was. Het project had tot doel een aantal onderzoeksvragen met betrekking tot de vindplaats te beantwoorden.

Locatie SE-504 ligt op een diepte van 18 tot 19 meter en strekt zich uit over een lengte van 61 meter en een breedte van 12 meter, georiënteerd van noord naar zuid. De vorming en afbraak van de vindplaats worden beïnvloed door factoren zoals de activiteit van paalwormen, natuurlijke verstoringen (erosie en sedimentatie) zoals stormen en orkanen en de beweging van de golven en stromingen in de baai.

Er werden verschillende artefacten ontdekt, waaronder aardewerk, glas, metalen voorwerpen, fragmenten van kleipijpen, stenen, houten voorwerpen en zelfs een rubberen voorwerp. Deze artefacten dateren voornamelijk uit de achttiende eeuw, met een paar uit latere eeuwen. Waarschijnlijk werden deze voorwerpen langs de waterkant gebruikt en werden ze weggegooid of vielen ze van schepen in de haven. Sommige artefacten, zoals aardewerk, glas en tonringen, duiden op scheepsinventaris of lading. Er zijn ook fragmenten van kleipijpen en een schoengesplint gevonden, die persoonlijke bezittingen representeren. IJzeren onderdelen

van masten en roeren, roerpennen, ankers en een peillood vormen scheepsuitrusting. Keramische bouwmaterialen zoals dak- en vloertegels en bakstenen zijn mogelijk afkomstig van gebouwen langs de kust of dienden mogelijk als lading of ballast. Een enkel ijzeren kanon kan van een schip zijn gevallen, maar is meer waarschijnlijk hergebruikt als ankergewicht.

Het onderzoeksteam stelde vast dat de vindplaats een middelhoge archeologische waarde heeft. Om de bescherming en het behoud van de artefacten en overblijfselen te garanderen, raadt het team aan om een open put te behouden waar duikers de site kunnen verkennen en van de site kunnen genieten. Dit gebied zou beheerd en bewaakt kunnen worden door STENAPA en de duikschool ScubAqua. Door duikers en bezoekers voor te lichten over de historische betekenis van de vindplaats en een goede controle uit te voeren, kan de waarde van de vindplaats behouden blijven voor toekomstige generaties en tegelijkertijd een unieke duikervaring bieden.

Samengevat onthulde de archeologische waardering van de vindplaats SE-504 een assortiment artefacten die de levendige handel en historische context van St. Eustatius weerspiegelen. Ondanks het ontbreken van een duidelijk scheepswrak, geven de artefacten inzicht in de geschiedenis van het eiland tijdens haar welvarende handelstijdperk. Door beschermende maatregelen te nemen en bezoekers voor te lichten, kan de historische betekenis van de site behouden blijven en tegelijkertijd een informatieve en boeiende duikmogelijkheid worden geboden.

1.1 Background

The Cultural Heritage Agency of the Netherlands (RCE) and the St. Eustatius Center for Archaeological Research (SECAR) conducted an archaeological assessment between 2 and 21 August 2021 at a location 800 metres off the coast in the Oranje Bay of St. Eustatius (or Statia, as the locals call it).

This location – with site code SE-504, but colloquially referred to as the Triple Wreck – was already marked as a potential shipwreck site after marine geophysical surveys conducted in the 1980s.¹ After hurricanes Irma and Maria raged through the area in 2017, divers of the Scubaqua Dive Center came across a ‘great number of artefacts’ according to M. Harterink² of ScubAqua. Mr. Harterink reported the situation to SECAR and the RCE.³

From 2018 to 2020, Caribbean workshop company Shipwreck Survey held three consecutive non-intrusive field schools in collaboration with SECAR⁴ with trainees from all over the world. From the field schools, it became clear that the site holds artefacts predominantly dating from the second half of the 18th century, linking it to the times in which St. Eustatius was an international harbour for traditional trade and a transit point for enslaved people. Moreover, the find of a copper-alloy ankle shackle in 2018, now on display in the Caribbean Netherlands Science Institute (CNSI), suggested the site could harbour finds related to the Caribbean slave trade. All these factors provided reason to suggest more artefacts and possibly a wooden shipwreck could be preserved underneath the sediment.

Each year with every storm, more archaeological material was washed free, while there were also reports of looting. This was a clear sign that the site was under serious threat. At the same time, if a shipwreck from Statia’s bustling era of trade was indeed to be found on the former roadstead, it would be of high archaeological value. After consulting with SECAR, Shipwreck Survey and ScubAqua, and after executing a pre-evaluation through the assessment framework⁵ developed to prioritize work by the International Programme for Maritime Heritage, the team decided to conduct a proper site assessment on SE-504 (see Table 1

for the administrative records). With the oncoming Kingdom-wide ratification of the UNESCO Convention on the Protection of the Underwater Cultural Heritage (2001), the project also proved the opportune moment to train the involved Dutch Caribbean archaeologist and volunteers in conducting underwater archaeological assessments.

1.2 Administrative records

Table 1 Administrative records.

Region	Caribbean Netherlands
Municipality	St. Eustatius
Place	Oranje Bay, Oranjestad
Toponym	Triple Wreck Site / SE-504
Coordinates (WGS84)	17°28.730’N 62°59.657’W
Complex type	roadstead, maritime transport, cargo
Period	early modern
Hydrological data	depth 18 to 19 metres
	salt water
	slight current when present, running north or south, occasionally strong
	visibility 15 to 20 metres, occasionally 10 metres
	mean temperatures of 29°C in August
Current location use	national marine park, shipping lane, sports diving location
Prevailing policy	<u>BES Maritime Heritage Act (in Dutch)</u>
	<u>St. Eustatius Marine Environment Ordinance (in Dutch)</u>
Originator	Cultural Heritage Agency of the Netherlands
- contact person	L. de Wit
Competent authority	public entity St. Eustatius
- contact person	S. van den Groenendaal
Executing organization	Cultural Heritage Agency of the Netherlands
Project leader	M.R. Manders
Executing fieldwork	Cultural Heritage Agency of the Netherlands
Management and location of documentation	Cultural Heritage Agency of the Netherlands
Authors	L.F. Derksen, J. van Doesburg, R.W. de Hoop and M.R. Manders
Authorization Project Outline	W. Waldus, senior maritime archaeologist

¹ Bequette 1992.

² Mr. Harterink and ScubAqua hosted the UNESCO Foundation Course in 2014.

³ Manders 2017.

⁴ Stelten & Hinton 2020.

⁵ [Afwegingskader Nederlandse scheepswrakken in den Vreemde | Publicatie | Rijksdienst voor het Cultureel Erfgoed.](#)



Figure 1 Group photo of the field team in front of the ship Wet One.

The project team consisted of:

Cultural Heritage Agency of the Netherlands (RCE) – Amersfoort, the Netherlands

M. Manders – senior maritime archaeologist; project leader

R. de Hoop – maritime archaeologist; field researcher

L. Derksen – maritime archaeologist, field researcher

M. van Ommeren – programme secretary; general project assistance

S. Waasdorp – communication officer

W. van de Langemheen – communication officer

J. van Doesburg – material specialist Middle Ages and Early Modern Period; materials analyst and interpreter of finds

St. Eustatius Center for Archaeological Research (SECAR) – St. Eustatius, Caribbean Netherlands

G. Soetekouw – president; general assistance

R. Stelten – maritime archaeologist; field researcher

J. Morsink – maritime archaeologist; field researcher

Scubaqua Dive Center – St. Eustatius, Caribbean Netherlands

M. Harterink – co-owner; diving safety and field assistance

M. van de Wetering – co-owner; general assistance

R. Wiersma – dive instructor; diving safety

C. Trip – dive instructor; diving safety

S. Boyd – dive instructor; diving safety

M. McCune – dive instructor; diving safety

Wet Work Marine

P. van Berlo – commercial diving support; field assistance

D. W. Peterson – commercial diving support; field assistance

1.3 Reading guide

This report presents the results of the archaeological assessment conducted by the RCE in cooperation with SECAR. After the introduction, Chapter 2 outlines the geological, environmental, historical and archaeological context and an archaeological expectancy for site SE-504. In Chapter 3, the research aims and research questions are presented, followed by Chapter 4 in which the methods and techniques are described that were used to answer these questions. The results of the fieldwork are then presented in Chapter 5. Chapter 6 consists of an interpretation of the research results. The assessment of the site then follows in Chapter 7. In Chapter 8, all the research questions are answered individually.

The conclusion and recommendations follow in Chapter 9. The appendices consist of background information on the Dutch system for archaeological assessments, followed by a catalogue of artefacts.

1.4 Acknowledgements

This project was supported with the help and care of many local partners. First of all, we would like to thank our field team (Fig. 1), starting with Joost Morsink and Ruud Stelten for their contributions in the field and taking part in the discussions. We also thank Mike Harterink and Marieke van de Wetering and all the divers at the ScubaAqua Diving Center for making sure that all the archaeologists could do their work in safety at SE-504, as well as for their ideas and for providing insight into the recent site history. Next, our thanks go to Paul and Donald of Wet Work Marine who provided technical support from their work platform. Gay Soetekauw of the St. Eustatius Center for Archaeological Research (SECAR) is acknowledged for the cooperation,

providing us with a workspace, additional basic equipment and help with the logistics. Johan Stapel and Lyshandra Schmidt at the former Caribbean Netherlands Science Institute (CNSI) are acknowledged for providing us with the warm welcome and for providing transportation from and to the airport. We're grateful for Claudia Toet and Susanne van den Groenendaal at the St. Eustatius Public Entity for their concern for Statia's underwater cultural heritage and for guiding us through the permit requirements. Ed Erdtsieck at the Department of Waterways and Public Works (Rijkswaterstaat) has our thanks for providing us with the permit and for being a long-time partner of the RCE in the Caribbean. Anna Maitz at BioCarib is thanked for finishing the Environmental Impact Assessment within the short time window. We would also like to thank the St. Eustatius National Parks (STENAPA) team led by Erik Boman, for their governance over SE-504. Lastly, our thanks go to Ineke Joosten at the Cultural Heritage Laboratory in Amsterdam and Dominique Ngantillard at the TU Delft for their respective x-ray and CT-scans of a heavily corroded artefact.

2 Context

2.1 Geological and environmental context

Formed on top of submarine banks, St. Eustatius or Statia is a part of the volcanic arc of the Lesser Antilles and has an approximate surface area of 21 km². Statia is home to a dormant volcano known as the Quill, while the remnants of lava flows can still be traced over the island as well as in the surrounding waters.⁶ Over the centuries, coral reefs have mainly grown on the rocky outcrops of the old lava flows.⁷ The coral reefs attract an abundance of marine life, including all kinds of (reef) fish, invertebrates and molluscs.

At a depth of 18 to 19 metres, approximately 800 metres out west in Oranje Bay, research site SE-504 lies alongside such a lava flow turned coral reef. This reef, visually reminiscent of a ship's hull, stretches alongside the research area from southeast to northwest. The entire site of SE-504 as mapped during the field schools coordinated by *Shipwreck Survey* measures 60 m x 13.5 m and is roughly oriented north-south. Local environmental features include rocky outcrops in the northern and central section of the area. The remaining surrounding area mainly consist of a visually flat sandy bottom with the occasional rocky outcrop, although the Oranje Bay actually gently slopes down further west to a maximum depth of approximately 38 metres until a drop-off with depths of over 300 metres.

SE-504 falls within the borders of what is referred to as the 'general use area' inside the St. Eustatius Marine Park managed by St. Eustatius National Parks (STENAPA) – though any environmentally intrusive activity requires an Environmental Impact Assessment (EIA). The EIA⁸ conducted prior to the archaeological fieldwork revealed that the site is almost entirely overgrown by an invasive sea grass species (*Halophila stipulacea*). Furthermore, in terms of marine life the site contains some immobile benthic species (e.g. jawfish, tilefish burrows, sponges), as well as cryptic species (e.g. molluscs, fish) and species of coral, coralline encrusted algae and encrusted sponges (e.g. *Helioseris culcullata*, *Diploria stringosa*). Apart from the flora and fauna observed in the EIA, the tropical Caribbean waters are generally known to be riddled with shipworm (*Teredo navalis*). This mollusc feasts well on wood and is

therefore the main danger to the integrity of wooden structures such as shipwrecks.

Currents, when present, are mostly mild, running either north or south with the direction of the tide. Occasionally, stronger currents can occur. Winds predominantly come from the east, leaving a leeward side on the west of St. Eustatius. From June to November St. Eustatius is frequented by hurricanes, with the height of the hurricane season starting in August and ending around mid-October.

2.2 Historical context

The first historical mention of St Eustatius was in 1493, when Columbus included the island in his charted observations.⁹ After Columbus' explorations, many Spanish expeditions in the Caribbean and the Americas ensued and the region was soon in the hands of Spain. As the 16th century progressed, European rivals of the Spanish Crown followed in their wake and thus, age-old European disputes were extended to the Caribbean. First pestered by the French, later by the English, the Spanish decided to concentrate their defences on the islands of the Greater Antilles while they left the Lesser Antilles to the increasing number of smugglers and pirates from other nations.¹⁰

Although still few in numbers, the Dutch were also among them. The Dutch presence in the West Indies increased rapidly however, when on three occasions in the 1580s the Spanish Crown confiscated numerous of Dutch merchant ships at anchor in Spanish ports in an attempt to deal a blow to the Dutch Revolt (1568-1648). Many of these ships carried salt from the Mediterranean. The Dutch herring industry, dependant on the influx of salt to keep the national industry and the salt trade with the Baltic afloat, was then forced to search for alternative markets. Thus towards the end of the 16th century, more and more Dutch sails were set for salt pans elsewhere, including the Caribbean and the Americas. Now while other nations navigated towards the West Indies in search for silver and gold, the Dutch came for the promise of salt. And not only that: the Dutchmen brought home hides, wood, tobacco, sugar, cacao and indigo.¹¹ Still, no attempts were made to take control over islands in the Caribbean.

⁶ Roobol & Smith 2004.

⁷ Stelten 2019, 17.

⁸ Maitz 2021.

⁹ Hartog 1976, 14.

¹⁰ Goslinga 1971, 43-47.

¹¹ Goslinga 1971, 47-49.

Settlers on St. Eustatius

The first historical mention of a European force occupying St. Eustatius is from 1629. In this year, a French expedition built a small fort overlooking the bay from the west. Shortly after however, the French abandoned the fort and left the island.

Meanwhile, the Dutch now joined together under the flag of the West India Company (WIC) since 1621, started to take control over several islands in the Caribbean. An expedition of the WIC Chamber of Zeeland had already taken control of Tobago (*Nieuw Walcheren*) in 1628 and in the 1630s, the Dutch flag would be planted on many more islands. Among them were the six islands now still part of the Kingdom of the Netherlands, including St. Eustatius.

In 1636, an expedition of men from Zeeland led by Jan Snouck sailed from Tobago and set foot on Statia. Soon Snouck and his men stumbled upon the abandoned French fort. They enlarged the terrain, reinforced the structures, installed sixteen cannon and named it *Fort Oranje* or Fort Orange. The island was named *Nieuw Zeeland*. By 1639, some 60 settlers had made Statia their home.¹² The settlers first focused on the cultivation of tobacco, for which they brought in enslaved indigenous people from the Caribbean and the Americas. Later, sugarcane and cotton plantations were established and the formerly mentioned people were gradually replaced by African enslaved brought over from the west coasts of Africa. Strategically, Statia was an entry point to the Caribbean and the Americas and conversely a venture point for the Atlantic. During the 17th century, as the demand for African enslaved people increased throughout the Americas and the Caribbean, the WIC seized the opportunity to position Statia as a transit point for the enslaved Africans, connecting the worlds on both ends of the Atlantic. Many Africans would be forced to pass through Statia.

European contestants

As the 17th century progressed, the Caribbean Sea was getting increasingly packed with European flags. While the Spanish kept roaming the seas as ever before, the Dutch also saluted ships from England, France and Denmark. The Caribbean islands became a highly contested area. Frequent clashes ensued and islands changed hands ever so frequent. St. Eustatius was no exception. The Dutch lost

and regained control of the island on several occasions. Especially the English targeted the island, leading to several brief occupations in 1665-1667, 1672-1673 and 1781. French occupation interspersed the English in 1689-1690, while in the year 1781 the French removed the English and returned the island to Dutch control in 1784.¹³

The 'Golden Rock'

After an economic lull that roughly spanned from the end of 17th century to the first half of the 18th century, the island's economy soared after the WIC abolished all import duties and catapulted Statia into a free port in 1756.¹⁴ Millions of products passed through Statia, from sugar and cotton to tobacco and other wares. Simultaneously, numerous warehouses popped up along Statia's lower west coast soon to be known as Lower Town. In the 1770s and 1780s, over 3,000 ships anchored in front of Oranjestad per year and the warehouses became stacked to the brim.¹⁵ It was in this period that Statia (Fig. 2) was aptly named the 'Golden Rock'.

Part of Statia's economic success came from the island's important role in the export of weapons and ammunition to the rebellious North Americans in their fight against the English Crown in what became known as the American War of Independence (1773-1783). Consequently, trade prospered even more. This particular trade was even so important, that on 16 November 1776, Fort Oranje fired a gun salute to the passing flag and sails of a North American vessel. This salute is still commemorated by the United States of America as the first recognition of their sovereignty. Angered by the salute, Statia was consequently sacked and briefly occupied by the English in 1781.¹⁶

In the following decades, the gravity of trade increasingly shifted towards the United States of America and Statia's economy as well its many warehouses fell into decay. Today, the remains of the Lower Town warehouses still bear testimony to the decades of economic success.

¹² Hartog 1976, 21.

¹³ Hartog 1976.

¹⁴ Hartog 1976, 38.

¹⁵ Stelten & Hinton 2020, 3.

¹⁶ Gilmore 2013.



Figure 2 An early 19th century depiction of Statia viewed from the south, showing the roads in the Oranje bay and the dormant volcano now known as the Quill, by A. Nolson and Means (source: Nationaal Archief).

2.3 Archaeological context

Precolonial remains

The first human activity in the area trails all the way back to around 300 AD, when indigenous people from the Americas slowly found their way further into the Caribbean. Their archaeological imprint can be found all over the island, mostly in the form of shell middens, pottery and tools made of shell and stone.¹⁷ From as early as the beginning of the 20th century, various studies of the islands' precolonial archaeological record have passed the review and serve as an interesting further read.¹⁸

Archaeology of the colonial age

To this day however, Statia or the 'Golden Rock' still prominently boasts the material relics of its past on the island's west or leeward side. Providing relative shelter from the prevailing

eastern winds, the leeward side has historically served as a roadstead where many passing European ships stopped to anchor. Statia's west coast became the transit point where commodities were brought to and from the shore, before the ships sailed along on their way. From the 17th century onwards, more and more stone warehouses popped up along the coast. By the 18th century, at the height of Statia's economic boom, Lower Town was jam-packed with a stunning number of over 800 warehouses. Several of these warehouses can still be found along the coast, although over time most of these warehouses have been left to crumble into the sea, leaving the nearby ocean floor riddled with warehouse debris. These and other eye-catching remains – such as Statia's iconic Fort Oranje overlooking the bay – have been under ample scrutiny by historians and archaeologists alike. With such a dynamic maritime history, the nearby waters also promise a great number of finds.

¹⁷ Hartog 1976, 7-13.

¹⁸ See for instance J.P.B. de Josselin de Jong's 'Archeological material from Saba and St. Eustatius, lesser Antilles' (Leiden, 1947) and J.A. Eastman's thesis 'An Archaeological Assessment of St Eustatius, Netherlands Antilles' (Virginia, 1996).

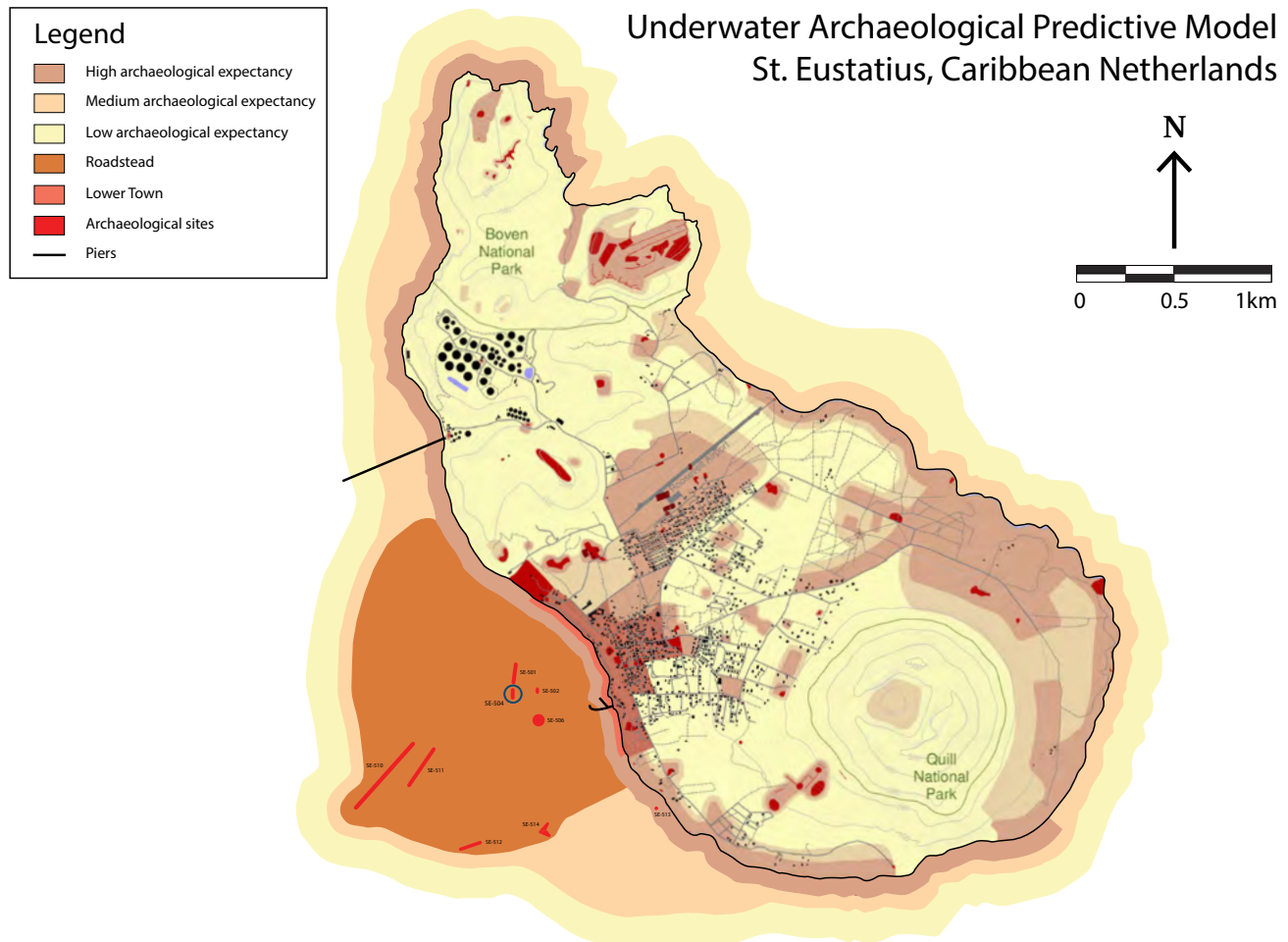


Figure 3 Underwater Archaeological Predictive Model for St. Eustatius, for the purpose of this report site SE-504 is highlighted (source: Hinton, Van Keulen & Stelten 2019).

Maritime archaeological surveys

For although ships were relatively sheltered there, the leeward side was certainly not a wind-free zone. Hurricanes still frequently stirred up the waters on the west side. Sometimes even with such a force that numerous ships sunk at their anchors. It is therefore not surprising that the majority of maritime archaeological research in Statia's waters focused on surveying the island's roadstead. In the 1980s, researchers from the College of William & Mary and the East Carolina University conducted several surveys in the roadstead searching for shipwrecks.¹⁹ Starting out with dive surveys and later proceeding with a magnetometer survey, these researchers came across several locations in the roadstead that were highlighted as possible shipwreck sites. Each of these locations was given a code, 'SE' for St. Eustatius, followed by a number.

This initially resulted in the observation of five sites, the research area of site SE-504 being one of them.²⁰ In later studies conducted by SECAR²¹, sites SE-510, 511, 512 and 513 were added, although the former three were rather lava flows on which anchors got stuck, while the latter was interpreted as a dumpsite for cast-iron cannon.

Despite the various ships' materials found at these locations – from anchors to numerous ships' nails, possible cargo such as glass bottles, ballast and cannon – no actual wooden wreckage has of yet been found at these locations. With such a promising potential, SECAR in collaboration with the Leiden University developed a predictive model (Fig. 3) including the underwater archaeological expectation; highlighting the entire roadstead as bearing a high archaeological expectancy.

¹⁹ Bequette 1980; 1986; 1992. Eastman 1996.

²⁰ Search: SE-5** on <https://mass.cultureelerfgoed.nl>

²¹ Stelten 2019.

SE-504

As already briefly introduced, the constant uncovering of an impressive number of artefacts at site SE-504 seemed to indicate the possibility of the presence of wooden shipwreck remains. Over the course of the three non-intrusive field schools held in the years 2018-2020, as much as 302 so-called *IJsselsteentjes* or Dutch bricks were found at SE-504. These bricks, with a typical yellowish colour, are often associated with shipwreck contexts as they are known to have been used as ballast and were also used for building the galleys in (Dutch) ships.²² A typo-chronological analysis of the associated finds from the assemblage brings the estimated date of the site to 1740-1760. The highest concentration of ballast material and other finds was found to be in the central and northern section of the site. Stelten and Hinton²³ suggested that at this location a ship went down as the hull with its ballast would weigh heaviest and bring down the main structure, while the wood over time could have collapsed and further deteriorated. During these consecutive field schools however, no wooden remains which are indicative of shipwreck material were found.

Due to the environmental circumstances as introduced above however, it should be kept in mind that any wooden shipwreck structure could

only be preserved under layers of sediment under anaerobic conditions – any wood lying bare would otherwise be biodegraded by (micro) organisms including shipworm, as well as the mechanical action caused by waves, currents and especially the frequent storms. Thus unless parts had already washed free, chances of finding wooden shipwreck material during non-intrusive archaeological fieldwork were low since practically no sediments were removed during the activities executed during the field schools.

Still, even without a wooden structure, the site could of course be the result of a shipwreck, although it will be a lot more difficult to discern what material belongs to the shipwreck complex and what material was washed in. The close dating ranges of the artefacts found, as well as the type of artefacts ranging from ships' construction materials to particular 18th century cargo (glass bottles, stoneware, Dutch brick ballast and more), left the field school leaders Stelten and Hinton²⁴ to suggest that this is indeed a shipwreck complex.

The possibility that more artefacts and even wooden shipwreck material could be discovered under the sediment prompted the adaptation of methods for an intrusive site assessment.

²² Veit 2000.

²³ Stelten & Hinton 2020, 19.

²⁴ Stelten & Hinton 2020, 18-21.

3 Objectives and research questions

3.1 Objectives

The overall objective of this research was to test the specified archaeological expectation by means of observations on site, whereby (extra) information was obtained about known or expected archaeological values or potentials within the research area. This included insight into the presence or absence, intrinsic quality (nature, size and date) and the physical quality (integrity and preservation) of the archaeological values for the value assessment (see appendices I & II).

Other research objectives were:

1. Information and knowledge collection about maritime history in the Caribbean.
2. To increase sustainable protection by means of a management plan.

3.2 Research questions

The following research questions were formulated in the Project Outline²⁵:

General questions about the research area

- What is the exact position of the site and how is it situated?
- What is the size of the site?
- What can be said about the site formation processes and degradation processes?

General questions about the wreck site

- What is the exact position of the wreck and how is it situated?
- What is the size and distribution of the ship's remains?
- Which parts of the wreck are still present?
- What can be said about the wreck site formation processes and degradation processes?

Questions regarding the ship construction

- Are any construction details of the ship visible at the site? And if so, which one?
- What can the construction details say about the nature, function and origin of the ship?
- Is it a Dutch ship and if so, what are the indications for this?

- Can it be determined from the remains which ship type the wreck is? If so, which type and what are the indications for this?
- Which types of wood were used?
- What indication do the wood samples give about the construction date of the ship and the origin of the construction timber?
- What is the quality and conservation status of the ship's timber, assessed at different ship parts and at different stratigraphic positions?
- What caulking method was used and with what kind of material was this done?

Questions regarding finds

- Are there remains of equipment, ship's inventory, cargo and personal belongings present? If so, what is their nature, function and dating?
- How are the finds distributed?
- What is the spatial relationship between the finds and the ship parts?
- What is the intactness and conservation status of the finds?
- Are the finds in situ? If so, how does that show? If not, what is the reason for that?
- Is there material that is washed in (unrelated artefacts)? And if so, which are these?
- Do the finds provide an indication of the date and time of the sinking of the ship? If yes, which date?
- Do the finds provide an indication of the ship's function and origin of its cargo? If yes, which one?

Questions regarding marine geology

- Can a stratigraphy be established at the site? And if so, which one?
- In which geological and pedological units or layers are archaeological remains located?

Overarching questions

- To what extent is it possible to make a reconstruction of the original vessel based on the excavation documentation and collected finds and samples?
- What does the shipwreck indicate about the position of St. Eustatius in the Caribbean trade network of the period from which the shipwreck dates (probably mid-18th century)?
- To what extent can the shipwreck provide insight into the degree of connection with global trade?

²⁵ De Hoop, Derksen & Manders 2021. Please note that many of these questions are standard and assume a shipwreck. As will be seen later in the text, there is no distinct wreck on the site.

- To what extent does the research (specific finds) indicate that enslaved persons were on board?

Question regarding assessment

- What is the valuation of the site (VSo6wb)?

Question regarding protective measures

- Which measures are needed in which parts of the research area for the sustainable protection of existing ship and other archaeological remains?

4.1 2021 Fieldwork

The fieldwork was carried out from 2 to 21 August 2021. Operations were based in Oranjestad, the capital of the island, which is located at the western side of the island. The research team consisted of three maritime archaeologists from the RCE and two archaeologists affiliated with the St. Eustatius Center for Archaeological Research (SECAR). The research team members from the RCE stayed at the Caribbean Netherlands Science Institute (CNSI). In the first week a presentation was held there to inform the local community of the field work. Every morning the RCE team members were picked up at CNSI by the SECAR members and driven to the Scubaqua Dive Center. The team stayed there during the day and used the dive centre as the base of operations for diving. The dive equipment was stored and cylinders were filled there. Scubaqua Dive Center provided a captain for the diving vessel *Yellow boat* and a diver to supervise the diving (for safety). Wet Works Marine's boat *Wet One* was used as a work platform for the compressor so that the self-made airlifts could be used for the construction of the test pits.

Workdays typically started at 7am with a briefing on the day's activities and the setting up of the dive equipment. Afterwards the crew boarded the diving vessel *Yellow boat* from Scubaqua in the protected harbour of Oranjestad. Once the equipment and personnel were on board, it took about 10 minutes to reach the Triple Wreck site. The boat was attached to a mooring with a shot line located a short three-minute swim from the site. On average, dives comprised of 40 minutes of working time. Usually two dives were done in the morning. Around noon an interval break was needed so that one or two more dives could be done in the afternoon. The day ended around five p.m. with cleaning the dive equipment, a final briefing on the day's activities and discussing next day's activities. Afternoons and evening were also dedicated to filling out diving logbooks, writing dive reports, transcribing filled in diving slates, consolidating spreadsheets and documenting finds.

4.2 Setting and dive conditions

Site SE-504 is situated 800 metres from shore at a depth of 18 to 19 metres in the Oranje Bay, which consists of salt water. According to previous research, the site is 61 metres long, 12 metres wide and oriented in a north-south direction. On the southwestern side SE-504 is bordered by an elongated coral reef and a sandy sea floor on all other sides that is covered with sea grass. The site itself is relatively flat, resting mostly on a sea floor composed of rocks and sand, with the exception of several rocky outcrops in the northern and central parts. The reef and rocky outcrops are overgrown with a variety of corals and sponges that limit the visibility of possible archaeological objects and structures. Marine life on and around the site further consists of a variety of reef fish, southern stingrays (*Hypanus americanus*), nurse sharks (*Ginglymostoma cirratum*), green turtles (*Chelonia mydas*), great barracudas (*Sphyrna barracuda*), and bottom dwellers such as queen conch (*Lobatus gigas*) and spiny lobsters (*Panulirus argus*).²⁶

Water conditions at the site are generally very good for diving. Currents are mostly mild if present, running from either the north or the south depending on the direction of the tide. Occasionally, stronger current can occur. The visibility underwater is 15 to 20 metres, although occasionally it goes down to ten metres during heavy swells. Mean temperatures of the water in Augusts are 29°C.

Winds predominantly come from the east, leaving a leeward side on the west of St. Eustatius. From June to November, St. Eustatius is frequented by hurricanes, while the height of the hurricane season starts in August. The research took place in August and 2 diving days were lost due to heavy storms.

The operational diving team consisted of five divers with varying scientific diving experience in archaeological projects under the lead of a senior archaeologist. In total, twelve days were spent diving at the site, totalling around 106 dives and 60.5 hours underwater. Dives were performed with regular scuba open circuit equipment with a compressed air/gas mixture (21% oxygen).

²⁶ Stelten & Hinton 2020, 3.

4.3 Fieldwork methods and techniques

4.3.1 2021 Field school

In June and July 2021, a field school for students organized by the private organisation *Shipwreck Survey*, took place on the Triple Wreck site SE-504. During the field school several locations with a high concentration of artefacts on the seabed were probed to establish the possibility of shipwreck remains. The locations were also inspected using a metal detector to see if there could be metal artefacts deeper in the sediment. The results of this field school were used to select locations for test pits during the Augusts 2021 fieldwork. Two locations were selected: a southern section near the reef and a northern section.

4.3.2 Mapping and recording

The first week the research team started off with several orientation dives to get the team acquainted with the site, to inspect the two locations that were selected based on the field school and to find suitable locations for test pits.

The locations with artefact concentrations were systematically searched and the depth of the loose sediment was determined (see 5.1). The sediment consists of grit, dead coral and shells and is at least 40 cm deep. While many artefacts were visible on the sea floor, some were partly covered in sand. These were cleaned by gentle hand fanning to get a better view. After several inspection dives, the southern section near the reef, nearby a cannon, was chosen as it seemed the most promising location with a high concentration of loose artefacts and a thick layer of loose sediment. It was then determined where the airlifts could be positioned and how the test pits could have as little impact as possible on the nearby coral reef and the rest of the natural environment.

A diving shot line was already in place and was utilized by the dive school to do recreational dives on the Triple Wreck site. After the southern section was selected for test pits a line was attached to the shot line to guide divers from the shot line to the southern section near the reef.

A total of nine datum points were installed covering the whole site to build a framework for trilateration measurements in a CMS. In the evening, if measurements were made during a dive that day, the measurements were put in the software *Site Recorder 4* of 3H Consulting for three-dimensional statistical adjustment. Questionable measurements were discarded



Figure 4 The baseline running west-east from the cannon.

and put on the agenda to be re-measured the following day. A total of 75 direct distance measurements were taken. The site was relatively level so no depth measurements were taken from each individual point. Unfortunately some of the distance measurements became useless when the cannon was moved by the dragging of an anchor from the dive platform *Wet One*. Datum point 396 was attached to the cannon.

A baseline of 16 metres (Fig. 4) was laid down between two of the datum points. It ran from west to east from the cannon, one of the datum points and the start point of the baseline, almost perpendicular to the reef and right through one of the most find-rich areas with hoops/mast rings²⁷, glass, bricks, pottery, bones and a shoe buckle.

4.3.2 Airlifting

After the southern section was selected and the datum points and baseline were in place it was time to start airlifting (Fig. 5). The main goal of the airlifting was to target sediment rich layers to detect and partly uncover cultural layers in order to establish whether the site requires further research and protection in the future. In total, there were six days during which the airlift was used.

An airlift is a device that allows maritime archaeologists to suck up sediment and small objects from the seabed, transporting debris away from the area of interest. Basically a vacuum cleaner for underwater use. It works by injecting compressed air at the lower end of the pipe. The upward movement of the bubbles from the lower end of the pipe will suck sediment through the lower end and discharge it from the upper end of the pipe.

Operating the airlift requires close proximity to artefacts when excavating. Divers expose artefacts by carefully removing the sediments around the artefact (ensuring that the context is recorded) using their hands, fingers or hand fanning. The gently disturbed sedimentary material is drawn into the water column. The airlift suction then pulls the loose sediment into the pipe, removing it from the excavated area. The airlift itself was not used as a digging instrument by itself, but acts as a wheelbarrow would on a terrestrial site for the removal of excavated material to a convenient location away from the site.

The two airlifts used in the project were constructed from PVC pipes and had different lengths. One was 4 m and the other was 6 m. Both had a diameter of 12 cm. A diver-controlled on/off valve was installed for regulating the airflow and strength of the suction. The most common problem with the airlifts was that large



Figure 5 Three divers make a test pit directly next to the baseline.

²⁷ In first instance, round metal rings were all identified as being iron hoops of barrels. The idea is now that at least a part of those rings are reinforcement rings for masts and spars.



Figure 6 A pair of divers deepen a test pit in search of cultural layers.

pieces of stones can get drawn into the pipe and get stuck as they ascend. If the airlift becomes even partially blocked it will become buoyant. If that happens the airlift would have to be turned off quickly otherwise it would shoot up. This can pose a threat as a diver can be carried rapidly upwards if an untethered airlift becomes blocked. That is why the airlifts were tethered to big weights.

Wet Works Marine's boat *Wet One* was moored above the site with two anchors and used as a work platform for the compressor so that the self-made airlifts could be used for the construction of the test pits. Divers worked in pairs while airlifting (Fig. 6). The process was constantly coordinated by a diver who was operating the airlift. A second diver monitored the process for safety, removed objects so they wouldn't get trapped in the pipe and handled artefacts that were found.

4.3.3 Artefact handling

A total of eleven test pits were made at various locations along the baseline using the airlifts. The baseline was used to determine the location of the pits. The idea was to make test pits of 1 x 1 m. However, during the work, we often encountered large rocks of different sizes that at times forced us to expand beyond the initial

square metre boundary. The test pits were generally around 50 cm deep before big rocks were reached. In these pits, the stratification of the sediment was investigated and documented. See section 5.1 for a detailed description of all the test pits.

A minimal number of artefacts was raised because of the limited capacity of the local SECAR depot on the island and because of the costs of conservation and lack of a conservation expert on the island. There was a focus on artefacts that could be dated. In consultation with SECAR it was decided which artefacts would only be documented underwater, which were raised, documented and put back again, and which were salvaged and conserved. Two artefacts were taken to the Netherlands for conservation and research, after which they have been sent back. SECAR also kept certain artefacts for their reference collection.

If artefacts were removed from the seabed, the artefacts were photographed, labelled, measured, described and entered into a database. This was done daily after diving. The next day the artefacts were carefully placed back in the test pit where they were found. The pits were then re-filled with the surrounding sediment and the site was left behind as it was found. Further determination and dating (see 5.2) were done in the Netherlands based on the photos of the artefacts, as the material was not allowed to leave the island.

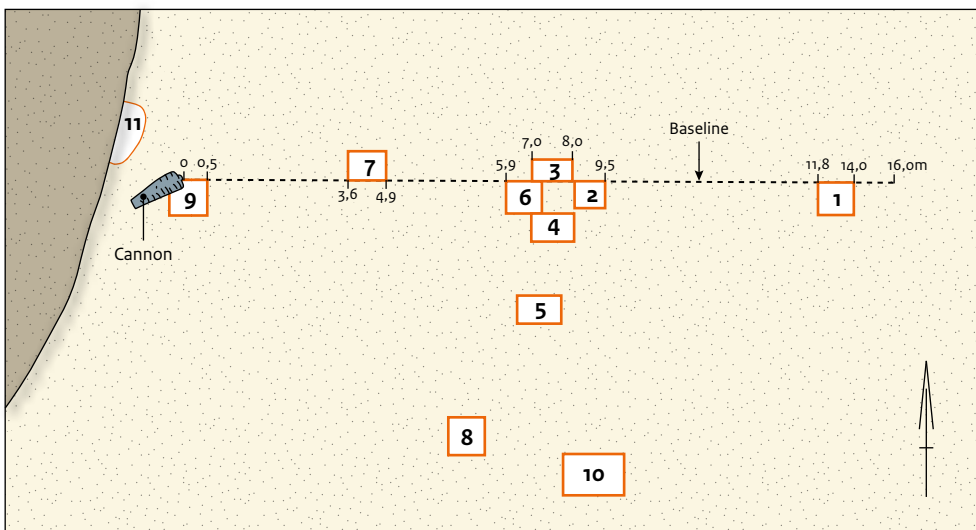
5.1 Test pits

A total of eleven test pits were excavated. See Figure 6 for an overview of test pits 1 to 11. During the excavation, a total of 113 artefacts were documented. In this chapter each test pit will be described and an overview (Fig. 7) will be given of the artefacts that were found in the pit. Due to time constraints, sketches were only

made of the test pits that followed the baseline. See the list of all artefacts in Appendix III (Table 16).

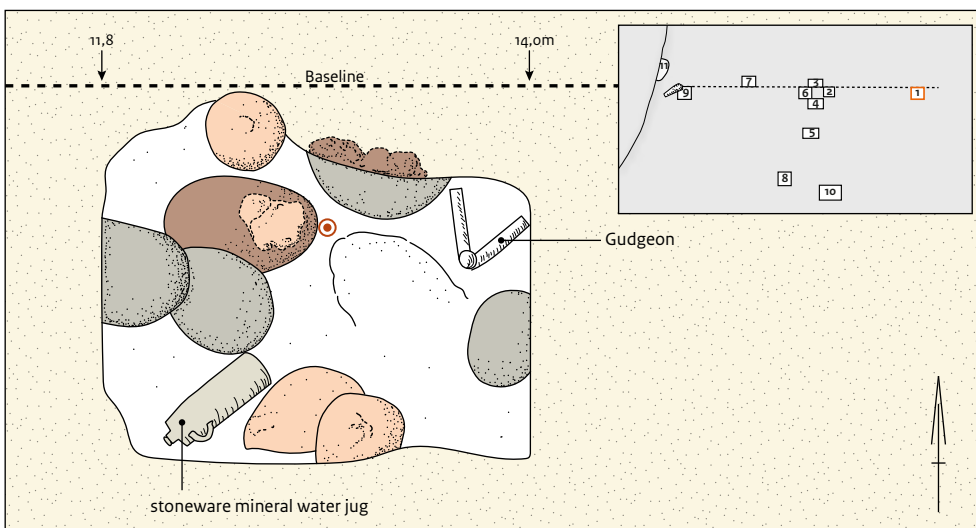
Test pit 1

The length of test pit 1 (Fig. 8) was +/- 230 cm and it was made directly south of the baseline between 11.80 and 14.10 m. The deepest point was around 45 cm. This was the first test pit that was made to test out the self-made airlifts and that's why it's a little bigger than the other



1 Test pit with number Reef Natural seabed

Figure 7 Sketched overview of test pits 1 to 11, digitized for this report.



Boulder Coral Volcanic rock Max. depth 45 cm Natural seabed

Figure 8 Sketch drawing of test pit 1, digitized for this report.

test pits. Within test pit 1 the following twelve artefacts were found:

Table 2 Artefacts from test pit 1.

Artefact number	Description
1	roof tile, damaged, diamond-shaped mortise/nail hole. 185 x 70 x 30 mm.
2	mineral water bottle, stoneware, salt glaze, type: s2-fle-9. width excl. handle 105 mm, mouth \varnothing 8 mm, 255 x 12 x 0 8 mm.
3	gudge, concreted, 406 x 34 x 11 mm, one arm damaged (220 mm).
4	concreted, unknown / dead coral, 75 x 65 x 35 mm.
5	concreted iron, 150 x 0 8 x 9 mm.
6	part of a roof tile, 85 x 44 x 10 mm.
7	possibly bluestone, 105 x 70 x 47 mm.
8	green glass shard, 78 x 45 x 1 mm.
9	green glass shard, 45 x 27 x 1 mm.
10	animal bone., possibly a tibia (shin bone) of a large mammal (bovine or equine), 12 x 7 4 x 3 mm.
11	bottle bottom, glass shard, white translucent, 82 x 56 x 5-7 mm, \varnothing 86, \varnothing pontil 15 mm.
12	green glass shard, tarnish inside, 83 x 53 x 3 mm.

Another broken gudgeon was found around the middle of the baseline, but it wasn't taken to the surface for documentation.

Test pit 2

The length of test pit 2 was +/- 150 cm and it was made directly south of the baseline between 8 and 9.50 m. The deepest point was around 30 cm. It contained lots of loose rocks. Within test pit 2 the following four artefacts were found (Table 3):

Table 3 Artefacts from test pit 2.

Artefact number	Description
13	concreted iron, 167 x 30 x 14 mm.
14	green bottom onion bottle, with black residue/soot, 147 x 137 x 3 mm, pontil 30 mm.
15	green glass shard, with dark deposit, 65 x 57 x 1 mm.
16	industrial stoneware bowl sherd, type: s2-fle-9. 68 x 40 x 3 mm.

Test pit 3

The length of test pit 3 was +/- 100 cm and it was made directly north of the baseline between 7 and 8 m. A lot of burned material was found in this pit. Within test pit 3 the following 13 artefacts were found (Table 4):

Table 4 Artefacts from test pit 3.

Artefact number	Description
17	shoe buckle, with tongue and shaft, 80 x 75 x 5-10 mm.
18	stick from a clay pipe, 54 mm x 8 mm.
19	glass shard, fire marks, onion bottle, 75 x 60 x 2 mm.
20	concreted iron, knife-shaped, 220 x 35 x 5 mm.
21	stem and chalice, incomplete.
22	pipe stem, 106 mm, \varnothing 6.
23	tile, 62 x 55 x 40 mm.
24	concreted piece of iron, 62 x 55 x 40 mm.
25	redware sherd, 50 x 25 x 8 mm.
26	redware sherd, 53 x 32 x 12 mm.
27	onion bottle, shard, 85 x 62 x 2 mm.
28	bottom shard of onion bottle, 138 x 25 x 2 mm, pontil \varnothing 30 mm.
29	bottom shard of drinking glass, 54 x 28 x 1 mm.

Test pit 4

The length of test pit 4 was +/- 100 cm and it was made 2 m south of the baseline between 7 and 8 m. Within the test pit there was about 10 centimetres of sediment after which white and big dark rocks (volcanic rock) blocked progress with the airlift. A lot of burned material was found in this pit. Within test pit 4 the following 14 artefacts were found (Table 5):

Table 5 Artefacts from test pit 4.

Artefact number	Description
30	glass shard, green, onion bottle, 77 x 5 x 0,3 mm.
31	piece of tile, 58 x 32 x 29 mm.
32	possibly slate, 67 x 34 x 8 mm.
33	piipe stem, 88 mm, ø 5 mm
34	green glass shard, presumably from bottle, 79 x 28 x 3 mm.
35	brick, 165 x 85 x 4 mm.
36	piece of brick, red, 78 x 108 x 40 mm.
37	concretion, possibly part or ring from mast, 240 x 60 x 15 mm.
38	concretion, possibly piece with bolts/nails, 240 x 52 x 12 mm.
39	clay pipe, some burnt, 72 mm, ø 5 mm.
40	clay pipe, 79 mm, ø 4 mm.

Artefact number	Description
41	stoneware sherd of a mineral water bottle, salt glazed, type: s2-fle, 87 x 60 x 5 mm.
42	clay pipe bowl, 47 x 18 x 2 mm.
43	faience plate with blue paint, incomplete and covered with soot, type: f-bor-3., 207 x 142 x 5 mm.

Test pit 5

The length of test pit 5 was +/- 100 cm and it was made 4 m south of the baseline between 7 and 8 m. The deepest point was around 50 cm. Within test pit 5 the following two artefacts were found (Table 6):

Table 6 Artefacts from test pit 5.

Artefact number	Description
44	onion bottle shard, 48 x 27 x 2 mm.
45	concreted iron object, 135 x 35 x 7 mm.

Test pit 6

The length of test pit 6 (Fig. 9) was +/- 130 cm, the depth was around 50 cm and it was made directly south of the baseline between 5.9 and 7.2 m. This pit was filled with old coral and directly beneath that were rocks that blocked progress with the airlift. No artefacts were found.

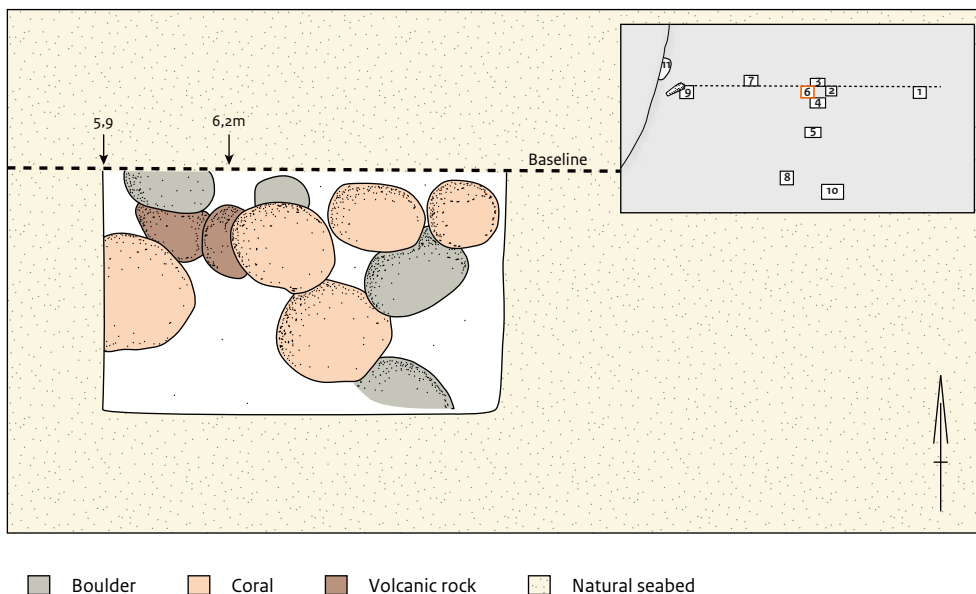


Figure 9 Sketch drawing of test pit 6, digitized for this report.

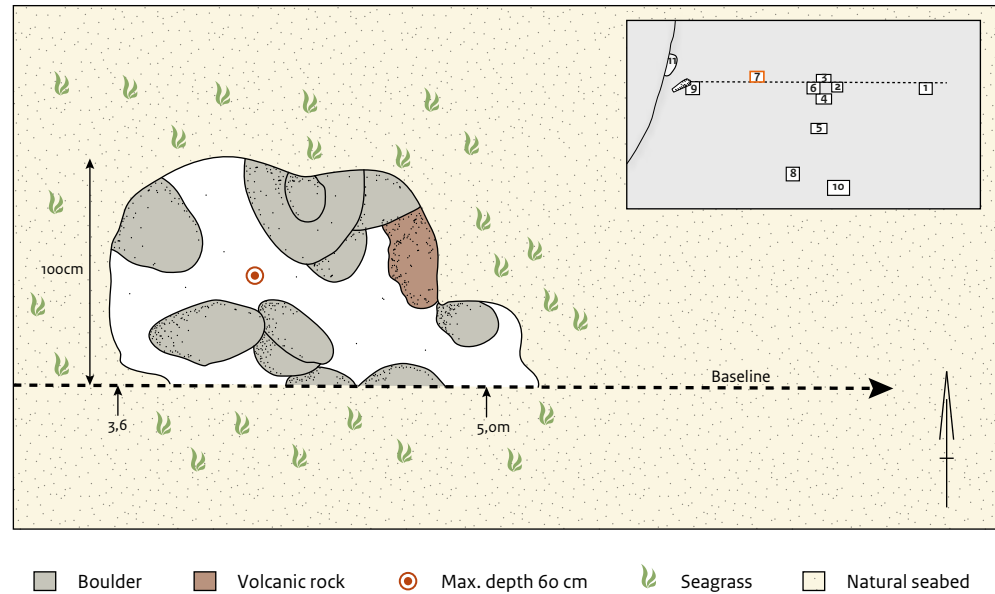


Figure 10 Sketch drawing of test pit 7, digitized for this report.

Test pit 7

The length of test pit 7 (Fig. 10) was +/- 130 cm and it was made directly north of the baseline between 3.6 and 4.9 m. The deepest point was around 60 cm. Within test pit 7 the following two artefacts were found (Table 7):

Table 7 Artefacts from test pit 7.

Artefact number	Description
46	stoneware rim sherd of a mineral water bottle, salt glazed, type: s2-fle, 103 x 70 x 4 mm.
47	concretised iron object, possibly mast ring part, 245 x 120 x 22 mm.

Test pit 8

The length of test pit 8 was +/- 95 cm, the depth was around 50 cm and it was made 8.6 m south of the baseline between 3.93 and 4.93 m. There were several big boulders within this pit that acted as a funnel for artefacts, trapping them. Within test pit 8 the following 14 artefacts were found (Table 8):

Table 8 Artefacts from test pit 8.

Artefact number	Description
48	basement bottle, largely complete, 253 x 72 x 2 mm, head: 18 mm (h), mouth: 7 mm.
49	redware sherd, 99 x 70 x 7 mm.
50	redware sherd, 145 x 124 x 5 mm.
51	redware sherd, 140 x 105 x 7 mm.
52	red brick, 60 x 30 x 44 mm.
53	redware sherd of a plate, pedestal 6 mm thick, 75 x 88 x 6 mm.
54	concretion.
55	redware sherd, 117 x 105 x 15 mm.
56	stoneware rim sherd of a jug with salt glaze and decorated with blue paint, type: probably 2-kan-5, 66 x 53 x 6 mm.
57	redware rim sherd, edge: 28 mm ϕ , 108 x 65 x 7 mm.
58	whiteware, lead glaze, manganese oxide, possible fire mark, 48 x 53 x 4 mm.
59	redware rim sherd, lead glazed inside, exterior burnt, 95 x 61 x 6 mm.
60	part of stoneware jug with salt glaze, type: s2-kan-96, 188 x 160 x 6 mm, mouth: 10 (h), 43 mm (w), neck: 60 mm (h).
61	strip of iron, 110 x 68 x 30.5 mm.

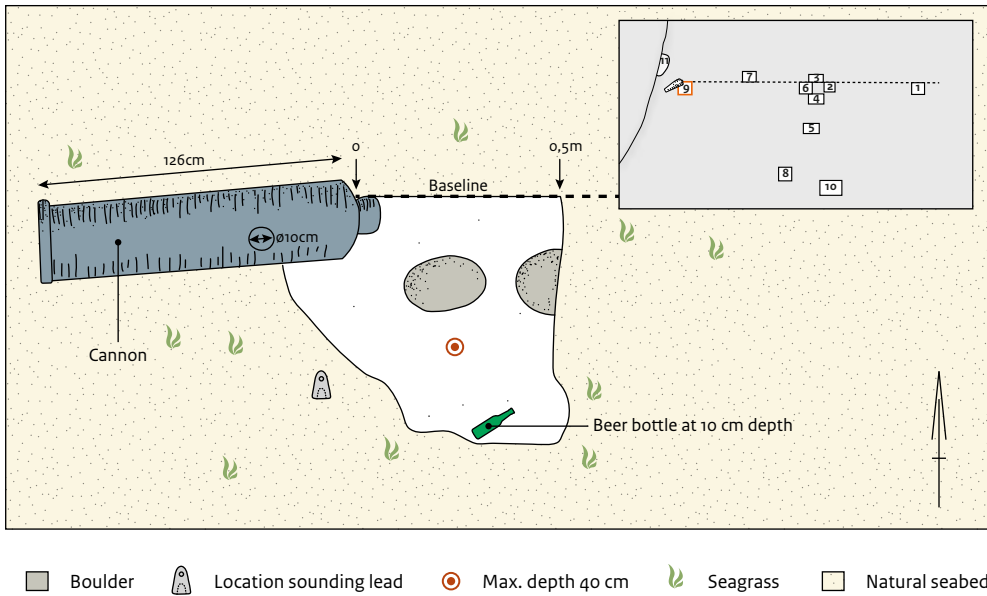


Figure 11 Sketch drawing of test pit 9, digitized for this report.

Test pit 9

The length of test pit 9 (Fig. 11) was +/- 120 cm and it was made directly south of the baseline between -0.7 m (west of the baseline) and 0.5 m. The deepest point was around 40 cm. The mobile layer itself was about 20 cm thick after which rocks appeared. At a depth of 10 cm two modern bottles were found. This means this sediment has been disturbed. This test pit was made from the baseline until the cannon. Within test pit 9 the following twelve artefacts were found (Table 9):

Table 9 Artefacts from test pit 9.

Artefact number	Description
62	coarseware/stoneware, unglazed, rigid rim, 96 x 120 x 11-18 mm.
63	onion bottle, shard, green, 60 x 60 x 3 mm.
64	green glass shard, with bubbles, 86 x 67 x 3 mm.
65	bottom of onion bottle, with soot, 136 x 130 x 4 mm, hollow bottom: 80 mm.
66	flat redware plate with ledge and raised rim, 93 x 115 x 5 mm.
67	redware skillet, handle broken off, lead glazed, with grease channel and fire remains, type: r-bak-4, 280 x 95 x 7 mm.
68	concretion, possibly nail, 62 x 30 x 8 mm.
69	quarter circle, appears circular, 102 x 40 x 25 mm.
70	iron, plate, possibly board, 64 x 47 x 2 mm.
71	souder, 58 x 30 x 28 mm.
72	concretion, possibly hoop/mast ring, 225 x 60 x 10 mm.
73	sherd of a porcelain bowl with blue paint on the edge, 50 x 35 x 2 mm.

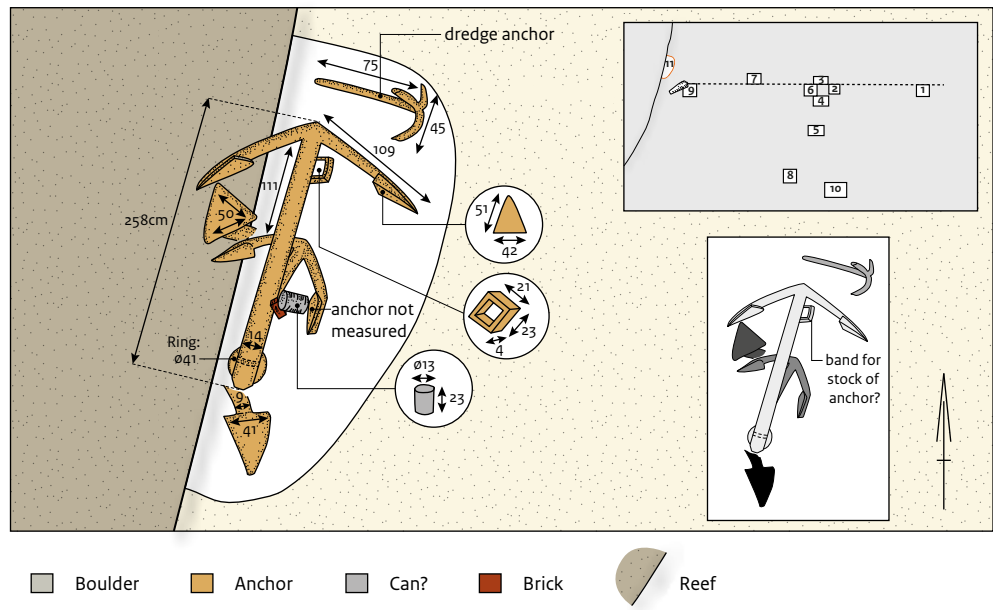


Figure 12 Sketch drawing of test pit 11, digitized for this report.

Test pit 10

The length of test pit 10 was +/- 100 cm, the depth was around 50 cm and it was made 2 m east of test pit 8. The test pit was made in an open area with finds but without any stones to test if the stones in test pit 8 really acted as a funnel. Within test pit 10 the following five artefacts were found (Table 10):

Table 10 Artefacts from test pit 10.

Artefact number	Description
74	concreted iron, 325 x 80 x 5 mm, width of flat part: 30 mm.
75	incomplete Dutch brick, Dutch: Ijsselsteen, 106 x 86 x 35 mm.
76	red brick, incomplete, 120 x 105 x 40 mm.
77	redware sherd of a large bowl, unglazed, 155 x 122 x 9 mm.
78	3x burnt wood, with square nail holes, hole:10 mm, largest: 105 x 95 x 50 mm.



Figure 13 Test pit 11 was made just under the reef. A total of 7 anchors were found.

Test pit 11

Test pit 11 was made underneath the reef where an anchor point was sticking out of the seabed. Eventually 7 anchors were uncovered here (Figs. 12 and 13). The length of test pit 11 was +/- 350 cm. Within test pit 11 the following 31 artefacts were found (Table 11):

Table 11 Artefacts from test pit 11.

Artefact number	Description
80	bottom of white bottle, 105 x 70 x 2 mm, pontil 15 mm.
81	bottom of onion bottle, 125 x 120 x 3 mm, pontil 15 mm.
82	bottom shard onion bottle, 140 mm, ø 30 mm pontil, 3 mm (d).
83	glass shard, possibly from an onion bottle, 60 x 54 x 3 mm.
84	glass shard, possibly from an onion bottle, 100 x 40 x 2 mm.
85	rib bone of a large mammal, 125 x 25 x 15 mm.
86	animal bone, 112 x 22 x 7 mm.
87	clay pipe, stem & head, 80 x 25 x 2 mm, thickness of stem: 5 mm.
88	clay pipe stem, 120 mm, ø 5 mm.
89	bottle, possibly a beer bottle, 230 x 65 x 5 mm.
90	redware sherd, unglazed, 175 x 115 x 9 mm.
91	redware sherd, unglazed, turned, 85 x 70 x 4 mm.
92	sherd of a stoneware jug with salt glaze, 165 x 130 x 16 mm.

Artefact number	Description
93	stoneware sherd of a mineral water bottle, salt glazed, 155 x 85 x 4 mm.
94	red roof tile, 200 x 150 x 5 mm.
95	redware sherd, unglazed, 150 x 75 x 9 mm.
96	redware sherd, unglazed, 165 x 130 x 16 mm.
97	rim sherd of faience plate with blue paint, type: f-bor-3, 130 x 60 x 4 mm.
98	rim of stoneware mineral water bottle with handle, salt glaze, type: s2-fle, Ø mouth 30 mm, 155 x 70 mm.
99	grey ware sherd, burnt, 55 x 55 x 5 mm.
100	red brick, incomplete, coralised, 135 x 80 x 40 mm.
101	part of a Dutch brick, Ijsselsteen, 85 x 40 x 30 mm.
102	glass shard, 85 x 55 x 2 mm.
103	nail, incomplete, 47 x 6 x 3 mm.
104	concreted iron, with bands, 144 x 50 x 5 mm.
105	concreted iron, with bands, 230 x 72 x 15 mm.
106	concreted iron, hoop/mast ring shape, 190 x 90 x 25 mm.
107	Concreted iron, hoop/mast ring shape, 175 x 50 x 10 mm.
108	black concreted metal, possibly burnt, 65 x 45 mm.
109	metal plate, modern, with imprint, approx. 150 x 80 mm.

5.2 Artefacts

J. van Doesburg

5.2.1 Introduction

During the archaeological fieldwork a relatively small number of artefacts was recovered: pottery, glass, metal finds, fragments of clay pipes, stones, ceramic building materials, wooden objects and a rubber object. The finds were cleaned and photographed in St. Eustatius. Also a first identification and division (material category) was made along with a description and the exact dimensions of the individual artefacts were recorded. In this chapter the pottery, glass finds, ceramic construction materials and fragments of clay pipes are discussed based on the photos due to the reason explained under 4.3.3. This means that identification of for instance the tempering of pottery was based on visual assessments only and not on the touch, which is not the ideal and preferred method since certain characterizing aspects could therefore have been missed in the determination process. Via thorough efforts, an assessment could nonetheless be made. A list of all the artefacts can be found in Appendix III.

²⁸ Classification system developed since 1989; See Clevis & Kottman 1989; Clevis & Thijssen 1989. Also Bartels 1999, 519-526; <https://archeologie-spa.nl/deventersysteem>; www.deventersysteem.nl.

²⁹ See Byrd 2014; Van Keulen 2017.

³⁰ See Bartels 1999.

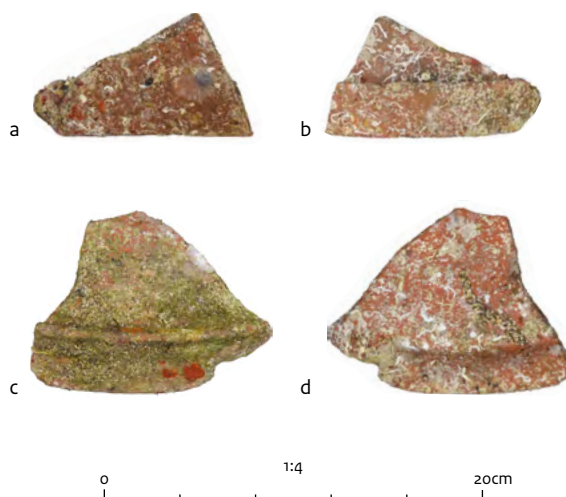


Figure 14 Rim fragments of coarse redware, artefacts numbers 57 (a = inside, b = outside) and 66 (c = inside, d = outside).

5.2.2 Pottery

Introduction

A relatively small number of pottery finds was excavated. The examination of the pottery was conducted based on photographs taken on St. Eustatius. Of all pottery finds at least one photograph is available. Sometimes there are two (outside and inside).

Methods

All pottery shards were studied on the basis of macroscopical aspects that were visible on the photographs. Apart from the production method (wheel-turned, handmade), form/type and decoration, the pottery is also distinguished by means of its fabric. The identification of the fabrics is based on two criteria: tempering (when visible) and colour.

The forms of the pots and pot types are determined on the basis of the so-called Deventer-system. This classification system is used in the Netherlands by archaeologist for pottery and glassware dating from the High Middle Ages and Post Medieval period.²⁸

The Deventer-system distinguishes fabric groups; within each fabric group it distinguishes pottery forms and then within those pottery forms it distinguishes types.

Results

We can distinguish the following fabric groups: redwares with and without glazing, white ware with lead glazing, faience, stoneware and porcelain (see Table 12).

Redwares

The largest number of shards found are redware pottery. On the basis of the fabrics they can be divided into two groups: coarse redware and fine redware with lead glazing. The coarse redware is most probably locally produced on the island.²⁹ The fine redware with lead glazing comes from the Netherlands, where it was produced in urban potteries in different parts of the country.³⁰

The coarse redware shards consist of five rim fragments, 12 wall fragments and one bottom fragment. All the pieces have a red to orange-red

Table 12 Pottery found at SE-504.

Artefact number	Rim	Wall	Base	Fabric	Form	Type
2	1			stoneware, salt glaze	mineral water bottle	s2-fle-9
16	1			industrial stoneware	bowl	s2-fle-9
25		1		redware		
26		1		redware		
41		1		stoneware, salt glaze	mineral water bottle	s2-fle
43	1			faience, blue paint	plate	f-bor-3
46	1			stoneware, salt glaze	mineral water bottle	s2-fle
49		1		redware		
50		1		redware		
51		1		redware		
53			1	redware	plate	
55		1		redware		
56	1			stoneware, salt glaze	jug	probably 2-kan-5
57	1			redware		
58		1		whiteware, lead glaze, manganese oxide		
59	1			redware, lead glaze		
60	1			stoneware, salt glaze	jug	s2-kan-96
62		1		redware		
66	1			redware	plate	
67	1			redware, lead glaze	skillet	r-bak-4
73	1			porcelain, blue paint	bowl	
77	1			redware	large bowl	
79	1			stoneware, salt glaze	jug	s2-kan-32
90		1		redware		
91		1		redware		
92		2		stoneware, salt glaze	jug	
93		1		stoneware, salt glaze	mineral water bottle	
95		1		redware		
96		1		redware		
97	1			faience, blue paint	plate	f-bor-3
98	1			stoneware, salt glaze	mineral water bottle	s2-fle
99		1		greyware		

colour. Sometimes they have greyish patches. One of the wall fragments is grey but can also be placed in this pottery group on the basis of the tempering. Several fragments are covered in coral.

Artefact number 57 is a rim fragment of a steep walled bowl with a collar-shaped rim (Fig. 14). Artefact number 66 is a rim fragment of a shallower bowl, also with a collar-shaped rim (Fig. 14). Artefact number 77 is a rim fragment of a large bowl with a rounded rim.

Artefact number 53 is part of the bottom

of a plate/bowl with a broad foot ring. The foot ring is similar to those of 18th century Dutch majolica from Friesland.

Coarse redwares are often found in excavations on St. Eustatius and are dated between 1700 and 1900.³¹

Artefact number 67 is a redware frying pan or skillet with a slightly sagging base, a solid handle and draining spout (r-bak-5, Fig. 15). The band-shaped rim is rounded at the top.

³¹ See for instance Byrd 2014, 204-218; Van Keulen 2017, Figure 21 and Figure 25.



Figure 15 Fragment of a redware frying pan or skillet with lead glazing on the inside and rim, artefact number 67 (a = top, b = bottom).

The inside of the skillet is treated with lead glazing, of which only traces remain. The outside has traces of soot. This type of skillet was produced in urban pottery workshops in different parts of the Netherlands. On the basis of the rim shape and form of the base this skillet can be dated to the 18th century.³²

Artefact number 59 is a wall fragment with brownish glazing on the out- and inside (Fig. 16). Based on the fabric this shard seems to belong to the group of unglazed redware and not to the redware skillet with lead glazing.

Whiteware with lead glazing

This fabric group is represented with one fragment (artefact number 58). The outer surface has lead glazing to which manganese oxide is added giving the surface a yellow colour with purple spots. The inner surface only has

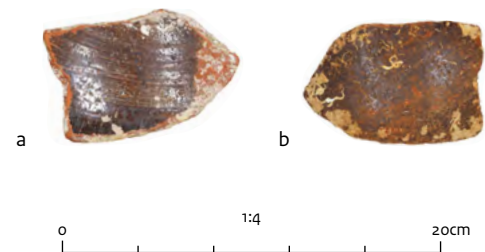


Figure 16 Wall fragment of coarse redware with glazing, artefact number 59 (a = outside, b = inside).

lead glazing. The form is not known. This type of pottery was produced in the Netherlands in several pottery workshops in the Western and Northern Netherlands between the 17th and 20th centuries.³³

Faïence

Two fragments of plates (f-bor-3) were found. Both have a flat base and curved sides. The most complete plate is heavily affected by seawater. The white surface has turned a patchy black. The plate has a central medallion decorated with a landscape or garden with flowers and butterflies in different shades of blue paint (artefact number 43, Fig. 17). The rim is probably decorated with peonies and other flowers. The decoration of the central medallion is in the style of porcelain plates from the Wanli era (1563-1620). The rims of these porcelain plates were commonly decorated with foliage, flowers and sacred symbols in panels. This type of landscape or garden scenes was widely followed by potters in Northwestern Europe during the 17th and 18th centuries. Based on the fabric and decoration it is likely that this plate was manufactured in Delft in the west of the Netherlands. There large quantities of so-called Delftware were produced and distributed to Northwestern Europe, Asia and the Americas. Based on the decoration the plate dates from the 18th century.

The second plate (artefact number 97) is decorated on the rim with simple rectangles placed at an interval. This type of rim decoration occurs on plates with a simple decoration on the inside central, mostly loosely painted fruits, fish or flowers.³⁴ This type of plate dates from the 18th century.

³² Van Oosten & Bult 2012.

³³ Van der Meulen & Smeele 2005; Van der Meulen & Smeele 2012.

³⁴ Gawronski & Kranendonk 2018, 297, nr. 5.5.12.

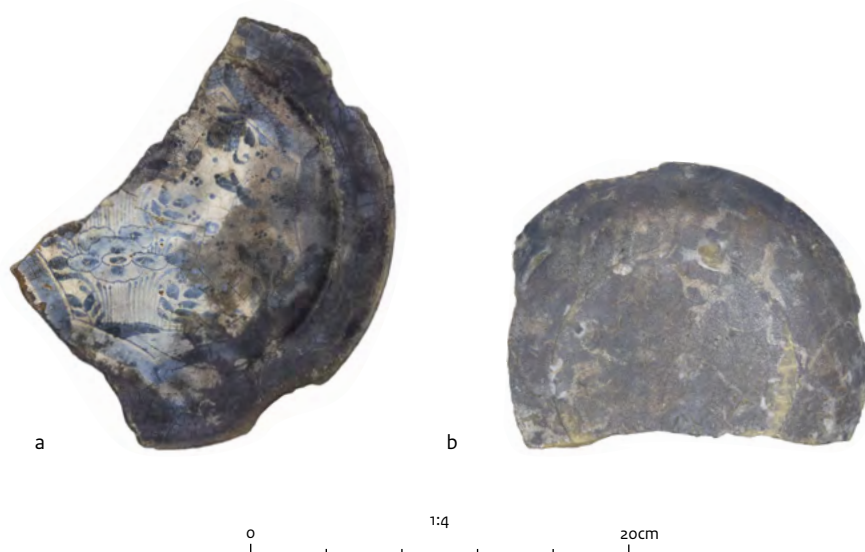


Figure 17 Faience plate with decoration of landscape or garden with flowers and butterflies in blue paint, artefact number 43 (a = top, b = bottom).

Stoneware

Artefact number 2 is an intact stoneware mineral water bottle with a handle (s2-fle-9, Fig. 18).

The bottle is 25.5 cm high and has a diameter of 10.5 cm. The mouth diameter is 8 mm.

The bottle has a flat base and cylindrical body tapering slightly towards the shoulder.

The ribbon-shaped handle is fastened on the shoulder just underneath the rim and an horizontal line in relief.

The everted rim has a flat top. The bottle is made of light grey stoneware with salt glazing and produced in the Westerwald area.

The bottle belongs to the earliest type of mineral bottles.³⁵ These are less cylindrical than younger specimen. This type of mineral bottle dates from the period 1775-1825.³⁶

The artefact numbers 41, 46, 93 and 98 are also shards of mineral bottles with this fabric.

Artefact number 56 is a rim fragment of a biconal jug of grey stoneware with salt glazing (probably s2-kan-5). The rim is rounded and the lower part of the neck is decorated with a zone of horizontal grooves delimited by cordons.

Two of the grooves have blue paint. The body is decorated with stamped impressions (possibly foliage) on a blue ground. The jug was produced in Westerwald in the second half of the 17th century.³⁷

Artefact number 60 is a rim of a stoneware jug with mottled light brown salt glazing (2-kan-96, Fig. 19). The inside is unglazed except at the rim. The beaded rim has a double cordon beneath it from which a tailed handle springs.

Artefact number 79 is a rim of another jug



Figure 18 Stoneware mineral bottle from the German Westerwald, artefact number 2.



Figure 19 Stoneware jug from Frechen or Cologne in Germany, artefact number 60.

³⁵ Brinkman 1982, 11, type C.

³⁶ Brinkman 1982.

³⁷ See Gawronksi & Kranendonk 2018, 333, 5.8.20.

of stoneware with mottled salt glazing (2-kan-32, Fig. 20). The glazing is darker than that of the previous jug. The inside is unglazed except at the rim. The beaded rim has a double cordon beneath it from which a tailed handle springs.

Both jugs (artefacts number 60 and 79) were produced in Frechen or Cologne. The first one dates from the 18th-19th century and the second from the period 1675-1750.³⁸

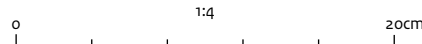


Figure 20 Stoneware jug from Frechen or Cologne in Germany, artefact number 79.

Artefact number 16 is a rim fragment of a bowl of industrial stoneware with salt glazing (s2-fle-9). The rim is slightly thickened on the outside and rounded at the top. On the outside there is a horizontal groove. Industrial stoneware was produced on the British Isles and in Germany from the second half of the 18th until the 20th century.³⁹

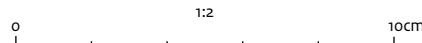


Figure 21 Decorated rim shard of a bowl of Chinese porcelain (artefact number 73).

Porcelain

The survey yielded only one fragment of porcelain: artefact number 73 (Fig. 21), a rim shard of a bowl of Chinese porcelain (p-kop-1). The bowl is decorated on the outside with a thin horizontal line in blue paint. The inside is decorated with two horizontal lines of blue paint in between which zones of diagonally placed stripes are painted. The fragment dates from the

18th century. The bowl was probably produced in Jingdezhen in China.⁴⁰

5.2.3 Ceramic construction materials

Introduction

A relatively small number of ceramic construction materials were found. The artefact numbers 110, 111 and 112 are stray finds.

Methods

All building material is divided into groups based on the dimensions, shapes and fabrics. There are three fragments of roof tiles (artefact numbers 5, 11, 94), one piece of a floor tile (artefact number 25) and eleven brick fragments (artefact numbers 31, 35, 39, 55, 75, 76, 100, 101, 110, 111, 112). The finds have been described and photographed on St. Eustatius.

Results

The fragments of roof tile and the floor tile are made of red clay as well as most of the pieces of brick. There are two fragments of yellow brick (artefact numbers 75 and 101). These so-called *IJssel* bricks were common in the Netherlands from the 17th century onwards. There are two intact bricks. Artefact number 35 measures 16.5 x 8.5 x 4 cm and artefact number 110 measures 16 x 8 x 4 cm. The bricks date from the 17th-18th centuries.

5.2.4 Clay pipes

Introduction

There are two almost complete bowls and five fragments of stems of clay pipes. The bowls and most of the stem fragments have turned black due to their long stay on and in the seafloor. They also have chalk remains on the outside and the bowls also on the inside. The fragments are partly eroded due to sand and salt.

Method

The fragments of the clay pipes were studied using photographs taken on St. Eustatius. The identification was based on the shape of the bowls. The heel marks on both bowls were not photographed in detail. Both heels have been

³⁸ See Gawronski & Kranendonk 2018, 278, 5-3.15.

³⁹ Bartels 1999, 85-88; Hildyard 1985; Hildyard 2005.

⁴⁰ See Gawronski & Kranendonk 2018, 340-341.



Figure 22 Bowls of clay pipes, artefact numbers 87 and 42. (side a and b)

affected by sand and seawater and the marks are not visible any more. Also the possible presence of rouletting on the outer rim of the bowl is not visible due to chalk. It is not possible using photographs to establish if the pipes belong to the crude ('grove') or fine ('fijne' or 'porceleijne') quality due to coral on the surface. The bowls and stems of this second quality group were polished. It was also not possible to determine if the pipes were used or not.

Results

Both pipe bowls (artefact numbers 42 and 87) are identically shaped. They belong to the slender ovoid model (basic model 2b) and have a heel (Fig. 22).⁴¹ In both cases the bowl is not decorated and has no heel side marks. The undersides of heels were usually marked but these are not identifiable. Pipes with this bowl type date from the period 1690-1715.⁴² The stem fragments are not decorated and are partly covered by coral.

5.2.5 Glass

Introduction

The second most extensive find category is glass. In most cases the shards are individual wall or base fragments. There are two more or less complete vessels.

Method

The glass finds are studied based on photographs. The identification was based on macroscopical parameters: way of production (free blown, produced in a mould), number of rim-, wall- and bottom fragments, colour, form/type and state of preservation. The forms and types are determined based on the already mentioned Deventer-system (see paragraph 5.2.2).

Results

Apart from a bottom of a beaker made of transparent glass (artefact number 11) and a

piece of milk glass (artefact number 80) all shards are made of green or dark green glass (see Table 13). In several cases the glass has

⁴¹ Duco 2003, 160, nr. 503; <https://www.claypipes.nl>.

⁴² Duco 2003, 160; Van der Meulen 2003; <https://www.claypipes.nl/18e-eeuw/>.

Table 13 Glass artefacts found at SE-504.

Artefact number	Rim	Wall	Base	Color	Condition	Form	Remarks
8		1		dark green	irisation	onion shaped bottle	
9		1		green			
11			1	dark green		cylindrical bottle	flat base with foot rim, pontil mark
12		1		dark green			
14			1	dark green	irisation	onion shaped bottle	cone shaped kick-up, ring shaped pontil mark
15		1		dark green	irisation		
19		1		dark green	irisation	onion shaped bottle	
21		1		dark green			
27		1		dark green	irisation		
28			1	dark green	irisation	onion shaped bottle	cone shaped kick-up, ring shaped pontil mark
29			1	transparent		tumbler	flat base, domed kick-up, pontil mark
34		1		dark green			
44		1		dark green	irisation		
48	1			dark green	irisation	cellar bottle	flat base, pontil mark
63		1		dark green	irisation		
64		1		dark green	irisation		
65			1	dark green	irisation		cone shaped kick-up, ring shaped pontil mark
80			1	white			flat base, pontil mark
81			1	dark green	irisation	onion shaped bottle	cone shaped kick-up, ring shaped pontil mark
82			1	dark green	irisation	cylindrical bottle	cone shaped kick-up, ring shaped pontil mark
83		1		dark green	irisation		
84		1		dark green	irisation		
89		1		green	irisation	cylindrical bottle	flat base, vertical seam
113			1	dark green		cylindrical bottle	cone shaped kick-up, ring shaped pontil mark



Figure 23 Cellar bottle of green glass, artefact number 48 (a and b = different sides).

deteriorated during its stay on the sea floor. The shards have a pitted surface or are flaking (irisation).

Artefact number 48 contains a rectangular bottle that tapers to the bottom (gl-fle-30, Fig. 23). The bottle has a everted flat rim and short neck. The shape from the shoulder to the wall is rounded square. The bottom is flat with a slightly domed kick-up and hollow pontil mark. This type of bottle is a so-called cellar bottle. This type of bottle was introduced in the 17th century and used until the 19th century to transport and store spirits.

The name cellar bottle is derived from the wooden box or cellar in which six bottles could be stored and transported. The bottles were separated by wooden panels. The oldest cellar bottles have a rectangular body, a short neck and flat rim mostly covered by a pewter stub often externally threaded on which a pewter cylindrical cap (internally threaded) could be placed or screwed. Later examples have a more tapered shape and tapered band shaped or everted flat rim. The cellar bottle dates from the 18th century.⁴³

Artefact number 89 is a beer bottle made of green glass (23.5 cm high and 6.5 cm in diameter). The bottle (gl-fle-214) has a flat base and is produced in a mould. The bottle dates from the 20th century.⁴⁴

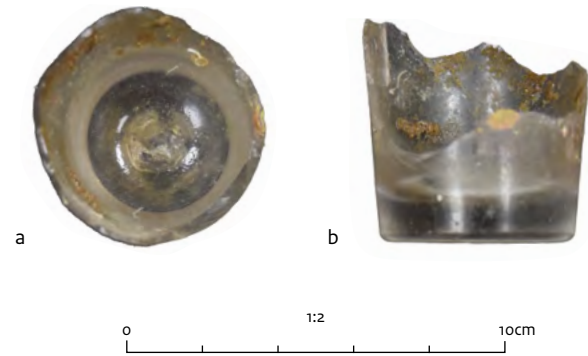


Figure 24 Base of a tumbler of transparent glass, artefact number 29 (a = top, b = side).

There are six bases of bottles of dark green glass. They all have a circular base with a cone-shaped kick-up and an open, ring-shaped pontil mark. The body is onion-shaped with bevelled shoulders and a tapering neck with a flat or flattened V-shaped string rim under the lip. This type of bottle was introduced in the third quarter of the 17th century.⁴⁵ On the basis of the rim shapes the bottles can be dated to the 18th century.⁴⁶ Artefact number 133 is fragment of a cylindrical bottle with a circular base and a truncated cone-shaped kick-up. The outside has a ring-shaped pontil mark. This type of bottle also dates from the 18th century.⁴⁷ Artefact number 11 is a base of a cylindrical bottle with a foot rim. This bottle dates from the late 18th or 19th century.⁴⁸

Most of the wall shards are fragments of onion-shaped wine bottles. Some have a sharp shoulder indicating that they belong to the cylindrical type.

Artefact number 29 is a fragment of a conical drinking glass or tumbler of transparent glass (gl-bek-6, Fig. 24). The circular base has a domed kick-up with pontil mark. This kind of glass was introduced in the 18th century and used until the 20th century for drinking wine, beer and spirits.⁴⁹ Often these glasses were decorated with engraved images.

Artefact number 80 is a round flat base of white glass with a pontil mark on the underside. The form of the object is not known.

⁴³ See Gawronski, Kist & Stokvis-van Boetzelaer 1992, 393-395.

⁴⁴ See Gawronski & Kranenburg 2018, 275.

⁴⁵ Kottman 2010.

⁴⁶ Kottman 2010; See also Gawronski, Kist & Stokvis-van Boetzelaer 1992, 395-399.

⁴⁷ Kottman 2010; See also Gawronski, Kist & Stokvis-van Boetzelaer 1992, 396, 489H.

⁴⁸ Gawronski & Kranendonk 2018, 272-273, 276.

⁴⁹ See Gawronski, Kist & Stokvis-van Boetzelaer 1992, 405.

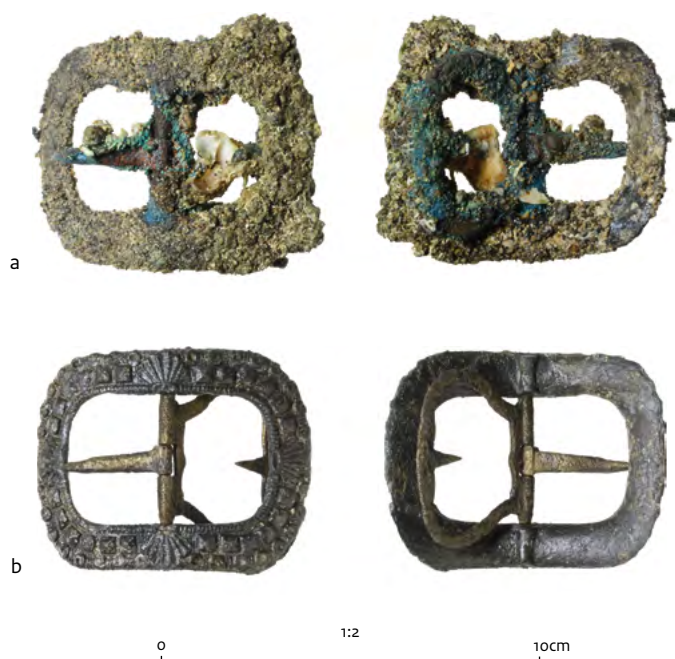


Figure 25 The pewter and gunmetal 18th century shoe buckle before (a) and after (b) cleaning (photo: Restaura, Heerlen).

5.2.6 Metal

Introduction

Various types of metal artefacts were encountered on the site, which are worthwhile describing here. All iron objects are strongly corroded. Objects of lead are better preserved. Some objects may date from the 18th century. Others are of a more recent date.

Shoe buckle

The first is a shoe buckle (artefact number 131). This find was covered with corrosion and therefore transported to the Netherlands where it was cleaned and photographed.⁵⁰

Method

The buckle was studied after restoration was completed. The metal composition was determined on the basis of macroscopical criteria and is concluded to be pewter.

Results

The buckle consists of two parts: a pewter frame with a rectangular outline with rounded edges (72 by 65 mm) and a single-pronged harp shaped chape (45 by 37 mm) with a hinged

tongue of gunmetal attached to a central pin (Fig. 25).⁵¹ The frame is slightly curved (12 mm high) and decorated with a moulding of raised decoration consisting of scallop shells in the centre of all four sides connected by a thin striped band. Between the shells is an inner border of squares and triangles. The outer border consists of dots or pearls. The squares and triangles represent gemstones. There are no makers' marks or guild marks on the back of the frame or chape.

When the buckle was new it would look like a silver buckle. Pewter was a cheaper alternative. On the basis of the form of the frame and chape and the decoration the shoe buckle dates from the 18th century and is probably Dutch.⁵²

Iron parts of masts and rudders

It was reported that several barrel hoops were seen on the seabed in various locations as can be seen on the figure below. When inspecting their shape and size it appears that at least some of them are not barrel hoops, but in fact it is more likely that they are iron rings that would be driven on to strengthen masts and spars (Fig. 26).

Several gudgeons were also found (Fig. 27). Gudgeons are used to attach the rudder to the ship. One of them was taken for further

⁵⁰ Restaura 2022. Restaura is one of the companies in the Netherlands that specializes in conserving and restoring artefacts.

⁵¹ Loop type 6 according to Gawronski & Kranendonk 2018, 588.

⁵² Whitehead 1996; Gawronski, Kist & Stokvis-van Boetselaer 1992, 325-335, especially H3046, H797, H3283, H3180; Gawronski & Kranendonk 2018, 566-568; Van Doesburg, Van Os & Brinck 2022, 52-53.

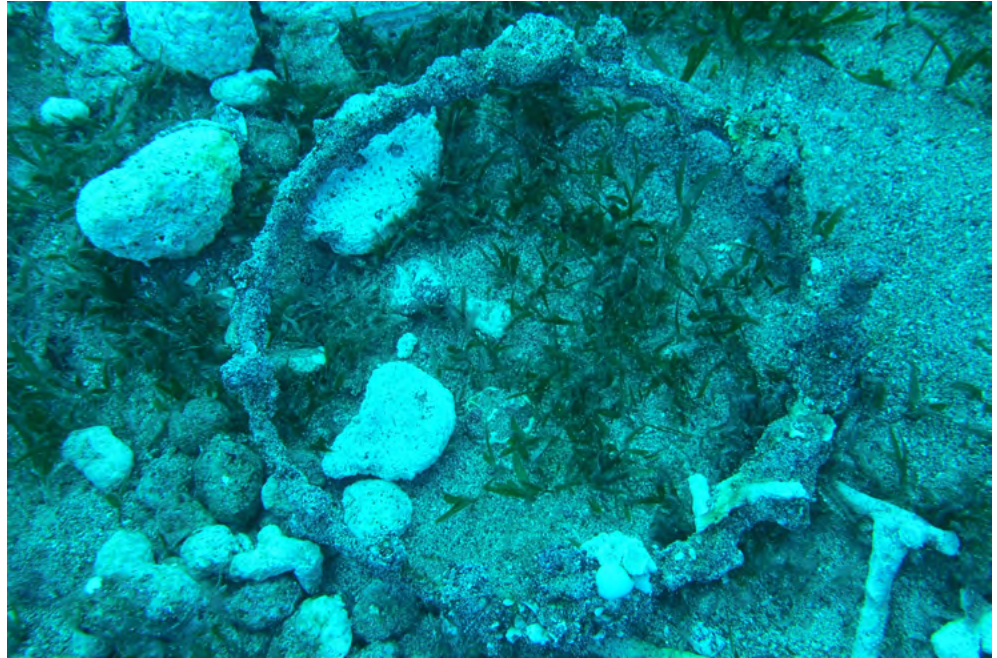


Figure 26 Barrel hoops or iron rings to strengthen the mast?

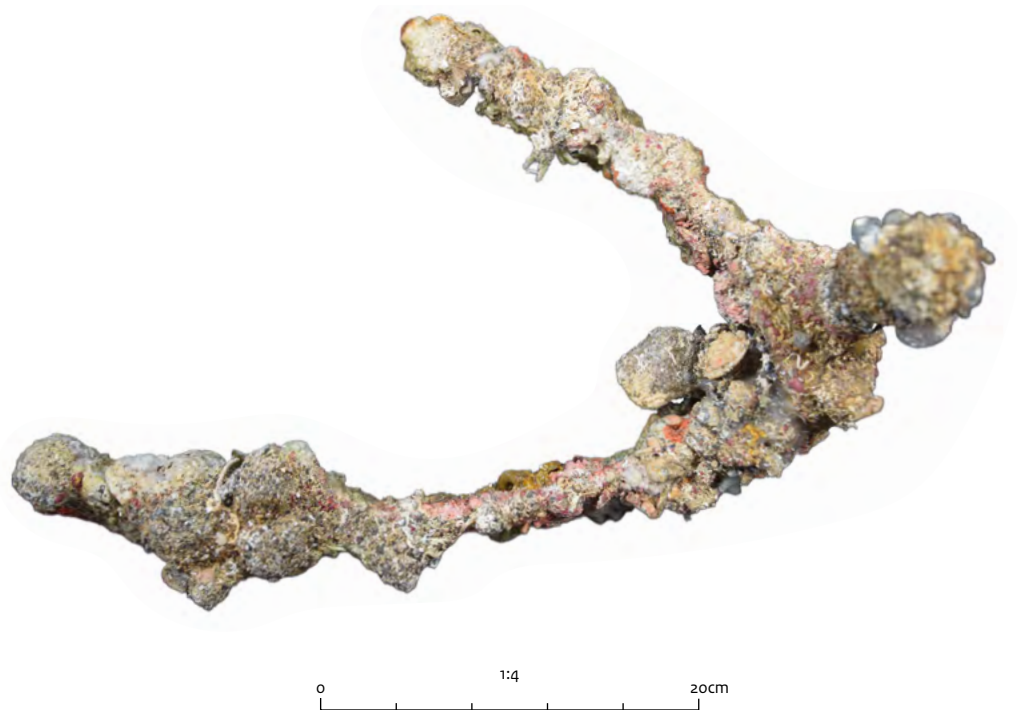


Figure 27 One of the gudgeons that was found, artefact number 3.

inspection (artefact number 3).

The iron rings and the gudgeons that were found suggest that we are dealing with iron parts of masts, spars and rudders that could easily break loose and be lost during storms. Unfortunately these iron parts are difficult to date.

Strip of iron

In test pit 8 a metal object was found that was heavily corroded (artefact number 61, Fig. 28). It was not only covered with a thick and hard corrosion deposit but also still subject to active corrosion. Its shape seemed to resemble a slave



Figure 28 The strip of iron before (b) and after (a) mechanical cleaning.

bracelet or half ankle shackle that was found in the area in 2018. An x-ray report made by the Rijks erfgoedlaboratorium (Appendix IV) and a CT-scan made by TU Delft were done to get a better idea of what was under the corrosion but the results were inconclusive.⁵³ That's why it was decided to mechanically remove the corrosion deposits up to the original surface. The artefact turned out to be a strip of iron that was bent and almost certainly not a (slave) bracelet.

Sounding lead

Artefact number 71 was a small sounding lead or sounding weight (Fig. 29) that was used for maritime navigation. A 50-called lead line was attached to the sounding lead with markings at fixed length intervals. The sounding lead was lowered over the side and let out until the lead reached the bottom. From the marks on the lead line the depth of the water beneath the vessel could be read. Sounding leads were not only used to determine the depth of water but also to bring up samples of the seabed. For this the bottom of the lead was hollowed out and would have some tallow inserted in order to take a bottom sample. These samples would be

compared with their knowledge of coastal geography and river sediments. It is difficult to date the sounding lead since they were used well into the twentieth century. The only things that can be said is that its colour, erosion and the coral on the object seem to indicate that it has been lying on the seabed for a while.

A cannon

Prominently visible on the site was a cast-iron cannon (Fig. 30) measuring 126 cm in length. It was obvious that the cannon was moved several times on the seabed – possibly due to anchoring activities – and when the team arrived it was completely surfaced on the seabed. Although most ships must have been armed with several iron and even bronze cannons, we believe that there is a good chance that this particular cannon was not lost overboard, but was lowered and put there deliberately to act as an anchor weight. Often times, cannon were used to keep the long anchor cables down on the seabed in order to prevent dragging. The cannon was left in its place by our team. It was heavily corroded and overgrown with coral, which hampered a proper investigation.

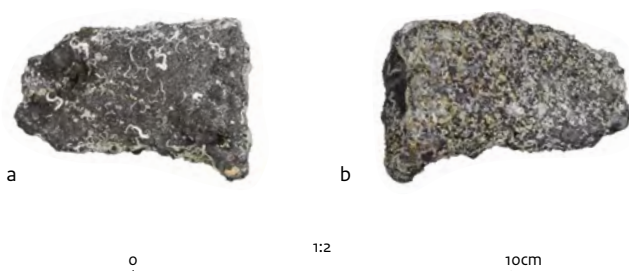


Figure 29 Sounding lead, artefact number 71 (a and b = different sides).

⁵³ Joosten 2021.



Figure 30 A cast-iron cannon left on the seabed, corroded and fully overgrown with coral.

This could have only been done if it would have been lifted to the surface. It was decided not to do that, as it would not majorly change the assessment of the site.

5.2.8 Interpretation of the artefacts

The artefacts discussed here mainly date from the 18th century (Fig. 31). A few are younger and

date from the 19th, 20th and 21st centuries. At various depths more modern artefacts were found as well as older ones indicating that the top layer of the seabed (in which the artefacts are found) is or has been very mobile and disturbed. Most artefacts have been affected by their stay on the seabed, especially the glass finds and fragments of clay pipes. The surfaces of the fragments of green and dark green bottles are pitted. The fragments of clay pipes have turned black and are covered in coral. The find

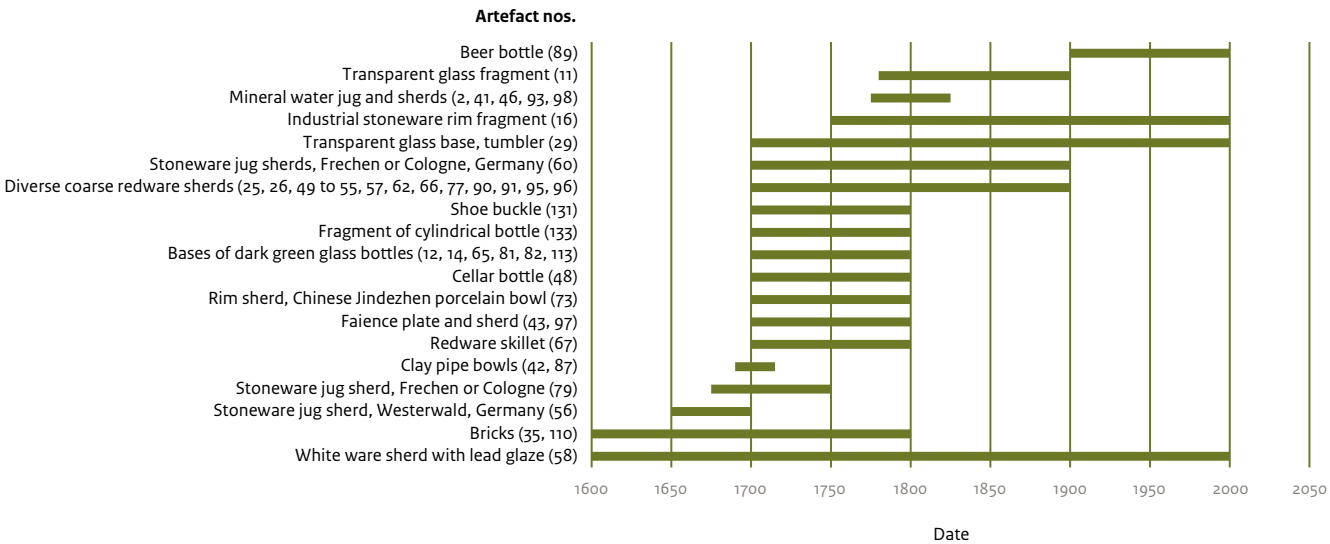


Figure 31 Overview of the relative dating of artefacts.

assemblage represents objects used along the waterfront that were likely thrown in the sea after use or breakage. Some may have been dumped from ships anchored in the harbour. The ceramic building materials may either come from a ship's galley, ballast or from buildings along the seafront.

5.3 Threats

Warmer waters are the domain of the shipworm (*Teredo navalis*). This mollusc feasts well on wood and is therefore the main danger to the integrity of wooden structures such as shipwrecks. It is also the reason why finds of wooden ship construction in Caribbean waters are so rare. Unfortunately, shipworms are not the only threat. Oranje Bay has been a protective roadstead for many ships, but from time to time storms and hurricanes not only caused ships to sink, but also caused disturbance of the seabed and the uncovering of fragments of wrecks and artefacts. The swells and currents – which move in a circular way in the bay – do the same, although in a more gradual and constant manner. The uncovering of wrecks and artefacts cause other deterioration to happen (shipworm and oxidation).

Human activity is always considered to be a threat for underwater cultural heritage. In this case however, the site also enjoys some protection from the underwater environment itself. For even though the site is popular with avocational divers, its depth of almost 20 metres involves serious risks for humans. Although careful training and preparation make these events quite rare, these risks include decompression sickness (DCS, the “bends”), arterial air embolism, and of course drowning. There are also effects of diving, such as nitrogen narcosis, that can contribute to the cause of these problems.

There are also few animals that potentially could cause issues: sharks, stingrays, stonefish, lionfish and scorpionfish. Further protection is provided due to the fact that the site lies within the confines of the St. Eustatius National Marine Park that is under the watch of STENAPA. Divers who do visit the site do so accompanied by a member of one of the local dive schools. These dive schools behave very responsibly and tell the divers not to take anything from the seabed. Since the site is right in front of one of them – ScubAqua – it will be fairly difficult to dive the site unseen.

6 Interpretation of the site

6.1 Spatial distribution of artefacts

This small-scale study has yielded some interesting results. Many objects, often still in good condition, were found consisting of bottles, pitchers, plates, but also clay pipes and a shoe buckle. Other common finds were different types of brick and remains of ship parts such as anchors and parts of rudders and masts. Also prominently present was one cast-iron cannon. Most of these objects are dated to the 18th century. This could lead to the conclusion that this is indeed the place where a ship had been wrecked. Historically, this is not so strange. Several ships were wrecked during storms. However, it is very well possible that something else is going on here: in the excavated pits we mainly see a thin layer of finds that is also very disturbed. Mixed in between 18th century objects, we also find a few older and many more modern objects at various depths. Through this observation we can conclude that the sediment in this area is very dynamic.

The 18th century material does not directly have a homogeneous origin, but comes mainly from Northwestern Europe, specifically the Netherlands and Germany. This does not immediately rule out the possibility that the finds could have come from a wreck, but in combination with the various ship parts that were found - iron parts of masts and rudders that can easily break loose during storms - we could also be dealing with a high concentration of finds that may have ended up in one place through loss, accident, deliberate jettisoning, storms and currents: all trapped behind a reef.

At the edge of the reef, a wide variety of anchors were found. Among them is an old Admiralty style anchor with its ring and stock visible, which is the largest of the finds. It has the slender proportions of an earlier design, dating back to the 18th or 17th century. Underneath that one lies an early stockless anchor, while a grappling hook was found adjacent to the Admiralty style anchor. The first possible explanation considered is that these anchors appear to have been abandoned after they got stuck in the reef, as often was the case. Another option, posed by an expert after being consulted on the anchors⁵⁴, suggested that the anchors could be cargo or scrap iron, since they were found huddled together. Among the

anchors was a find that was interpreted underwater as a possible band of a wooden anchor stock. Found inside the band were pieces of charred wood with square nail holes, which have been recovered and photographed (artefact number 78).

The location studied is almost exactly in the centre of the bay and also the roadstead of St. Eustatius in the 18th century. It must have been very busy there with ships waiting to be unloaded and loaded. With all those actions, all those storms, undoubtedly something went wrong when transferring cargo. Thus we find mostly empty liquor bottles, stoneware pitchers, clay pipes, but also heavier items such as bricks – ballast on arrival and exchanged for cargo on the roads – and a cannon at the bottom of the bay. Winds and storms have not only churned up the bottom for centuries, but as mentioned above also instigate a circular flow with the result that a lot of material is deposited in the eye of that current, including possibly material that has fallen into the sea from the coast at Lower Town. The reef creates a natural boundary where the objects accumulate. This led to the conclusion that these aren't the remains associated with a shipwreck site but rather a mixed residue from Statia's maritime past.

According to the researchers from SECAR, during the field schools carried out by *Shipwreck Survey* the northern part of the site showed more homogeneity among the finds. This location, however, could not be included in the investigation carried out by the RCE due to the fact that this area was too far away from the initial focus of the research, and that the site was too deep to easily extend the research. It could be investigated in the same manner at a later date.

6.2 Dimensions of the site

The site SE-504, including the surveyed area, is 61 metres long, 12 metres wide and oriented in a north-south direction. The area in which the test pits were made for the archaeological assessment measures approximately 18 metres long and 9 metres wide and is in the centre of SE-504.

⁵⁴ Written remarks from M. Beattie-Edwards by email on 27 September 2023.

6.3 Dating

Most of the artefacts are dated mainly to the 18th century. The location studied is almost exactly the centre of the bay, which was the location of the roadstead of St. Eustatius in the 18th century. A few artefacts are younger and date from the 19th, 20th and 21st centuries.

6.4 Origin

For several artefacts their origin could be ascertained. Both the *IJsselsteen* bricks and the clay pipes have a Dutch origin. Most likely the shoe buckle (artefact number 131) and the fragment of a faience plate (artefact number 43) are also Dutch. Based on the fabric and decoration it is likely that the faience plate was manufactured in Delft in the west of the Netherlands.

Amongst the pottery there is more variety in their origin. Most of the redware seems to be Dutch in origin. The foot rim of artefact number 53 is similar to those of 18th century Dutch majolica from Friesland. Artefact number 67 is

a redware frying pan or skillet. This type of skillet was produced in urban pottery workshops in different parts of the Netherlands.

Artefact number 58 is a fragment of white ware with lead glazing. This type of pottery was produced in the Netherlands in several pottery workshops in the Western and Northern Netherlands between the 17th and 20th centuries.

Most of the stoneware seems to be German in origin. Artefact number 2, an intact stoneware mineral water bottle, and artefact 56, a biconal jug of grey stoneware with salt glazing, were both produced in the Westerwald area. Artefacts 60 and 79 are stoneware jugs from Frechen or Cologne in Germany.

The survey yielded only one fragment of porcelain. Artefact number 73: a rim shard of a bowl of Chinese porcelain. The bowl was probably produced in Jingdezhen in China and dates from the 18th century.

6.5 Complex type

Roadstead, maritime transport, cargo.

7.1 Introduction

In the Netherlands, the value of a site is determined using valuation criteria defined in the *Kwaliteitsnorm Nederlandse Archeologie* (KNA), the Quality Standard for Dutch Archaeology, to assess if this site is a cultural heritage site worth preserving. The KNA was made to ensure the quality of archaeological research and it consists of standards and guidelines for archaeological research in the Netherlands.⁵⁵

According to these standards, a site's archaeological significance is established on the basis of its **perception, intrinsic quality and physical quality**. An assessment is made as to which elements are present that can be used in the valuation of the site and what their quality is. This information is then compared to what is already known from similar sites and/or information on the region and/or the same period. The KNA valuation works with a score system. See annex 1 and 2 for more explanation of the KNA valuation system. The different elements of the Triple Wreck site will be discussed below.

7.2 Assessment

7.2.1 Aspects of perception

Aesthetic value

Several objects on the site can be clearly defined and are visible on the seabed, such as the large anchors and a cannon. The site is about 800 metres off the coast in the Oranje Bay of St. Eustatius and is locally well known as a recreational dive site. The depth (max. 19 metres), good visibility under water, coral, biodiversity, and the many artefacts scattered all over the seabed make it a popular diving destination which is easily reached from the Oranjestad harbour.

Aesthetic value = Medium

Historic value

Despite the fact that no shipwreck was found, at site SE504 there are many artefacts scattered all over the seabed. This tangible history of the

18th century illustrates the story Statia's roadstead. The artefacts show a multinational gathering of ships, the bustle of the roadstead, trade, what people ate and drank, and also how they dressed and what they liked. It is also possibly a source for knowledge about the darker sides of this history; the transatlantic slave trade.

Historical value = Medium

7.2.2 Intrinsic quality

Rarity

The rarity of the site lies in its historical significance, the diverse range of artefacts, and the valuable insights it provides into the past. The fact that it offers a chance to explore the history of the island and provides an additional dimension to diving further emphasizes its rarity and significance.

Rarity = Medium

Research potential

The site has been found to exhibit a mixture of both modern and older artefacts at various depths, which suggests that the archaeological layers may have been disrupted or altered over time. There is no clear context or association between the artefacts and a specific vessel, which further limits the research potential.

Research potential = Low

Group value

The site's location in the roadstead of St. Eustatius enhances its group value by providing insights into the maritime landscape, the interactions between ships, and the historical significance of the area within the broader context of the island's history.

Group value = Medium

Representativeness

The presence of artefacts from different time periods and potential disruption of the archaeological layers can affect the site's ability to accurately represent a specific historical period or context. However, given that the site is located in the St. Eustatius roadstead, representativeness of the site can be considered higher in terms of capturing the historical context of that period. Most of the artefacts are

⁵⁵ Willems & Brandt 2004, 68.

dated to the 18th century, which is also the time that the roadstead saw significant activity.

Representativeness = Medium

7.2.3 Physical quality

Integrity

This site is characterised by a richness of artefacts in loose sediments. The disturbance caused by regular storms, hurricanes, swells, and currents can further impact the integrity of the site.

These natural forces have the potential to dislodge, expose, or scatter fragments of wrecks and artefacts, leading to potential damage and accelerated deterioration. The movement of sediments and artefacts can disrupt the original context and spatial relationships, making it more challenging to interpret the site accurately. And if the site ever contained any wooden (shipwreck) material, the wood would have been infested with shipworms to such an extent that any wood exposed above the sediments would quickly have vanished.

Integrity = Low

Preservation

A particularly large number of artefacts, often still in very good condition, were found at the site.

Preservation = Medium

The consolidated assessment of the archaeological value of SE-504 is presented in the table (14) below.

Table 14 Consolidated assessment of the archaeological value of SE-504.

Values	Criteria	Scores
Perception	1.1 aesthetic value	medium
	1.2 historical value	medium
Intrinsic quality	2.1 rarity	medium
	2.2 research potential	low
	2.3 group value	medium
	2.4 representativeness	medium
Physical quality	3.1 integrity	low
	3.2 preservation	medium

8 Answers to the research questions

In the Project Outline several research questions were formulated (see Chapter 3.2). In this chapter those research questions will be answered.

General questions about the research area

- *What is the exact position of the site and how is it situated?*

Site SE-504 is situated 800 metres from shore at a depth of 18 to 19 metres in the Oranje Bay of St. Eustatius.

- *What is the size of the site?*

The site is 61 metres long, 12 metres wide and oriented in a north-south direction.

- *What can be said about the site formation processes and degradation processes?*

The site formation processes at SE 504 Triple Wreck are influenced by various factors, including biological activity like those of the shipworm, natural disturbances such as storms and hurricanes, and the movement of swells and currents in Oranje Bay. These processes contribute to the degradation and alteration of the site over time.

General questions about the wreck site

- *What is the exact position of the wreck and how is it situated?*
- *What is the size and distribution of the ship's remains?*
- *Which parts of the wreck are still present?*
- *What can be said about the wreck site formation processes and degradation processes?*

Questions regarding the ship construction

- *Are any construction details of the ship visible at the site? And if so, which one?*
- *What can the construction details say about the nature, function and origin of the ship?*
- *Is it a Dutch ship and if so, what are the indications for this?*
- *Can it be determined from the remains which ship type the wreck is? If so, which type and what are the indications for this?*
- *Which types of wood were used?*
- *What indication do the wood samples give about the construction date of the ship and the origin of the construction timber?*
- *What is the quality and conservation status of the ship's timber, assessed at different ship parts and at different stratigraphic positions?*

- *What caulking method was used and with what kind of material was this done?*

The above set of questions primarily focus on a shipwreck. The outcome of the research has however been that there is not a specific wreck at the Triple wreck location, but a conglomerate of artefacts from the Statia roadstead. Therefore the above questions cannot be answered.

Questions regarding finds

- *Are there remains of equipment, ship's inventory, cargo and personal belongings present? If so, what is their nature, function and dating?*

A relatively small number of artefacts was recovered: pottery, glass, metal finds, fragments of clay pipes, stones, ceramic building materials, wooden objects and a rubber object. Primarily, the artefacts date from the 18th century, with a few younger artefacts from the 19th, 20th, and 21st centuries. The find assemblage represents objects used along the waterfront that were likely thrown in the sea after use or breakage and are therefore considered to be unrelated to a specific shipwreck. Some may have been dumped or fallen from ships anchored in the harbour. Another option is that objects fell during offloading and unloading.

The pottery, glass and the barrel hoops are most likely from a ship's inventory or cargo.

Fragments of clay pipes and the shoe buckle are the only personal belongings that were found. Iron parts of masts and rudders, gudgeons, anchors and the sounding lead are all ship's equipment. The ceramic building materials consist of roof tiles, floor tiles and (fragments of) bricks. These building materials seem to come from buildings along the seafront but could also possibly have been cargo or ballast. The two yellow *IJsselsteen* bricks may have been part of a ship's ballast, but have also been used in the past to build the galley of a ship. Another possibility is that the bricks originally came from the shore (the warehouses) and may have migrated over time towards the centre of the roadstead.

- *How are the finds distributed?*

Eleven pits were excavated and within them 113 artefacts were found. There is no specific distribution within the test pits, but based on the presence the artefacts throughout the test

pits the artefacts appear to have all been trapped behind the reef.

- *What is the spatial relationship between the finds and the ship parts?*

No shipwreck was found so nothing can be said about a spatial relationship.

- *What is the intactness and conservation status of the finds?*

A particularly large number of artefacts, often still in good condition (Fig. 32), were found at the site. Most artefacts have been affected by their stay on the seabed, especially the glass finds and fragments of clay pipes. The surface of the fragments of green and dark green bottles is pitted. The fragments of clay pipes have turned black and are covered in coral. Iron and other metal objects are corroded. Except for the charred wood in the band of an anchor stock, no wood was found due to the mobility of the upper layer of sediment and the appearance of the shipworm.

- *Are the finds in situ? If so, how does that show? If not, what is the reason for that?*

At various depths more modern artefacts were found as well as older ones indicating that the layer is or has been very mobile and disturbed. We can therefore assume that most finds are not in situ. However, the anchors, stuck underneath the reef seem to have been lost there originally.

- *Is there material that is washed in (unrelated artefacts)? And if so, which are these?*

In pit 9 at a depth of 10 cm two modern bottles were found and in pit 11 a metal plate with imprint was found. These finds are from a different time period than the others and not related to the roadstead of St. Eustatius.

- *Do the finds provide an indication of the date and time of the sinking of the ship? If yes, which date?*
- *Do the finds provide an indication of the ship's function and origin of its cargo? If yes, which one?*

The above two questions primarily focus on a shipwreck. The outcome of the research has however been that there is not a specific wreck at the Triple Wreck location, but a conglomerate of artefacts from the heyday of Statia as a mercantile hub. Therefore these questions cannot be answered.

Questions regarding marine geology

- *Can a stratigraphy be established at the site? And if so, which one?*

In the west of the site there is a thicker layer of fine (sandy) sediment than there is in the east. Below the sand a mixed layer of large round boulders can be found, limestone fragments and chunks of pumice. The round boulders formed at the beginning of the Holocene when sea levels were lower and the site location was in the surf. Above the boulders is a mobile layer with sediment consisting of grit, dead coral and shells and is at least 40 cm deep in most pits.

- *In which geological and pedological units or layers are archaeological remains located?*

The archaeological remains are located in the mobile layer that consists of grit, dead coral and shells and is at least 40 cm deep.

Overarching questions

- *To what extent is it possible to make a reconstruction of the original vessel based on the excavation documentation and collected finds and samples?*
- *What does the shipwreck indicate about the position of St. Eustatius in the Caribbean trade network of the period from which the shipwreck dates (probably mid-18th century)?*
- *To what extent can the shipwreck provide insight into the degree of connection with global trade?*
- *To what extent does the research (specific finds) indicate that enslaved persons were on board?*

The above set of questions primarily focus on a shipwreck. The outcome of the research has however been that there is not a specific wreck at the Triple wreck location, but a conglomerate of artefacts from the heyday of Statia as a mercantile hub. Therefore these questions cannot be answered.

Question regarding assessment

- *What is the valuation of the site (VSo6wb)?*

The site's archaeological value is medium, see chapter 7.

Question regarding protective measures

- *What measures are required in which parts of the research area for the sustainable protection of existing ship and other archaeological remains?*

The test pit with the large number of anchors was left open, allowing divers to see and admire some of the lodged anchors and the surrounding artefacts. STENAPA and the diving school

ScubAqua will monitor the site to ensure proper management and monitoring of this area. This site could also be used to educate divers and visitors about the significance of the site and the importance of preserving and respecting the archaeological remains. By implementing these

measures, the protection of the research area may well be improved, ensuring the long-term preservation of existing ship and archaeological remains while providing an instructive and enjoyable diving experience for visitors.



Figure 32 While this onion bottle is reasonably well preserved, most artefacts have been more or less affected by their stay on the seabed.

9.1 Conclusion

At location SE-504, we see some remnants of the history of the busiest – often referred to as the heyday – period of St. Eustatius trade literally lying on the bottom of Oranje Bay. This tangible history of the 18th century illustrates the unique position of St. Eustatius at that time. In the finds we see a glimpse of the multinational gathering of ships, the hustle and bustle on the roads, trade, what people ate and drank, but also how they were dressed and what they thought was beautiful. It is a valuable source of knowledge of which we have barely scratched the surface. It potentially can teach us more about the economic prosperity as well as about the darker stories of slave trade, contraband and war. These kinds of resources we should cherish, because they can help us to create a more balanced narrative of the Netherlands as a whole.

Despite the fact that no shipwreck was found on the southern section of the site near the reef, it is an important location because of the above. It recounts the boom of St. Eustatius' trade, the period when the island was the first to recognize the United States of America, when the coast of the lower town was still dotted with hundreds of warehouses full of trade goods, when the enslaved were dispersed in large groups, traded and had to work in appalling conditions on the sugar plantations and refineries, or at home with the wealthy merchants of the island and far beyond. The location is therefore an excellent opportunity, especially for diving tourists, to explore the history of the island. It lies underwater, is concentrated and is also visible. This makes the site certainly valuable in a larger context and also gives an extra dimension to diving, for which many also visit St. Eustatius.

9.2 Recommendations

1. After the research, the research team removed all materials that were temporarily installed on the bottom, such as the airlifts, the measuring points and the baseline. The eleven test pits were closed again after the artefacts that were brought up for research were returned to the pits. Only one pit has remained open (see above). This was done in consultation with STENAPA and the diving school. Here, divers can see as many as four anchors that have become lodged beneath the reef. The artefacts that were found around it have been placed around the anchors so that they can also be admired by the divers. It is proposed not to physically protect the site so that it can still be visited. However, it would be good to ensure that divers do not pick up souvenirs from the bottom, but that they leave the objects for others to enjoy. It is forbidden to lift artefacts without a permit, but proper monitoring and enforcement by the various stakeholders is crucial. This way the SE504 location can be turned into an instructive diving location.
2. Now only the southern part near the reef has been investigated. A possible follow-up action could be planned for the northern part.
3. Research into the local coarse redware. The coarse redware found in this context (artefact numbers 25-26, 49-55, 57, 62, 66, 77, 90-91, 95-96) is slightly different from European redware and often found during excavations on Caribbean islands. It seems likely that it was locally produced. Not much is known about the production process and production sites and it would be interesting to compare these local coarse redwares with redwares found on different Caribbean islands, as well as to compare it to European and African products.

- Bartels, M.**, 1999: Steden in scherven: vondsten uit beerputten in Deventer, Dordrecht, Nijmegen en Tiel (1250-1900): finds from cesspits in Deventer, Dordrecht, Nijmegen and Tiel (1250-1900), Zwolle.
- Bequette, K.**, 1980: Shipwrecks of St Eustatius. A preliminary study, Greenville (Department of History, East Carolina University).
- Bequette, K.**, 1986: Preliminary report on the magnetometer survey of Oranje and Gallows Bays, St. Eustatius, Greenville (Department of History, East Carolina University).
- Bequette, K.**, 1992: An archaeological reconnaissance of the anchorage, seawalls, and shipwrecks within Oranje Bay, St. Eustatius, Netherlands Antilles, Greenville (MA thesis, Department of History, East Carolina University).
- Brinkmann, B.**, 1982: Zur Datierung von Mineralwasserflaschen aus Steingut, *Keramos* 98, 7-36.
- Byrd, D.L.**, 2014: In search of Ubuntu: an examination of enslaved African domestic and labor environments on St. Eustatius, (Illinois State University, Theses and Dissertations 232).
- Clevis H. & J.F.P. Kottman** 1989: catalogus, in: H. Clevis & J.F.P. Kottman (red.), *Weggegooid en teruggevonden: aardewerk en glas uit Deventer vondstcomplexen 1375-1750*, Kampen, 77-142.
- Clevis, H. & J. Thijssen** 1989: Kessel, huisvuil uit een kasteel, *Mededelingenblad Nederlandse vereniging van vrienden van de ceramiek* 136, 4-48.
- De Hoop, R., L. Derksen & M. Manders** 2021: Programma van eisen MAR_SE_504, Amersfoort (internal document).
- Den Braven, J.A.**, 2006: *Tabakspijpen aan boord. Een overzicht van de kleipijpen uit de wrakken van het Burgzand (Waddenzee)*, Lelystad (internal report ROB/NISA).
- Duco, D.H.**, 2003: *Merken en merkrecht van de pijpenmakers in Gouda*, Amsterdam.
- Eastman, J. A.**, 1996: An archaeological assessment of St. Eustatius, Netherlands Antilles, Virginia.
- Gawronski, J. & P. Kranendonk** 2018: *Spul: catalogus archeologische vondsten Noord/Zuidlijn*, Amsterdam.
- Gawronski, J., B. Kist & O. Stokvis-van Boetzelaer** 1992: *Holland compendium. A contribution to the history, archaeology, classification and lexicography of a 150 ft. Dutch East Indiaman (174901759)*, Amsterdam.fshint
- Gilmore, G.**, 2013: St. Eustatius: the nexus for colonial Caribbean capitalism, in: D.C. Comer, (ed.), *The archaeology of interdependence. European involvement in the development of a sovereign United States* (Springer briefs in archaeology), 4160, New York.
- Goslinga, C.**, 1971: *The Dutch in the Caribbean and on the wild coast 1580-1680*, Assen.
- Hartog, J.**, 1976: *History of St. Eustatius*, St. Eustatius.
- Hildyard, R.J.C.**, 1985: *Browne muggs: English brown stoneware*, London.
- Hildyard, R.**, 2005: *English Pottery 1620-1840*, London.
- Joosten, I.**, 2021: *Onderzoeksrapport 2021-113 Rijkserfgoedlaboratorium. X-Ray gecorrodeerde metalen band uit de baai van Sint Eustatius*, Amsterdam.
- Kottman, J.F.P.**, 2010: 'Soo langh daer wat in is'. De geschiedenis van de vroegmoderne wijnfles in onze streken, *Vormen uit vuur* 209/210, 50-71.
- Maitz, A.**, 2021: *Maritime archaeological research on site SE-504 / Triple Wreck. Environmental assessment report*, St. Eustatius.
- Manders, M.**, 2017: *Kort verslag St. Eustatius wrak*, Amersfoort (internal report).
- Restaura**, 2022: *Conserveringsrapport van een schoengesp afkomstig van Sint Eustatius In opdracht van de Rijksdienst voor het Cultureel Erfgoed RCE-2021-5 t/m 5*, Heerlen.
- Roobol, M. J. & A. L. Smith** 2004: *Volcanology of Saba and St. Eustatius, Northern Lesser Antilles*, Amsterdam.
- Stelten, R.**, 2013: *Archaeological predictive model, St. Eustatius, Caribbean Netherlands*, St. Eustatius.

Stelten, R., 2019: *From golden rock to historic gem. A historical archaeological analysis of the maritime cultural landscape of St. Eustatius, Dutch Caribbean*, Leiden.

Stelten, R. & A. Hinton 2020: *The SE-504 shipwreck Site, St. Eustatius report on the 2018, 2019, and 2020 archaeological research campaigns*, St. Eustatius.

Van der Meulen, J., 2003: *Goudse pijpenmakers en hun merken*, Leiden.

Van der Meulen, A. & P. Smeele 2005: *De pottenbakkers van Friesland 1750-1950. Het ambacht, de mensen, het aardewerk*, Leiden.

Van der Meulen, A. & P. Smeele 2012: *De pottenbakkers van Gouda 1570-1940 en hun betekenis voor de geschiedenis van de Nederlandse keramiek*, Leiden.

Van Keulen, F., 2017: *An archaeological desk-based assessment and field investigation of Guyeau, St. Eustatius, Caribbean Netherlands*, SECAR archaeological report number 2017-04, St. Eustatius.

Van Oosten, R.M.R. & E.J. Bult 2012: *Het laatmiddeleeuwse bakpannenraadsel: voer voor archeozoölogen?* in: R. van Genabeek, E. Nijhof, F. Schipper & J. Treling (red.), *Putten uit het Bossche verleden. Vriendenbundel voor Hans Janssen*, Den Bosch, 235-250.

Veit, R., 2000: *Following the yellow brick road: Dutch bricks in New Jersey fact and folklore*, *Bulletin of the Archaeological Society of New Jersey* 55, 70-76.

Whitehead, R., 1996: *Buckles 1250 – 1800*, Witham.

Willems, W.J.H. & R.W. Brandt 2004: *Dutch archaeology quality standard*, Den Haag. Available at: <https://www.sikb.nl/doc/archeo/knauk.pdf> (accessed on 09-11-2022).

- Appendix I KNA valuation of a site
- Appendix II KNA valuation criteria and parameters
- Appendix III Catalogue of artefacts
- Appendix IV Specialist report

Appendix I KNA valuation of a site

In the Netherlands, the value of a site is determined using valuation criteria defined in the *Kwaliteitsnorm Nederlandse Archeologie* (KNA), the Quality Standard for Dutch Archaeology, to assess if this site is a cultural heritage site worth preserving. The KNA was made to ensure the quality of archaeological research and it consists of standards and guidelines for archaeological research in the Netherlands.⁵⁶

In Appendix II (Fig. 34) a systematic representation of the criteria can be found, which describes the groups of steps in the valuation process and the valuation parameters. The valuation process is carried out as a number of steps:

1. Valuation on the basis of **perception** aspects
In this step, sites are valued on the basis of criteria, which are important with regard to their perception value, that is their **'aesthetic value'** and **'historical value'**.
2. Valuation on the basis of **physical criteria**
This valuation is based on the criteria **'integrity'** and **'preservation'**.
3. Valuation on the basis of **intrinsic** criteria
In this step, monuments are valued according to their scientific importance. The scientific value is measured on the basis of four criteria: **'rarity'**, **'research potential'**, **'context value'** or **'group value'** and **'representativeness'**.⁵⁷

An assessment is made as to which elements are present which can be used in the valuation of the site and what their quality is. This information is then compared with what is already known from similar sites and/or information on the region and/or the same period.

The KNA valuation works with a score system (Table 15).

The valuation procedure can be represented in a flow diagram (Fig. 33) as follows (the process within the box is the valuation, followed by the selection recommendations):

During the first step, an assessment is made as to whether a site can be typified as worth preserving due to their **perception** value, on the basis of their aesthetic value or **historical value**. **Aesthetic value** refers to the value of archaeological sites as part of the landscape, which is expressed primarily in visibility. No score is given during this step, so if the site has an aesthetic or historical value it is immediately considered worth preserving.⁵⁸

If a site cannot be typified as worth preserving due to their perception value, the physical quality of the site is assessed in step 2. **Physical quality** is the extent to which remains are still intact and present in their original position. Within this value, a distinction is made between the criteria integrity and preservation.⁵⁹ **Integrity** is the extent to which the monument has been disturbed and the stability of the physical environment. In particular under water, the stability of the physical environment will have to be verified, as the integrity of a site can change rapidly due to natural processes (principally currents).⁶⁰

Preservation is the extent to which find material has been preserved.⁶¹ A site is, in principle, designated worth preserving on the basis of physical quality if the criteria of integrity and preservation together produce an above-

⁵⁶ www.sikb.nl; Willems & Brandt 2004, 68.

⁵⁷ Willems & Brandt 2004, 68.

⁵⁸ Willems & Brandt 2004, 70, 207.

⁵⁹ Willems & Brandt 2004, 214.

⁶⁰ Willems & Brandt 2004, 212.

⁶¹ Willems & Brandt 2004, 215.

Table 15 The valuation score table of the KNA.

Values	Criteria	Scores		
		high	medium	low
Perception	aesthetic value	no score applicable		
	historic value	no score applicable		
Physical quality	integrity	3	2	1
	preservation	3	2	1
Intrinsic quality	rarity	3	2	1
	research potential	3	2	1
	group value	3	2	1
	representativeness	not applicable		

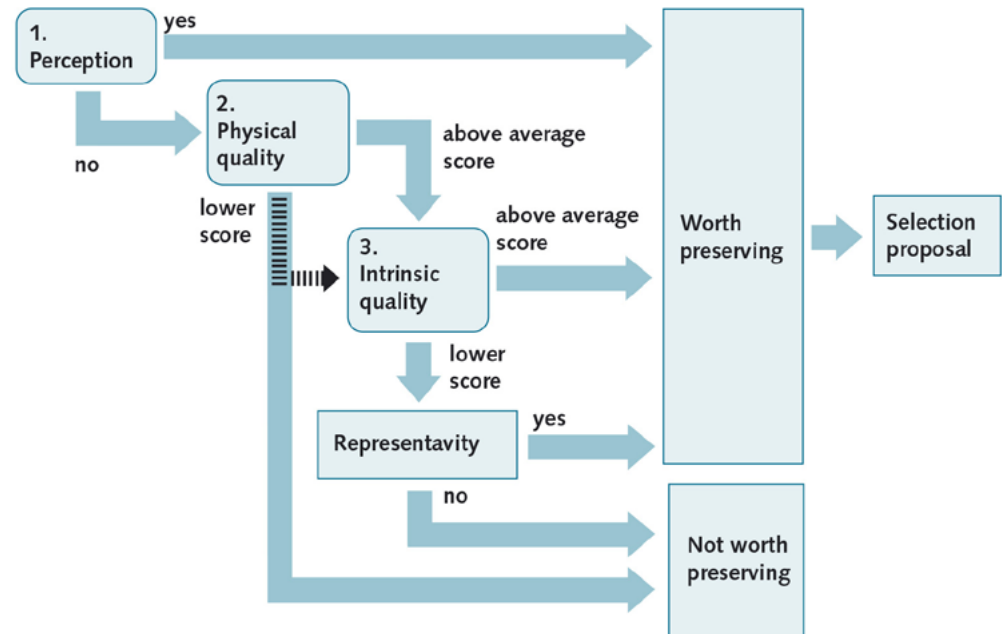


Figure 33 Valuation criteria (source: Willems & Brandt 2004, 71).

average score, which is five or six points. The assessment of physical quality is related to the archaeo-region in which the site is located, so that the preservation condition can be examined in relation to other relevant sites.⁶²

An **archaeo-region** is a relatively large area, within which there is a certain relationship between cultural heritage and the landscape both from the historical perspective and the spatial context. Thirteen archaeo-regions have been defined in the Netherlands. These form the geographical framework for investigating the archaeological record.⁶³

In case the physical quality gets a medium to low score, which is four points or less, the **intrinsic quality** criteria will be examined in order to determine whether the site is worth preserving. Sites which are designated as worth preserving on the basis of their physical quality are also valued according to their intrinsic quality. An assessment is made on the basis of the first three intrinsic quality criteria, which are rarity, research potential and group value.⁶⁴ **Rarity** is the extent to which a certain type of site is (or has become) rare for a period or in an area.

Research potential refers to the relevance of a site as a source of information and knowledge of the past. The research potential is the extent to which (excavating) the site can contribute to new knowledge on the past.⁶⁵ **Group value** is the added value assigned to a monument on the basis of the extent to which there is an archaeological context and a landscape context.⁶⁶ If the score is above-average with seven points or more, the site will be designated as worth preserving. Once this assessment has been made, a decision will be taken in the case of sites with a lower intrinsic value (less than seven points) as to whether the criterion of representativeness applies. If so, a proposal will be submitted for a selection of monuments worth preserving to be made per category. If it is expected that a high score will be assigned to one of the intrinsic criteria, the site will also, in principle, be regarded as worth preserving. This 'safety net' is intended to ensure that sites with limited physical quality, but which are nevertheless important from a research point of view, score too low and are dropped from further assessment.⁶⁷

⁶² Willems & Brandt 2004, 70, 72.

⁶³ Willems & Brandt 2004, 208.

⁶⁴ Willems & Brandt 2004, 70, 72.

⁶⁵ Willems & Brandt 2004, 215.

⁶⁶ Willems & Brandt 2004, 208.

⁶⁷ Willems & Brandt 2004, 70.

Appendix II KNA valuation criteria and parameters

Values	Criteria	Parameters
Perception	Aesthetic value	<ul style="list-style-type: none"> - Visibility from the ground level as landscape element. - Form and structure. - Relationship with the environment.
	Historical value	<ul style="list-style-type: none"> - Connection with actual historical occurrence. - Association with attributed quality or meaning.
Physical quality	Integrity	<ul style="list-style-type: none"> - Presence of contexts. - Integrity of contexts. - Spatial integrity. - Stratigraphy intact. - Mobilia in situ. - Spatial relationship between mobilia themselves. - Spatial relationship between mobilia and contexts. - Presence of anthropogenic biochemical residue. - Stability of the natural environment.
	Preservation	<ul style="list-style-type: none"> - Preservation of artefacts (metal/other). - Preservation of organic material.
Intrinsic quality	Rarity	<ul style="list-style-type: none"> - The number of comparable monuments (assemblage types) of reasonable physical quality from the same period within the same archaeo-region whose presence has been established. - Idem, on the basis of a recent and specific predictive map.
	Research potential	<ul style="list-style-type: none"> - Excavation/research of comparable monuments within the same archaeo-region (less/more than 5 years ago; complete/partial). - Recent and systematic research in the archaeo-region concerned. - Recent and systematic research of the archaeological period concerned. - Relevance for current research programmes according to the National research Agenda
	Group value	<ul style="list-style-type: none"> - Synchronic context (presence of monuments from the same period within the micro-region). - Diachronic context (presence of monuments from consecutive periods within the micro-region). - Landscape context (physical and historical-geographic integrity of the contemporary landscape). - Presence of contemporary organic sediments in the immediate surroundings.
	Representativeness	<ul style="list-style-type: none"> - Characteristic for a certain area and/or period. - The number of comparable monuments of reasonable physical quality from the same period within the same archaeo-region whose presence has been established and whose preservation is guaranteed. - Idem, on the basis of a recent and specific predictive map.

Figure 34 KNA Valuation criteria and parameters (source: Willems & Brandt 2004, 69).

Appendix III Catalogue of artefacts

Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
1	1	ceramic construction materials	tile shard, with diamond shaped nail hole	185 x 70 x 30
1	2	ceramics	mineral water jug	255 x 105 (minus handle), mouth ø 8
1	3	iron	concretion, one arm damaged, gudgeon	406 x 34 x 11

Photos

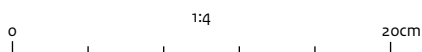
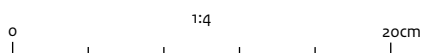


Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
1	4	unknown	concretion, dead coral	75 x 65 x 35
1	5	Iron	concretion	150 x 8 x 9
1	6	ceramic construction materials	tile fragment	85 x 44 x 10
1	7	stone	bluestone (?)	105 x 70 x 47
1	8	glass	fragment of green glass	78 x 45 x 1

Photos



0 1:2 10cm



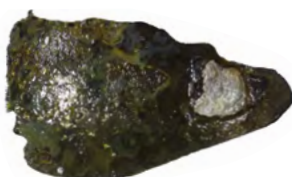
0 1:4 20cm



0 1:2 10cm



0 1:2 10cm



0 1:2 10cm

Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
1	9	glass	fragment of green glass	45 x 27 x 1
1	10	bone	animal bone	12 x 74 x 3
1	11	glass	base of white glass	82 x 56 x 5-7, ø 86, ø pontil mark 15
1	12	glass	fragment of green glass	83 x 53 x 3
2	13	iron	concretion	167 x 30 x 14

Photos

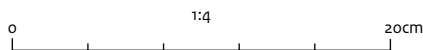
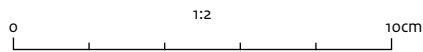
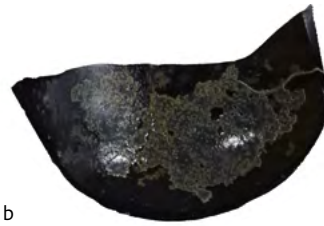
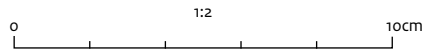
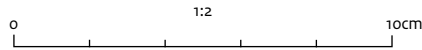
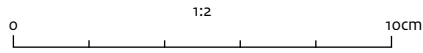


Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
2	14	glass	base of green glass onionshaped bottle, black residu/soot	147 x 137 x 3, pontil mark 30
2	15	glass	fragment of green glass, dark residu/soot	65 x 57 x 1
2	16	ceramics	red brown pottery	68 x 40 x 3
3	17	composite	copper and pewter shoe buckle	80 x 75 x 5-10
3	18	ceramics	fragment stem of a clay pipe	54 x 8

Photos

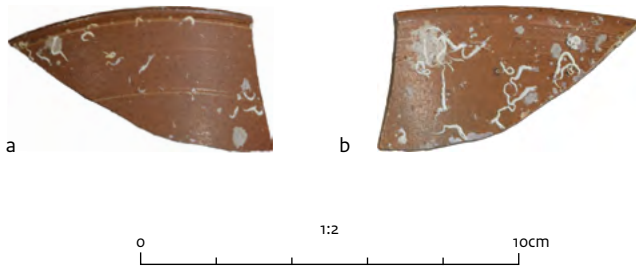
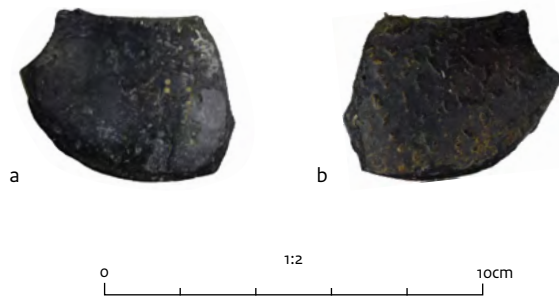
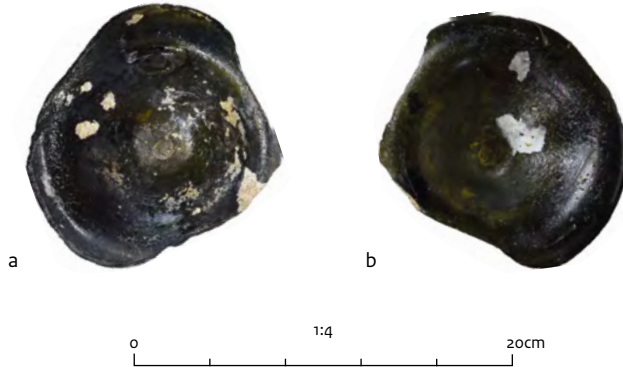


Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
3	19	glass	fragment of green glass, onion shaped bottle, burn marks	75 x 60 x 2
3	20	iron	concretion, knife shaped	220 x 35 x 5
3	21	ceramics	bowl and stem clay pipe, fragment	37 x 48 x 12
3	22	ceramics	stem fragment of a clay pipe	106, 6
3	23	ceramic construction materials	tile	62 x 55 x 40
3	24	iron	concretion	38 x 30 x 5

Photos

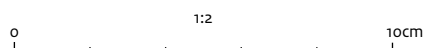
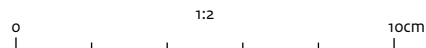
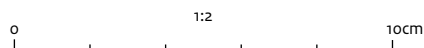
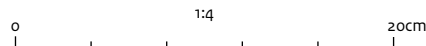
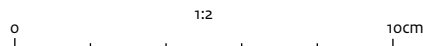
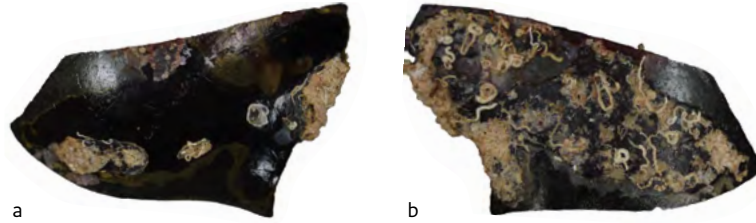
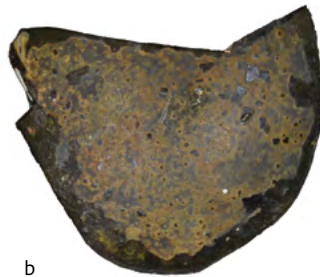
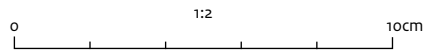
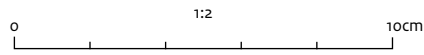


Table 16 Catalogue of artefacts.

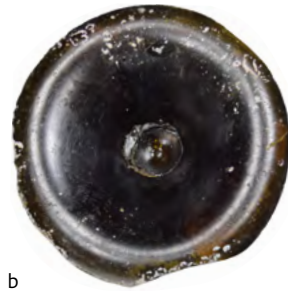
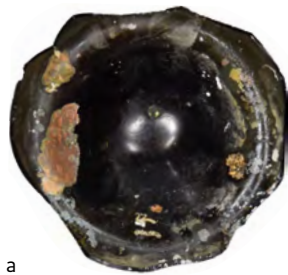
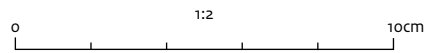
Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
3	25	ceramics	redware, rim fragment	50 x 25 x 8
3	26	ceramics	redware	53 x 32 x 12
3	27	glass	fragment of green glass, onion-shaped bottle	85 x 6 x 2
3	28	glass	base fragment, green glass, onion-shaped bottle	138 x 25 x 2, pontil mark \varnothing 30
3	29	glass	base fragment, drinking glass	54 x 28 x 1

Photos



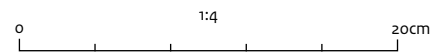
a

b



a

b



a

b



Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
4	30	glass	fragment green glass, onion-shaped bottle	77 x 5 x 0.3
4	31	ceramic construction materials	tile fragment	58 x 32 x 29
4	32	Stone	slate (?)	67 x 34 x 8
4	33	ceramics	stem fragment of a clay pipe	88, ø 5
4	34	glass	fragment of green glass, bottle (?)	79 x 28 x 3
4	35	ceramic construction materials	brick	165 x 85 x 4

Photos

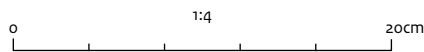
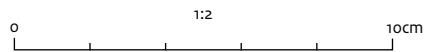
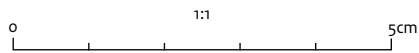
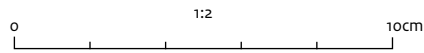
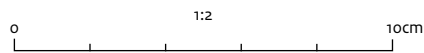
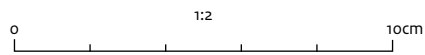
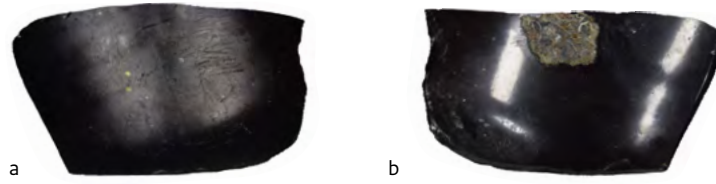


Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
4	36	ceramic construction materials	brick, red	78 x 108 x 40
4	37	iron	concretion, possibly part ring of mast	240 x 60 x 15
4	38	iron	concretion, fragment with bolts/nails (?)	240 x 52 x 12
4	39	ceramics	clay pipe, burnt	72, Ø 5
4	40	ceramics	clay pipe	79, Ø 4

Photos



0 1:4 20cm



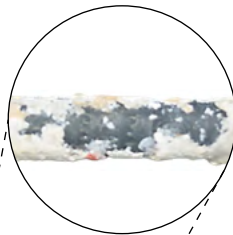
0 1:4 20cm



0 1:4 20cm



0 1:1 5cm



0 1:1 5cm

Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
4	41	ceramics	ceramics, grey-glazed, wheel turned	87 x 60 x 5
4	42	ceramics	bowl clay pipe	47 x 18 x 2
4	43	ceramics	ceramic plate, blue-and-white, soot, incomplete	207 x 142 x 5
5	44	glass	fragment onion-shaped bottle	48 x 27 x 2

Photos

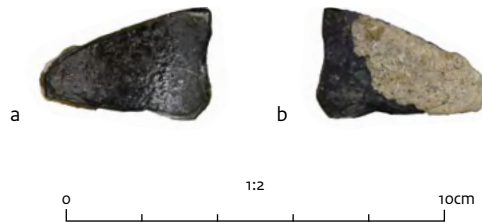


Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
5	45	iron	concretion	135 x 35 x 7
7	46	ceramics	stoneware, Westerwald or Cologne	103 x 70 x 4
7	47	iron	concretion, part of mast ring (?)	245 x 120 x 22

Photos



0 1:4 20cm



a

b

0 1:4 20cm



0 1:4 20cm

Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
8	48	glass	cellar bottle, partly intact	253 x 72 x 2, shoulder 18 (h), mouth 7
8	49	ceramics	redware	99 x 70 x 7
8	50	ceramics	redware	145 x 124 x 5
8	51	ceramics	redware	140 x 105 x 7

Photos

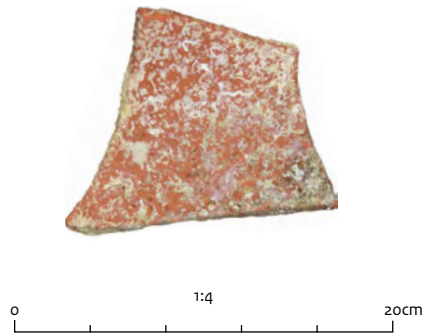
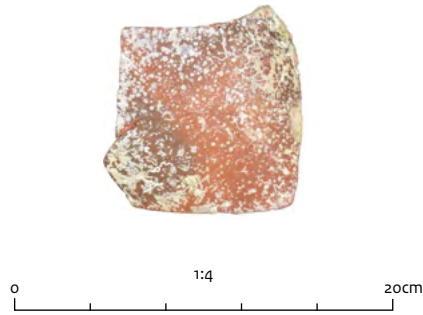
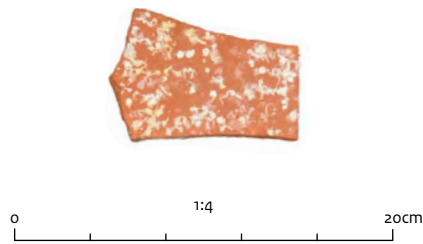


Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
8	52	ceramic construction materials	brick, red	60 x 30 x 44
8	53	ceramics	ceramic fragment, plate, Delft ware	75 x 88 x 6, base 6
8	54	iron	concretion	108 x 44 x 7
8	55	ceramics	redware	117 x 105 x 15

Photos

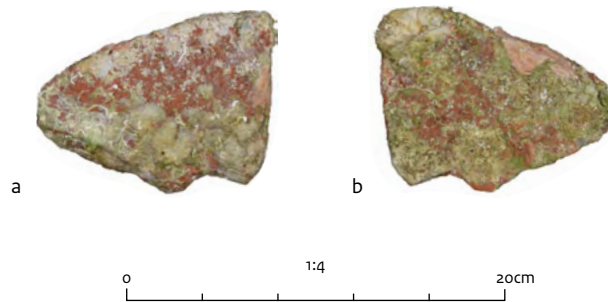
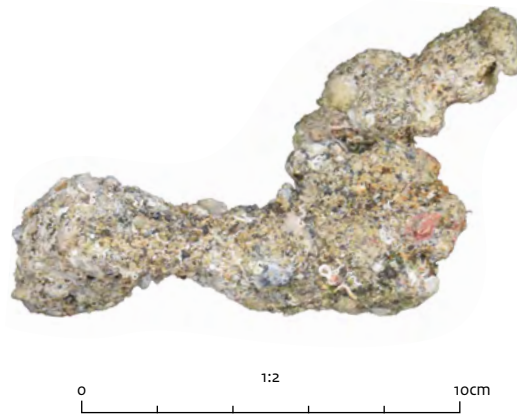
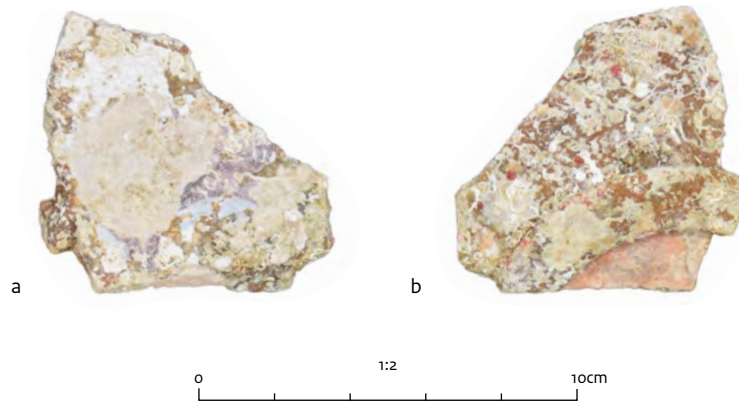
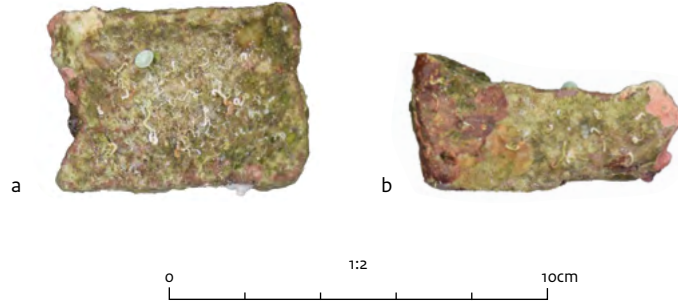
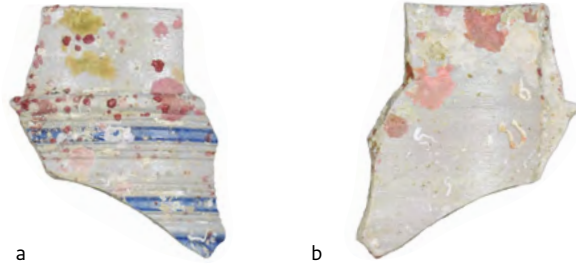


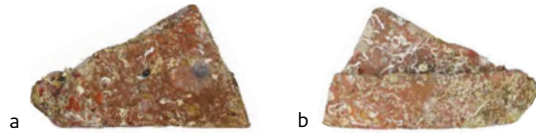
Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
8	56	ceramics	greyware, rim fragment with decorations	66 x 53 x 6
8	57	ceramics	ceramics, rim fragment	108 x 65 x 7, rim \varnothing 28
8	58	ceramics	yellowware, glazed	48 x 53 x 4
8	59	ceramics	redware, glaze inside, burned outside	95 x 61 x 6

Photos



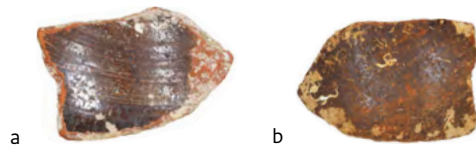
0 1:2 10cm



0 1:4 20cm



0 1:2 10cm



0 1:4 20cm

Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
8	60	ceramics	jug, salt-glazed	188 x 160 x 6, mouth = 10 (h), 43 (w), neck = 60 (h)
8	61	iron	concretion, hoop, selected for X-ray	110 x 68 x 30/5
9	62	ceramics	coarseware/stoneware, unglazed, steep rim	96 x 120 x 11-18

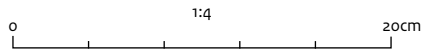
Photos



a



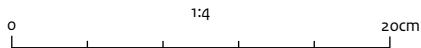
b



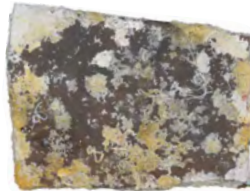
a



b



a



b

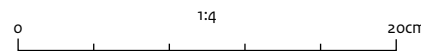
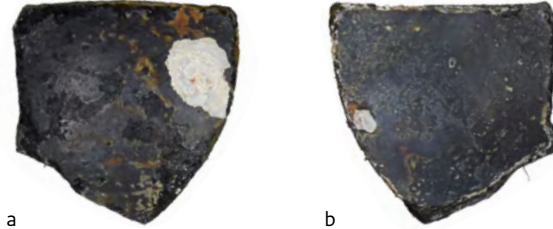


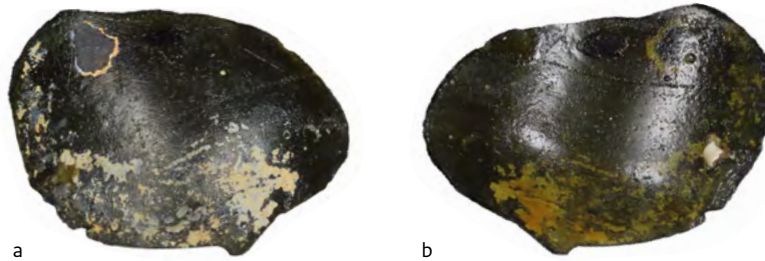
Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
9	63	glass	onion-shaped bottle, fragment, green glass	60 x 60 x 3
9	64	glass	fragment of a green bottle, in relation with find no. 6	86 x 67 x 3
9	65	glass	base onion-shaped bottle, soot	136 x 130 x 4, hollow base with kick-up = 80
9	66	ceramics	plate with fringe and collar-shaped rim	93 x 115 x 5

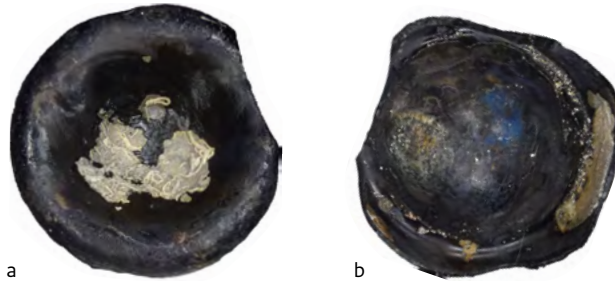
Photos



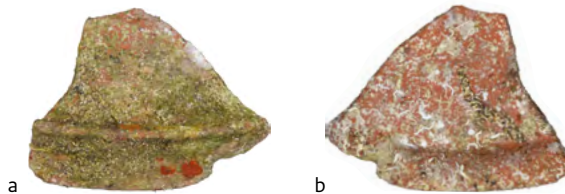
0 1:2 10cm



0 1:2 10cm



0 1:4 20cm



0 1:4 20cm

Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
9	67	ceramics	skillet, handle missing, burnt	280 x 95 x 7
9	68	iron	concretion, possibly nail	62 x 30 x 8
9	69	iron	quarter of a circle	102 x 40 x 25

Photos



a



b

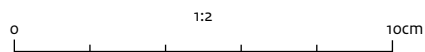
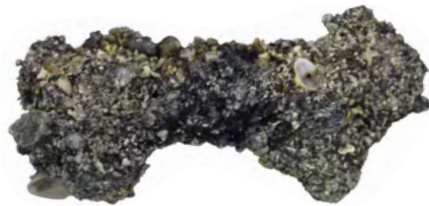
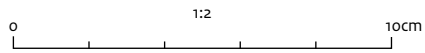
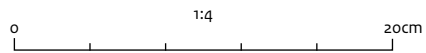
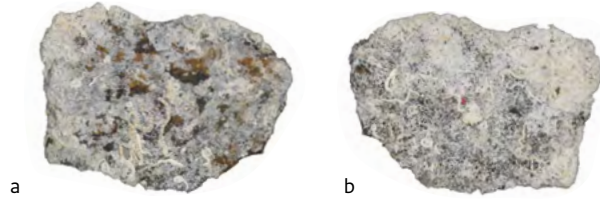


Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
9	70	iron	sheet, possibly plate	64 x 47 x 2
9	71	Metal	sounding lead	58 x 30 x 28
9	72	iron	concretion, possibly hoop/mast ring	225 x 60 x 10
9	73	ceramics	ceramics blue-and-white with decorated rim	50 x 35 x 2

Photos



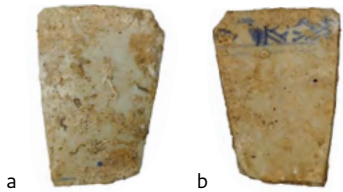
0 1:2 10cm



0 1:2 10cm



0 1:4 20cm



0 1:2 10cm

Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
10	74	iron	concretion	325 x 80 x 5 mm, width flat part = 30
10	75	ceramic construction materials	brick fragment, yellow	106 x 86 x 35
10	76	ceramic construction materials	brick fragment, red	120 x 105 x 40
10	77	ceramics	redware, unglazed	155 x 122 x 9

Photos



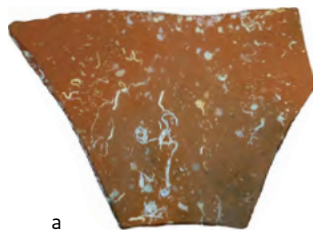
0 1:4 20cm



0 1:4 20cm



0 1:4 20cm



0 1:4 20cm

Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
10	78	charcoal	3 pieces of burnt wood, square nail holes	largest piece = 105 x 95 x 50, hole = 10 mm
11	79	ceramics	fragment of Beardmann jug (?)	135 x 95 x 10, neck = 25, mouth = \emptyset 50
11	80	glass	base white bottle	105 x 70 x 2, pontil mark 15
11	81	glass	base onion-shaped bottle	125 x 120 x 3, pontil mark = 15

Photos

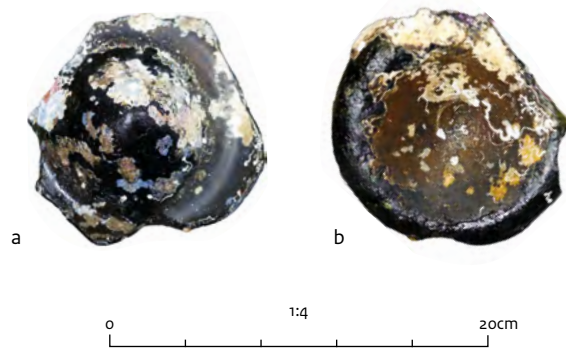
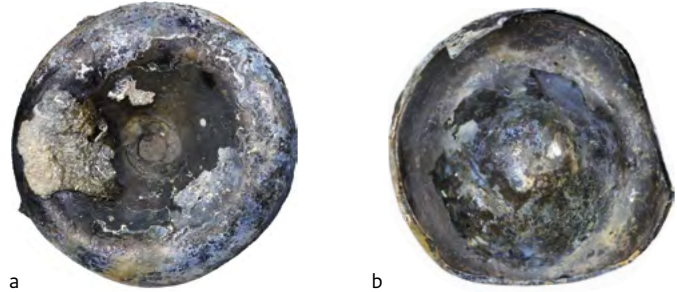


Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
11	82	glass	base fragment, onion-shaped bottle	140, ø 30, pontil mark 3
11	83	glass	glass fragment, onion-shaped bottle (?)	60 x 54 x 3
11	84	glass	glass fragment, onion-shaped bottle (?)	100 x 40 x 2
11	85	bone	animal bone, possibly rib	125 x 2 x 15
11	86	bone	animal bone	112 x 22 x 7

Photos



0 1:4 20cm



0 1:2 10cm



0 1:2 10cm



0 1:2 10cm



0 1:2 10cm

Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
11	87	ceramics	bowl and stem of a clay pipe	80 x 25 x 2, \emptyset 5
11	88	ceramics	stem fragment clay pipe	120, \emptyset 5
11	89	glass	beer (?) bottle	230 x 65 x 5
11	90	ceramics	redware, unglazed	175 x 115 x 9

Photos

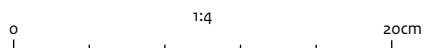
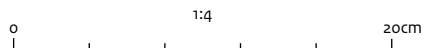
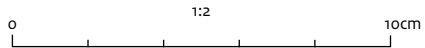
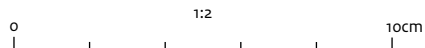


Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
11	91	ceramics	unglazed ceramics, wheel thrown	85 x 70 x 4
11	92	ceramics	rim fragment, unglazed, wheel turned	115 x 110 x 6
11	93	ceramics	rim fragment, stoneware, grey, wheel turned	155 x 85 x 4
11	94	ceramics	tile, red	200 x 150 x 5

Photos



0 1:2 10cm



0 1:4 20cm



a



b

0 1:4 20cm



0 1:4 20cm

Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
11	95	ceramics	unglazed ceramics, wheel turned	150 x 75 x 9
11	96	ceramics	unglazed ceramics, red	165 x 130 x 16
11	97	ceramics	plate, rim fragment, blue decoration, painted	130 x 60 x 4
11	98	ceramics	rim jug with handle	155 x 70, mouth \emptyset 30

Photos

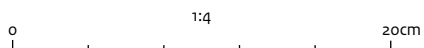
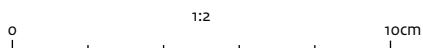
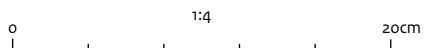
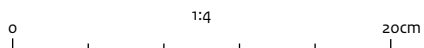
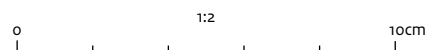
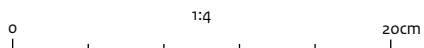
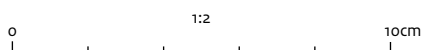


Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
11	99	ceramics	ceramic fragment, burned	55 x 55 x 5
11	100	ceramic construction materials	brick, fragment, red, corals	135 x 80 x 40
11	101	ceramic construction materials	brick, yellow, fragment	85 x 40 x 30
11	102	glass	glass fragment	85 x 55 x 2

Photos



a



b

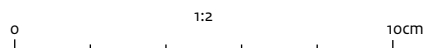


Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
11	103	iron	nail, incomplete	47 x 6 x 3
11	104	iron	concretion, hoop / mast ring	144 x 50 x 5
11	105	iron	concretion, hoop / mast ring	230 x 72 x 15
11	106	iron	concretion, hoop / mast ring	190 x 90 x 25
11	107	iron	concretion, hoop / mast ring	175 x 50 x 10

Photos

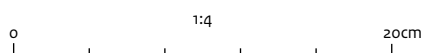
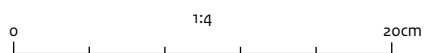
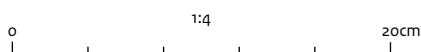
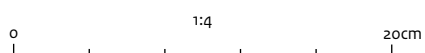
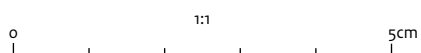


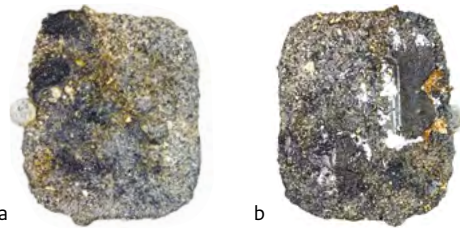
Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
11	108	metal	black metal, concretion, burned (?)	65 x 45
11	109	iron	metal badge, modern, with imprint	c. 150 x 80
888	110	ceramic construction materials	brick, red, without context	160 x 80 x 40
888	111	ceramic construction materials	brick, red, without context	102 x 78 x 40
888	112	ceramic construction materials	brick, red, without context	108 x 95 x 35

Photos



0 1:2 10cm



a b
0 1:4 20cm



0 1:4 20cm



0 1:4 20cm

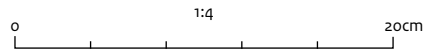
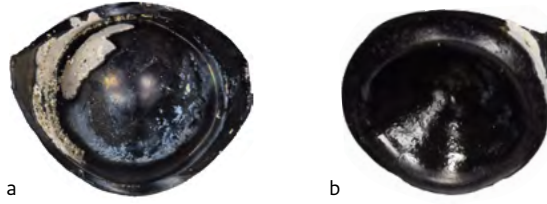


0 1:4 20cm

Table 16 Catalogue of artefacts.

Trench no.:	Find no.:	Category:	Remarks:	Dimensions (mm):
888	113	glass	base fragment of a bottle	96 x 90 x 3, base kick-up opening 70

Photos



Appendix IV Specialist report



Rijksdienst voor het Cultureel Erfgoed
Ministerie van Onderwijs, Cultuur en
Wetenschap

Onderzoeksrapport 2021-113
Rijkserfgoedlaboratorium

X-Ray gecorrodeerde metalen band uit de baai van

Sint Eustatius

Ineke Joosten

Colofon

**Onderzoeksrapport 2021-113
Rijkserfgoedlaboratorium**

X-Ray gecorrodeerde metalen band uit de baai van Sint Eustatius

Datum: 01-10-2021

Joosten, I.

Toegankelijkheid van dit document

Door Rijksdienst voor het Cultureel Erfgoed (RCE) verstrekte informatie is onderhevig aan de ‘Wet openbaarheid van bestuur’ (Wob). De rapporten zijn beschikbaar via de bibliotheek van het RCE. Uitzonderingen hierop kunnen schriftelijk worden aangevraagd.

© 2021 Rijksdienst voor het Cultureel Erfgoed. Alle rechten voorbehouden. Niets uit dit rapport mag worden vervoelvoudigd en/of gepubliceerd, in enige vorm of op enige wijze, zonder voorafgaande schriftelijke toestemming van de Rijksdienst voor het Cultureel Erfgoed (RCE).

Foto titelpagina: © Rijksdienst voor het Cultureel Erfgoed

Alle andere foto's in dit rapport tenzij anders vermeld: © Rijksdienst voor het Cultureel Erfgoed

Hoe te refereren naar dit document

Joosten, I, 2021, *X-Ray gecorrodeerde metalen band uit de baai van Sint Eustatius*, RCE projectnummer 2021-113, Amsterdam, Rijksdienst voor het Cultureel Erfgoed, Rijkserfgoedlaboratorium.

Rijksdienst voor het Cultureel Erfgoed

Postbus 1600

3800BP Amersfoort

www.cultureelerfgoed.nl

Inhoud

Objectgegevens	4
Samenvatting	5
1. Inleiding	6
1.1 Achtergrond	6
1.2 Onderzoeksvragen	6
2. Werkwijze, resultaten en discussie	7
3. Conclusie	9
Bijlage 1: Referenties	10
Bijlage 2: Toegepaste analysetechnieken	12

Objectgegevens

Datering	17 ^e eeuw?
Locatie	800 meter uit de kust bij Sint Eustatius
Afmetingen	Ca. 15 bij 8 cm
Objecttype / Materialen	Band/ijzer (gecorrodeerd)



Gemineraliseerde metalen band uit Sint Eustatius

Samenvatting

Uit de baai bij Sint Eustatius is een gecorrodeerde metalen band opgedoken. Omdat hier een drukke rede was van de West Indische Compagnie (WIC) bestaat het vermoeden dat het hier een slavenboei betreft. De band is in drie stukken gebroken en deze stukken zijn met een röntgenapparaat doorgelicht. Stuk A bestaat uit twee overlappende strips gecorrodeerd metaal. Het metallische ijzer lijkt grotendeels te zijn omgezet in ijzer(hydr)oxiden. De corrosie/concretie aan de zijkant lijkt geen structuur te bevatten die duidt op een sluiting of iets anders. De band van stuk B bevat twee uitstulpingen, mogelijk zijn dit steentjes of een structuur die bij de band hoort. Vervolgonderzoek met een CT scanner of een neutronen tomografie van stuk A en B laat mogelijk meer structuur in de corrosie en concretie zien.

1. Inleiding

1.1 Achtergrond

Bij een opgraving in de baai van Sint Eustatius is een gemineraliseerde metalen band opgegraven. Omdat hier een drukke rede was van de West Indische Compagnie (WIC) bestaat het vermoeden dat het hier een slavenboei betreft. Er is al eerder een koperen enkelschakel aangetroffen (nu in beheer van het Sint Eustatius Center for Archaeological Research (SECAR)). Er zijn tot nu toe heel weinig slavenboeien gevonden, dat maakt deze vondst mogelijk heel bijzonder. Vlak na de opgraving is de band in drie stukken gebroken (Fig. 1).

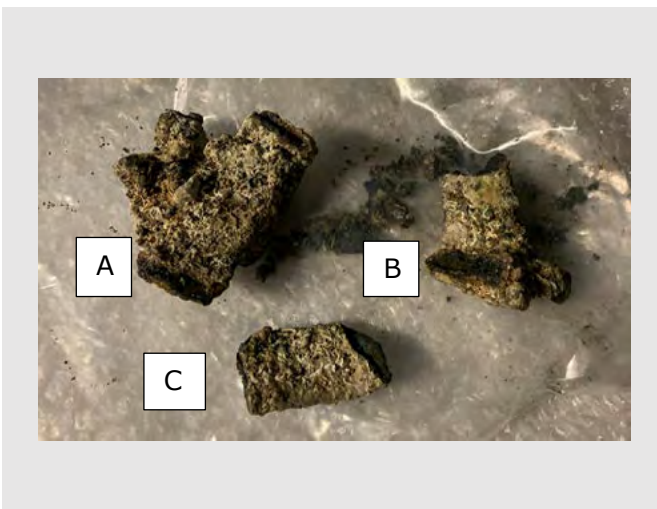


Fig. 1: De drie stukken van de band genummerd A, B en C

1.2 Onderzoeksvragen

De band is gecorrodeerd en overdekt met concretie uit de zee. De vraag is of met röntgendoorlichting de constructie en daarmee de mogelijke functie van de band zichtbaar te maken is.

2. Werkwijze, resultaten en discussie

De drie stukken zijn afzonderlijk met het röntgenapparaat doorgelicht (Fig. 1). Er zijn zowel foto's als filmpjes gemaakt. Drie metaalrestauratoren van het Rijksmuseum (Joosje van Bennekom, Sara Creange en Tamar Davidowitz) hebben meegekeken. Het oppervlak van de band is bedekt met corrosie en concreties van wit materiaal, vermoedelijk koraal. Stuk A lijkt uit twee banden die elkaar overlappen te bestaan (Fig. 2A en B). De band kon dus mogelijk groter en kleiner gemaakt worden. In de corrosie aan de zijkant is geen duidelijke structuur zichtbaar (Fig. 4). Mogelijk zijn er bogen te zien maar dit is niet heel duidelijk. Aan de bovenzijde van stuk B zijn twee knoppen zichtbaar. Het gecorrodeerde oppervlak is enigszins groen gekleurd. Misschien komt dit doordat de band samen met een gesp waarop groene corrosieproducten aanwezig zijn verpakt was. In de knoppen is geen structuur zichtbaar maar het is minder wolkig dan de rest van de corrosie (Fig. 5A en B). Mogelijk zijn het steentjes. Stuk C laat de gecorrodeerde band zien. De drie stukken zijn overal magnetisch. Dit kan duiden op de aanwezigheid van ijzer of magnetiet. Waarschijnlijk is al het metallisch ijzer omgezet in ijzer(hydr)oxides en bestaat het originele oppervlak van de band nu uit magnetiet. De röntgendoorlichting geeft geen uitsluitsel over de aanwezigheid van een sluiting. Mogelijk bevat de corrosie van stuk A resten van een sluiting dit is met röntgendoorlichting echter niet zichtbaar. Misschien geeft een CT scan of neutronen tomografie van de stukken band een beter resultaat omdat tomografie een reconstructie van de interne structuur van de corrosie mogelijk maakt (Van der Stok-Nienhuis et al, 2021, Van der Stok-Nienhuis et al., In prep).

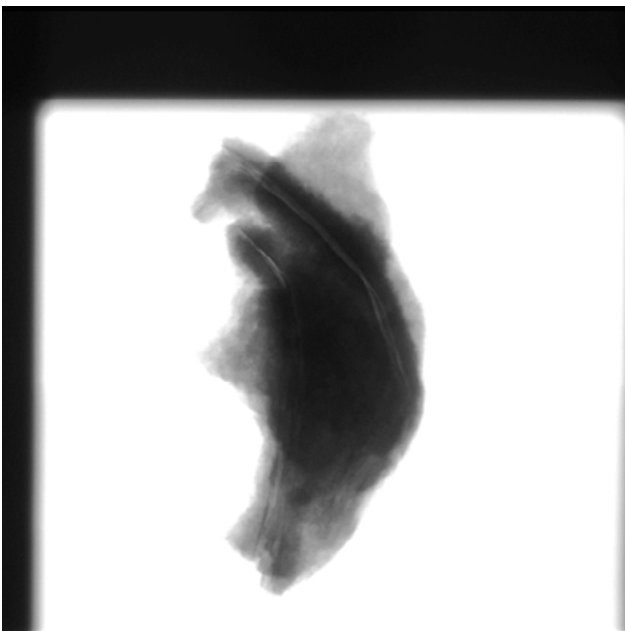


Fig. 2A: Band stuk A: Er zijn duidelijk twee, elkaar overlappende, stukken band aanwezig. Er is waarschijnlijk geen metaal meer aanwezig.

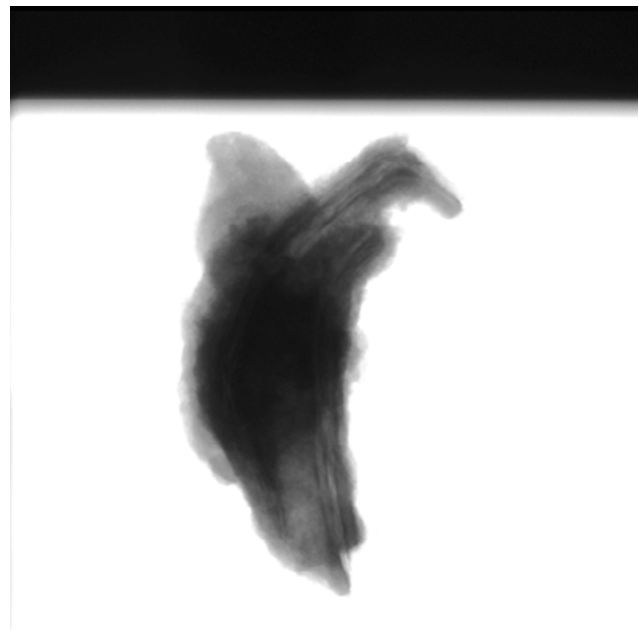


Fig. 2B: Band stuk A: doorgelicht vanaf de ander zijde.

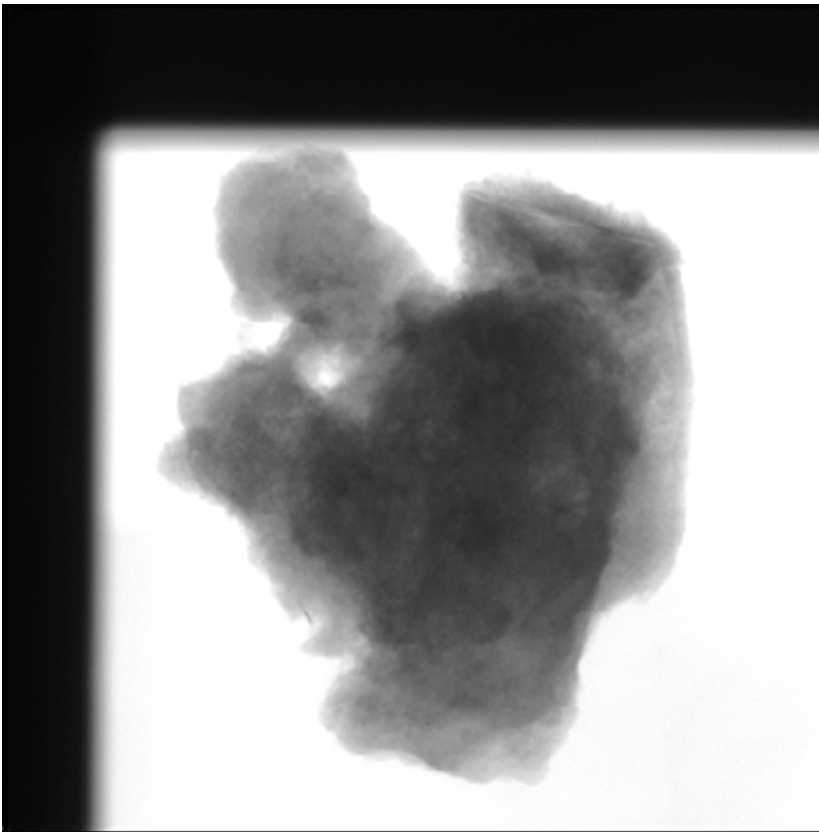


Fig. 3: Band stuk A: er is geen structuur zichtbaar in de concreate en de corrosie.

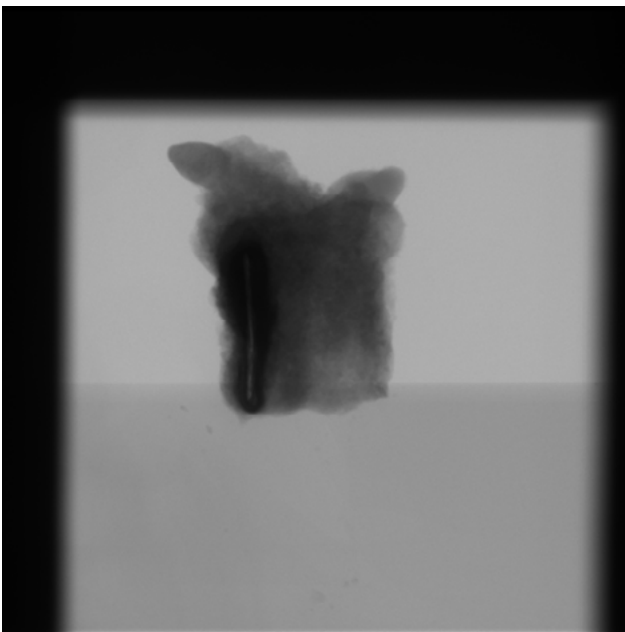


Fig. 4A: Band stuk B: de band is zichtbaar, aan de bovenkant een structuur die er anders uitziet dan de corrosie die de band omringt.

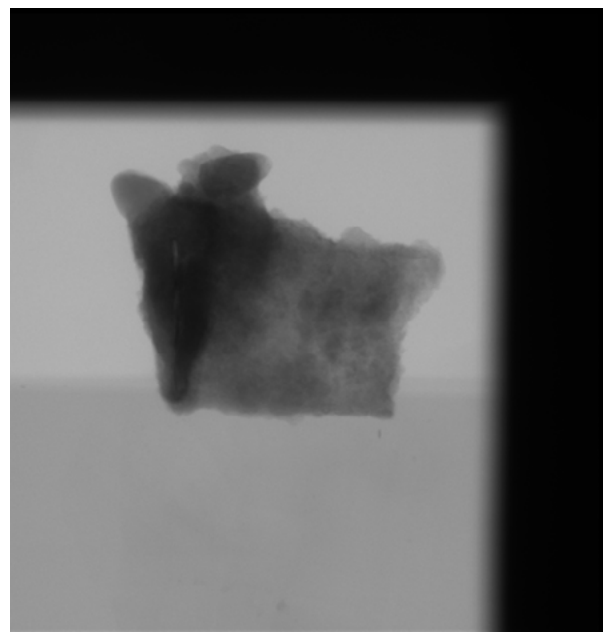


Fig. 4B: Band stuk B: aan de bovenzijde zijn twee ovale structuren, mogelijk steentjes, zichtbaar.

3. Conclusie

Het vermoeden bestaat dat een gecorrodeerde metalen band opgedoken uit de baai bij Sint Eustatius is gebruikt als slavenboei. De band is in drie stukken gebroken en deze stukken zijn met een röntgenapparaat doorgelicht. Stuk A bestaat uit twee overlappende strips gecorrodeerd metaal. Het metallische ijzer lijkt grotendeels te zijn omgezet in ijzer(hydr)oxiden. De corrosie/concretie aan de zijkant lijkt geen structuur te bevatten die duidt op een sluiting of iets anders. De band van stuk B bevat twee uitstulpingen, mogelijk zijn dit steentjes of een structuur die bij de band hoort. Vervolgonderzoek met een CT scanner of een neutronen tomografie van stuk A en B laat mogelijk meer structuur in de corrosie en concretie zien.

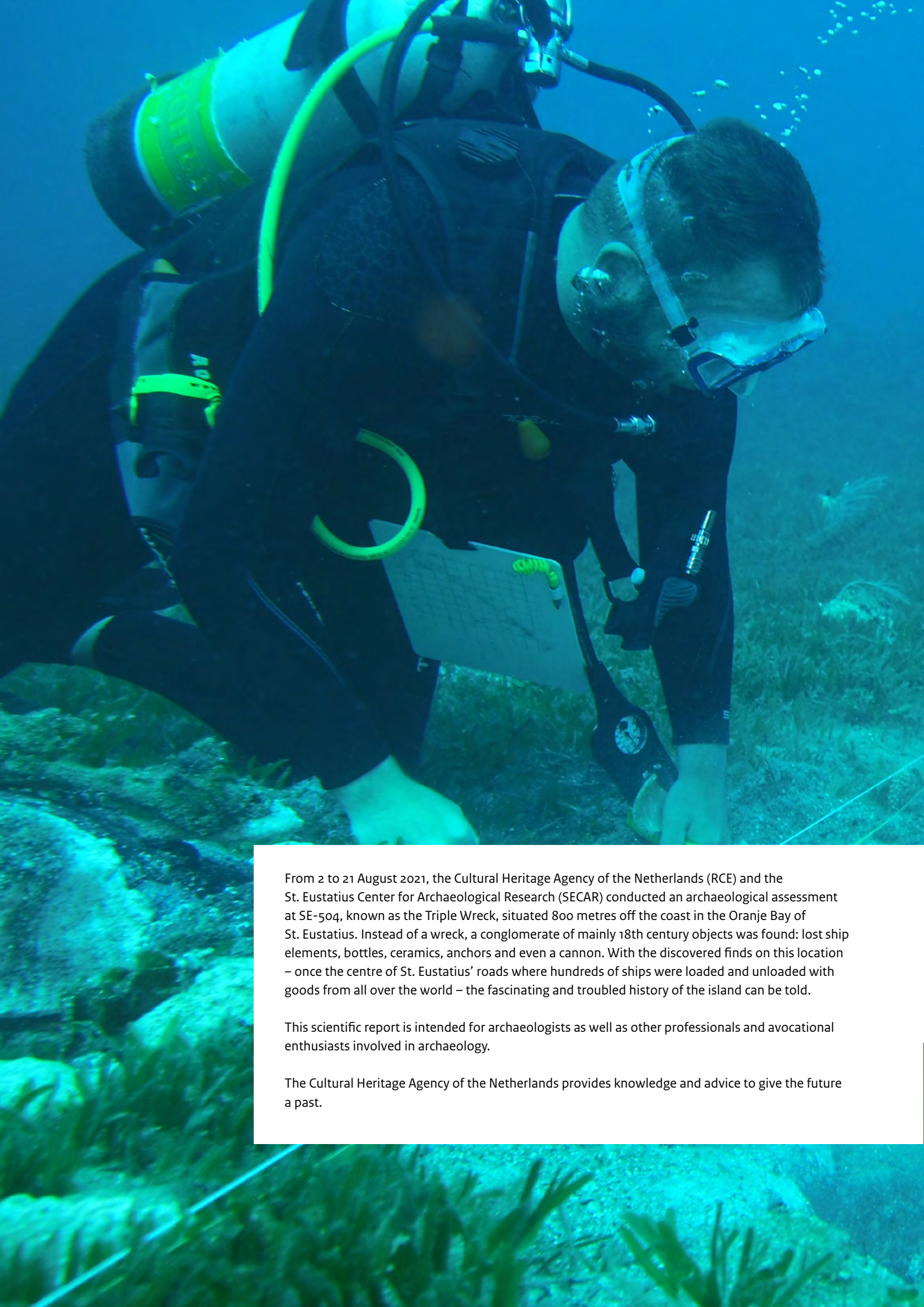
Bijlage 1: Referenties

Janneke van der Stok-Nienhuis, Elisabeth Kuiper, Tonny Beentjes, Ineke Joosten, Lambert van Eijck, Zhou Zhou, Maarten van Bommel (2021): A case study for scientific research prior to conservation of marine metal artefacts , *Journal of Archaeological Science*: 37, pp 11.

Janneke van der Stok-Nienhuis, Tonny Beentjes, Dominique Ngan-Tillard, Lambert van Eyck, Ineke Joosten, Maarten van Bommel, (in prep.): Unravelling the construction of 17th century silver filigree spheres from a shipwreck using non-invasive imaging.

Röntgendoorlichting

Er is gebruik gemaakt van een General Electric Eresco 280 MF, met een roterende tafel, 2 mm dik koper filter en een Flat Panel (FP)-detector. De beelden zijn gemaakt bij een versnelspanning van 150-225kV en 2.8 mA en een spotsize van 1 mm.



From 2 to 21 August 2021, the Cultural Heritage Agency of the Netherlands (RCE) and the St. Eustatius Center for Archaeological Research (SECAR) conducted an archaeological assessment at SE-504, known as the Triple Wreck, situated 800 metres off the coast in the Oranje Bay of St. Eustatius. Instead of a wreck, a conglomerate of mainly 18th century objects was found: lost ship elements, bottles, ceramics, anchors and even a cannon. With the discovered finds on this location – once the centre of St. Eustatius' roads where hundreds of ships were loaded and unloaded with goods from all over the world – the fascinating and troubled history of the island can be told.

This scientific report is intended for archaeologists as well as other professionals and avocational enthusiasts involved in archaeology.

The Cultural Heritage Agency of the Netherlands provides knowledge and advice to give the future a past.