Connected by Water

A maritime perspective of Plantation Esthersrust and Suriname's defence system between the 17th and 19th century

Santosh A. Singh

Cover: bird eye view of the planting beds at Plantation Esthersrust

(photo by Fabian Vas, February 2020)

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PREFACE

Archaeology has always been a subject that has fascinated my mind. The common layman often confuses archaeology with history or palaeontology. I too was once guilty of this train of thought. It was during the first month of my bachelor's study that I realized the difference. Though all three study the past, they do so differently. History studies written sources, archaeology studies human remains and artefacts, while palaeontology studies fossils. Slowly, but surely, I got even more enticed in the science of archaeology. Digging up the past, which sometimes lies only a few centimetres in the ground and some cases on the surface (in the case of Plantation Esthersrust). In the four years of my bachelor's course, I received an education in history, anthropology, and archaeology from the terrestrial point of view. My exposure to maritime archaeology happened in the 4th year of my bachelors. This specialization concerns itself with the relationship between people and their maritime surroundings. It was at this point that I began to develop an appreciation of water in society.

This thesis uses a maritime perspective for an in-depth study of Plantation Esthersrust and the military defence system of Suriname between the 17th and 19th centuries. This thesis was written in partial fulfilment of my MA degree at the Faculty of Archaeology at Leiden University.

The Maritime paradigm gives a unique perspective of the past. This master's thesis is a small contribution towards creating awareness towards the Maritime element within history, which is often overlooked.

This thesis would not have been possible without the help of some esteemed friends, family members, mentors and well-wishers. First of all, I would like to thank God almighty for giving me the needed health and intelligence to have been able to put this thesis together. I offer my most sincere gratitude towards my parents for always believing in me. Furthermore, I would like to extend my gratitude to the following persons:

Martijn Manders, Associate Professor in Maritime Archaeology at Leiden University, for granting me a scholarship to pursue my MA in archaeology and for being my mentor; Cheryl White, Ph.D., member of the Faculty of Humanities at the

Anton de Kom University of Suriname (AdeK) for helping me secure the scholarship in the first place and for guiding me through field and lab work; Bas Spek, owner of Bakkie Museum and Plantation Esthersrust, for his invitation to study Plantation Esthersrust, accommodation, and for facilitating the teams access to the site; Stephen Fokké, Director of Stichting Gebouwd Erfgoed Suriname (SGES), for his continuous support and photography skills; Irene Meulenberg, archaeologist at the Archaeological Services of Suriname for her guidance, permission to use tools for fieldwork and for providing a place for lab work; Kathleen Gersie, coastal morphologist at AdeK, for her guidance and support regarding the coastal morphology of Suriname; and Fabian Vas, drone operator, for helping on short notice.

Furthermore, I would like to especially thank my colleagues from AdeK alumni. Sushmeeta Ganesh, Jõvan Samson, and Farisha Kartosemito, for their continuous support during fieldwork and lab work.

"Therefore the doubts which have arisen in your heart out of ignorance should be slashed by the weapon of knowledge"

- Bhagavad Gita 4.42

Amsterdam, 25th June 2020

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Introduction

Plantation Esthersrust was one of Suriname's last cotton plantation and is located on the confluence of the Warappa Canal and the Atlantic Ocean. [1] The plantations were a crucial aspect of the prosperity of Suriname during the colonial period. The plantocracy were established as early as the 16th century. The first plantations were all sugar plantations and gradually other types of crops such as coffee, cocoa, indigo and cotton were introduced.

The first plantations were established more inland, away from the coast. When the defence system was strengthened and expanded near the coastal area, plantations were slowly established in the coastal region, because they were better protected. Water played an essential role for the plantations as well as for the defence system, yet, it has been ignored or insufficiently stressed upon in Suriname's historical and archaeological literature.

Theoretical framework

Surinamese archaeology is quite young. Past research saw a bias in the archaeology of pre-Columbian cultures (Versteeg 2003, 2008; Rostain and Versteeg 2005). In recent years, a new set of archaeologists (both professional as well as in training) have researched and written about other aspects of Surinamese history. These research endeavours include studies in Maroon archaeology (Ngwenyama 2007), comparative studies on material cultures between the Maroons and the Indigenous groups (Meulenberg 2011), the study of material culture (Ganesh 2018), NGO involvement in creating awareness about archaeology (Nremoredjo 2019), and conservation and preservation of archaeological metal artefacts (Singh 2019) are some of the examples. These research endeavours were mostly presented via a terrestrial point of view. The maritime aspect of history has only recently been introduced into the Surinamese historical (Balai 2011, 2013) and archaeological (Phagu 2019) disciplines.

Watercourses have played a major role in the colonization, exploitation and development of Suriname. Historically Suriname's foreign threat has always come

[1] The Warappa Canal is an man dug extension of the Warappa Creek and that extents to the Altantic Ocean. Other canals were also dug from existing creeks to make transportations within the colony easier. Other well-known dug out canals are the Saramacca, Matapicca, Tapoeripa, Orelana and Jonkermans (van Sijpesteijn 1854, 79).

from the sea. The coastal mangroves and the interior rainforest was too dense and difficult for European colonizers to penetrate and therefore were both a natural deterrent to terrestrial exploration[2]. The rivers and creeks formed the only way to penetrate far inland, through the river rapids and waterfalls, also known as *soela's* (in local parlance), were not sailable for traditional European boats. Only well-equipped expeditions could penetrate inland with *korjalen*, boats made of bark, and hollowed-out tree trunks (Dalhuisen and Hassankhan 2018, 9). It is therefore logical that goods, people, and information were transported over these waterlines, but also that as strategic locations these waterways needed to be protected. In the pre-Columbian period, the Indigenous cultures used these waterways for trade and as a mode of transportation in their *korjalen* (Dalhuisen and Hassankhan 2018, 9). [3] During the colonial period, the Indigenous people also gifted their knowledge, about the construction of dugout canoes, to the Maroons, (Dalhuisen and Hassankhan 2018, 9).

The landscape was heavily manipulated while establishing the plantocracy. When fortifications were introduced at the confluence of the rivers and the coast, the Dutch introduced hydraulic engineering (Kapper 2010, 7). To manage the water, they created water locks and dikes in different areas of Suriname. This made the lower situated lands cultivatable.

The many waters of the Guiana's originating from the Guiana highlands and the Amazon River basin was used by the Indigenous peoples and later on by an array of European colonizers and the escaping enslaved, or Maroons, connecting them with different terrestrial points.[4]

The maritime paradigm offers us an alternative vantage point to look at the relationship of human activities to land and water. The term maritime cultural

[2] The forests of Suriname have always been and still are a dense concentration of mangroves, rainforest with low shrubs and high canopy trees, which makes it very hard to penetrate. Suriname has the largest swath (93%) of pristine rainforest in the world; due in part to low, population density and rates of deforestation.

[3] Dugout made from a hollowed tree trunk.

[4] The Guiana's are a region in north-eastern South America which include the territories known as French Guyana (still an overseas department of France), Suriname formerly Dutch Guiana (previously a colony of the Dutch) and British Guyana (previously a colony of the British). The Guyana region in Venezuela known as Spanish Guyana and the state of Amapá in Northern Brazil also known as Portuguese Guyana is also included in the wider context of the Guiana's (van Sijpesteijn 1854, xi).

landscape is the interaction between human processes in the coastal area over a period of time and the environment and it includes the sea, the coastal line and the land (Vladimirova 2016, 45).

Christopher Westerdahl uses the term cognitive landscape or the landscape in man. "*The term cognitive landscape denotes the mapping and imprinting of the functional aspects of the surroundings in the human mind* " (Westerdahl 1992, 5). This term can be associated to its terrestrial alternative, landscape archaeology. Landscape archaeology focuses on how landscapes changed and evolved over time due to human influence and how past peoples perceived the environment (Newman 2017, 1). According to Westerdahl a natural way of discovering the maritime cultural landscape is by way of the cognitive perspective of local tradition (1992). In this case, the local tradition of the Suriname plantation and the defence system of the colonial period will be examined via the maritime perspective. Westherdahl's concept of transport zones together with his maritime cultural landscape theory will be adopted for this thesis.

Research questions:

The research questions were developed based on the points articulated above. Plantation Esthersrust was one of the last cotton plantations in Suriname. The current site of Plantation Esthersrust has recently been exposed due to the cyclical change to the coastal morphology. In addition, it is threatened by natural erosion and looters. Plantation Esthersrust was one of the last cotton plantations in Suriname. Because this site has resurfaced, it gives us a unique opportunity to gain more knowledge of plantations from this period. Therefore, it is important to explore the opportunities to protect this site and its undocumented tangible heritage.

On colonial maps, a military post can be seen at the mouth of the Warappa Canal. This post, at the Atlantic coast of Suriname, played a major role in the 1804 attack of the Dutch colony by the British (Bosz 1964, 129). The British simultaneously attacked on two fronts. One of these fronts is mentioned to be the very same post at the mouth of the Warappa Canal. The military post is mentioned in primary and secondary historical maps and texts but without any further information or details.[5]

[5] Most of the primary sources mention the post briefly. Chapter two of this thesis further discusses this military post.

To date, there is no extensive research about the military post. Moreover, the colonial defence system of Suriname and its relationship to the plantocracy and maritime landscape remains to be explored. Based on the above, the location and the concept of the maritime cultural landscape, the main question is formulated as follows:

What is and was the role of water at the site of the former cotton Plantation Esthersrust?

Sub questions:

- How important was water in the functioning of plantations in general?
- How important was the role of water in the functioning of Esthersrust and what did the maritime landscape look like?
- What was the role of water in the defence system of Suriname in the Dutch colonial period and how did that maritime landscape look?
- What role did the military post at the mouth of the Warappa Canal have with the national defence system and the plantation?
- What are the present threats to Plantation Esthersrust?
- What does the current maritime landscape look like?
- What are the effects of coastal morphology at Esthersrust?
- Is it worth protecting the site and how could this be done?

Methodology

This study consists of three components: archival study, fieldwork and lab work.

For this thesis, the research methods included archival reviews of relevant primary and secondary sources. Documents from both the National Archives of the Netherlands and Suriname have been studied. Because of the 2020 Coronavirus (Covid-19) global pandemic outbreak, most of the archival studies in the Netherlands have been conducted online. The primary sources such as the accounts of Anthony Blom (1786), Teenstra (1835), John Gabriel Stedman (1796) and C.A. van Sijpesteijn (1854) give a sketch of plantation life in Suriname during the 18th and 19th centuries. Teenstra gives a detailed description of the cotton industry and the different types of cotton with scientific names and where they grow, which is

important for this thesis. Blom's work is essential to this thesis because it does not only speak about life on the plantations but also discusses shipbuilding on plantations. Furthermore, it gives a detailed account of how plantations should be established from scrap. Blom does this separately for coffee, sugar, cocoa, and cotton plantations. He also gives an estimate of how much a certain plantation producing a certain number of crops per year would cost.

The fieldwork within this research consisted of a structured pedestrian survey to determine the boundaries of the site and identify the areas or clusters of surface artefacts (see chapter 5). A judgmental sampling strategy was employed to collect a representative sample of artefacts from each demarcated feature. Shovel test pits, augers, and or excavation were not feasible due to the time constraints, the daily tides and the site is situated in a mudflat. The site is only accessible for six hours during springtide. Furthermore, at low tide, assemblages of objects were visible on the surface, therefore subsurface investigation was not necessary. Potentially important objects were flagged, selected, photographed, bagged, and catalogued.

A drone survey was also part of this fieldwork. Drone images and photos were taken and the inaccessible areas, towards the ocean, were further inspected in this regard.

The objects were curated at the Ministry of Education, Science, and Culture, Directorate of Culture, Archaeological Services of Suriname.

Research goals

For this thesis, the main goal is to determine the attributes of Plantation Esthersrust and the previously mentioned military post from a maritime perspective. The objectives of this thesis are as follows:

- to discern and record physical attributes of Plantation Esthersrust and the military post at the mouth of the Warappa Canal;
- to contribute to the development of a maritime archaeological view and plantation archaeology in Suriname;
- to raise awareness of historical places and events that are forgotten or simply and sadly still unknown to the general Surinamese public;
- to contribute to the historiography of the military defence of the Surinamese colony in general; and

- to raise greater awareness about the importance of Suriname's heritage, its protection, and management.

Thesis structure

This master research is about Plantation Esthersrust linked to the colonial Dutch military post stationed at the mouth of the Warappa Canal, using a maritime perspective. The possibilities for sustainable heritage management of the site will also be discussed. Therefore, this thesis has the following structure:

- The Introduction gives an overview of the problem and sub-questions, goals, methods, and theoretical framework;
- In chapter 1 the methodology used for this thesis is discussed in detail;
- In chapter 2 the historical background of Plantation Esthersrust and the role of water on the plantations are discussed. Though Suriname had several types of plantations, the focus is directed to the sugar and cotton plantations. Esthersrust is highlighted in this chapter. The general aim of this chapter is to gain a better insight into the background of the plantations and their relationship with water. The use and types of plantation vessels will also be mentioned in this chapter;
- Chapter 3 is about the defence system of Suriname between the 17th and 19th centuries, the role of water and waterworks. The importance of ships and the military post at the Warappa Canal are highlighted in this chapter;
- In chapter 4 I present an explanatory tool to understand the geological aspects of the coastal area and the surrounding landscape of Plantation Esthersrust. The coastal morphology of Suriname is important to understand the reappearance of Plantation Esthersrust. Also, the maritime cultural perspective is discussed in this chapter;
- In chapter 5 the archaeological research with the results will be presented;
- In chapter 6 the possibilities for management of the site and the current laws that protect heritage in Suriname will be explored;
- And in the last chapter, the conclusions and recommendations will be given. The whole is concluded with a conclusion and subsequent recommendations.

Chapter 1. Methodology

1.1. Introduction

This chapter discusses in further detail the methodology, archives and literature used for this thesis. The aim of the fieldwork was to gather as much information as possible by studying the resurfaced structures and scattered artefacts and to get a personal and visual understanding of the sites setting and situation. The archival study aimed to gain more insight into the maritime and defence aspects of colonial Suriname. Due to a small budget and a shortage of time, fieldwork was planned and conducted from the 23rd to the 27th of January, 2020.[6] On the 15th of February a one day visit was executed to conduct a drone survey. The purpose of the fieldwork was to gather as much information as possible through observation and pedestrian survey, recording, measurements of known and newly discovered features and plantation beds, drone survey, collection of significant and representative objects and by establishing GPS coordinates to determine site boundaries.

1.2. Archival and literature study

To gain more insight about the plantocracy and the colonial Dutch defence system in Suriname, archives from both the National Archives Suriname (NAS) as well as of the National Archives In Den Haag (NA) were studied. The Surinaamse Almanakken from of the 18th and 19th Century and the Gouvernementssecretarie 1788-1805. Unfortunately, due to the outbreak of the Corona Virus, research on-site (NA) was cut short. Fortunately, some of the archives needed were available on their website as scans. Archives from the Regionaal Historisch Centrum Eindhoven (RHCe) were also used, because they contained important information of the family Bots, who were the last owners of the Plantation Esthersrust. To answer the sub-questions related to the site's protection, laws protecting Surinamese heritage on an international, regional and local level were studied.

Newspapers from the 17th through the 19th centuries were also used and were all found on the website www.Delpher.nl. Newspapers always hold the 'latest' news

[6] The fieldwork had to be planned to suit everyone's time schedule. In addition to that, the site was only accessible during low tide every two weeks for maximum six hours a day (full moon).

and therefore give a sketch of a certain period. Keywords used were Plantation Esthersrust, Warappakreek and Warapperkreek.

Other sources that were heavily used in the first and second chapters were accounts by people who passed through Suriname between the 17th through the 19th century. These primary sources offer insights to the situation of the colony during this period. The primary sources used for this thesis are:

- Blom Anthony: *Verhandelingen in den landbouw in de colonie Suriname* (1786).
- Dentz Fred Ousdchans: *De Herkomst en de Beteekenis van Surinaamsche Plantagenamen* (1944).
- Hartsinck Jan Jacob: *Beschrijving van Guyana, of the Wilde kust van Zuid America(1770)*.
- Kappler A.: *Zes jaren in Suriname: Schetsen en Tafereelen deel 1* (1854).
- Stedman J. G.: Narrative of a Five Years Expedition Against the Revolted Negroes(1796).
- Teenstra, M. D.: *De landbouw in de colonie Suriname* (1835).
- van Sijpesteijn, C. A.: *Beschrijving van Suriname: Historisch, Geografisch en Statisch Overzigt* (1854).
- van Wesele, A.: *Grieven gedaan maken, ende de Hoogh... van wegen de Raden van Politie der Colonie van Suriname,... Mitsgaders van veele voornaeme... Ingesetenen, en ey genaers van de Plantatgien aldaer, concernerende het poinct van het onderhout der Fortificatien* (1733).
- Wolbers, J.: *Geschiedenis van Suriname* (1861).

The archival study and literature study was used to answer the sub-questions related to chapters 2, 3, 4 and 6. For the coastal geomorphology section, scientific works of renowned professor Pieter Augustinus of the Utrecht University based in the Netherlands, professor Theo Wong and MSc. Kathleen Gersie, coastal morphologist, both of the Anton the Kom University of Suriname, were used to answer the sub-question on coastal morphology in chapter4.

Historical and archaeological information of the military post is compared to other military structures of that time in the surrounding area and Suriname as a whole.

The role water played in the defence system will be studied, taking current theories of the maritime landscape into account as done by renowned maritime professor Christopher Westerdahl. Westerdahl's theories include a holistic approach of looking at maritime cultural landscape via the tangible and intangible perspective and the inland aspects such as the transit points that are very important subjects to understand the maritime cultural landscape of that time.

1.3. Onsite

The expedition team comprised of Cheryl White (mentor), Stephen Fokké (site photographer), Sushmeeta Ganesh (archaeological field volunteer), Jõvan Samson (archaeological field volunteer), Farisha Kartosemito (archaeological field volunteer), Alex Vigelandzoon (archaeological field volunteer), Marsha Mormon (co-owner of the plantation), Katleen Gersie (AdeK geologist), Fabian Vas (drone operator), Mister Borsoe (boatsman) and Santosh Singh (project leader). The site was only reachable by boat and took approximately one hour to reach from the Bakkie resort where the team stayed.

The site of Plantation Esthersrust has only surfaced recently, as it was submerged in the ocean. Upon reports of excessive site looting, a reconnaissance team of amateur historians was dispatched to the site in late 2019 by the Ministry of Educations, Science and Culture’s, Archaeological Service. At this time a map of the visible immovable features and movable artefacts was produced by KDV architects. In January 2020, an archaeological investigation was launched. The fieldwork at this site consisted of a structured pedestrian survey to determine the boundaries of the site and identify the areas or clusters of surface artefacts. Most of the area was inaccessible and hard to walk due to the thick layers of mud. The true boundaries of the site were not determined, but representative points were determined with the GPS as much as possible. The site is only accessible for six hours during low tide, when the water recedes and the features and artefacts are exposed. The site sits on the temporary open seabed in a mudflat. For this reason, excavations were not possible and would be futile, because after six hours the returning tide would collapse unit walls and fill units with water. Upon arrival at the site, it became clear that subsurface investigation was not necessary, because defined structures and assemblages of objects, were visible on the surface.

A judgmental sampling strategy was employed to collect a representative sample of artefacts from each discernible structure. Shovel test pits, augers, and or excavations were not feasible due to the time constraints of the daily tides and the site being situated in a mudflat. A pedestrian survey was conducted to help determine site boundaries and identify important artefacts and potentially undiscovered features.

During the structured pedestrian survey, each participant was handed red flags to mark possible 'relevant' objects or artefacts in clusters/concentration. Field team walked in a straight line, encompassing the scope of the site with a distance of 20 meters between each other. In this way, remnants of new structures such as the assumed 'bakery' and other plantation beds were found. Potentially important objects were flagged, selected, photographed, bagged, and catalogued. The objects that were collected within the features, were all put together in one bag with the proper provenience information. In total ten features were identified. Artefacts that were found scattered and outside of the features, were also put in bags and were temporarily catalogued as Surface Collection (S.C.).

The site and structures were measured using a compass, GPS coordinates, and measuring tape. A map was produced on paper and sent off to KDV architects[7] to update the AutoCAD drawing.

Drone survey

To get a better layout and orientation of the sight, drone footage was taken.[8] The DJI Phantom 4 Pro V2.0[9] was used to take birds-eye-view photos of the total site, better revealing the plantation beds and plantation structure. These pictures will be presented in the Analysis and Results chapter. The mudflats towards to the east of the plantations were photographed as far as the drone could be operational. At the mouth of the Warappa Canal, an unusual formation of mud was spotted, but it was not possible to reach it by boat or on foot to the mudflat. The drone photographed

[7] An architecture company based in Paramaribo. The owner Philip Dikland has a keen interested in Surinamese history and heritage.
[8] The fieldtrip and the drone imagery was financed by the International Programme for Maritime Heritage.
[9] The drone was operated by Fabian Vas.

this and the photo will be presented in the next chapter together with all the other drone imagery.

Camera

Photographs were made of the features, wooden posts, visible plantation, and artefacts that were clustered together per feature. The camera model used for this was a Fuji FinePix HS30EXR.

Measurements of the structures

The structures were measured using measuring tapes and the structures were drawn on paper. GPS points were taken from the NE corner of each discernible structure (feature). KDV architects already had an existing blueprint of the site which they produced in the last quarter of 2019. This with their permission was used to identify each structure. However, other structures were found, measured, and added on the existing blueprint manually and sent to KDV architects for modification. The Features were also renamed. The modified blueprint is presented in Chapter five (results and analyses). The results of the fieldwork are found in chapter 5.

1.4. Lab work

The objects were sorted, washed, labelled, and stored at the Ministry of Education, Science, and Culture, Directorate of Culture, Archaeological Services of Suriname. In due course of time, the artefacts will be handed over to Museum Bakkie[10]. Only ceramics and pipes were washed, left to dry and rebagged. Other artefacts such as metal were just left to dry and then lightly brushed to remove excessive mud. This was done using a soft brush. Metal objects were not washed, because it would contribute to a quicker rusting process.

After the washed and brushed artefacts dried, they were sorted according to their type. They were weighed, measured, analysed, assigned a catalogue number, and put in separate bags and added into the main feature bag to which they belonged to. To catalogue the artefacts a specific code was used (see appendix 1 for details and analysis sheet). A database was generated and includes all relevant site and locational information for each catalogued object.

[10] The site is situated on the private property of Bas Spek the owner of Bakkie.

Artefacts that showed a specific significance were selected to be photographed. These artefacts were photographed and are found in the Appendix section with a short description.

Chapter 2: The story of a cotton plantation

2.1 Introduction

In the beginning, the Dutch profited immensely from Suriname. One of the main reasons was due to the many plantations they developed in this colony.[11] There were several types of plantations; sugar, coffee, and cotton are some of the examples of the products that were cultivated on the plantations. This chapter looks at the plantation Esthersrust. To help understand this better this chapter will not only look at the function and history of Plantation Esthersrust alone, but also give a quick overview of the different kinds of plantations that existed in Suriname.

2.2. The spread of plantations

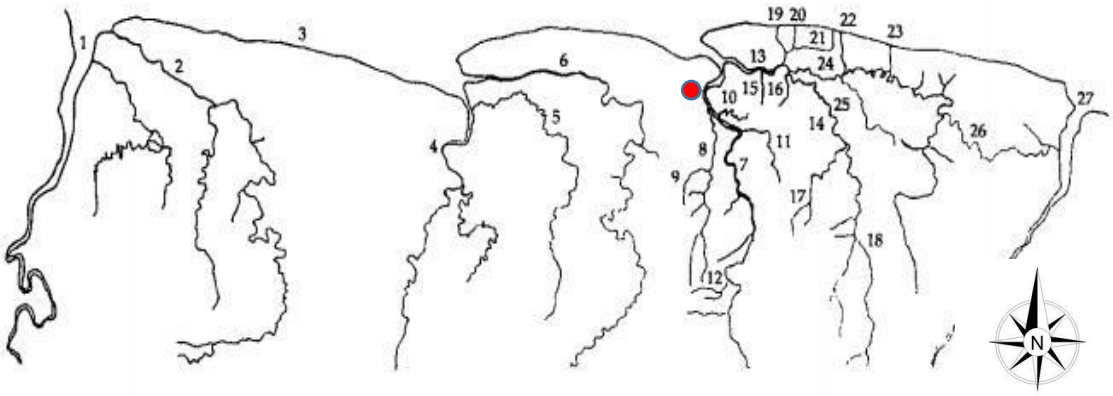
During the signing of the peace treaty of Breda is 1667, the British exchanged Suriname for *Nieuw-Nederland* (present-day New York) (Lesaffer 2015, 6). During that time there were approximately 178 plantations according to English maps and this amount kept on increasing, totalling to 591 in 1785 (Dalhuisen and Hassankhan 2018, 22). These plantations were established alongside the river banks of the Suriname, Commewijne, Coticca, Saramacca, Coppename Rivers. At a later point some were also established in Nickerie (what is presently known as the rice district), and the district of Coronie. The earliest plantations, in general were cultivated first, were more inland. The oldest plantations in Suriname were established during the second half of the seventeenth century, along the headwaters of the rivers in the northeast of the country. The planters did this to protect their colony against raids from pirates and hostile powers. In addition, the lands further away from the coast were not so swampy and therefore easier to cultivate (van Stipriaan 1993, 47). This all changed when fortifications were introduced to the confluences of the rivers and the Dutch introduced their hydraulic engineering knowledge (Kapper 2010, 7).

Shifting to the lower coastal area was in one sense better, because those lands were more fertile than the ones upstream and it was easier for the supply and discharge

[11] During the early 19th century the annual income the Netherlands earned from their colony Suriname was estimated to be 2.238.755 Dutch guilders (Brandon and Bosma 2019, 8).

of goods. The downside to this was the constant inundation of water coming from the ocean, rivers, and swamps. This lowland was/is a tidal area of clay and peat, with swamps and sand ridges (Ehrenburg 2020, 83). To manage the water in Suriname, the Dutch built water locks, dikes, and introduced the polder system in different areas of Suriname (Oostindie 2012, 52). The plantations consisted of polders with a complicated and controlled water management system. This made cultivating the lower situated lands possible. The inhabitants of Suriname have always been dependent on the watercourses. This can be seen on the plantations, and the transportation system connecting each settlement and Paramaribo. On a macro scale, Suriname was connected (still is) with the rest of the world due to a crucial role related to trade, transportation and other purposes (expeditions). Even today this is evident, because Suriname's major cities such as Paramaribo, Nieuw Nickerie, Albina and Totness, are either on the banks of or close to water bodies.

Throughout time plantations sometimes expanded and, in some cases, changed owners due to various factors. Some plantations were more successful than others. Those that were successful expanded their territories, while those who were less successful or even failed had to sell parts of their plantations. In some cases, whole plantations were sold to pay off debts. Colonial period maps and illustrations of plantations are testimony that plantations had different names over time. When these maps are compared, the sizes and names of several plantations seem to have changed. It can be concluded that some plantations became smaller, while others expanded. Figure 1 (van Stipriaan,1993) illustrates the expansion and slow decline of the concentration of plantations close to water courses from 1735-1860. The importance of water for plantations is demonstrated through these figures. The typical Suriname coastal plantation was a polder, an ingenious system of canals (Oostindie 1993, 17).



Verklaring van de rivieren enz.

1	Corantijnrivier	15	Hoer Helenakreek
2	Nickerierivier	16	Commetewanekreek
3	Kust van Coronie	17	Cassewinicakreek
4	Coppenamerivier	18	Tempatiekreek
5	Coesewijnerivier	19	Warappakreek/kanaal
6	Saramaccarivier	20	Matapicakreek/kanaal
7	Surinamerivier	21	Tapoeripakreek/kanaal
8	Pararivier	22	Motkreek
9	Coropinakreek	23	Vredenburger- of Oranjekreek
10	Pauluskreek	24	Cotticarivier
11	Surnauskreek	25	Pericarivier
12	Maréchalskreek	26	Coermotiborivier
13	Beneden-Commewijne	27	Marowijnerivier
14	Boven-Commewijne		Paramaribo

Figure 1. A representation of the coastal region and surroundings of Suriname, including the important rivers, creeks, and canals of the area. Source: (van Stipriaan 1993, 48).

Short description of rivers, lakes, and creeks in Suriname.

Figure 1 demonstrates the different rivers and creeks and the spread of the colonial plantations on their respective banks. Suriname has numerous rivers that dissect the country. They are all interconnected by a remarkable system of creeks. In the central part of Suriname, the principal rivers are the Nickerie, Saramacca, Suriname, Coppename, and the Commewijne Rivers. The largest river of this land is the Corantyne with its tributaries,[12] the Sipaliwini, Lucie, and the Kabalebo, which lies in the western part of Suriname. Along the eastern border is another large river called the Maroni, with its tributaries the Tapanahoni, Paloemue, and the Oelemari.

[12] A tributary is a freshwater stream that feeds into a larger stream, river or other body of water. The larger, or parent, river is called the main stem.

All these rivers flow towards the North to the Atlantic Ocean, with many rapids and waterfalls. The Corantyne and the Maroni rivers drain almost 58% of the country, while the Coppename and the Suriname rivers drain around 24% of the country. The smaller rivers are the Nickerie, Saramacca, and Commewijne that drain a total of 16% of the country. The final 2% of the country is coastal areas with direct drainage into the Atlantic Ocean (www.Swris.sr)[13].

The only significant lake in Suriname is the W.J. van Blommenstein lake, which is a manmade lake established in the 1950s. This lake has a surface of 1560 km2 and therefore makes it the largest lake in Suriname (Phagu 2019, 1).[14] Because it was established in the 1950s this lake has no significance for this thesis.

Suriname has an array of creeks that can be found across the country.[15] In the colonial period creeks were as valuable as rivers, and plantations were also established in their surroundings. In some cases, these creeks were extended via a canal and connected to the Atlantic Ocean. the Warappa and the Matapica are such examples. Other creeks important to the plantocracy in the colonial period were the Matapica, Tapoeripa, Marechal, Cometewane, Oranje, Tempati, Casewinika, Coropina, Paulus and Motcreek.

Figure 2. The spread of plantations along the rivers and creeks in 1735. Source: (van Stipriaan 1993, 48)

[13] Suriname Water Resources Information System.

[14] There are other smaller lakes. The Nani lake in Nickerie is the only natural fresh water lake of the country, but there are other smaller man-made lakes, lakes that are a result of exhausted bauxite mines (www.fao.org).

[15] For this thesis the words creeks and canals will be used frequently. The word creeks refers to watercourses that were created naturally, and canals are watercourses created by human intervention.

By the 18th century, plantations were established on the banks of the Suriname, upper Commewijne, Cottica, Perica, and Para Rivers. On the Marchall, Paulus, Coropina, and Cassewinika and Commetewane Creeks plantations were also established. This is illustrated in Figure 2.

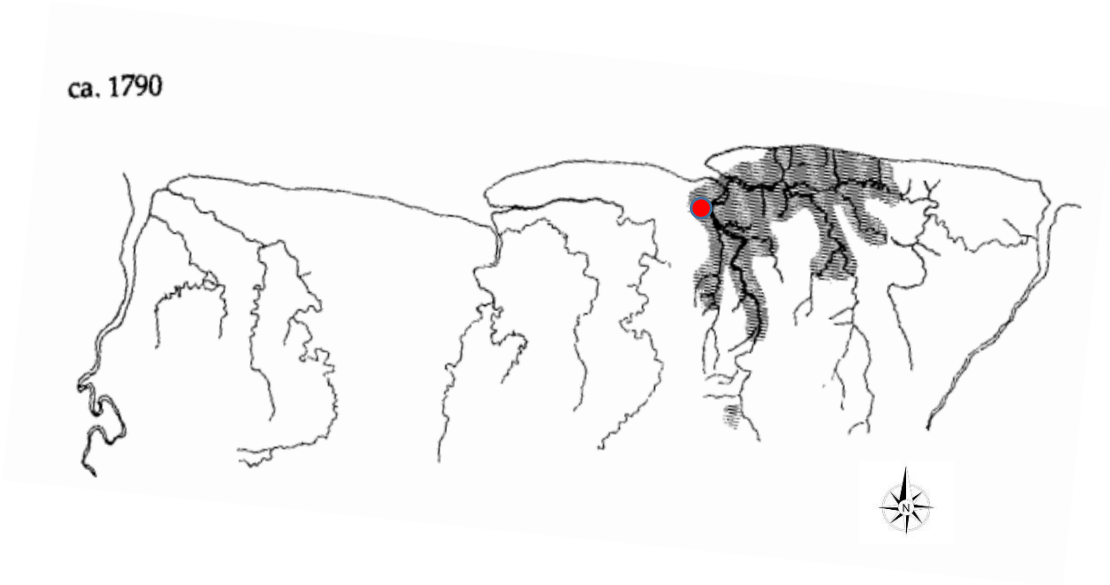


Figure 3. The spread of plantations along the rivers and creeks in 1790. Source: (van Stipriaan 1993, 49)

By the second half of the 18th century, the range of plantations expanded to the lower Commewijne River and around the confluence of the Suriname and Commewijne Rivers. This was made possible after Fort Nieuw Amsterdam was established (Kapper 2010, 40). The establishing of plantations in the coastal area was largely linked to the presence of forts, military posts or defence lines to provide the necessary protection (Kapper 2010, 39). Before this, Fort Sommelsdijk protected the plantations further upstream (Bosz 1964, 105). Also, plantations could be found more towards the coast and creeks, such as the Warappa, Matapica, Tapoeripa, Oranje, and Motcreek. This can be seen in Figure 3.

During the first half of the 19th century, the range of plantations expanded beyond the rivers in the North/Eastern region such as the Suriname and Commewijne Rivers. Plantations were also established along the Nickerie and Corantyne Rivers in the east in the District known as Nickerie today. Plantations were also introduced to the coastal area of Coronie and the Saramacca River. This can be seen in Figure 4.

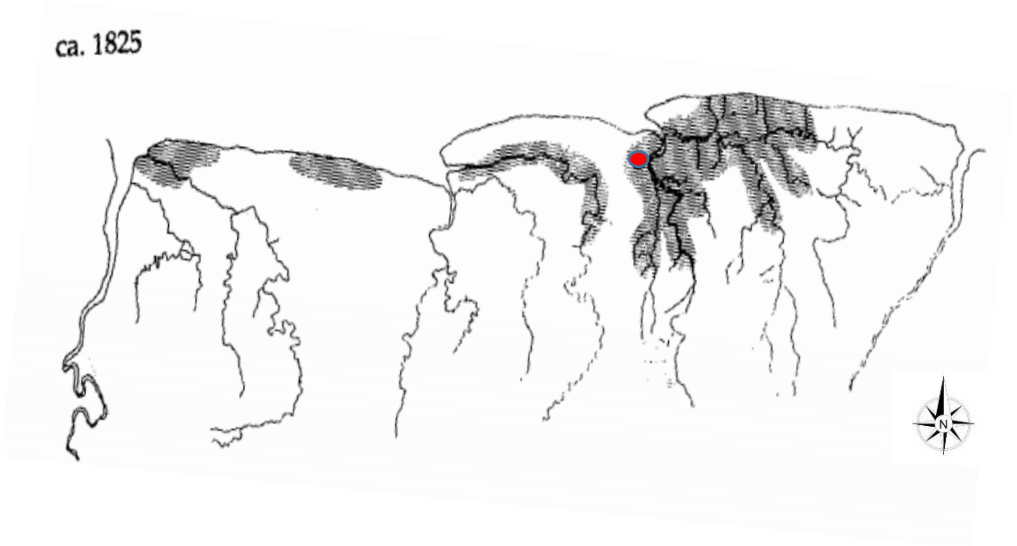


Figure 4. The spread of plantations along the rivers and creeks in 1825. Source: (van Stipriaan 1993, 49)

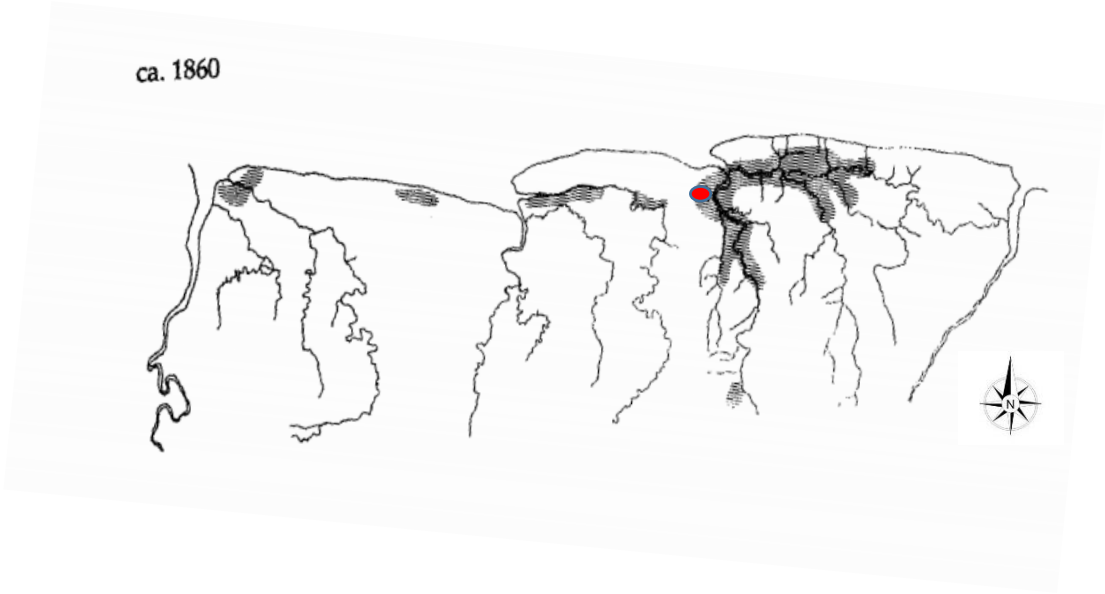


Figure 5. The spread of plantations along the rivers and creeks in 1860. Source: (van Stipriaan 1993, 49)

By the second half of the 19th century, the decline of active plantations took place, especially in the area of the Warappa, Matapica, Tapoeripa, Oranje, and Motcreek as seen in figure 5. Most of the plantations during this time were abandoned.[16]

[16] This is also linked to the abolishment of slavery in 1863. Enslaved people (African descendants now free) were still forced to work on the plantations for 10 years, while the indentured labourers would slowly take over. When the 10 year period passed, the ex-enslaved people left the plantations in large numbers (van Andel 2012, 4).

2.3. Types of plantations

Throughout the 17th to 19th centuries Suriname was home to several types of plantations. [17] Due to the circumstances and different types of produce that only grew in certain environments, plantations were strategically located to facilitate growth of a specific product. For example, sugar and coffee plantations could not withstand the saltiness of the ocean water, and therefore cotton plantations were predominantly concentrated at the coastal area near the ocean. Cotton was one of the few shrubs that were able to grow in these soils. Sugar, wood[18], coffee, and cotton plantations were among the most common, and largest plantations. Other crops like indigo[19] were also cultivated, but it was never done in large quantities, as the before mentioned crops. Sugar and cotton plantations will be discussed next, due to their relevance to the topic. The sugar plantations are relevant, because they had a typical water management system. The cotton plantations are equally important, because their water management system was also unique and slightly different from the system of the sugar plantation. Focusing on cotton plantations is important because Plantation Esthersrust was a cotton plantation.

Sugar Plantations

Sugar plantations were one of the most common plantations along with those cultivating coffee, cocoa, and cotton. Initially, the Surinamese plantations produced predominately sugar until the second half of the 18th century when coffee, cocoa, and cotton were introduced (Dalhuisen and Hassankhan 2018, 36). The production of sugar was tough. The harvest was very labour intensive and there are accounts of enslaved people losing body parts during the processing of sugarcane. Next to each mill was an axe, which was used by other enslaved persons to hack off in some cases the fingers (or worse, hand) of a fellow 'worker' accidentally caught in one

[17] The plantation owners were not all Dutch but had different nationalities. There were owners from Italy, Germany, Switzerland, England, Scotland, Poland, France, Russia, Spain and Belgium (Dentz 1944, 168-169).

[18] There were many wood plantations, that were mostly concentrated along the upper Suriname River, Cassawinicacreek, Saramacca River, Paracreek, Marschalcreek, het Pad van Wanica and Pararaccreek (Surinaamsche Almanak, 1820). The wood of these plantations were used to build houses, other plantation buildings and as fuel for the sugar ovens. They were also used to dry coffee and cocoa. Two famous wood plantations were Plantation Berlijn and Berg en Dal.

[19] The cultivation of Indigo was already a reality by 1708, but it was never as important as the rest of the other crops and was thus soon replaced with the cultivation of Coffee (Haarnack 2017, 125).

2.4. Vaartrenzen en loostrenzen

The harvest was very labour intensive and time-consuming. The planters invented an efficient way to transport cane from the field to the factory where they were processed. Water played a very important role in this regard. Dams were built to hold the excess water out and to protect the plantation from being flooded. The dam surrounded the plantation so that the water level within the plantation could be regulated independently from the surrounding plantations (Dikland *et al.* 2017, 104). The water locks at the riverside and the drainage canals helped to regulate the excessive water (figure 6). It was important to keep the water level steady. If there was too much water the cane would rot and if the water level was too low the cane would dry out (Dikland *et al.* 2017, 104). Sugar plantations were often larger than coffee and cotton plantations, and would therefore also have canals in which boats were used to transport the cane and to power their water-powered mills[20] (van Stipriaan 1993, 85). The larger a plantation was, the more labour intensive and time consuming it would be to harvest and transport the traditional way. This system increased the mobility on the plantation and cane could be transported to the factory area much faster. On the plantations, especially on the sugar plantations, there was a dual water system. *Vaartrenzen* (sailing or transportation canals) and *loostrenzen* (water discharge canals) were very important elements in this system. The water level of the *Vaartrenzen* or mill canals (figure 6) was kept as high as possible so boats could pass through them, while the water level of the *loostrenzen* was kept as low as possible and they were used for the drainage of rainwater (Kapper 2010, 11). Dams and *loostrenzen* were common to all plantations. *Vaartrenzen* would mostly be found on sugar plantations. Blom describes *vaartrenzen* as follows:

> " *Vaartrenzen are the crossways on sugar plantations found on both sides of the molentrens[21]. They extend as far as possible on the cultivated grounds. The Keenponten (vessels) sail on them, transporting crops from one point to another.*

[20] Initially 'beestewerken' or animals such as horses and donkeys were used to operate the mills, when this became too expensive, planters started to rely more on water and windpower (van de Voort 1973, 34).

[21] Blom distinguishes 4 types of trenches. (1) The kleine *(loos)trenzen* which are connected to the (larger) *loostrenzen* (2). He mentions the *molentrenzen* (3) which is the trench that comes out of the mill building on sugar plantations. In some cases they were large enough that two *keenponten* could sail through at the same time. He then also describes the *Vaartrenzen* (4).

Some coffee plantations also have these trenzen (transportation canals). It also serves to load coffee into the vessels during the harvest times and bring them to the buildings, and to transport all that is needed from one place to another. It is a useful expense and greatly relieves the slaves in their labour" [22] (Blom 1786, 444).

The *vaartrenzen* were very important because they helped increase the productivity and mobility of the plantation but also helped with the health of the slave (Blom 1786, 181). Sugar plantations were often large estates, and for the enslaved to carry the crops from distant places on the plantation to the plantation buildings would be less productive and also damaging to the health of the enslaved, according to Blom. Cutting cane is labour intensive and transporting it on foot for long distances throughout the day is the reason why *vaartrenzen* were so important.

There were main *loostrenzen (water discharge canals)* and smaller ones (*kleine trenzen*). The main *loostrenzen* would be connected to the river. The smaller *loostrenzen* were connected to the larger *loostrenzen* and in this way, the excessive water from the beds would stream from the beads via the smaller and bigger *loostrenzen* to the river (Blom 1786, 443).

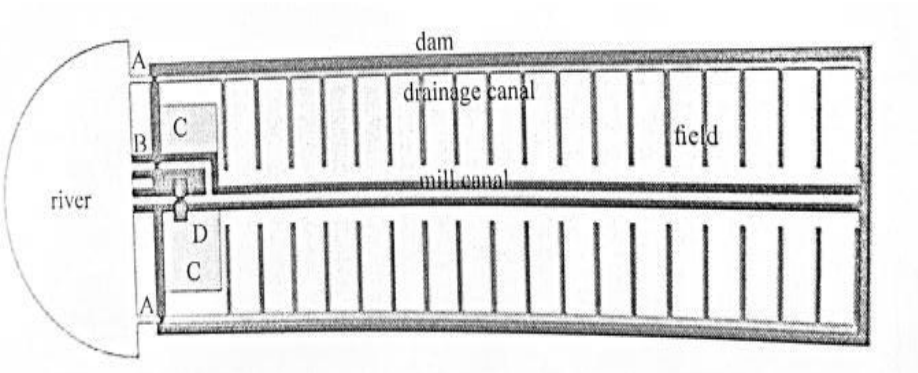


Figure 6. The general layout of a Surinamese sugar plantation. A= water lock at the outlet of the drainage canal. B= water lock at the inlet mill canal. C= inhabited area. D= Sugar mill (tide mill) and boiling house. Mill canal= *Vaartrenzen.* Drainage canal= *Loostrenzen.* Source: (Dikland *et al.* 2017, 104).

[22] *"Vaart-trenzen zyn de dwarsvaartten welken op eene Suikerplantagie aan wederzyde van de moolentrens zyn, en zo verre zig uitstrekken als de bewerkte gronden: Ze dienen voor de Keenponten om alles aantevoeren: men heeft op sommige coffy plantagiën eene vaarttrens; dezelve dient om in de pluktyden van coffy in de ponten te laaden en naar de gebouwen te brengen, en verders om alles aan te voeren; het is een nuttige koste, en verligt de negers zeer in hunnen arbeid* (Blom 1786, 444)."

2.5. Cotton and cotton plantations

Initially, the planters established only sugarcane plantations, while coffee and cotton was introduced much later. By 1795 there were around 39 cotton plantations in Suriname (table 1). By 1820 sugar, coffee, and cotton were the three most important crops for the plantations, while cocoa was not as demanded (Surinaamsche Almanak 1820, 19). By 1825 cotton plantations almost doubled reaching its peak and by 1890 they completely disappeared from the market. Around 1790 the lands that laid close to the sea between the Warappa and Vredenburge creeks were cleared for the soon to be cotton plantations (van Stipriaan 1993, 51). Table 1 by van Stipriaan mentions that there were no cotton plantations before 1770, however according to accounts by Teenstra and Hartsinck[23] small scale cultivation already existed. Teenstra mentioned that Plantation Felix on the Matapicca Creek was the first to set up a 500-acre plantation with cotton by 1735 (Teenstra 1835, 264). Hartsinck confirms that this was an experiment by the owner of the Plantation Felix. He planted cotton shrubs between his coffee crops. The general thought at that time was that the *biri biri*[24] lands were useless and that even cotton would not properly grow there. The exact opposite was proven, when the owner of Plantation Felix exported three to four thousand pounds reaped from his plantation the next year and with an increase in the following years. The neighbouring plantations also took notice of this and also started planting cotton crops (Hartsinck 1770, 742).

jaar	suiker	koffie	katoen	totaal
1713	171	–	–	171
1745	154	ca. 140	–	ca. 294
ca. 1770	111	295	–	406
ca. 1795	102	248	39	389
ca. 1812	100	235	48	383
ca. 1825	95	178	73	346
1836	105	137	52	294
1849	88	76	32	196
1854	86	52	29	167
1862	86	30	15	131
1890	14	–	–	86*

Table 1. The number of plantations that produced for export from 1713 – 1890. Source: (van Stipriaan 1993, 33)

[23] (Hartsinck 1770, 741)

[24] The coastal areas of Suriname which are low, swampy, and mainly with brushes. Often such a swamp is covered with a thick layer (www.dbnl.org). These lands are described and mentioned by Teenstra (1835), Hartsinck (1770), Blom (1786) and other writers as the *biri biri* lands. According to Blom (1786), low growing brushes can be found in the *biri biri* lands. Along the sea coasts these lands are fertile, but along the Para-Creek they yet to be cultivated (Blom 1786, 410).

Blom describes how a new cotton plantation was established and what the cost of setting up one would be. The typical layout of a cotton plantation was the same as that of a coffee or cocoa plantation (Blom, 1786). To start a cotton plantation a piece of land was cleared. The piece of land depended on how large the plantation would be. After it was cleared the piece of land was prepared to layout polders. The beds were made to be 33 ½ feet wide and the *kleine trenzen* between the beds 2 ½ feet (Blom 1786). In some cases, the beds were 24 ½ feet while the *kleine trenzen* remained 2 ½. The *kleine trenzen* were two schoppen (30 cm) deep. Normally they would make this 10 *kettingen*[25] (660 feet) long. To help drain the water out of the *kleine trenzen*, a five *ketting* trench was made crossing to the cultivated area. The soil that was dug up was thrown on the beds. This had to happen with caution. The earth had to be spread equally to avoid forming holes in which water could sit in during the rainy season. This was to be avoided to stimulate good drainage of the beds. If the drainage was not in order, the crops would grow poorly and would not bear much fruit. This was especially true for the coffee plantations. Cotton plantations were most successful with their crops close to the sea. On the banks of the upper Suriname and Commewijne Rivers, it proved to be harder, because the crops bore less and the plants did not last long.[26]

According to Blom (1768), after the initial ground preparation of each planting bed, three to four lines or rows were made, young stalks were placed in the ground. were put in the ground. The stalks were put eight to 9 feet apart from each other. The reason for the spacing was to allow fully grown cotton shrubs of an erea to spread their branches. After this was done, three cotton seeds were planted near each stalk. The seeds were inserted in the ground with a depth between ½ to one *duim*[27]. They were then covered up with earth. Whenever a plant died, new seeds were planted in its place. Every five to six weeks the grounds were weeded and every four to five years if needed the *kleine trenzen* were dug up one s*chop* or 15 cm. These trenches needed to be maintained properly for good drainage, but workers were always cautious that these trenches were never deeper than the roots of the cotton plants.

[25] A unit of length equal to 66 feet, mainly used in the US for public ground surveys (Metric-conversions.org).
[26] The grounds in this region were less fertile than the ones in the young coastal plain, which resulted in soil exhaustion (Kapper 2010, 7).
[27] one *duim* is equal to 1 inch or 2.54 cm.

The young cotton plants started to sprout around four to five days and between four to five weeks they turned into trees that were around six to seven feet high; maturing in six months.

When the time was near for harvesting cotton, they quickly picked the crops. Failure to do so might spoil the crops. The rain and the mist were the damaging factors. These trees blossomed in December during the small raining season and in June during the big raining season. During spring (March and April) and autumn (September) the trees were maintained and the old branches were removed to a certain extent. In two months, the trees would once again look like a new green tree. If this was not done with the older trees, they would not bare as many fruits as before. The young branches and leaves attracted a lot of cotton worms, that could mean trouble if not handled properly. Another problem these plantations had was the rainy season. Too much rain could cause the buds and cotton to become black and rot away. Caterpillars were also a great problem for these plantations. They were present mainly during the rainy seasons and would eat everything including the leaf, the bud, and the fruit. As soon as the dry season started, they disappeared. It was proposed to get rid of the cotton worm (caterpillar) by driving them away with smoke, but the plantations were too big and this process could cause more damage than the worms themselves.[28]

Blom (1786) also gives an estimate in currency on how much it would cost to establish a cotton plantation. He looked at the different factors needed such as the materials to construct the buildings, but also calculated how many enslaved people (table 4), vessels (table 3) and land (table 2) would be needed to run the plantations. He also calculated the projected maintenance cost per annum (table 3).

According to Teenstra (1835) and Hartsinck (1770), Suriname's environment enabled different kinds of cotton, which they listed in their accounts. Teenstra's description is more detailed and, in some cases, even mentions the scientific names (see table 5). According to Teenstra (1835) six main types of cotton could be found

[28] The cotton shrubs were in close proximity of to each other and using fire to drive away the caterpillars could have resulted in more damage to the crops than the damage done by the caterpillars themselves.

on Surinamese grounds. To understand these types of cotton is important to know which cotton was used on plantations.

The following is calculation of estimated acreage for a cotton plantation that produces 76666 pounds of cotton annually.

		Subtotal
1	460 acres planted with 230,000 cotton shrubs	600 acres
	230 acres held as reserve	
2	70 planted with eatable crops	210 acres
	140 as reserve	
3	35 acres for the slaves to plant for themselves	35 acres
4	35 acres for polders and paths	30 acres
5	35 acres for Savanna, kitchen garden, buildings, etc.	35 acres
Total		**1000 acres**

Table 2. Amount of acres needed to establish a 10000-acre plantation divided into different sections. Source: Blom (1786).

		Costs
1	cotton warehouse	f 20000
2	residential building for the planter or administrator	f 4000
3	Zygebouw (side building) for white servants, kitchen and storehouse for tools and food, etc.	f 4600
4	Regenbak (Cistern)	f 3000
5	stone water lock	f 4000
6	Hospital	f 800
7	Koornhuis	f 400
8	slave houses	f 4000
9	Bootenhuis (boathouse)	f 400
10	three vessels: tentboat f 800 tentpontje f 250 and lastdraager f 200	f 1250
11	carpentry and field tools	f 400
12	246 slaves á f 500,-	f 123000
13	interests and maintenance cost for vessels, buildings, water lock, etc.	f 17109
14	yearly costs and commission concerning gage for the director and two white servants and food	f 2250
15	food and items for the slaves, medicines, tobacco, pipes, etc.	f 6047
	Total	f 191256

Table 3. Costs for the establishment of a plantation. The letter f stands for the currency known as *Nederlandse Guldens* (Dutch Guilders) Source: Blom (1786)

			Subtotal
1	460 acres planted with cotton 70 acres of agricultural lands	Total of 530 acres of maintenance á 5 acres per slave	106
2	black officers		3
3	3 kostwachters (looking over crops)		3
4	5 black carpenters		5
5	1 mason		1
6	2 slaves to look after the sick		2
7	2 slaves in the kitchen garden		2
8	1 cattle guard		1
9	1 fisherman and hunter		1
10	5 on commando		5
11	5 house girls		5
12	38 old slaves and malinkers[29]		38
13	74 children		74
Total			246 slaves

Table 4. The number of estimated enslaved people needed for a 530-acre plantation. For a larger plantation, the numbers would differ. Source: Blom (1786)

[29] Old slaves not able to do hard labour.

#	Type	Description
1	*Zwartzadige* (black seed)	The black seed cotton (*xylon herbaceum*.) gives the whitest balls of cotton, but the ones from Saba are superior in quality. The black seeds are found in the centre of the cotton ball close to each other. That is why it is also known as gesloten katoen (closed cotton). Teenstra mentions that he brought some black seed cotton from Saba and planted them in both in Nickerie as in the old colony (older plantations).
2	*Groenzadige* (green seed)	In Suriname this cotton also known as *Bourbonsch katoen* and in England it is known as the Sea Island Cotton. They were mostly found in the Nickerie region. It does not grow as tall as the black seed cotton, but spreads out its branches more. The leaves are smaller than that of the black seed cotton shrub, and is less wrinkly, finer and not as green in colour. The blossoms grow like a tulip on three green leaves. It is also known as *los katoen* (Loose cotton). This cotton is greyish and long threaded. In Java, Indonesia it is also known as *Georgiakatoen*. The leaves are bitter and less attractive for worms. This cotton type is also found on different plantations on the Warappa Creek (and Canal). This type of cotton is harder to process and needs more energy of the steam machines; for this reason its more expensive, but it also gives ¼ more cotton than the rest.
3	*Bruinzadige* (brown seed)	This cotton is a family of the black seed cotton and is similar in appearance. The cotton of this tree is of less quality and gives less cotton. The seeds are brownish and also have a blueish tint.
4	*Arabische* (Arabic)	Slaves refer to this type as *snipkatoen*. Its leaves are somewhat broader and shorter than the black seed cotton shrub. It has reddish leaf veins and branches. According to Teenstra these leaves are used to heal old wounds. The slaves used to stamp these leaves into a powder and give it to their children to kill worms. It is also known as *rood katoen* (red cotton). The blossom is yellow and the flakes are white and are plentiful on the tree.
5	*Tuinkatoen* (garden cotton)	This cotton shrub bears dark red blossoms and is known to the English as Srob Cotton. The slaves call it the *Tra Condrie katoen*, which according to some is from *Othaheiti* (Tahiti). The blossom consists of a five-leaved, dark reddish flower with a yellow seed pistil. The buds are small and burst open in 3 pieces. Because it hard to separate the cotton from the seed, becoming really dirty in the process it becomes unusable. It is thus only planted as an ornamental plant in the gardens of plantations. They were found in plantations gardens such as Badenstein on the Warappa Creek (and Canal) and Livonia on the Matapicca.
6	*Bokkekatoen*	This cotton is also known as Indiaansch katoen or Indian cotton. This shrub has a reddish bark and a small dark green pentagonal leaf. The bitter leaves do not attract worms and chenille (type of caterpillar). This was tested on planation Cadrosspark in upper Nickerie. The Indigenous people use this cotton to make kweejoes, hammocks and other items such as clothes. There are different types of this cotton plant. The different types are: *1. Kodebejoosi or vogelkopjeskatoen. 2. The Ebbesebooro. 3. Karremisieri 4. Karremetooisi 5. Ecowreeteca 6. Murri Murri Seero 7. Itowri or baboenkatoen* All seven are described in further detail in Teenstra's account (1835).

Table 5. Description of Types of cotton found in Suriname. Source: (Teenstra 1835, 265-274).

According to the newspaper Suriname: Nieuws en Advertentieblad dated to Friday 6th June, 1924 the Sea Island cotton (Gossypium Barbadense) was the most common cotton shrub in Suriname. The American Upland cotton (Gossypium Herbaceum) was very rare. Table 5 shows the other less known types of cotton that were encountered by Teenstra (1835) in Suriname.

2.6. Plantation Esthersrust, a brief history

Plantation Esthersrust, not to be confused with plantation Esthers*lust*[30], was a cotton plantation on the confluence of the Warappa Canal and the Atlantic Ocean. The Warappa Canal was a man dug extension of the existing Warappa Creek. Egbert Jacobus Bartelink a Surinamese mulatto, describes the Warappa Creek area[31] as the most beautiful and rich agricultural region in its time. It was even called *'de kleine stad'* or little city. He further describes the well-maintained paths along the banks of the creek. The masterly water locks gave a considerable appearance to the plantations. Stone bridges, large beautiful houses and other buildings were all present. Plantation Esthersrust, although at the end of the Warappa Canal, was also part of this 'little city'. This cotton plantation is briefly mentioned in various colonial accounts and is also found on different colonial maps.

The history of Plantation Esthersrust started with Jan Limes. In 1786 Jan Limes[32] received a piece of land and called it aan Barbados (to Barbados)[33]. Later it was named Estherslust[34] and by 1825 it was changed to Esthersrust (Dikland 2020, 1). Although this plantation was once also named Estherslust, it should not be confused with Plantation Estherslust on the Suriname River. By 1819 the Flemish family Schas were the new owners of Plantation Esthersrust. They settled in Suriname, Nederlands Indië (Indonesia), and North America. They were also the owners of Plantation Barbados, Goudmijn, and Ostage. In local parlance, the names of these plantations were also referred to as Skassi derived from the owner's name Schas (Dentz 1944, 158). In 1853 the brother's Bots[35] bought this plantation of 850 acres and appointed J. Haase & Son as administrators while they were based in Helmond (North Brabant in the Netherlands) (Ooijevaar 1978, 7). They also owned the Plantation Killenstein on the Commewijne River, in the same period.

[30] A wood plantation on the banks of the Suriname river (Surinaamsche Almanak 1836, 59).
[31] Hoe de tijden veranderen: herinneringen van een ouden planter 1855-1875 (Bartelink 1914, 29).
[32] The initial owner of plantation Barbados during 1786.
[33] On many maps of plantations, one can see the suffix '*aan*' before the name of an already existing plantation. Often owners of existing plantations would also receive or buy pieces of land and put this suffix before the existing name. By doing this one would know that the plantation was the property of such an owner. In this case Jan Limes was the owner of Plantation Barbados and when he received the extra land on the other side of th Warappa Creek he named It aan Barbedos. There are other examples such as Aan Moed en Kommer, aan Anna's zorg, aan Berlijn and aan Loefbeek.
[34] By then a 500-acre cotton plantation.
[35] They were owners of a textile company in Helmond, the Netherlands (Dikland 2020, 6).

Layout

Presently the exact layout of Plantation Esthersrust is still unknown, but there is a short description of the different buildings and possessions it had during an auction advertisement in the *Surinaamse Courant* on 10th October 1871. According to figure 7, at the time of its auction in 1871, it consisted of a 200-acre land planted with cotton shrubs. Furthermore, it also had a good drainage system, steam machine, cotton press, and mill. In addition, there was a large residential house including a storage place for cotton (cotton warehouse), stone kitchen, hospital, factory buildings, workers houses (slave houses), vessels (open and closed), a tent boat and 50 horned cattle.

In other accounts, there are mentions of additional buildings on the plantation such as a church, and a school. According to the newspaper Suriname 1914, it might have been the first stone masonry Roman Catholic church in Suriname (figure 9). According to the overview of the activities in the diocese, in the years 1852/1854 to 1879, both plantations owned by the brother's Bots were regularly visited by priests of the diocese. In 1854 Peter *Clavercapel*[36] was consecrated by Mgr. J.G. Schepers at Esthersrust place. Reverend Mr. S.H.A.M. Meurkens alternately lived on the Plantations Esthersrust and Killensteyn in 1855. The diocese report last mentions the Plantation Esthersrust in 1879, simply stating that the plantation was no longer visited.

Figure 8 is a depiction of Plantation Esthersrust made by one of the owners A.G. Bots. A sum of 10 buildings can be seen. Working with the buildings mentioned in figure 7, it can be presumed that the largest building on the drawing might have been the large residential house. The first house on the bottom right corner also looks like a living quarter, presumably for the white servants. Next to it on the right, there is a building that could have been the factory or the cotton storage building

[36] *In de jaren 1852/1854 tot en met 1879 worden beide plantages geregeld bezocht door priesters van het bisdom, zo blijkt uit het overzicht van de activiteiten in het bisdom. In 1854 vindt de inwijding van de Petrus Claverkapel door mgr. J.G. Schepers op Esthersrust plaats. Gemeld wordt dat de eerwaarde heer S.H.A.M. Meurkens in 1855 afwisselend op de plantages Esthersrust en Killensteyn woonachtig. De laatste vermelding in het bisdomverslag is dat in 1879 Esthersrust niet meer wordt bezocht* (www.bots.demon.nl).

judging from its shape. This might have been the view of the plantation from the other side of the Warappa Canal (on the Plantation Alsimo).

14523 In het begin der maand Januari e. k., dag en datum nader te bepalen, zal in het openbaar worden te koop aangeboden:

De in de *Warappekreek* gelegene

Katoen plant.

Esthersrust c. a.

Genoemde Plantage, op goede lezing, heeft een alierschoonste cultivatie van plus minus 200 akkers voltallig beplant met jonge KATOENBOOMEN van de beste verwachting, een uitmuntend goed onderhouden STOOMMACHINE, Katoenpers en Molen, een groot **Woonhuis** (tevens voor katoenberging) Katoenloods, steenen *KEUKEN*. ZIEKENHUIS, *FABRIEKGEBOUWEN*, ***Arbeidderswoningen***, een gedekte en een open PONT, een vier en een achtriems Tentvaartuig, alles in goede orde, een schoone Veestapel van pl. minus 50 stuks **Hoornvee**, die met succes kan uitgebreid worden, alles breeder bij inventaris vermeld.

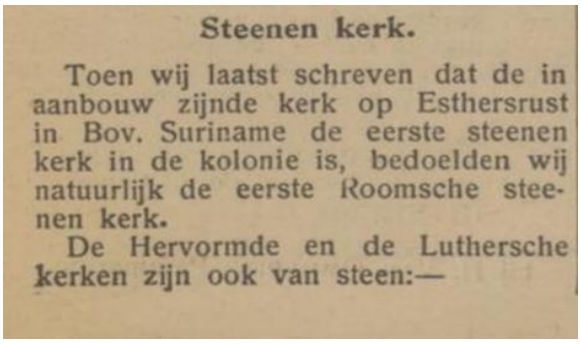
De veilconditien en Eigendomsbewijzen zullen tijdig ter inzage liggen ten kantore van den ondergeteekende, bij wien bovenvermeld EFFECT inmiddels uit de hand te koop is.

Paramaribo, den 7 October 1871.

J. P. HAASE Jr qq.

Figure 7. Short description of Plantation Esthersrust up for sale in de *Surinaamsche courant en Gouvernements advertentie blad* on October 10th 1871.

Figure 8. Old map of Plantation Esthersrust made by the A.G. Bots. Source: (Dikland 2020, 7)



Steenen kerk.

Toen wij laatst schreven dat de in aanbouw zijnde kerk op Esthersrust in Bov. Suriname de eerste steenen kerk in de kolonie is, bedoelden wij natuurlijk de eerste Roomsche steenen kerk.

De Hervormde en de Luthersche kerken zijn ook van steen:—

Figure 9. Snippet from the newspaper Suriname on 23rd January 1914. This stone church might have been on Plantation Estherslust, because the article mentioned it to be in Boven Suriname. Plantation Esthersrust was once also named Estherslust before being named Esthersrust. Further research is needed to establish whether this first stone church was on Plantation Esthersrust or Plantation Estherslust. The resemblance of the plantation names is easily confusing. Fact is that there surely was a church at Plantation Esthersrust named Clavercapel.

The (polder system) drainage on Plantation Esthersrust and the seasonal insect plagues.

In the results chapter of this thesis, recent drone imagery of the plantation beds and the different *trenzen* (canals) will be presented (see chapter 5). The polder system played an important role on plantations in the young coastal plains close to the ocean. This was discussed earlier in this chapter. During fieldwork on Plantation Esthersrust, the plantation irrigation structures could be seen clearly. The archives do not mention much about the plantation beds of Esthersrust specifically, but there is one account of a person who stayed there in the 1860s and gave a brief description. The name of the person is unknown. The following is a summary of that text translated from Dutch.[37]

"Plantation Esthersrust is a 500-acre[38] plantation of which 350 acres of its land has been planted with cotton. It has a slave population of 191. It is said that a good labourer should be able to cultivate five acres of land with cotton, four acres with sugarcane, eight with plantain, and ten with cocoa. The grounds best for cotton seem to be the ones close to the sea, which contain lime and are clayish. The soil also contains a moderate amount of iron oxide. Too much iron oxide is not good for the shrub itself and has a direct effect on the colour of the cotton. The saltiness of the air has a good effect on the cotton plant. Before the shrubs can grow perfectly, the drainage of the place needs to be in place. The general system is applied according to the same principles and undergoes only a few minor changes, due to the condition of the soil. Wide channels (possibly the vaartrenzen) (voedings-kanalen) intersected by shallower ditches carry the water into the canals (possibly the loostrenzen) (grachten)[39] surrounding the plantation beds. The plantation beds are usually 20 feet broad its length is not exactly given. They are intersected lengthways by roads. Each plantation bed is

[37] https://geheugen.delpher.nl/nl/platform/view/de-aarde-haar-volken-dl-guyana-hoofdstuk?coll=ngvn&facets%5Bsubject%5D%5B%5D=Herrnhutters&maxperpage=36&page=1&query=&identifier=SURI01%3AZ3642-1867

[38] The writer states 500 acres, but oddly in other sources mentions that this plantation was initially 500 acres but expanded to 850 acres by the time it was bought over by the brothers Bots in 1853.

[39] A Dutch word for a canal within a city. It cannot be easily translated, because a *gracht* could mean different sizes and classifications of canals such as a *vaart* (used for transport), a kanaal (manmade watercourse, usually in the country side), a *single* (by origin a water filled moat, which surrounds a city for defence purposes or a city canal. Even though the word literally refers to a canal or waterway, there is no exact equivalent for the term in English. In the case of Plantation Esthersrust, it could also mean that it was used as a *Vaartrens* for example.

numbered for the convenience of culture to divide the labour. Over the ditches (slooten) there are often narrow and slippery planks, which makes a stroll through the plantation an unpleasant one, equivalent to a gymnastic exercise. When the ground has been cleared, it is ploughed, but no to deep. Afterward, the seeds are inserted. The planting happens during mid-April during the rainy season. They dig the ground with hands or with tools, but not too deep before the seeds are inserted. In each hole around 20 seeds (1 hand handful) are inserted and covered again by dirt. These holes are equidistant and in a rhombic (ruitsgewijze) setting. They are dug at a distance of three feet. If the beds are new three rows of cotton shrubs are sown on one bed, but if the land has been cultivated before five to six rows are sown on one bed. The cotton shrub often gives two bearings, ones during August-September, and ones from January - February. Six weeks after the flowering has taken place they are harvested. After the second harvest, the cotton shrubs are cut at a height of a cubit (el) [40]and purifies them. All of this is done to control the development of the trees in connection with the changing of the seasons and the annual recurring rainy seasons so that the ripening of the fruit happens during the dry season. The cotton fields are renewed every four to five years and the time chosen to do this is always in the rainy season (Unknown 1867, 360). *"*[41]

The writer continues to speak about the different plagues that were detrimental to the cotton plantations, but also speaks of another important function the sea had for the cotton plantation. The summary continues.

"Sometimes during the dry seasons, the buds of the cotton seeds would open problematically. In this way, the harvest was threatened. The planters had a remedy for this. They opened a water lock during high tide and would let the seawater inter their plantations. This would help to open the barks of the cotton buds. However, this should be done with care, taking into account that the residue of sea salt left behind is all but auspicious. It is calculated that an acre in Dutch Guyana (Suriname) gives about a half bale of cotton every year. One

[40] An ancient measure of length, approximately equal to the length of a forearm. It was typically about 18 inches or 44 cm, though there was a long cubit of about 21 inches or 52 cm (https://www.oxfordreference.com/view/10.1093/oi/authority.20110803095652508).

[41] *The Aarde en Haar Volken* 1867: part 3: Guyana: chapters 9-11. Source: www.Delpher.nl

acre would, therefore, supply 165 pounds. The cotton shrubs have several enemies such as the crabs, the normal cricket, the mole cricket (veenmol or Gryllotalpa Gryllotalpa), the manioc ant (Acromyrmex Octospinosis) and the caterpillars (Diaphania Indica) which attack when the tree is young. When the trees reach their fertility and the rich blossoming seem to promise a wonderful harvest another scourge suddenly appears that is equivalent to that of Egypt, destroying the hopes of the planters. Yellow butterflies fly through the sky, they lay thousands of eggs that quickly turn into caterpillars and grow at the expense of the flowers, leaves, and branches of the cotton shrubs. They cause horrible damage and the harvest is spoiled. The noise due to the nibbling of millions of small creatures sounds like the fizz of the sea. A New York magazine of 1860 names these creatures the Heliotis Americana, Phalena Gossypion, Egera Carbasina, etc. There are no known methods to get rid of them than to get rid of the old larvae. Fire is a bad idea, because the other quadrants (vakken) might also catch on fire. If this happens then the whole plantation might have to start from scratch again. It is now clear why Dutch colonists give up this culture because of its uncertain nature. Other cultures are more certain (Unknown 1867, 362)*."* [42]

The above illustrates the importance of a good drainage system and how important seawater and the *biri biri* lands turned to be for cotton plantations. To a certain extent, the descriptions correspond to Blom's account (1786).

In the previous paragraphs the importance of the canals were mentioned. The use of vessels on the plantations was equally important as the canals themselves. Blom's calculations also mention that a plantation needed a *botenhuis* and several vessels including a *tentboot*, *tentpontje* and *lastdraager* (see table 3).

Local vessels

According to Westerdahl (see chapter 4), ships and vessels are influenced by their surroundings. Their shapes and materials are adapted to the surroundings to be more durable and efficient. The local vessels both pre-Columbian as well as post-contact were adapted to the surrounding areas. Every estate in Suriname kept a tent-boat (see table 3) and several other crafts during the colonial period when water

[42] *The Aarde en Haar Volken* 1867: part 3: Guyana: chapters 9-11. Source: www.Delpher.nl

transportation was the only option. For the conveyance of their products they also had a covered dock to keep them dry and for repairing them (Stedman 1796, 314). For plantations, it was very important to have vessels and they were always calculated in the budget as was seen in the calculations of Blom (1786) in Chapter one. These vessels were kept by the *botenhuis*[43], which was also a common possession of a typical plantation.

Plantation vessels

The vessels built in Suriname were meant to be used locally. In descending order of size these were barges, tent boats (*tentboten)*(see figure 10) and various types of pirogues and dugout canoes (‘*priauwen*’ or *prauwen* and ‘*corjaren*’ or *korjalen*) (Fatah-Black 2019, 526). The descriptions and usage of these vessels are found and mentioned in different primary sources.

Plantation barges (tentboats)

Stedman gives the following description:

> *“We now set out from Paramaribo for Sporkesgift, in a tent-boat or barge, rowed by eight of the best negroes belonging to Mr. Macneyl's estate; everybody, as I have already mentioned, travelling by water in this colony. These barges I cannot better describe than by comparing them with those that accompany what is usually styled the Lord Mayor's Show on the River Thames. They are, however, somewhat less, though some are very little inferior in magnificence, and are often decorated with gilded flags, filled with musicians, and abound in every convenience. They are sometimes rowed by ten and even by twelve oars, and being lightly built, sweep along with astonishing celerity. The rowers never stop, from the moment they set out till the company has landed at the place of destination; but continue, the tide serving or not, to tug night and day, sometimes for twenty-four hours together, singing a chorus all the time to keep up their spirits (Stedman 1796, 92).”*

According to Van Sijpestijn (1854) these tentboats were mostly used for the transport of people and would often have four, six, or eight rowers. They were often

[43] The boathouse what is known in Holland as the Schuitenhuis was always built on the water. It served to protect the Tent boats and the Tent ponten from the sun and rain (Blom 1786, 110).

favoured by the colonial elites (Fatah-Black 2019, 526) and well stocked with rum, tobacco, fruit, and wines (Wolbers 1861, 191). Blom describes tent boats as follows:

> *"A tent boat is a rowing vessel, suitable for the whites to travel from one plantation to another, or from a plantation to Paramaribo, or to sail to the Fort. It is covered as far as where the whites are seated, there is enough room to load a big amount of cargo. Some have six rowers, while others have eight* (Blom 1786, 110)*."*

Figure 10. Representation of a tent boat or plantation barge. Source: (Stedman 1796, 92).

Tentpontje

A *tentpontje* was noticeably smaller and lighter than the tent boat and did not have so much storage space in it. Some had six oars while others only had four. It had no keel like the Tent boats and was flat in front. They were frequently used to go from one plantation to the other, especially those with four oars, while those of six oars were used to go to Paramaribo. Since they were lighter, they could be rowed by big boys, who did not work in the field yet. On tent boats, adult enslaved people were necessary (Blom 1786, 110).

Lastdraagers

A Load Carrier was also known as a *kroes kroes.* This vessel is the equivalent of the *schouw* in the Netherlands. It was square from above, and from below without

keel. It was used to transport all kinds of goods from Paramaribo and Vice versa to the plantations. It was covered with a roof of *Piena* leaves (figure 11), to keep the goods in them dry (Blom 1786, 111).

Keenponten

For the transport of heavy materials *ponten* were used (van Sijpesteijn 1854, 80). The *Keenponten* are also used as load bearer *(lastdraagers)* but were open (no roof or covering). They even resembled the *lastdraagers* vessels from below (without keel). Sometimes they were made longer than the load bearers. They were used to bring sugar cane from the field to the mill; and at the same time barrels, firewood, food from the gardens such as *taijer* (leaf vegetable), bananas, etc. (Blom 1786, 111). They were an essential and efficient part of the plantation together with the *vaartrenzen* (van Stipriaan 1993, 85). There were also other types of *ponten*. For example, barrels of molasses would be loaded on a so-called *matrozenpont* and would be transported to the main place (Paramaribo), where they would be shipped to elsewhere (van Sijpesteijn 1854, 206).[44] The *keenponten* were approximately 11x3 meters long and because they were very expensive to maintain (they were fully made out of wood) and labour intensive, they were replaced by iron containers that were pulled by cattle during the 19th century (van Stipriaan 1993, 173). The iron containers were inserted in the water and they were thus attached to the cattle, who would, in turn, pull the containers. A similar system was also used in the Netherlands for transportation. The vessels were called *trekvaarten or trekschuiten*. Trek means to pull. The vessel was connected to a cattle (in most cases a horse) via a tow line (Wegman 2014, 36). This system came from the Netherlands and was thus adopted in Suriname.

Conclusion

That role of water on the plantation network of Suriname is evident. The surrounding water bodies were initially seen as an obstacle due to flooding in the lower coastal area. When Governor van Sommelsdijck introduced the polder system and when fortifications started to rise in the coastal plains, the plantations started to

[44] It's called the *matrozenpont* because initially *matrozen* (sailors) would transport sugar on these vessels from the plantations to the ships. The sailors were over working and many even died. Governor Van Panhuis abolished this practice. This work was now done by the enslaved. These vessels (Teenstra 1835, 242).

spread in this region. The usage of grachten was important for both the main fortifications such as Fort Sommelsdijk and Fort Nieuw Amsterdam, but also most essential for the plantations. The plantations and the fortifications were mainly found near rivers and creeks. The fortifications were intelligently designed using the rivers and the surrounding flora as a natural defence as is the case with Fort Nieuw Amsterdam and Fort Sommelsdijk. The maritime landscape had a strong impact on the residents of colonial Suriname. The same is true of the opposite. The landscape characteristics were both favourable for the defence system as well as for the economy of the colony in terms of plantations and trade. Suriname was connected by water and the need for vessels both for international as well as for local routes were more than evident. To reach Suriname, ships were needed. However, for the travel within Suriname, vessels were also very crucial. Suriname was a hydraulic (maritime) society. The next chapter will focus on the importance of water for the colonial defence system of Suriname.

Figure 11. Paintings of Suriname by Benoit. *Lastdraagers* can be seen in all three paintings. Source: (Benoit, 1839)

Chapter 3. Colonial defence systems between the 17th and 19th Century

3.1. Introduction

To maintain the sanctity of the colony, Dutch rulers devised many strategic military plans. They constructed numerous fortifications and posts to defend against foreign and local attackers. Looking at the colonial defence system of Suriname, it is evident that the water did not only fulfil an important role on the plantation but was also linked to most of the fortifications in that period. The defence system was also directly linked to the plantations. They were dependant on each other. From this perspective, if there was no water, there would be no plantations on the coastal plain, and the forts would never have been constructed where they are presently situated. Both the fortifications and the plantations made use of canals, but did so differently. To understand this statement better, this section onward will briefly look at the defence climate of Suriname from the 17th through to the 19th century. This section will also not focus too much on the establishment years of the different forts and posts, but will rather focus on the area and landscape surrounding the forts and posts which were often near water bodies.

During the colonial period, the Dutch had great influence in the Caribbean and parts of South America. This is projected in parts of the regional culture and the structures left behind (Dabbabi, 2011, 3). Dutch fortifications were often built in strategic locations to defend and protect (Pardoel, 2016, 9). More importantly, in the New World, they reflect colonial strongholds and settlements. In Suriname, several forts were built during the colonial period such as the well-known and maintained Fort Zeelandia built in the 17th century by the British and conquered by the Dutch (Brunings, 2014,3). Consequently, Fort Nieuw Amsterdam, Fort Para[45] , and Fort Sommelsdijk are also reflections of strategically placed structures to protect a newly established Dutch settlement.

[45] Fort Para was one of the first fortifications built by the Dutch Governor Aerssen van Sommelsdijk. The fort was laid where the Para river enters the Suriname river. This fort was a blockhouse with 4 half bastions and was armed with four small cannons (Lancker 1980, 2).

3.2 Forts and posts

The landscape of the coastal area itself can be seen as a fort. Usually, the main forts have different ditches or '*grachten*' surrounding its premises and have a function to make it harder for the enemy to penetrate and conquer. Different colonial descriptions of Suriname mention that the mangrove of the coastal plain and the rainforest interior were almost impossible to penetrate (Stedman 1796, 2; Fermin, 1770, 114; Hartsinck 1770, 3).[46] The waterways seem to be the only and most sufficient way to go travel. Bearing this in mind the Dutch used the rivers to their advantage. To enter into Suriname with large battleships was hard, because they would not go unnoticed and there were only a few rivers by which entry was possible. These rivers were the Coppename, the Marowijne, the Corantyne and Suriname. The administration of Suriname was in Paramaribo, which lied on the banks of the Suriname River. The only way to get there was through the Suriname River from the Atlantic Ocean. This turned out to be very challenging as the Dutch defence strategy, was very tactful. The Suriname River at its mouth, was shallow and not very wide (figure 13). For enemy ships to pass through unnoticed by the Dutch militia was almost impossible, but still, it was done in 1804, which will be elaborated upon further in this chapter.

There were different facets to the colonial defence system of Suriname during the 17th through to the 19th century. When it came to fortifications there were the main forts such as Fort Zeelandia, Fort Sommelsdijk, Fort Nieuw Amsterdam, and Fort Para. There were also secondary fortifications supporting the main ones such as the famous Fort Purmerend and Fort Leyden (redoubts). Furthermore, there were different posts situated throughout the country that were placed, settled, and abandoned throughout time. Famous examples of these posts are Post Oranje and Post Brandwacht at the Mot Creek.

Most of the main forts were either on the confluence of an important river or next to one. This can be seen in figure 14. Fort Zeelandia, Fort New Amsterdam, Fort Sommelsdijk, Fort Para, Fort Leyden and Purmerend, Post Brandwagt, Post Oranje are some of the main and most important examples of military fortifications. Although these fortifications were not established simultaneously, they all seem to

[46] The Surinamese coastal and interior forests are dense and full of wild animals.

have a link with the surrounding water bodies. They did not just try to protect the rivers but used the rivers to protect themselves and their possessions. To illustrate this the Forts Sommelsdijk and Nieuw Amsterdam will be discussed briefly on their use of water in their defence strategy.

Fort Sommelsdijk

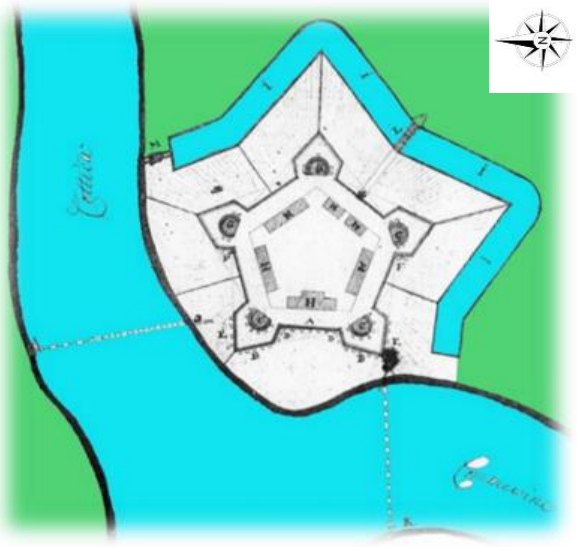


Figure 12. Fort Sommelsdijk on the confluence of the Commewijne and Cottica rivers in Suriname, South America (Dikland 2004, 3).

Fort Sommelsdijk[47] and Fort Para[48] were both build during the reign of Governor Cornelis Aerssen van Sommeldijk. Except for foreign threats, these forts were also used to help protect against local attacks by the Indigenous and the Maroons. (Van Sijpesteijn 1854, 16). Fort Sommelsdijk had a pentagonal shape situated on the confluence of the Commewijne and Cottica Rivers and Fort Para was a reinforced stone house on the Para Creek (Wolbers 1861, 63).

Fort Sommelsdijk was financed by the planters (ingezetenen) of that time and was of much importance because it protected two rivers and a whole series of plantations (van Wesele 1733, 19). Fort Sommelsdijk just like Fort Zeelandia and Fort Nieuw

[47] Established in 1684 (Hallema 1933, 37)

[48] Abandoned by 1740 (Hallema 1933, 37). Fort Para was one of the first fortifications built by the Dutch Governor Aerssen van Sommelsdijk. The fort was laid where the Para river enters the Suriname River. This fort was a blockhouse with 4 half bastions and was armed with four small cannons (Lancker 1980, 2). After it was abandoned Plantation Houttuin was established at the same location (Van Sijpesteijn 1854, 16).

Figure 13. Nautical map showing the projected fairway larger ships would take. This map is calculated in Amsterdam feet (at 0.2831 m) from the mouth of the Suriname River to Paramaribo, reduced to low tidewater. This revision dates from 1869. The original handwriting card, which was compiled on board the naval vessel Z.M. Adder in 1860, is kept in the Library of the former Ministry of Colonies (http://dpc.uba.uva.nl)

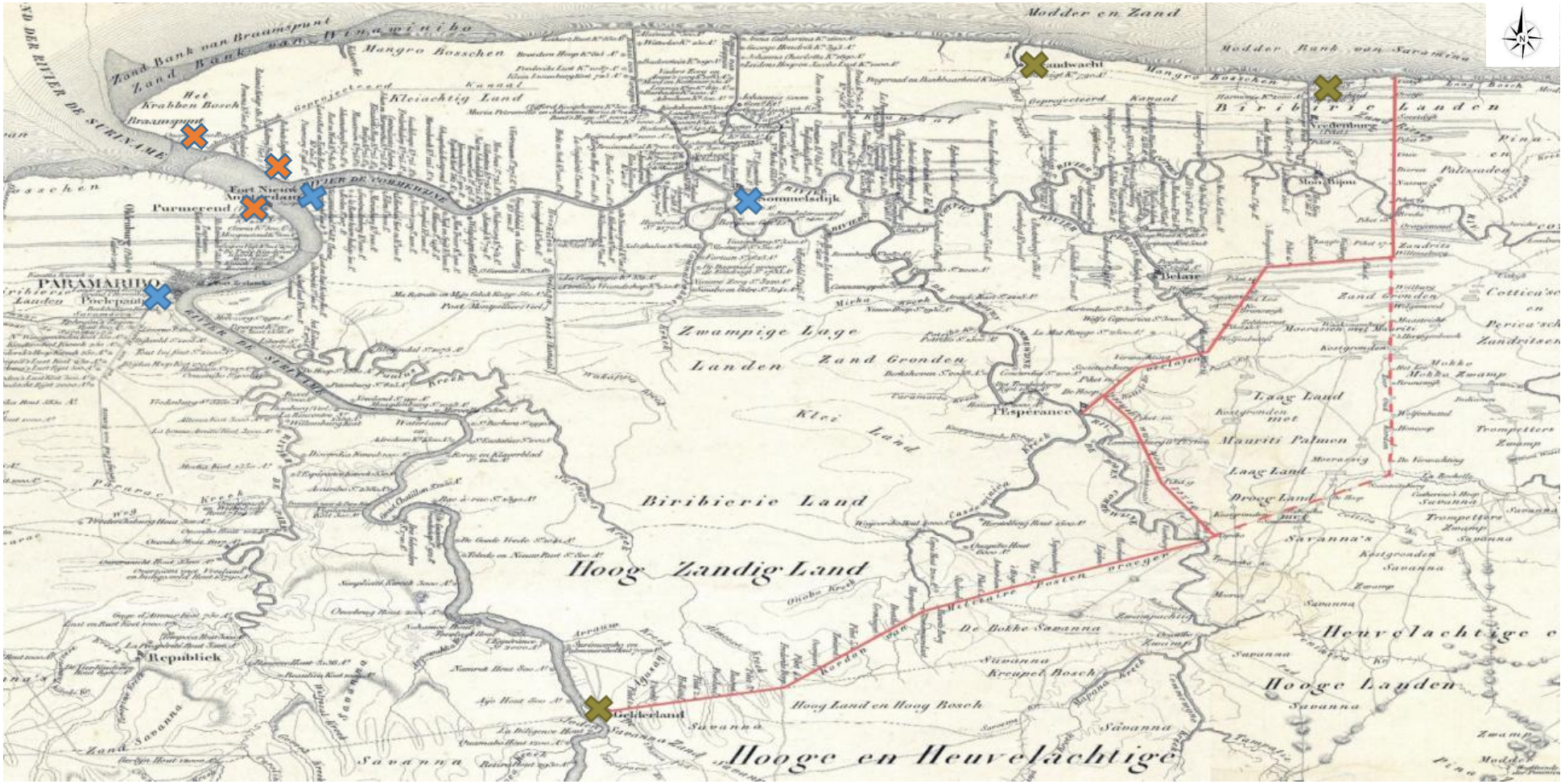


Figure 14. Position of the Cordonpad in Suriname, plotted on a portion of the map: '*Kaart van de Kolonie Suriname, een gedeelte van Guijana, Nederlandsche bezitting op het vasteland Zuid-Amerika* Published in the Year 1784 by den Ing. J.C. Heneman. Improved and changed to the present condition of the Colony, and all existing Plantations indicated on it, by Jonkh. C.A. van Sijpesteijn, 2nd Lieutenant of Artillery, Adjutant of Z. Exc. Mr. General Major R.F. Baron van Raders, Governor of Suriname. 1849. Edited by Santosh Singh. Blue = Main Forts. Orange= redoubts. Green = Military post(There were far more military posts, especially along the red line).

Source: https://www.nationaalarchief.nl/onderzoeken/kaartencollectie/00bbc97b-5ad2-4da8-b192-2eacef263ce5

Amsterdam also was star-shaped (5 bastions). These bastions were named *Nicolaas (Witsen), Willen, Nasau, Marie, and Oranje* (Hartsinck, 1770, 576). By the time Fort Nieuw Amsterdam was built, fort Sommelsdijk was slowly being deserted.

Jan Reeps visited Suriname in 1693 after he failed to start a plantation in Brazil (Dikland 2004, 2).[49] He wrote the following short description of this Fort.

> "…*On the corner lies fort Cotteca of Sommelsdijk in a swampy place. It has five strongholds and curtains (gordijnen)*[50] *of earth, a beautiful moat (gracht) equipped with artillery almost seems invincible. Ships cannot pass by during high tide, because they would need to be towed with the aid of a tow rope and a rowing boat."* [51]

Reeps describes the *grachten* (canals) to be beautiful as it is also equipped with artillery. Figure 12 gives somewhat of a depiction of this. On one side, the fort borders the rivers (or the natural *grachten*), while on the other side, it is partially surrounded by manmade *grachten* indicated by the letter i. Though there is no scale given and the exact depth and broadness of the canals are still to be researched, its size does look significant when compared to the rivers. The letter M indicates a water lock running into the Cottica River, while the letter L indicates a bridge two protective gates (Dikland 2004, 3). Another significant part of this fort is letter K, which crosses both rivers. The letter K indicates two chains that were spun across both rivers. Since the rivers were the only, most logical, and easiest ways when it came to transportation, these chains would form a hindrance for enemy ships, making it impossible to pass through.

Fort Nieuw Amsterdam and its complementary forts.

When governor van Sommelsdijk introduced the polder system in Suriname, the plantations spread out to the lower coastal area. Because of their position in the whole network of plantations, Fort Zeelandia and Fort Sommelsdijk, were not able to oversee all the plantations (Bosz 1964, 111). On 19th December 1733, the

[49] Jan Reeps left from Vlissingen in a frigate. His goal was to establish a Dutch plantation colony between French Guyana and the mouth of the Amazon in Brazil. Unfortunately for him, his ship got destroyed during a storm and together with 17 others they had to sail in a small sloop. They managed to reach the coast of Brazil. After this they stayed seven months in Suriname before returning to the Netherlands (de Jong 1971, 201).

[50] Main ramparts between two strongholds

[51] (Van Alphen 1962, 310)

decision was made to build a new and more strategic Fort on the mud bank Tijgerhol[52], which would be known as Fort Nieuw Amsterdam[53] (Van Sijpesteijn 1854, 30). John Gabriel Stedman was a Dutch-born Scottish colonial soldier who compiled the Narrative of a Five Years Expedition against the Revolted Negroes of Suriname in 1796. This book is a collection of his personal experience whilst he was in Suriname during the 18th century. In chapter 7 he gives a description of Fort New Amsterdam which he visited on 3rd July 1773.

"It is built in the form of a regular pentagon, with five bastions, being about three English miles in circumference, surrounded by a broad moat (gracht), which is supplied by the river, and defended by a covert (secret) way, well palisaded. Its foundations are a kind of rocky ground. Its principal strength by water is a large mud bank on the confluence, supported by a strong battery of cannon. This prevents even flat-bottomed vessels from making any approach in that area. The fire of the guns with the opposite redoubts, Leyden and Purmerend protects the entrance of both the rivers, Suriname and Comewina, As I have said before: it has, besides, powder-magazines and victualling offices, and is well provided with all the other necessary buildings for the use of a strong garrison. There are even a corn-windmill and a cistern that will hold over a thousand hogsheads[54] of water. This is no more than necessary; since, according to my opinion, it will take the whole army of Suriname to defend so large an extent for any length of time. Adjoining to the fortress is also a large spot of ground, well stocked with plantains, yams, &c. to feed the society slaves, which are kept here, at the colony's expense, to work at the fortifications, under the inspection of a proper overseer. In this fort is generally stationed a small garrison, commanded by an officer of the artillery, which obliges all vessels whatever to bring to, shew their colours, and salute them with seven guns each, the compliment being answered with three guns from the battery, and the hoisting of a flag on the ramparts. I shall only add, that this fortress is, on the Northeast side, surrounded with bogs

[52] On the confluence of the Suriname and Commewijne Rivers.
[53] The first stone was laid in 1734 by Governour J. A. Cheusses and was completed in 1747.
[54] A hogshead ('hhd') is a large cask of liquid (or, less often, of a food commodity). More specifically, it refers to a specified volume, measured in either imperial or US customary measures, primarily applied to alcoholic beverages such as wine, ale or cider.

and impenetrable bushes and that the spot was from these circumstances, formerly called the Tyger's hole." [55]

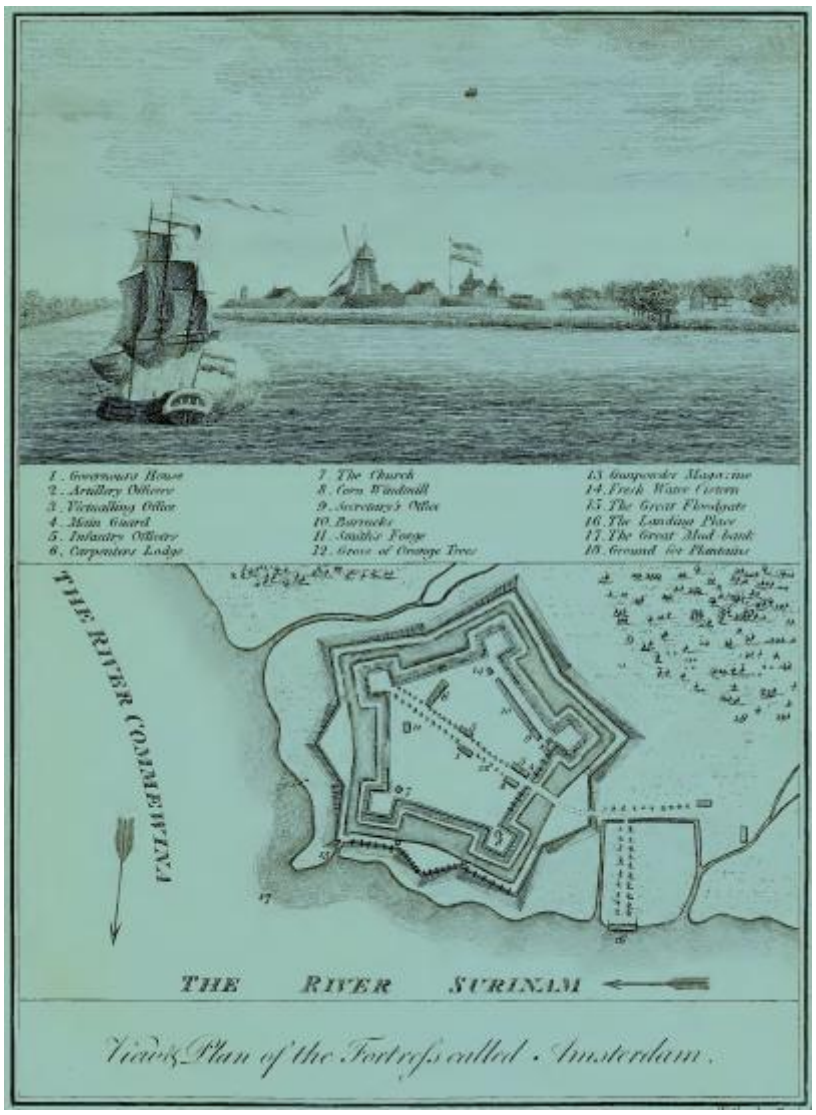


Figure 15. A depiction of Fort Nieuw Amsterdam by Stedman. Source: (Stedman 1796, 135)

Van Sijpesteijn also writes about Fort Nieuw Amsterdam and from this point of view the importance of its strategic location and its connection to the rivers used to increase the protection of the Fort can be derived.

"The colony of Suriname is defended against the foreign enemy by the Fort Nieuw Amsterdam. It is laid out on a very low swampy clayish soil. The waterway forces the ships to sail close to the fort. The mud bank in front

[55] (Stedman 1796, 133)

prevents ships and even the flat-bottomed vessels from approaching the ramparts outside this waterway." [56]

"The fort has a regular pentagonal shape and is surrounded by wide moats and earth walls. In the past, the crossfires from the now-abandoned redoubts Leyden and Purmerend, which were built on the other overs of the Suriname and Comewijne rivers, contributed much to the defence of the colony. The Leyden redoubt, in particular, gave through the battery Frederici ahead, a powerful fire on the waterway which, because of its direction, forced the ships to remain under this fire for a long time. Both redoubts have been abandoned due to the cost of maintenance and the lack of occupancy." [57]

Paths and posts of importance

Other facets of the colonial defence systems eventually manifested as paths through the vast Surinamese rainforest, connected by different posts. The Cordon path (figure 14) and its predecessor the *Oranje pad* were very important strategic defence mechanisms for the colonial rulers to help keep everything in 'order'.

Most military posts were along the water (rivers and creeks). These were generally more directed against the foreign raids of other colonial powers. In contrast, the more inland military posts, the *Cordonpad* and *Oranjepad*, were specifically aimed at protecting the plantations from attacks by the Maroons (Biharie 2019, 9).

The Cordon Path consisted of a well maintained military pathway running from Upper Suriname (Post Jodensavanne)[58] to the sea (Post Orange) and was protected by main posts and pickets. There were also other independent and secluded posts in different parts of the colony. These posts were often weakly filled and serve only to secure peace in the divisions or to protect and promote the control of the Maroons (Van Sijpesteijn 1854, 90). Van Sijpesteijn names the following posts in his account: Post Monbijou (upper-Cottica River), Post Vredenburg (Oranjekreek), Post Belair (Perica), Post Brandwacht (Motkreek at sea), Post l'Esperance (upper-Commewijne River), Post Gelderland (upper Suriname river), Post Republiek

[56] (van Sijpesteijn 1854, 87)
[57] (van Sijpesteijn 1854, 88)
[58] Post Gelderland has been mistakenly misrepresented in literature as the first post of the Cordonpad. Post Jodensavanne was the first post of the Cordonpad (van Dun 2008, 3).

(Para), Post Nassau (Saramacca River). The districts Coronie and Nickerie also had posts and all other posts were abandoned sooner or later (Van Sijpesteijn 1854, 90).

3.3. Military post at the mouth of the Warappa Creek

According to different sources and maps, there used to be a military post on the mouth of the Warappa Creek. Since Plantation Esthersrust also lies on the mouth of this creek, the link between the two, if there was any, will be briefly discussed.

Figure 16 is a map dating back to 1784. On this map, a military post by the name Warapper Post is mentioned and is seen almost at the end of the Warappa Creek. Aan Barbados as mentioned earlier was established in 1786 by Jan Limes, two years after the making of this map. Thus far the primary sources that were studied did not mention any link with either Plantations Esthersrust or its predecessors. Figure 16 clearly shows that the post that was present there at that time, was not based on any plantation.

Figure 16. Title Leupe: "A new map of the Colony of Suriname in Guiana, South America, describing all the Rivers and Districts as far as the same have been discovered, likewise the cultivation of the lands and plantations." *Met karton voorstellende*: "plan of the town of Paramaribo, the capital of Suriname." This is the reprint of J.C. Heneman's comprehensive map of Suriname from 1784. It was printed a quarter of a century after the original and contains updates showing the extension of settlements and plantations. The ground plan of Paramaribo at the left sheet also derives from Van Heneman. North is up. Scale-bar 1: 777. A post by the name Warapper can be seen.

Source: http://www.atlasofmutualheritage.nl/en/Comprehensive-British-map-Suriname.10460

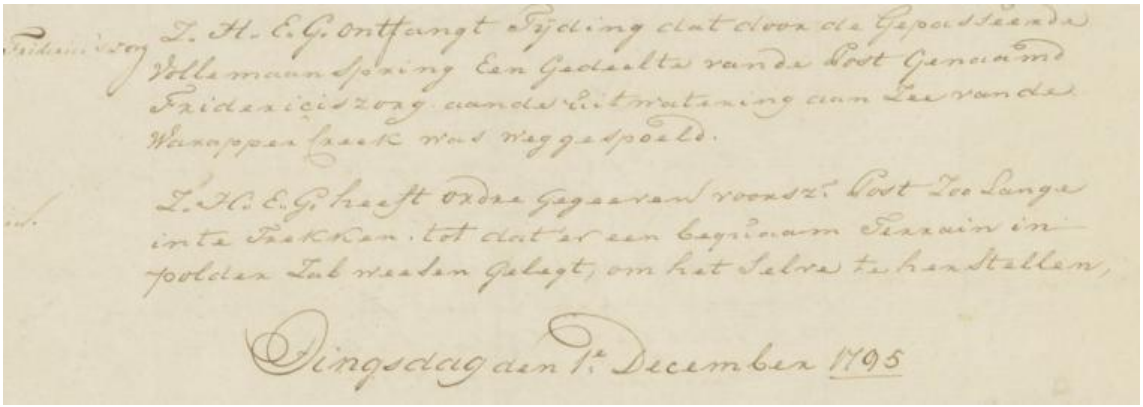


Figure 17. A post by the name Fredericiszorg at the mouth of the Warappa Creek. Source: *Oud Archief*, 30-11-1795, *Gouvernementssecretarie, Inventarisnr*. 18 scan 134.

In the gouvernementssecretarie of 1795 (figure 17) a post at the mouth of the Warappakreek is also mentioned by the name of Fredericiszorg. This record mentioned that it was ordered to withdraw the military post until a suitable impoldered piece of land has been found to re-establish it again.

The British attack in 1804

The most famous mention of any military action linked to the military post at the mouth of the Warappa creek took place in 1804. The British attacked Suriname and successfully managed to secure Suriname as their new colony. Figure 18 shows the battle plan. Wolbers mentions the following in his account:

> *"On April 25, 1804, 31 English large and small warships appeared on the coast at Saramacca and Braamspunt. On the 27th they conquered Braamspunt with two frigates and two brigs (2 Brikken) after mutual cannon shot. The garrison present there included five injured who were made prisoners of war. On the 28th of April, the British now the master of the river went up the Suriname River with twenty-two ships. Two ships kept watch at the mouth of the river. The other frigates were sent to the Warappa Creek and the Saramacca. At 8 a.m., the colony was summoned by the English commanders Charles Green and Samuel Hood. The councils of police as representatives of the civilian population feared the loss of property and. With such great power (four to five thousand soldiers, marines and sailors, on which the power of the English was estimated) the enemy threatened the*

colony. The council saw more salvation in a capitulation than in opposition. Berranger pointed out that it was difficult to conquer the enemy with 580 men who were still divided between Fort Nieuw Amsterdam and the redoubts Purmerend, Leijden and Friderici, During the capitulation it was secretly made clear that the after peace had been made, the colony would be returned to the Batavian Republic." [59]

"On the 30th the enemy disembarked their men from Jonkerman's Creek and by night the redoubts Leijden and Friderici were captured by storm by 100 sailors and 50 soldiers. Few persons were injured in this conquest; but by the jumping a gunpowder box two officers and three men were killed and 20 men, all English, wounded. The English in possession of the Leijden redoubt made a mortar battery across the New Amsterdam fortress and sent troops along the river Commewijne to attack the fort from behind. Five hundred men landed at Warappa Creek, which is located near the others added. The attack would now be from the rear and the side of the river be undertaken by ships at the same time." [60]

The Gentlemen's Magazine of 1804 mentions the following:

" General Maitland, who was directed to effect a landing at the Warappa Creek, about 10 leagues to the eastward of the Suriname river, where the enemy occupied ***a post.*** *The object of this operation was to obtain a water communication with the Commewijne river, to procure* ***plantation boats*** *in sufficient number to transport the troops down that river toward, its junction with the Suriname, and thereby facilitate our approach to take a position in the rear of Fort New Amsterdam; and also to cut off a considerable detachment of the enemy stationed at Fort Brandwacht."* [61]

The British went on to conquer Suriname eventually and ruled Suriname from 1804

[59] (Wolbers 1861, 503)
[60] (Wolbers 1861, 504)
[61] The Gentlemen's magazine of 1814, volume # 74, page 672. Source: https://books.google.com (PDF document)

to 1816 which is known as the British occupation (*Engels Tussenbestuur)*. In this same article by the Gentlemen's Magazine, the difficulty of penetrating the forests of Suriname is also mentioned. The mangrove forest was very dense and also it was very swampy. The waters were also problematic because it was shallow and full of mud banks and could only be accessed during high tide. Nonetheless, the British were able to overcome these natural barriers and the military fortifications of the Dutch. Capturing the post at Warappa Canal proved to be essential, for this granted them access to the Commewijne River, by which Maitland was able to attack Fort Nieuw Amsterdam from the rear and eventually conquer it.

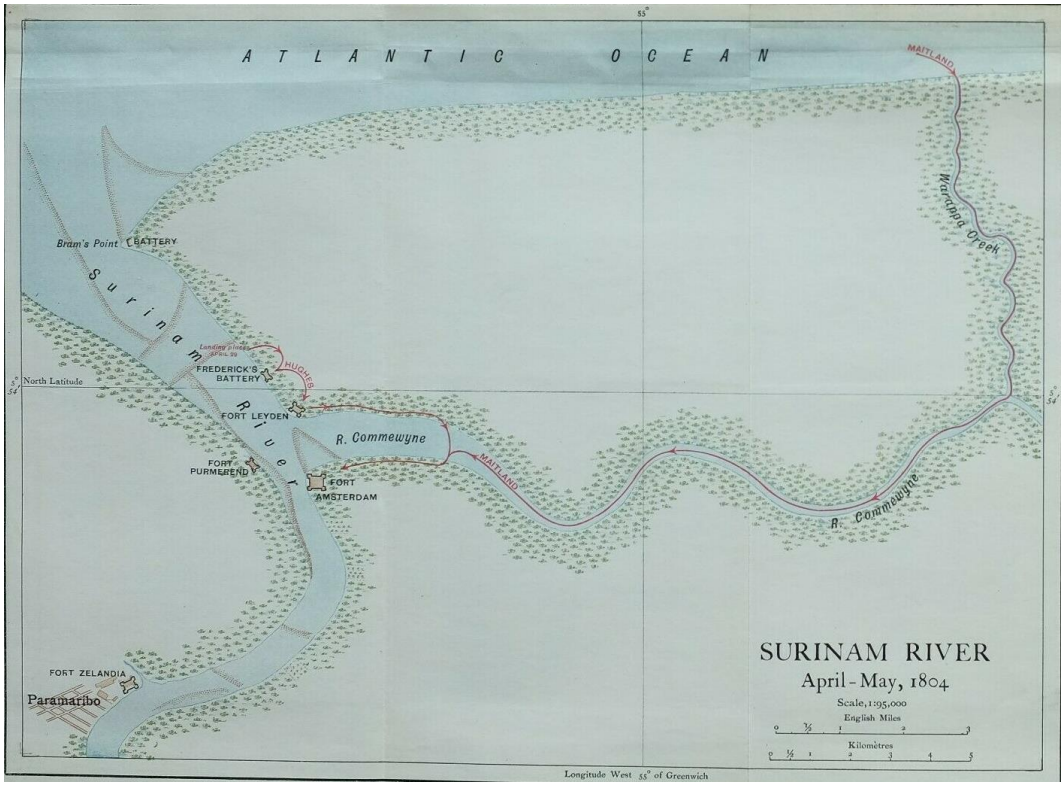


Figure 18. British Battleplan 1804. The red lines show the strategic well-planned routes by the British to conquer Suriname, which turned out to be a great success. Source: www.Ebay.co.uk**.**[62]

Military post plantation Alsimo (1835)

Plantation Alsimo which was across Plantation Esthersrust, also had a military post.

[62] https://www.ebay.co.uk/itm/MAP-BATTLE-PLAN-SURINAM-RIVER-APR-MAY-1804-FREDERICKS-BATTERY-FORT-LEYDEN-/143517868197

This post was mentioned to have had around six soldiers and that they were not on good grounds with the plantation director who accused them to be a bigger threat to his chickens than the cats[63] and possum (Kappler 1854, 182).

In the previous paragraph, Van Sijpestijen mentioned the existence of secluded posts which were often weakly filled and served only to secure peace in their divisions or to protect and promote the control of the Maroons. It can be concluded that the military post at the mouth of the Warappa Canal was one such post and was rather focused on keeping peace in its division than protecting against foreign attackers. Further research has to be done to find if there was any connection between Plantation Esthersrust and the military post.

Defending Suriname with ships

Ships were not only used for the transportation of goods and passengers from one place to another. They were very important factors in the defence system of Suriname. The complete Surinamese defence system consisted of the *Zeemagt* (naval power), *Landmagt* (army on land), and de *Schutterij* (militia). The naval power is described by Van Sijpestijn (1854) as follows:

The squadron, stationed in the West Indies and now under the command of Captain at Sea W. Stort, consisted of the following in January 1853:

warships:

S.M. corvette (ship type) *de Heldin, Captain at sea W. Stort, armed with 20 guns and manned with 160 heads.*

Z. H. brig (ship type) *de Koerier, Captain-Lieutenant W.H. Dittlof Tjassens, armed with 18 guns and manned with 115 heads.*

H. brig (ship type) *de Arend, Captain-Lieutenant J. R. Cambier (since then deceased), armed with 12 guns and manned with 60 heads.*

S. M. schooner de Schorpioen, Captain Lieutenant A. van Wachendokff van Rijn, armed with 3 guns and manned with 40 heads.

[63] Suriname does not have tigers, but is home to other types of big cats such as the Jaguar, Black Panther and Ocelot.

Z. M. schooner (ship type) *de Wesp, led by 1st class Lieutenant at Sea R. C. Sloos, armed with 5 artillery pieces and staffed with 40 heads.*

Z. M. steamship Curaçao, led by 1st class Luitenant at sea and G. Eabek Huns, armed with 2 guns and manned with 66 heads. (This ship left for the Netherlands afterwards and was replaced by Z. M. steamship Sindoro, led by 1st class Lieutenant at sea J. J. Westerouen van Meeteken).

Of these vessels, the corvette de Heldin and the steamship remain stationed in Suriname. The other ships, brigs, and schooners are located when alternating in Suriname, Curacao, or the other Islands.

Except for the listed ships, the following are still intended for service in the colony:

Two gunboats; de Nickerie, stationed at the place of which it is named, and the Coppename, which is still under construction. Two colonial schooners called the Henriette-Elizabeth and the Curaçaonaar; the latter is used to deliver and collect mail packages to and from Demerarij, and is therefore always in service. The Henriette- Elizabeth is used for all other common services and is now mostly stationed on the coast in front of Coronie to prevent the slaves from escaping.[64]

The Dutch did not take their naval defences lightly. Ships were not only stationed at the Coast near the Suriname River, but they were also stationed near Coronie, Coppename, and Nickerie.

Conclusion

Chapter 2 established the importance of water for the existence of the plantations on the coastal zone of Suriname. This chapter linked the importance of water to the defence system of Suriname. Water was a crucial aspect for the defence strategy of colonial Suriname, because the only way from point A to point B was by water. The Dutch utilized this to their advantage and placed different posts, redoubts and forts on strategic points. The main forts could all be found close to water bodies. The Forts also made use of Grachten (canals) to help fortify them. The waters were also strategically defended by warships that could be found along Suriname's coast.

[64] (van Sijpesteijn 1854, 153)

Chapter 4. Maritime cultural landscape and coastal morphology of Suriname

4.1. Introduction

The previous chapter discussed the importance of water for the plantations and the defence system during the 17th through the 19th century. This chapter will discuss in further detail, the impact water has on humans and vice versa, via discussion about the aspects of the maritime cultural landscape and coastal morphology. Further to this point, this chapter will explore the maritime perspective as presented by Christopher Westherdahl (1992), to better understand Warappa Creek and Plantation Esthersrust.

4.2. Maritime landscape and cultural landscape

The maritime landscape paradigm is comprised of two definitively separate concepts, namely maritime and landscape. Before discussing this vital concept according to the views of Christopher Westherdahl (1992), this section will try to define these terms as briefly as possible and then combine these words to provide an understandable definition of the term that is used in this chapter.

Maritime

According to the Oxford Learner's Dictionaries, Maritime as a noun is defined as that which is connected with the sea or ships or that which is near the sea.[65] However, in the Cambridge Dictionary Maritime as an adjective refers to that which is connected with human activity at sea or that which is near the sea or the coast.[66] Maritime can also be brought in relation to smaller bodies of water, which will be discussed later in this chapter. Scientific maritime research deals with technologies and innovative solutions for better exploitation of sea and ocean resources, such as the design, building and operation of vessels, harbours, and oil platforms. A broader scope of this definition suggests any kind of human-related activity centred around sea and ocean resources (Hildebrand & Schröder-Hinrichs 2014, 176).

[65] www.oxfordlearnersdictionaries.com/definition/english/maritime
[66] www.dictionary.cambridge.org/dictionary/english/maritime

Landscape

Oxford Learner Dictionary defines landscape (noun) as everything you can see when you look across a large area of land, especially in the country. It is also defined as the characteristic features of an area of activity.[67] The Cambridge dictionary views landscape as a noun, and thus offers a slightly different understanding, by defining landscape as a large area of countryside, especially in relation to its appearance. As a verb, it is defined as changing the appearance of an area of land, especially next to a building or road so that it looks more like the natural countryside.[68] but the Merriam-Webster dictionary defines landscape as the physical features of a region as a whole.[69] The commonality of the three definitions places focus on these key words, large area or region and its physical features and appearance all lending to a holistic phenomenon perceived by humans (Antrop 2000, 2).

Cultural landscape

According to the UNESCO World Heritage Committee (1992), Cultural landscapes represent the

> *'combined works of nature and man' and embraces a diversity of manifestations of the interaction between humankind and its natural environment. It often reflects specific techniques of sustainable land-use, considering the characteristics and limits of the natural environment they are established in, and a specific spiritual relation to nature. Cultural landscapes are those where human interaction with natural systems have, over a long time, formed a distinctive landscape. These interactions arise from, and cause, cultural values to develop (UNESCO 1996 in Mitchell et al. 2009, 5).*

UNESCO, through the provisions of the World Heritage Convention (1972) which was the first international legal instrument for the protection of the cultural landscapes, established the following classification for cultural landscapes during the World Heritage Committee in 1992:

[67] www.oxfordlearnersdictionaries.com/definition/english/landscape
[68] www.dictionary.camebridge.org/dictionary/english/landscape
[69] www.merriam-webster.com/thesaurus/landscape

1. **Clearly defined landscape:** *The most easily identifiable is the clearly defined landscape designed and created intentionally by man (WHC 2008, 86).*

2. **Organically evolved landscapes:** *The second category is the organically evolved landscape. This results from an initial social, economic, administrative, and/or religious imperative and has developed its present form by association with and in response to its natural environment. They fall into two sub-categories: a relict (or fossil) landscape and a continuing Landscape (see appendix 4 For details) (WHC 2008).*

3. **Associative cultural landscape:** *The final category is the associative cultural landscape. The inscription of such landscapes on the World Heritage List is justifiable by virtue of the powerful religious, artistic or cultural associations of the natural element rather than material cultural evidence, which may be insignificant or even absent (WHC 2008, 86).*

Maritime cultural landscape

Christopher Westerdahl (1992) has played an important role in forming the term 'maritime cultural landscape'. His ground-breaking article 'the maritime cultural landscape' was published in 1992. Westherdahl's previously published articles influenced the emerging debate of what is known today as the 'maritime cultural landscape'. Since then archaeology has witnessed an unprecedented and consistent array of publications either directly or indirectly contributing to this field of analysis by both 'terrestrial' and 'maritime' archaeologists (Flatman 2011, 311).

Maritime cultural landscape, as a term, was first promoted by Westerdahl and The defined by him as 'the network of routes and harbours' (Westerdahl 2011, 337). In 1992 this definition became broader and included much more than just the network of routes and harbours. The definition of maritime cultural landscape expanded to human utilization (economy) of maritime space by boat: settlement, fishing, hunting, shipping, and its attendant subcultures, such as pilotage, lighthouse and seamark maintenance (Westerdahl 1992, 5). In this regard, Westherdahl sums up important subjects in his article that explain maritime cultural landscape even

further, terms such as cognitive landscape and transport zones. For this thesis cognitive landscape, transport zones, and the cultural perspective are selected as most relevant. These three subjects will be discussed separately in relation to the maritime cultural landscape of Suriname, during the 17th to 19th centuries. To do this, Plantation Esthersrust and the assumed associated military posts will be used as a case study, to their own respective networks.

Cognitive landscape: the man in landscape and the landscape in man

The term cognitive landscape denotes the mapping and imprinting of the functional aspects of the surroundings in the human mind (Westerdahl 1992, 5). For this, the phrase man in landscape and landscape in man is used to further make the concept easier. To help understand this concept better, the concept within landscape archaeology known as cognitive space can be used. Landscape archaeology studies how past humans manipulated and used the environment (both natural and human-influenced) around them (Newman 2017, 1). Space is often associated with only the physical and material aspects of our surroundings. Cognitive space gives another perspective on this subject matter. When it comes to cognitive space it is about how people comprehend their social and material spaces, how they understand the environment around them and identify the appropriate ways of conducting themselves in the many different environments they may occupy (Delle 1998, 38-39). This perspective is apropos, when looking at the cognitive landscape in relation to the maritime cultural landscape. Westerdahl (1992) explains that a natural way of discovering the maritime cultural landscape is by looking at the cognitive perspective of the local tradition. To understand this better, the next section (a cultural perspective) will discuss the cultural perspective concerning the plantation and defence system

Landscape character

Landscape character is what makes an area unique and different and is defined as a distinct and recognizable pattern of elements that occurs consistently in a particular type of landscape (Meryem *et al.* 2015, 19). The human mind is often analysing the surrounding physical landscape. The physical landscape and its elements, are also known as landscape characteristics, that influence the way people think and determine whether to stay or look for another more ‘hospitable’ area. These characteristics co-determine if a person or group would like to settle or not. When

a place is chosen, the landscape is shaped according to the needs and thoughts of the person or group. In the case of the Surinamese plantations, at first the lower coastal plains especially the *biri biri* lands were thought to be uncultivatable due to the excessive water (water floods), the soils, and the salts of the sea.[70] When the polder systems were introduced, which is another way of altering the landscape, the areas which were once thought (cognitively) to be uncultivatable suddenly became attractive. They were also favourably connected to Paramaribo. The cognitive landscape influences the physical landscape according to what humans project onto the physical landscape, but the physical landscape also influences and forces people to create or adapt to a certain way of life (culture).

A cultural perspective (tangible and intangible aspects)

Every person has a frame of reference that keeps on increasing and expanding throughout their lives. The word culture in this case plays a very important role. The specific culture in which people are born or raised self-perpetuates regardless of experiences and is inculcated onto their immediate environment. Kluckkohn (1951) says the following about culture:

> *" Culture consists in patterned ways of thinking, feeling and reacting, acquired and transmitted mainly by symbols, constituting the distinctive achievements of human groups, including their embodiments in artefact; the essential core of culture consists of traditional ideas and especially their attached values* (Kluckkohn 1951 in Lebron 2013, 126)*. "*

One's identity is thus influenced by culture. Identity is not something static; although it is mainly based on the context of everyday experience, its roots lie in the past, and the past from which one has descended (Versteeg 2003, 12). The psychological frame of reference forms an essential part of a person or a group.[71] The way how they think, walk, and speak are all influenced by their culture (Weiss 1973, 1377). In this way, they influence their physical surrounding according to their cognitive understanding and projections. The cultural aspect of the landscape also known as the cultural landscape is the right term to use here. Cultural

[70] The lands in the lower coastal area (except for the biri biri lands), were always thought to be good fertile lands. The only obstacle was the excessive amount of water, unfavourable for agricultural purposes. When the polder system was introduced this all changed.
[71] The frame of reference refers to people's perceptual frame of mind.

landscapes are environments that in some way may have been altered by people, which includes temporary structures and places (Spencer-Wood *et al.* 2010, 464). According to Westerdahl the cultural landscape on the coast includes fishing on shoals as well as navigation, harbour constructions, forts, bridges, ferry sites, and intentional sailing blockages. Accordingly, a vision of the total topography of the waterfront area is applied, features on nearby land being as important as depth curves underwater (Westerdahl 1992, 6).

How can this be understood related to Suriname's colonial plantation and military past? To understand this means to try to understand the cognitive perspective of the landscape of the colonial Dutch person. To understand this cognitive perspective means to try to understand their culture during that time. In chapter 2 it was explained that the lower coastal area was not cultivated into plantations, because they were poorly protected and almost impossible to cultivate due to the excessive water coming from the rivers, swamps, and ocean. Excessive water is something the Dutch are completely familiar with. Even today the Dutch are world-famous for their creative techniques in controlling the water around them.[72] The dikes, bridges, canals (*grachten*), and polders[73] are all evident and important against the fight with intrusive water. Dykes were already in existence during the 11th century (van Schoubroeck and Kool 2010, 5). The first major polders of North Holland such as Beemster, Purmer, Schermer, and the Heerhughowaard all date back to the 17th century (Cultural Heritage Agency 2014, 13). The Beemster polder preserved its regular landscape of fields, roads, canals, dikes, and settlements, laid out per the principle of classical and Renaissance planning (WHC 1999, 1). Annelien Kapper (2010) in her dissertation *De Goudkust van Suriname* gives a vivid comparison between the Beemster and the Suriname Plantations found in the Commewijne district and describes the similarities and differences between the two. According to Kapper, the difference lies in the scale and the connection of the drainage system. In the Beemster a standard plot was 16,2 ha and the water would end up in de rivers via 'boesems' or storage basin[74], while a Suriname plantation would vary between

[72] Though the Netherlands is situated below the sea level, with the construction of dikes, dams, polders and other water controlling systems, the residence of this country have managed to control the water there for centuries.

[73] A polder is an area that lies lower than the surrounding water. The surrounding water level is artificially regulated.

[74] Surface water that serves to collect and drain polder water.

10 and 2500 ha and the drainage system would be connected directly to the river (Kapper 2010, 12).

Figure 19. Aerial photo of the Beemster in the Netherlands. Photo by Maarten van de Biezen. Copywrites: Holland Luchtfoto. Source: www.Holandluchtfoto.nl

Figure 20. Aerial photo of a Nickerie polder, currently used for planting rice. Source: www.nickerie.net

Figure 21. Aerial photo of Commewijne. The remnants of abandoned plantations reclaimed by nature. Source: Google Earth.

In 1683 gouvernor Van Sommelsdijk arrived in Suriname and attracted many planters with polder techniques (Kapper 2010, 34). This imported knowledge had and still has a major impact on Suriname. This imported knowledge of polder techniques came with the planters in the form of 'cognitive landscape'. The

practical knowledge (part of the culture) that was exercised became part of the cognitive landscape of the Netherlands. This lived on in the minds of the people living there. When these planters came to Suriname and saw a similar 'water problem', they projected their water controlling skills and knowledge to cultivate the crops of the plantocracy. The same can be said about the fortifications near waterways, such as Fort Zeelandia, Fort Sommelsdijk, Fort Para, and Fort Nieuw Amsterdam (see figures 22 and 23).

Figure 22. Fort Bourtange in the Netherlands Source: www.meetthecities.com

Figure 23. Fort Nieuw Amsterdam In Surinamee. Source: www.wikiwand.com

4. 3. Transport zones by Westherdahl (1998a)

In his article, the Maritime Cultural Landscape: on the concept of transport zones of Geography distinguishes seven transport zones (figure 24). Westerdahl defines transport zones as the landscape of transportation or communication. Furthermore, he states that the means of transportation are influenced by the landscape. In other words, the construction of ships and other vehicles are influenced by the maritime cultural landscape. Although Westerdahl's research focuses more on the European landscape, it can be adapted to other parts of the world as well. This section will discuss the different transport zones as given by Westerdahl and will try to discern which zones are/were applicable to Suriname.

Trans isthmian land transport

The term refers to the transport between waterways. For example, we can look at central America which boarders both with the Caribbean Sea (Atlantic Ocean) and the Pacific Ocean. In this area, there is a huge stream of transportation that takes

place on the waterways connected to both oceans. One famous example of such a waterway is the Panama Canal. This transport zone was and still applies to Suriname. For example, the daily transportation that takes place between the Courantyne and Marowijne Rivers. People crossover with goods, ideas, and much more from British Guyana to French Guyana every day and vice versa. The best example in colonial Suriname is the Cordonpad. This pathway started from the Suriname River and ended at the Atlantic Ocean, passing by creeks and other rivers such as the Commewijne. The transportation of goods, people and news happened frequently on this pathway.

Ferry corridors or routes of regular transportation

This type of transportation zone is quite common. This transport zone applies to Suriname and is evident when looked at the different regular routes that are conducted on waterways. Famous ferry examples include the Canawaima Ferry Service in the west of Suriname connecting the country with Guyana and The BAC La Gabrielle in the east connecting Suriname to French Guyana. There are other routes such as from Meerzorg to Paramaribo and Paramaribo to Nieuw Amsterdam which are conducted by smaller boats. This zone applies appropriately to Plantation Esthersrust. The Plantation was situated in the Warappa Creek area and the connection between this area and the City of Paramaribo was frequent. The plantation barges kept regular routes delivering goods, news and transporting people from one place to another. In a letter dating back to 1st April 1878 A. H. Bots (co-owner of Plantation Esthersrust), writes that they set off for the plantation from Paramaribo on a steamship. After sailing for about four hours, they transferred to a *tentboot* operated by ex-enslaved (now free people). The journey to the plantation took another 3 hours.[75]

Zones based on river valleys or other far-reaching watercourses

This transport zone does not necessarily apply to Suriname, because river valleys are not present. However, the rivers of Suriname can be seen as far-reaching watercourses, because they have been used in different periods by different groups

[75] Regionaal Historisch Centrum Eindhoven. Archief Familie Coovels, Helmond 1750- 1967. Inventaris nummer 12138:143 Brieven ingekomen bij de kinderen van G. J. Coovels en Maria Bots van voornamelijk Amandus H. en Arnoldus G. Bots uit Suriname.

for different purposes.

Coastal transport zones

This applies to Suriname. Suriname only has one major port (SRPBM) located on the Suriname river and a minor port located near the mouth of the Courantyne river (SRICK). The coasts of the Guyana's are mostly shallow, forested with mangrove and tropical vegetation. The extensive coastal banks and shoals require that ships along these coasts be well offshore, outside the sight of land except when approaching a port. Ships of moderate size and limited draft can gain access to the ports of Georgetown and Paramaribo at favourable tidal conditions (National Imagery and Mapping Agency 1997, 3). In Chapter 3 of this thesis, it was made clear that the colonial Dutch warships patrolled the Suriname coast. Also, ships did transport goods using Suriname coastal routes (see Appendix 2).

Estuary lagoon zone

Suriname has lagoons such as Bigi Pan in the Nickerie district. Where the transportation of people (mostly tourists and fishers) takes place daily. An estuary is a partially enclosed coastal body of brackish water with one or more rivers or streams flowing into it, and with a free connection to the open sea. Suriname has several estuaries such as the areas where the Suriname, Coppename, Marowijne, and Courantyne Rivers enter the Atlantic Ocean. These zones are subjected to different kinds of transportation. The most important being the Suriname River on whose banks Suriname main seaport lies.

Lake zones

Suriname has the Blommenstein Lake, which is manmade and also the biggest lake of Suriname. This lake is constantly used for the Transportation of goods, people, and recreational purposes such as fishing and sightseeing. There are different types of boats found in this lake such as speedboats and regular wooden fisherman boats. However, this zone is not applicable for the colonial period.

Zones of open sea

This type of transport zone covers a large area of transportation that happens in oceans and sea. This was and still applies to Suriname. In colonial times the regional and transatlantic ships covered this area of transportation (see 4.4 and appendix 2).

Figure 24. Visual representation of transport zones according to Westerdahl. Red dot= Paramaribo as transit point. Blue dot= Plantation Esthersrust. Purple arrows= representation of routes of regular transportation. Orange arrow= representation of Trans Isthmian land transport zone. White arrow= representation of coastal zone. Black arrow= representation of zones of open sea. Source map: Google Earth. Edited by Santosh Singh.

Transit points

All these zones have different environments and are connected to different traditions and cultures. The place where people from different zones exchange are called transit points (figure 24 as TP). Transit points can be categorized in different categories such as docks, ferry corridors, and harbours. Transit points are also the connections with inland waterways and the points where vessel or transportation methods change (Westerdahl 1992, 6). Figure 25 depicts an ideal situation. The zones all have different environments. The inland zones are more inland and can be found near the rivers. The coastal zone is the zone that lies between the coastal waterfront and the inland zone. The Plantations at the Warappa Creek can all be categorized to be in the Coastal Zone. The earliest plantations that were established more inland such as the Jewish plantations near Jodensavanna are all in the inland zone. The transition from the inland zone to the coastal zone took place with the introduction of the polder systems and the strengthening of the defence system. One major transit point of Suriname was (still is) Paramaribo. All the products from the plantations were transported from the plantations in smaller vessels to Paramaribo.

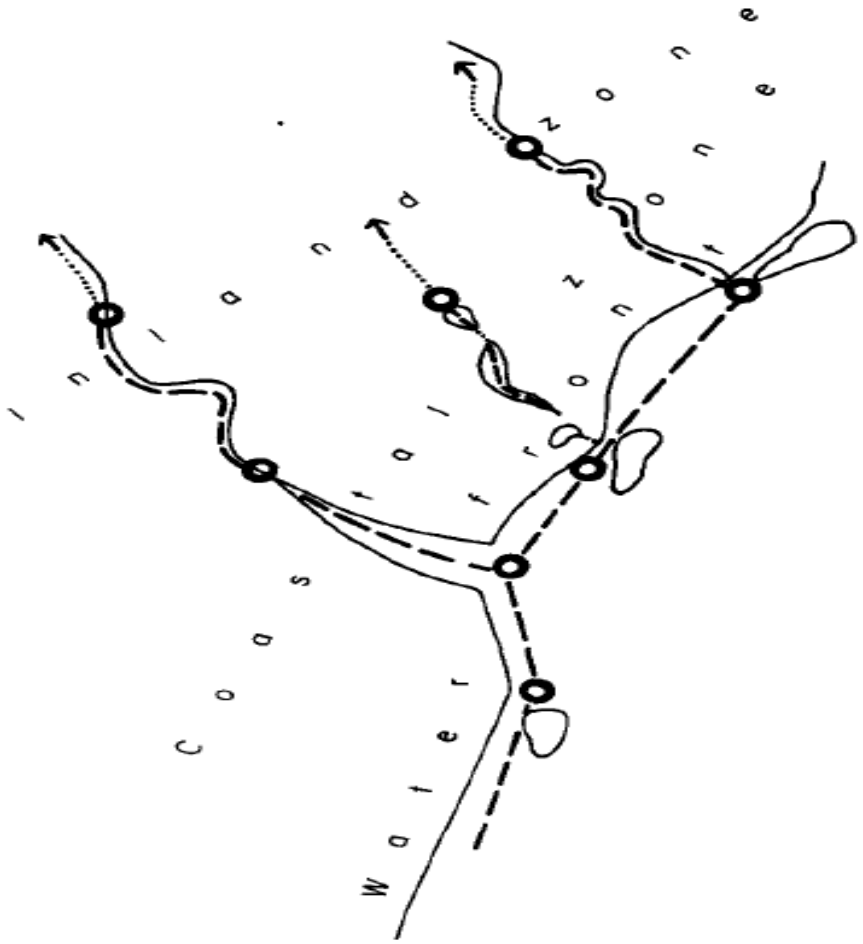


Figure 25. Inland and coastal transit points. The principal pattern of zonal distribution in transport terms and settlement stages (Westerdahl 1992, 11). O = Transit points, ---- = water transport and ….. = land transport.

From there the products were exported to Europe. The inland and coastal zones both met at Paramaribo.

4.4. Ships & vessels

Ships and vessels have taken different shapes and sizes throughout time. They adapted their forms and sizes according to their surroundings. During the colonial period, Suriname has also seen different kinds of ships and vessels. Chapter 2 discussed the vessels used on the plantations, while chapter 3 discussed the warships in Suriname during the colonial period. Water was the predominant means of transportation in the colony therefore boat traffic on the rivers was intense (Oostindie and van Stipriaan 1995, 90). Even in the pre-Columbian times, the Indigenous invented vessels used for transportations throughout Suriname. This section looks at the types of international ships that came into contact with

Suriname and the types of vessels that were used on a local level for transportation and defence. The focus will be on the latter since it will give us a better perspective on the use of vessels on plantations. The former will be discussed briefly. Understanding the usage of vessels in Suriname is an important aspect of the maritime cultural landscape. All transport in Suriname in the early colonial period was by water, therefore Suriname has been described as a 'hydraulic slave society' (Fatah-Black 2019, 522).

International ships

Throughout time Suriname has been in contact with different kinds of ships that had ventured from far away. Ships came from North-America, Europe, and parts of South America. These ships were very important as they brought goods, enslaved people, and passengers from distant lands and returned with the raw products from the colonies. They were crucial to the whole system. These international ships could be divided into regional and transatlantic ships. The regional (non-Dutch) cargo ships that sailed from South America to Suriname (vice versa) were smaller[76] than the Trans-Atlantic ships and Ships from North America accounted for as many as half of all the ships calling at Suriname (Fatah-Black 2019, 533).

The names of ships and from where they came from can be found in different colonial accounts. The *gouvernements journaal* for example gives some information on the names, origin, and nature of the ships (cargo/passenger/war). The *gouvernements journaal* of 1791 mentions different types of ships arriving in and departing from Suriname (for details see appendix 2).

The previous paragraphs of this chapter the transport zones and aspects of the maritime paradigm as outlined by Westerdahl (1992). The geology, climate and coastal morphology are also important aspects of the maritime landscape and the landscape character. They are knitted into the tapestry of the environment and cannot be ignored. The following section will focus on these aspects and will attempt to present them in order to understand the current situation of Plantation Esthersrust.

[76] Usually 1/5 of a transatlantic freighters (Fatah-Black 2019, 533).

4.5. Geology, climate and coastal morphology of Suriname

To understand the history of an area, one can turn to the material past of archaeological resources, the material past from iconographical, historical, and archival sources and the intangible past from traditions and habits. By studying, looking, and interpreting the current and past physical landscapes one can also come to understand the past of an area. The climate and geology are important factors when it comes to the landscape of an area. These are also crucial factors of the landscape characteristics, which co-determine as push and pull factors for people to settle in an area or not. In the previous section, the distinction was made between inland zones and coastal zones. Since Plantation Esthersrust is situated within the coastal zone of Suriname on the mouth of the Warappa Creek, this section will mostly be focused on the coastal plain. The geology and climate of Suriname (which heavily effected the plantation as well as the defence system of Suriname) will also be discussed briefly.

Geology

Suriname can mainly be distinguished into three major landscapes: the coastal plain, the savannah belt, and the Precambrian shield or basement (figure 30). The coastal plain approximately covers an area of 21,000 km^2 and can be divided into the young coastal plain and the old coastal plain. The young coastal plain is roughly six meters above the sea level and soft fluvial clays and sand ridges are common here. The percolation and surface drainage here are very slow, due to the peat soils. Most water finds its way out due to evapotranspiration. The old coastal plain also known as the upper plain is approximately between six and twelve meters above the sea level and consists of silt clay, loam, sandy loam, and fine sand. The percolation and surface drainage is also very slow (www.swris.sr). The young coastal plain is also divided into two formations. The Mara and the Coronie formations. The Mara Formation consists of sediments deposited during the relatively rapidly rising sea level in the first millennia of the Holocene between 10,000- and 6,000 -years BP, while the Coronie formation formed around 6,000 years BP when sea level weakened the coast began to rapidly expand seaward with sediment largely from the Amazon (Wong *et al.* 2017, 138-139). In comparison with the other zones, the coastal zone (young coastal plain) is the most fertile in

Suriname, but also the most difficult to cultivate due to its low location (Kapper 2010, 33). Plantation Esthersrust is located in the young coastal plain.

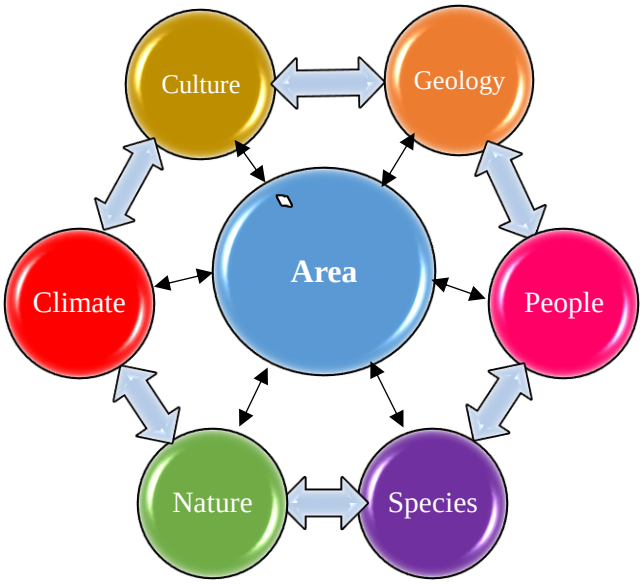


Figure 26. Visual representation of the connection between the landscape(area) and the different aspects. Source: Martijn Manders (2020 Leiden University course material).

The savannah belt covers an area of 8.500 km^2 and is approximately between 15 and 20 meters above the sea level. In this area, groundwater flow is the main contributory to discharge. This area reacts more quickly to rainfall. The savannah belt is an important source of recharge of the aquifers. This area consists of white coarse sands and coarse sandy clay (www.swris.sr).

The Precambrian shield or basement covers 80% of the Surinamese landscape. Infiltration and percolation in this area are very small. Surface runoff is very high and the drainage density is high. Time to the peak period of about 13 to 28 hours and a concentration-time of 51 to 72 hours were reported in the literature (www.swris.sr).

Climate

Suriname is located in the tropical climate zone and is classified by Köppen in Aw, Am, and Af.[77] The temperature varies between 23 and 31 ºC. The relative humidity

[77] Aw = tropical savanna climate with dry winter characteristics. Am = tropical monsoon climate. Af = tropical rainforest climate

is about 80% a year, the sunshine is about 58% a year. The average annual rainfall in Paramaribo is about 2,200 millimetres. In the whole country, the rainfall varies from less than 1,750 to greater than 3,000 millimetres annually. The annual evaporation is about 1,700 mm (1931-1960). About 67% of the precipitated water on the Suriname rivers basins returns to the atmosphere by evapotranspiration and approximately 33% is drained off into the Atlantic Ocean. The year can be roughly divided into two wet seasons (April to mid-August and December to February) and two dry seasons (February to April and mid-August to December) (www.swris.sr). The four seasons are the short rainy season which occurs during the first half of December to the second half of January, the short dry season which occurs during the second half of January to the second half of March, the long rainy season occurs during the second half of March to the first half of August and finally the long dry season that starts during mid-August up to the first half of December. The seasons are controlled by the movements of the Intertropical Convergence Zone (ITCZ). In this zone the North-eastern trade of the Northern Hemisphere and the South-eastern trade of the Southern Hemisphere meet. Convergence is widespread in this zone and there are extensive areas with clouds and showers.

4.6. Coastal morphology and the Surinamese Coast

Due to the processes of mother nature, the areas where land meets the sea (coasts) are constantly under the threat of being eroded. In the case of Suriname, parts of coastal areas have been washed away, and thereby threaten potential tangible heritage (Van Stipriaan 1994, 359; Kapper 2010, 90). To understand these processes this section will discuss the term coastal morphology. Coastal morphology studies the natural ongoing processes at the shoreline and the impact caused by human interventions within the coastal zone (Davidson-Arnott 2010, 10). The coast of Suriname is a moderate to low energy coast whose hydrodynamic processes are almost permanent and operate in the same direction. With few exceptions, people have had little influence on the coast (Augustinus 1999, 6).

The 30-year cycle of shifting mud banks

One of the main things that effects any coast are the amount of sediment that is deposited or eroded. To understand this process of sedimentation and erosion in the context of Plantation Esthersrust, it is important to understand the shifting mudflats

of the Guiana Shield (figure 27 & 29). Coastal development in Suriname is determined by the continuously westward-migrating system of mud banks and interbank areas[78]. Mud banks vary in length between 30 and 60 km and extend offshore to about the 20 m isobaths (Gersie *et al.* 2016, 423). These mud banks are approximately five meters thick (Wong *et al.* 2017, 141). Suriname's coastline is just one part of a larger ecosystem that stretches from the mouth of the Amazon in Brazil to the Orinoco in Venezuela. These mighty rivers play an important role in the transportation of massive mineral-rich mud banks along the coast of the Guyana's (from east to west). The abundance or scarcity of these mud deposits is subject to an ebb and flood cycle lasting circa 30 years. It is estimated that three times per century the coastline is subjected to mud scarcity and erosion, which allows the high tide to penetrate more inland. These periods of erosion are followed by a period of accretion as the cycle continues. The cyclical erosion happening on the foreshores of Suriname (and the other Guyana's) have the potential to create natural sea defences, such as mangrove forests.[79] These forests act as buffers protecting the coast's intense wave action. Suriname's coast has between five to seven mud banks (Wong *et al.* 2017, 141). Wherever there are mud banks, the coast grows, while the area between two mud banks known as the interbank zones are subject to erosion. Waves approaching a deposit of liquid silt lose their powerful eroding effect and are subdued. The deposition of silt on the west side of the mud banks are further promoted. In the east, the mud bank undergoes the compaction of the silt deposit. A few kilometres away from the head of the mud bank, mangroves start to settle on the higher parts. Mangroves extract water from the substrate and thus promote the compaction of the deposition. The east side of the bank has developed into young clay and because it has no wave damping properties anymore, it declines under the influence of the approaching waves. Due to growth on the west side and the decay on the east side, the mud banks migrate to the West (Augustinus 1999, 8).

[78] The area between two mud banks.

[79] The combination of transported sediment and seeds create the opportunity for mangrove forests to be erected.

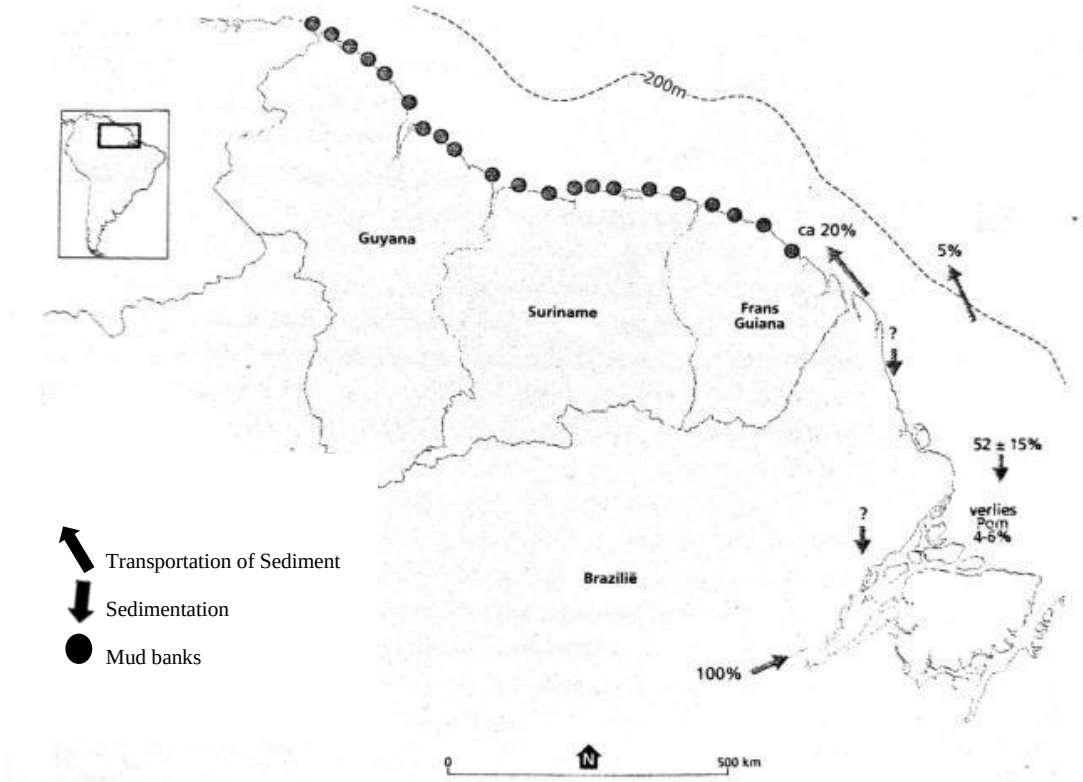


Figure 27. Visual representation of the migrating mud banks between the Amazon and the Orinoco Rivers. Source: (Wong *et al.* 2017, 141).

Where there are mud banks, cheniers are also present.[80] The waves run unhindered in the interbank zone and if sand and/or shell material is available in this erosive environment, cheniers are formed (Wong *et al.* 2017, 154). Cheniers are perched, shallow based beach ridges, resting on clay (Augustinus, 1978, 2), run parallel with or at small angles to the common shoreline and characteristically cluster at one or both sides of a major river. Along the eastern part of the Suriname coast, the chenier sand mainly originates from the Marowijne/Mana river system (Gersie *et al.* 2016, 423). The coastal growth can be looked at from three scales. The micro-scale[81], the macro scale, and the mega scale. On a micro-scale the shoreline changes every 30 years, on a macro-scale, it takes between 100-200 years[82] and on a mega-scale up to 1000 years[83] or more (Wong *et al.* 2017, 161-163)

[80] Sandy ridges resting on clay, which run parallel the coast (Augustinus, 1989, 220).
[81] 30 year cycle.
[82] The system of the migrating mud banks are still active, but are also influenced by forces of the sea. The exact reason what stimulates the macro coastal behaviour is still debatable.
[83] This is on the scale of the sedimentation phases such as the Wanica, Comowine and Moleson phases.

Figure 28. A chenier at the mouth of Warappa Creek. Photo by Fabian Vas

During fieldwork Geologist Kathleen Gersie visited the site of the former Estherslust Plantation. Gersie analyzed the area, with the assistance of the archaeologists. Inaccessible areas were filmed and photographed using a drone. After carefully examining the site and looking at the requested digital drone materials Gersie made the following conclusions:

"The study area (Plantation Esthersrust) was located between two mud banks for years, in other words, it was situated in the interbank area. The erosion process has taken its toll. The waves have caused large areas of land to be eroded. As a result, a lot of study material that had been buried under sediment for years has been exposed. The erosion also ensured that the mangrove trees that were there to protect the coast have disappeared. While the erosion process was going on,

a zipper (chenier) has started to form. This ensured that the underlying area was still somewhat protected (Personal communication, 30th April 2020).

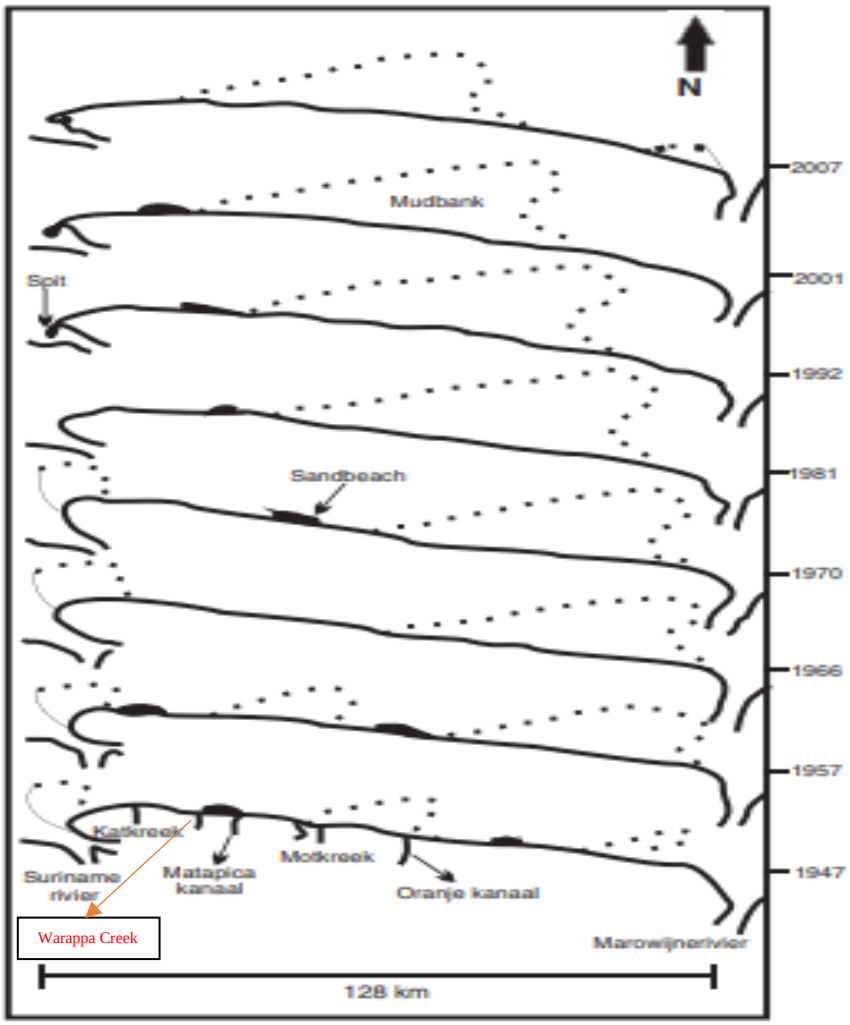


Figure 29. Timeline of migrating mud banks along the Surinamese coast from 1947 to 2007. Source: (Gersie *et al. 2016*, 425).

"In the last few years (I don't know exactly how many), a mud bank has been pushed in front of the area, which has caused erosion to decrease and stopped. A period of coastal growth has now started, and according to the 30-year cycle of the Surinamese coast concerning growth and erosion, this growth will take about 15 years (may also be more or less). This will ensure that the study area will be protected against the devastating effect of the waves and currents in the coming years. But the whole will ultimately depend on the migration speed of the mud bank, which in turn depends on the direction of the wind (ENE or NNE) with respect to the coast (personal communication, 30th April 2020)."

Conclusion

To understand the maritime landscape seems to be very crucial to understand the Surinamese colonial plantocracy and defence system. The aspect of man in landscape and landscape in man used in an attempt to understand the cognitive landscape of the past people of Suriname. It is evident that the landscape influenced the people to adapt to the landscape, but it is also clear that while adapting, the landscape was manipulated to better suit the expectations of the people. One of the ways to understand this is by trying to understand it via the culture spectacles.

The coastal area of Suriname is subject to change and can be understood by the different cycles through time. Due to the 30-year cycle of shifting mud banks, Plantation Esthersrust has now resurfaced, but it is unclear if it will remain so or eventually be covered again. The cyclical nature of the changing mud flats may have inadvertently fostered a more nutrient environment for crops that are growable in the salty water, like cotton.

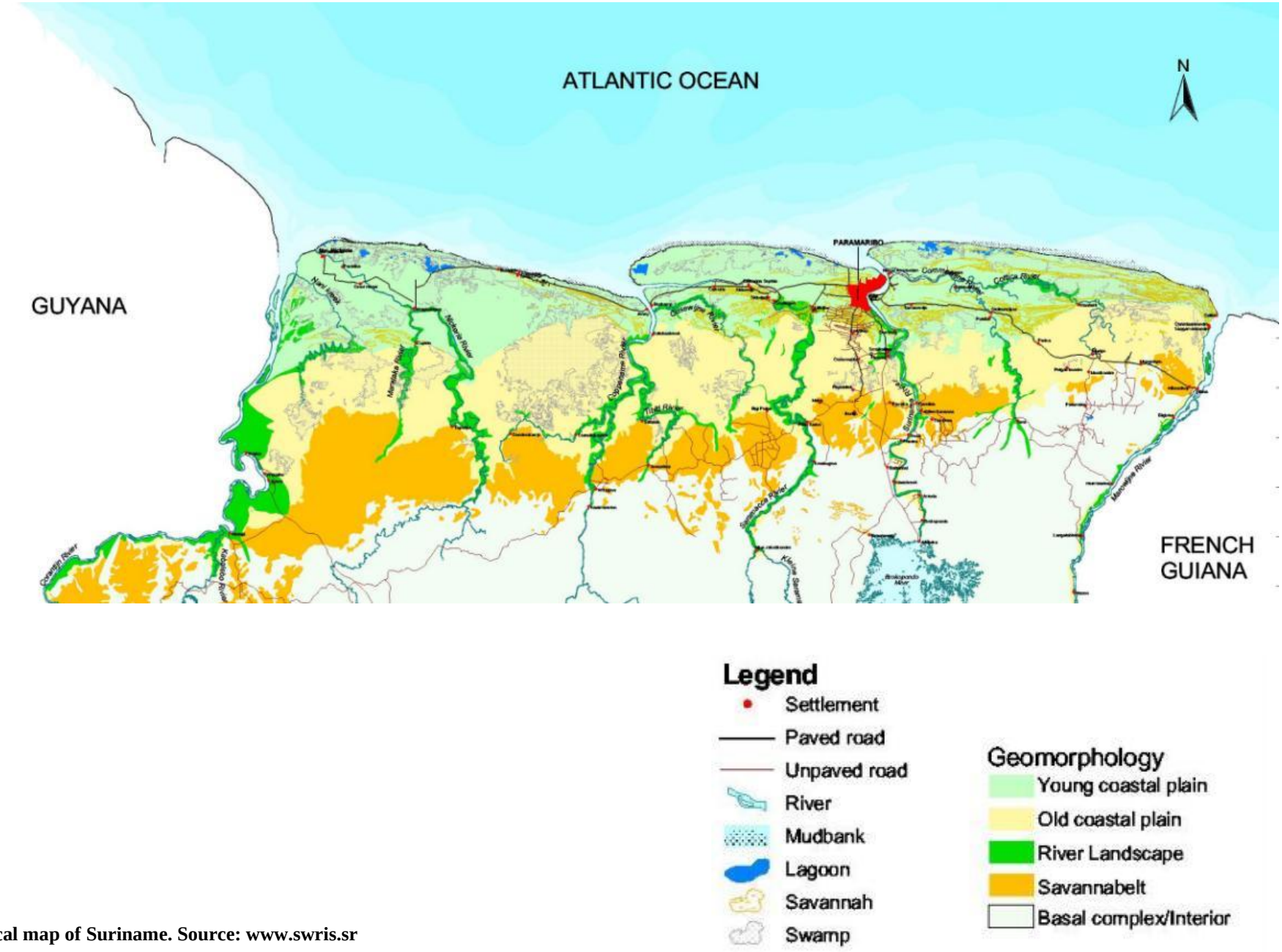


Figure 30. Geomorphological map of Suriname. Source: www.swris.sr

Chapter 5. Analyses and results

5.1. Introduction

In this chapter, the results of the fieldwork done at Plantation Esthersrust during the period January-February 2020 and the results of lab work will be presented.

5.2. Layout and observations

Figure 31. Plantation Esthersrust submerged underwater during high tide

To date, 10 features have been identified during fieldwork (see figure 42 for an overview). This section will discuss the layout and observations during fieldwork.

Feature 1

Feature 1 has the biggest concentration of tiles, bricks, and iron objects and most of the base wall is still intact. It was undoubtedly one of the biggest structures on Plantation Esthersrust with a circumference of 10.7x38.5 meters. Judging from the remains, feature one must have been the factory considering the remnants found on the feature such as the hearth (stookplaats), machine foundation, anvil, brick floor channel, machine parts, and much more. The entrance sidewalk is still intact (figure 49).

Feature 2

Feature 2 lies approximately 40 meters away from feature 1 and also has a concentration of tiles left, but far less than that of feature 1. The posts that are still visible are ornamented and the base walls of the structure extends inwards towards the bluff and under the solid soil. Due to lack of time feature 2 was not excavated. This feature is believed to have been the main living quarter or at least another type of residence (figures 32 & 47). The layout of this feature suggest that there might be additional subsurface features underneath the hard soil bluff area, for future exploration.

Figure 32. Feature 2 bird eye view. Photo by Fabian Vas.

Feature 3

Feature 3 has been eroded almost completely, but most of the boundaries of the structures itself can still be seen. It is difficult to establish the exact size of this feature, but figure 63 shows what was attempted. An assemble of different artefacts are found scattered all over the surface area of this feature. Due to a lack of information, it is hard to say what this structure was used for. Feature 3 has eight brick piles or remnant posts each with a circumference of 40x40 cm (figure 47).

Features 4-7

Features 4, 5, 6, and 7 have the same structure and measurements. The only difference is that features 4-6 all point towards the ocean while feature 7 faces the ocean horizontally. At first, these features were believed to be the barracks of soldiers, but judging from the evidence in chapter two this seems to be less likely to be true. Also, the artefacts found were not pointing out to military remains.

Further research has yet to prove whether these features were barracks or not. All of the features still have some remains of posts left. These posts consist of clay bricks cemented together. At features 4 and 5 working tools were found such as knives and hoes (*schoffel*). At these two features the most 'musket balls' were found. From this, it may be assumed that these buildings might have been used for storage. Feature 6 had fewer artefacts and a larger concentration of bricks. At figure 7 bricks with inscriptions were found. Because the bricks are heavily eroded, it is hard to read the letters. Features 4-6 have a circumference of 4x 20, while feature 7 is slightly bigger with a circumference of 4x25. The wooden cross was found between features 6 and 7. It could be possible that feature 7 might have been the church. Further research has yet to prove this (figures 33, 34 and 47).

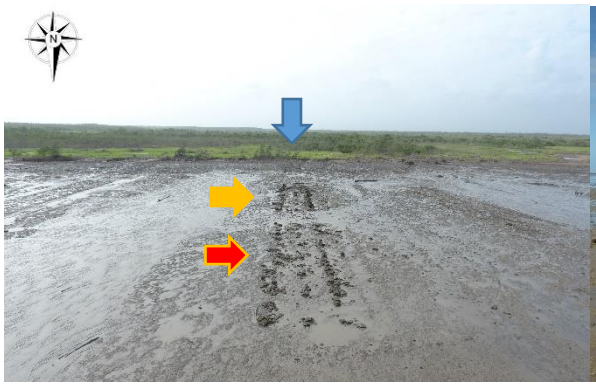


Figure 33. Bird eye view of feature 4 (blue), feature 5 (yellow) and feature 6 (red). Photo by Fabian Vas.

Figure 34. Feature 6 (red) and feature 7 (white). Photo by Stephen Fokké. In photo: Santosh Singh

Feature 8

Feature 8 was discovered after the team scanned features 1-7. This feature consists of an incomplete floor. The rest of the brick floor lie scattered around the incomplete floor. Some of these bricks of this feature have the letter P marked on them. The bricks of this feature are thicker than the bricks of the other features. For this reason, this feature is taught to have been a bakery (figure 35).

Figure 35. the brick floor of feature 8

Feature 9

Feature 9 consists of an incomplete grey tile flooring and is the first visible feature upon entering the site from the Warappa Canal. Not much can be said of this structure. Further research is needed (figure 47).

Feature 10

Feature 10 lies between features 1 and 2 and consists of 4 brick posts. Further research is needed to conclude anything about this structure (figure 47).

5.4. Drone survey and imagery

The footage of the site was taken from North to South (the Atlantic Ocean towards the shore) and from East to West (from the mouth of the Warappa Canal towards the plantation beds where a marker was put, indicating the furthest point the team reached by foot during this fieldwork. The coordinates of the markers are:

ER20B10: N5° 59.513’ W54° 55.501 and ER20B11: N5° 59.476’ W54.503

Figure 36. Plantation beds. Red= Warappa Canal

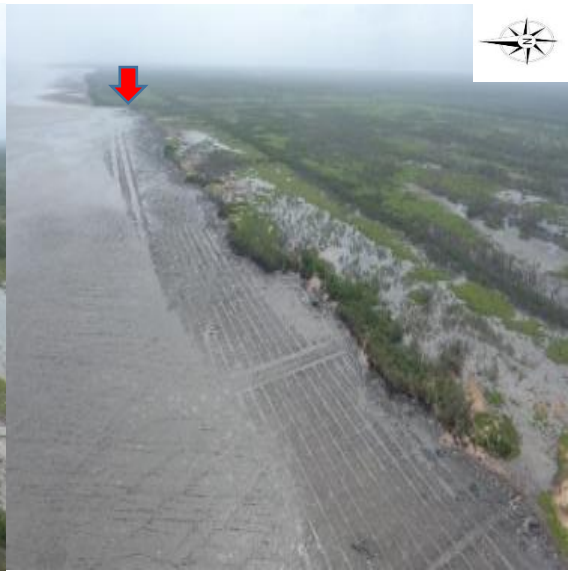


Figure 37. Plantation beds. Red= Warappa Canal

Images taken include an overall picture of the site, separate images of all individual foundations as well as groups of foundations. They were taken from a 90° angle bird eye view. Reconnaissance of possible structures in the water and along the shore was also done.

Figure 38. Plantation beds

Figure 39. Plantation beds

Figure 40. Wooden posts at the mouth of the Warappa Canal

Figure 41. Mud accumulation near the mouth of the Warappa Canal

Figure 42. Aerial photo of the Mud bank stretching from the Warappa Canal towards the East (away from Plantation Esthersrust).

Figure 43. Aerial photo of the Mud bank stretching from the Warappa Canal towards the West (towards Plantation Esthersrust).

Figure 44. Aerial photo of plantation beds surpassing Feature 7(red). The blue lines= plantation bed's direction. Green lines = feature 3. Red lines= feature 7

Starting from feature 3 towards the west the plantation beds start vertically and are eventually found horizontally a few hundred meters away (figures 36-39 & 50). This pattern seems to be consistent. The plantation beds also extend towards the ocean (figure 44) passing the furthest feature (feature 7). The same pattern can be seen there too. Figures 36, 37 and 38 show two 'channels' that seem to be unusually broader than the rest and don't seem connected to the other smaller channels. The smaller channels are the *loostrenzen*, while it can be assumed that the broader channels might have been the v*aartrenzen*, where vessels used to pass by loaded with harvested crops. The beds are approximately 6,5 x 100 meters, while the channels in between or the *loostrenzen* are approximately two meters broad. Figure 40 shows wooden posts that need further investigation, as well as the mud accumulation several hundred meters from the mouth of the Warappa Canal (figure 41).

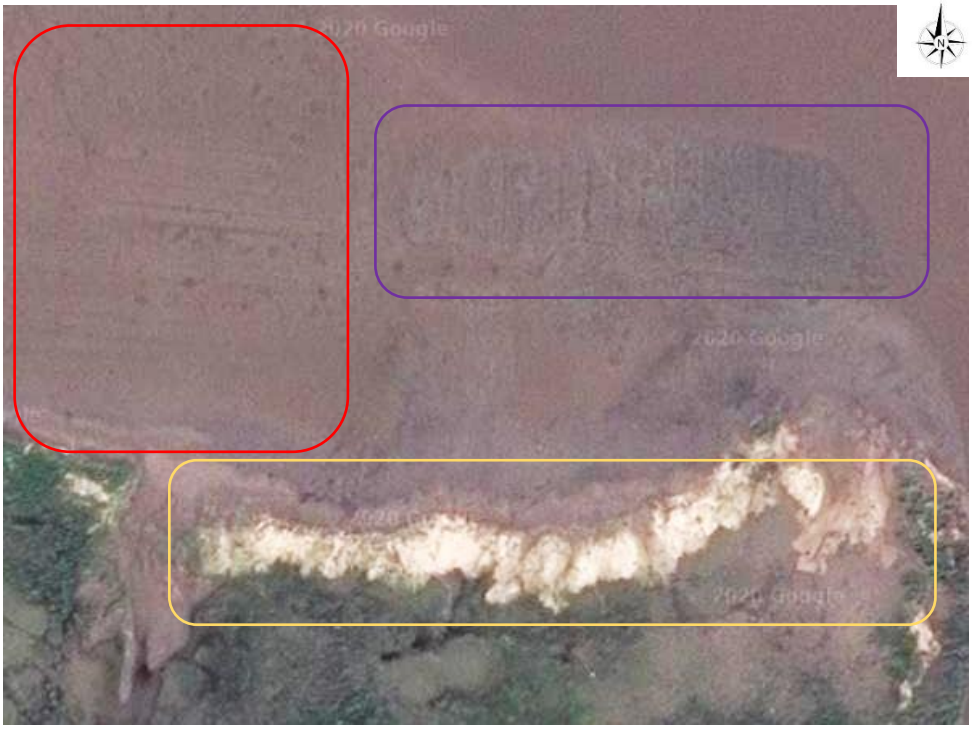


Figure 45. Satellite image of the plantation beds on Esthersrust. Red= Horizontal plantation beds. Purple= Vertical plantation beds. Yellow= Coast with chenier (area of plantation Esthersrust). Source: Google Earth[84]

[84] https://www.atlasofmutualheritage.nl/nl/Matapica-(kreek-kust).9198p

Figure 46. Satellite image of the Warappa Canal area ending at Plantation Esthersrust. Black= estimate ending of the plantation. Red= estimate boundaries of Plantation Esthersrust. Yellow= boundaries of surrounding plantations. Blue= Warappa Canal. Brown= site of Plantation Esthersrust site (zoomed-in see figure 45). Source: Google Earth. [85]

The borders of some plantations can still be seen via satellite imagery. Though the exact boundaries of Plantation Esthersrust could not be established, figure 46 gives us an estimate of what they could have been. The yellow lines show the boundaries of the neighbouring plantations. The southern borderline of Plantation Esthersrust is still visible. However, the northern border has been washed away and the upper red line gives an estimation of where the site might have ended, based on the width of the other neighbouring plantations. The length of the plantations stretch far towards the west and seem to end before the mangrove forest (the forest is not projected on the image). The black lines give an estimation of where the plantations might have ended. The brown lines indicate the Plantation Esthersrust site, where the archaeological survey was conducted (figure 46). The plantation beds are also visible via satellite imagery (figure 45).

[85] https://www.atlasofmutualheritage.nl/nl/Matapica-(kreek-kust).9198p

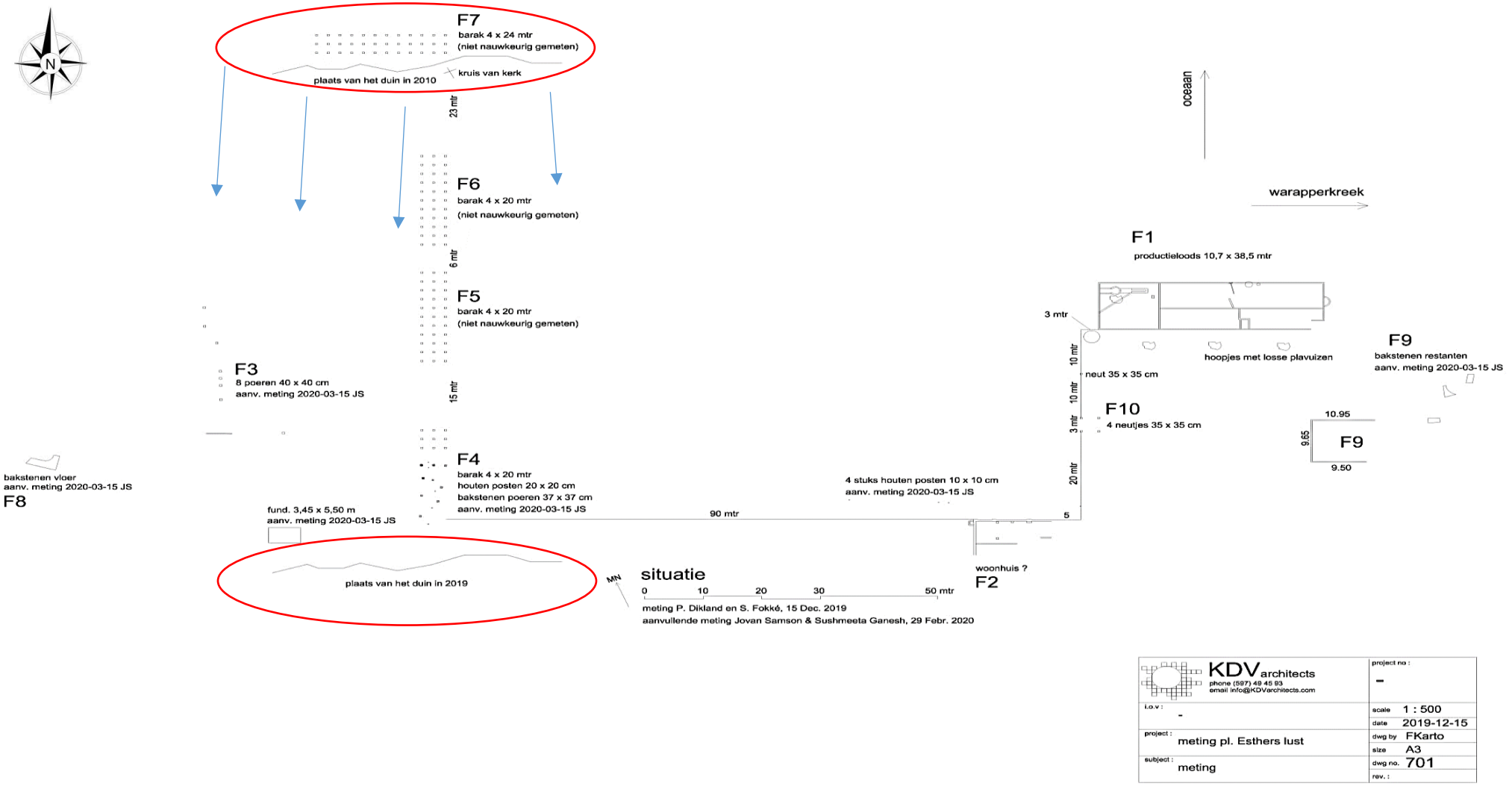


Figure 47. Overview of Plantation Esthersrust with the existing features. The shifting of the dune (chenier) is also visible in this structure over almost a decade (red oval). Source: KDV Architects.

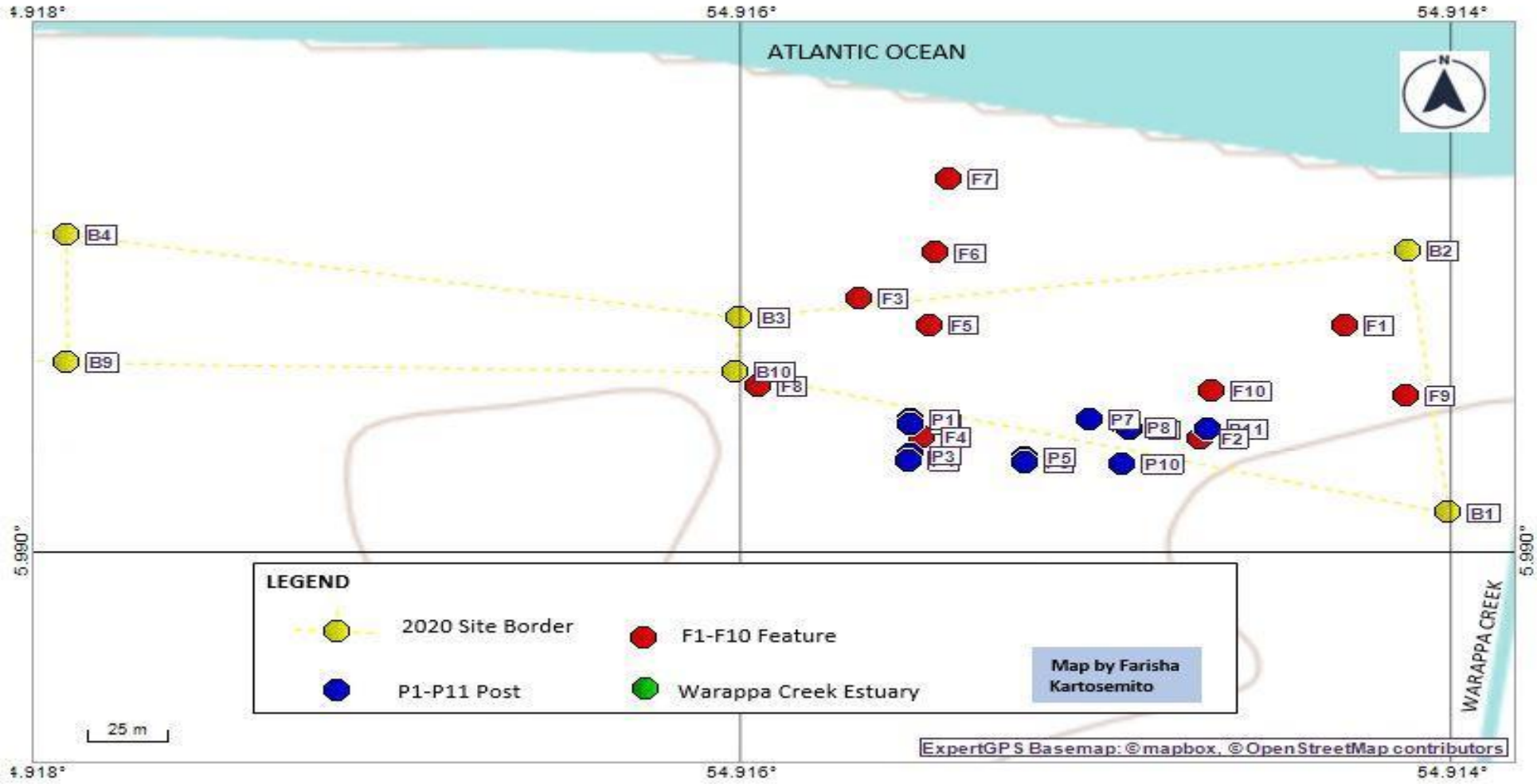


Figure 48. AutoCAD drawing of the site by Farisha Kartosemito. GPS points taken by Farisha Kartosemito and Sushmeeta Ganesh.

The site borders on the drawing do not represent the actual borders, as they are yet to be found. Due to the soggy mud, much of the plantation remained inaccessible. In total ten features were identified and 11 wooden posts in different sizes. Some of these posts were found in a straight line and may indicate some kind of wooden structure (figure 48).

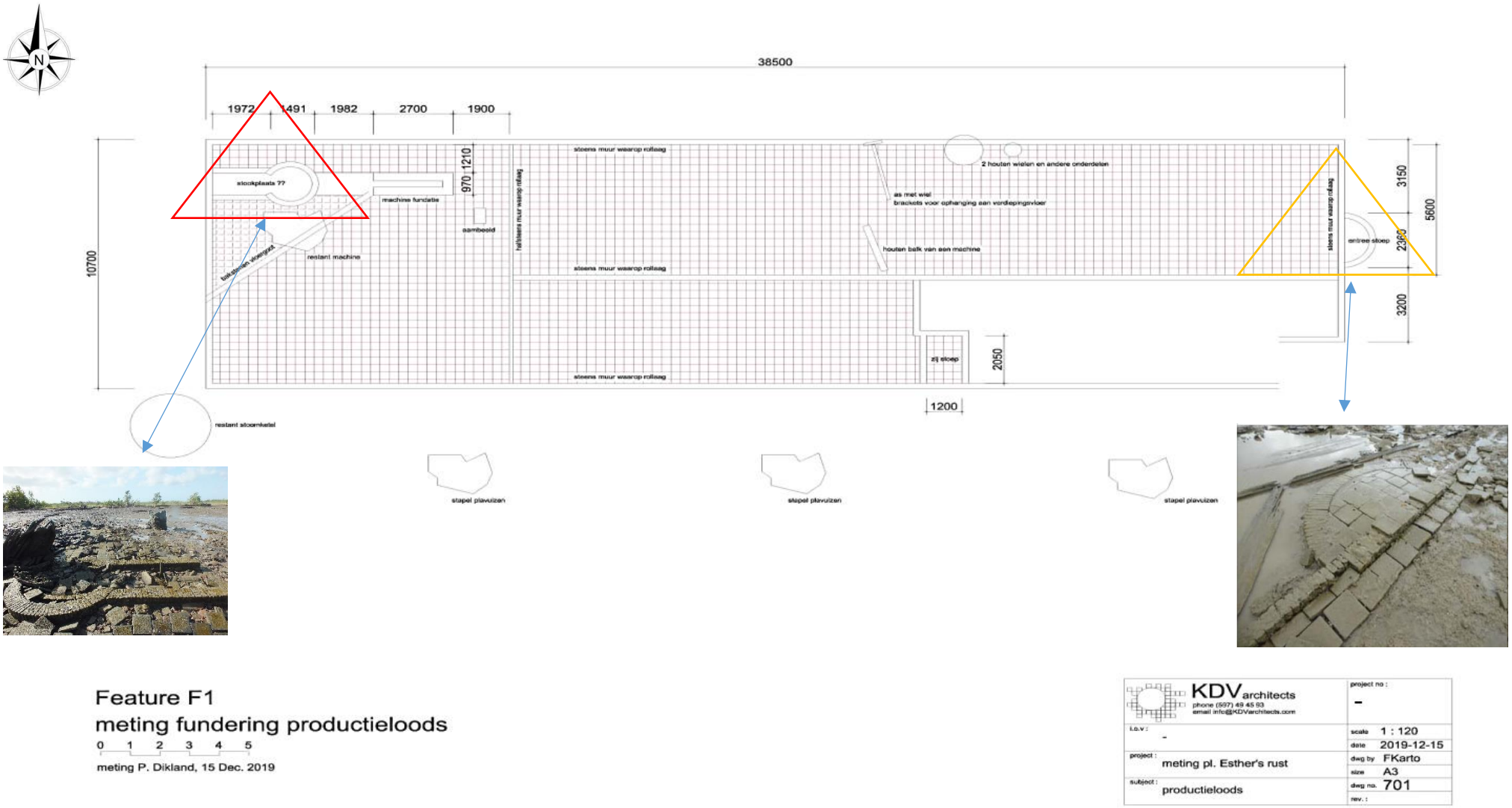


Figure 49. A detailed measuring of feature 1 (the factory). Red triangle = hearth, orange triangle= sidewalk entrance. Photos by Stephen Fokké. Drawing by KDV architects. Edited by Santosh Singh.

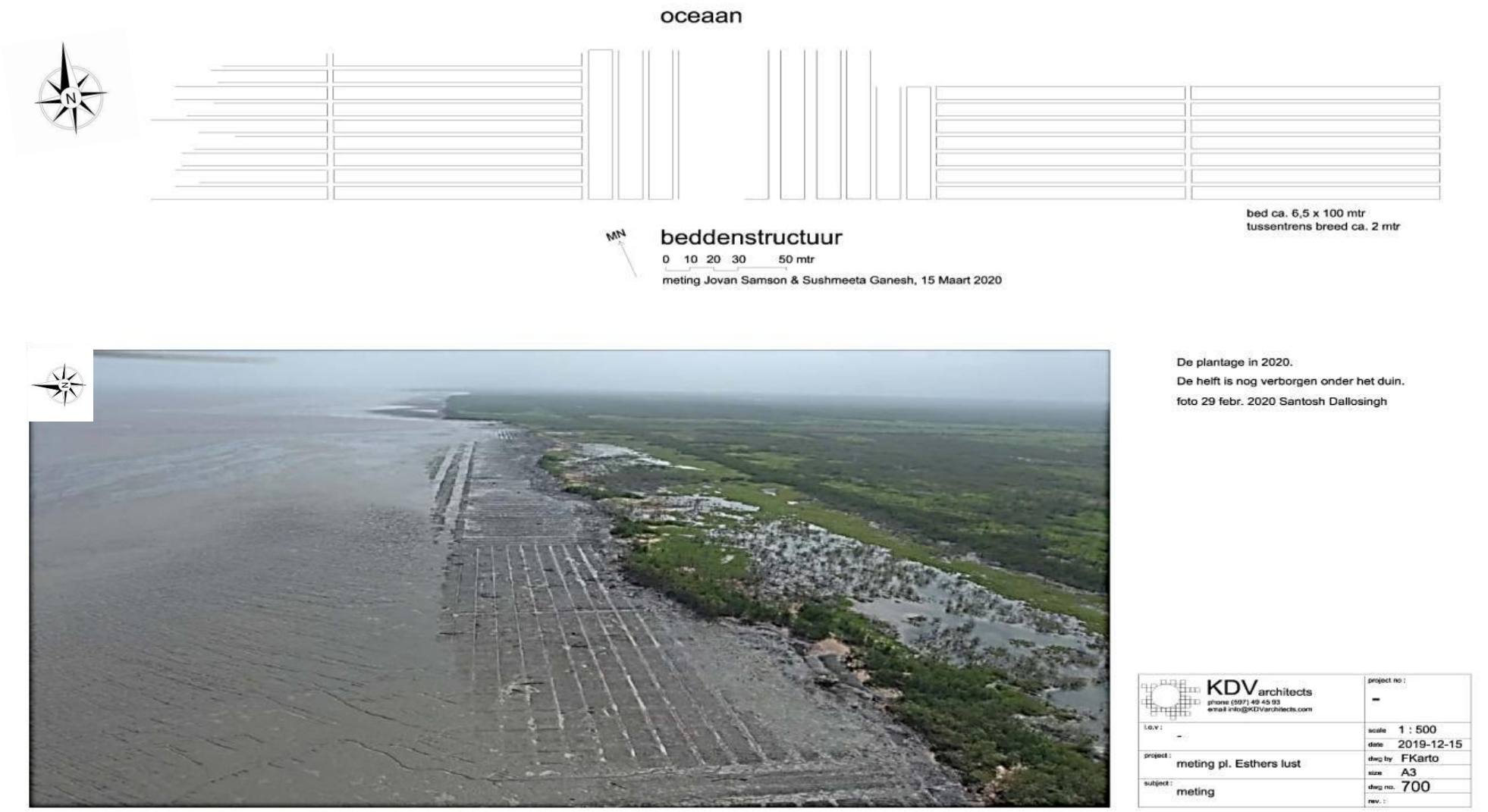


Figure 50. The pattern of the plantation beds at plantation Esthersrust with their respective measurement. Photo by Fabian Vas. Measurements by Jovan Samson and Sushmeeta Ganesh. Drawing by KDV Architects.

5.2. Analyses

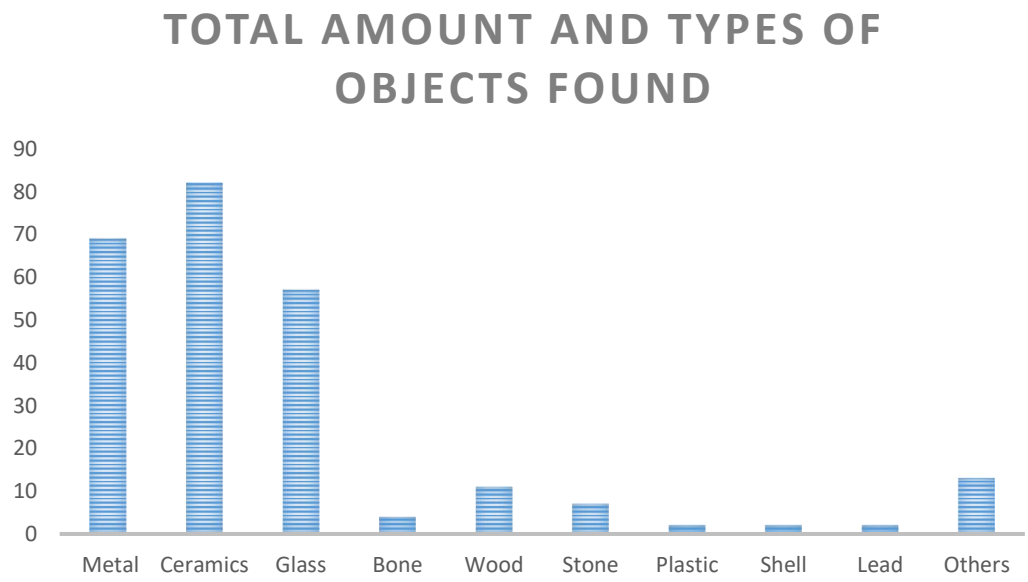


Figure 51. representation of the total amount of objects categorized.

In total n= 259 objects were found during fieldwork at Plantation Esthersrust (figure 51 & appendix 7). Among these n= 69 are metal objects consisting of coins, iron, and other metal type artefacts such as lead (figure 52). Furthermore, n= 82 ceramics were found categorized as stoneware, faience, refined earthenware, redware, porcelain, and Amerindian ceramics (figure 54). Wooden objects total n=11 consisting of artefacts such as the wooden cross, buttons, and planks (figure 53). Seven stone objects were found consisting of bricks, a stone dice, and tiles. Two plastic buttons were found and one made of shell.[86] Glass objects totalled to 57 consisting of whole bottles, shards, beads, bottlenecks, glass bases, and UID objects (figure 55).[87] Artefacts that did not fit into the aforementioned categories or were unidentifiable were placed under the label other n= 13 (figure 56). Among these are 8 white marbles[88].

[86] The plastic buttons are modern. Probably transported by the ocean, or belonging to tourists or fishermen.
[87] UID= Unidentified
[88] Because the material of the objects was not identified, they were put temporarily in this category.

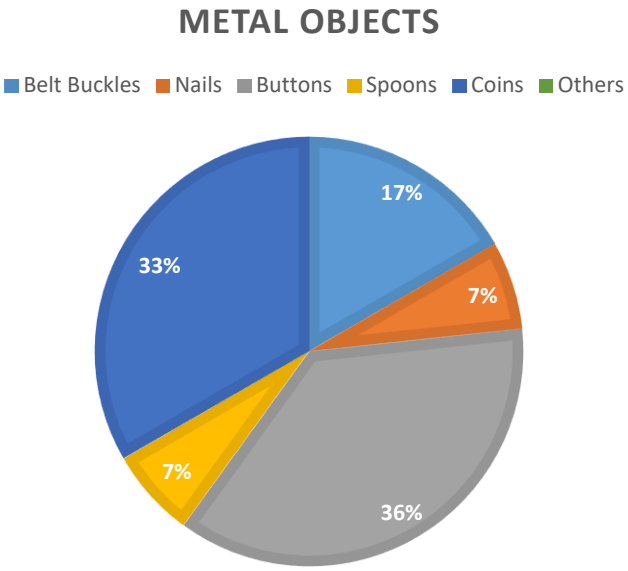


Figure 52. Categorization of metal objects in percentage.

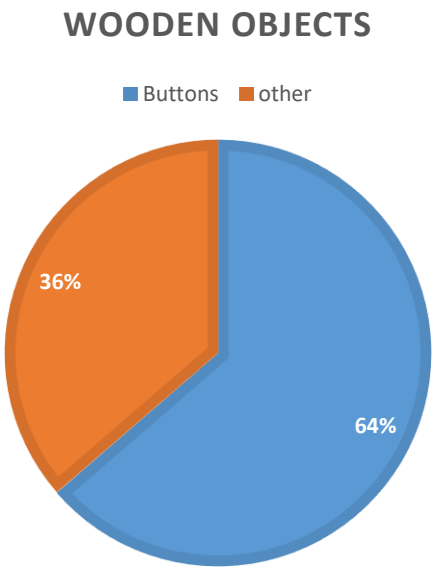


Figure 53. Categorization of wooden objects in percentage.

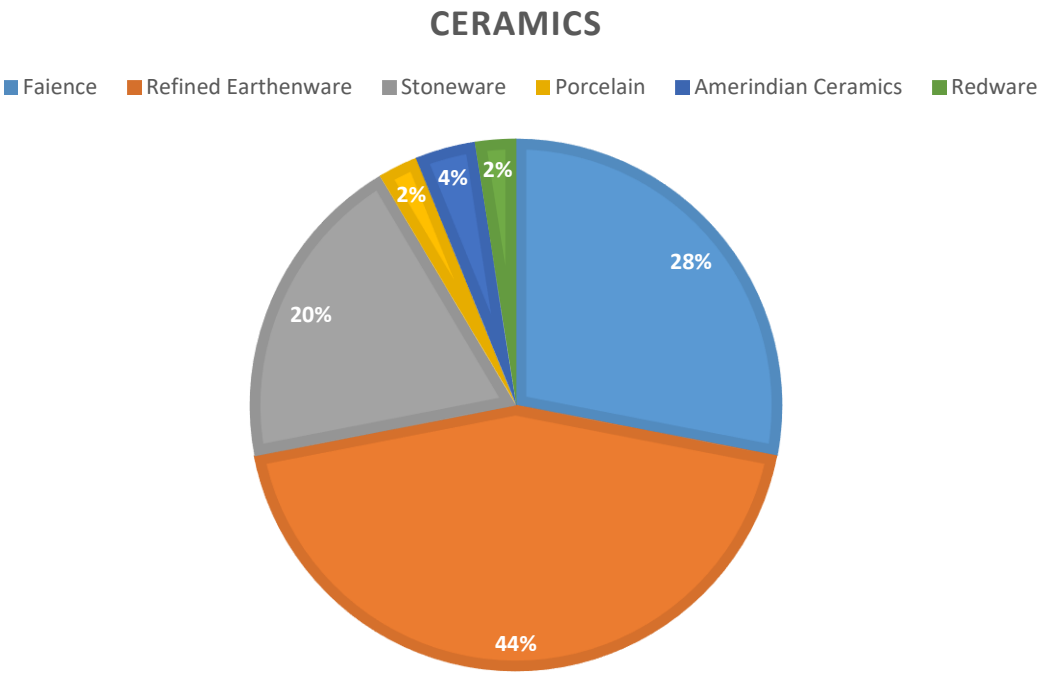


Figure 54. Categorization of ceramics in percentage

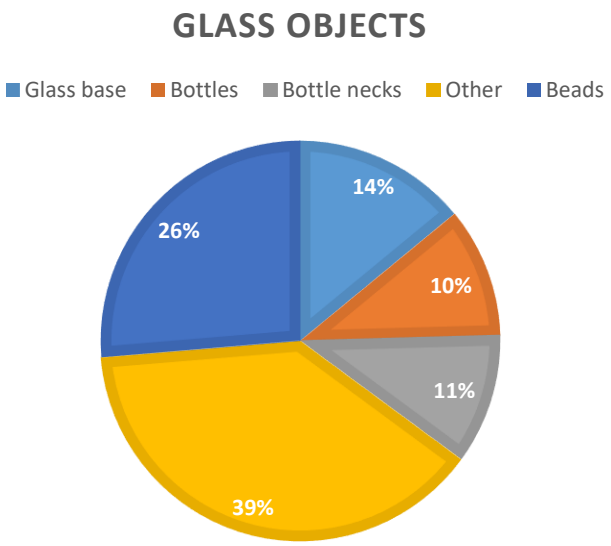


Figure 55. Categorization of glass objects in percentage.

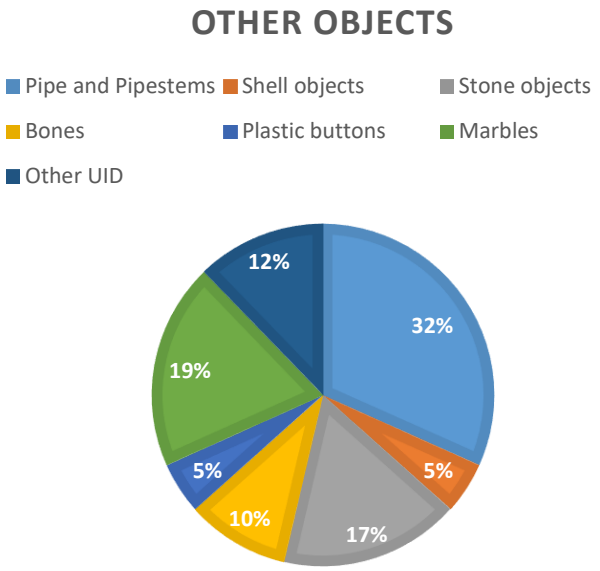


Figure 56. Categorization of other objects in percentage.

5.3. Special finds

Figure 57. Clay pipe bowl with Napoleon's depiction.

These types of pipes can be dated back to circa 1850-1900. During this time the manufacturing and styles of pipes became more detailed and sophisticated. On this pipe, Napoleon is depicted riding a horse on one side and the other side he runs holding a sword in his hands. There is also an inscription which says " *Napoleon op den velden. Overwinnaar van Waterloo*", which translates to Napoleon on the (battle) fields conqueror of Waterloo (figure 57).

Figure 58. Stone dice.

In other Dutch colonies such as the Dutch Antilles and St. Eustatius enslaved people made use of dice and other gaming items such as cards, which was eventually prohibited by law (Gilmore 2013, 67) (Appendix 3). Dice were also used as a trading object between the Dutch and the Maroons, but the Maroons preferred gunpowder, bullets, and weapons instead of dice and cotton (Ngwenyama 2007, 300). Further research on its origins and its age has to be done to make a statement.

Figure 59. *Popchi globo* (ceramic doll)

This ceramic doll more known as the *popchi globo* was popular among the wealthy families of Curacao and Aruba around the 1920s (figure 59). they were sold in the *Heerenstraat* at the El Globo store, the company name of Delvalle Hermanos & Co. (www.jck.nl). Another version of this doll was also found at the archaeological site of Jodensavanna in 2016. The presence of this doll shows that there was a connection between the islands of Curacao, Aruba, and the mainland of Suriname (Dutch colonies) (Ganesh 2018, 34).

Figure 60. Marbles

Initially, these round white objects were thought to be musket balls (figure 60). On further inspection, they turned out to be marbles. They weigh between two and nine grams, which are too light for musket balls made out of lead. When lead musket balls are cast they are shiny silver, but if they are exposed to moisture, a white lead carbonate will form creating a distinct patina (Sivilich and Bohy 2019, 3). They were mostly found at features 4 and 5 (feature 5). Among the eight marbles, one was broken. The inside was not made of metal. This dismissed the possibility for them to be made out of lead.

Figure 61. Metal Knives found in feature 5

The metal knives that were found are covered by a thick corrosive layer. To be able to determine what type of knives they were and what they were used for, further research is needed. They might have been ordinary kitchen knives, but could have also been used as tools for agricultural or defence purposes.

Figure 62. Wooden cross

Chapter two confirms that there was a stone Roman Catholic church present during the flourishing times of Plantation Esthersrust. This cross was found between features 6 and 7 and could be related to the church (figure 62). It has a length of 177 cm long and a width of 70 cm.

Figure 63. *Barbamang* or Bartmannkrug found at Plantation Esthersrust

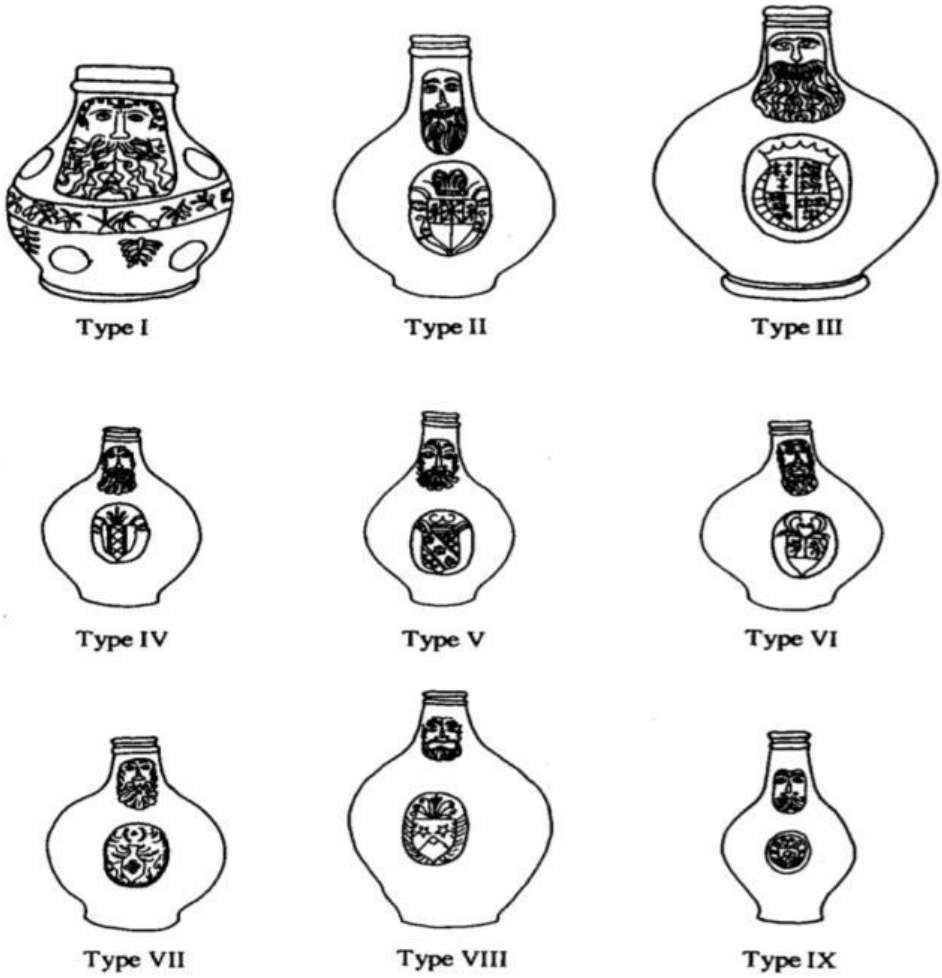


Figure 64. Evolution and types of Bartmannkrug. Source: (Lessmann 1997, 20)

The face on the pottery is also known as the Bartmann. Vessels with this symbol depicted on them were called Bartmann krugs or Bellarmine jars. Bartman or Wild Man was a mythical creature and is often depicted in Renaissance manuscripts, textiles, graphic art, and architecture (Urbonaite-Ube 2018,195). The Bartmann krugs were produced from the 1550s up to the 19th century (Bates and Cooper 2014, 5). Initially, this was used as a storage vessel for Rhenish wine and was eventually also used as a household storage vessel and as well as a transport jar for vinegar, oil, acids, and mercury. (Lessmann 1997, 17). The Shard that was found onsite closely resembles type IX (figure 63).

Figure 65. Bricks from Features 7 and 9 with inscriptions.

Some of the brick from feature 7 have the letters RTI inscribed on them and some of the bricks of feature 9 have the letter P inscribed on them (figure 65). The expenses incurred for the purchase of various plantation equipment were by far the largest and were almost the same distributed over Suriname and the Netherlands. About a third of this consisted of building materials such as wood and stone (van Stipriaan 1993, 259). *Baksteen* or bricks were initially imported, but due to the high costs (Volders 1966, 19) and the abundance of good and rich clay in Suriname, they were eventually made locally (Dikland 2002, 14). The maker marks need to be further investigated to know where they originated from.

Conclusion

The fieldwork and lab work unveiled interesting information about the plantation. The drone imagery showed the layout of the site and the in-situ plantation beds. Although no sign of military presence has yet been uncovered, further research may reveal the precise location of this military post.

Chapter 6. Heritage and Protection Laws.

6.1. Introduction

Heritage is important to society, because it carries information from the past. For this reason, it should be safeguarded for future generations to behold and for future research. Suriname has an array of heritage and archaeological sites. This chapter will discuss the heritage protection laws of Suriname and how current legislation can be used to help protect Plantation Esthersrust.

6.2. What is Heritage?

According to article 1 of UNESCO's Convention concerning the protection of the world cultural and natural heritage, adopted by the General Conference at its seventeenth session in Paris on 16 November 1972, the following definition is to be considered as "cultural heritage":

1. *Monuments: architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science;*
2. *Groups of buildings: groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science;*
3. *Sites: works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view.*

Source: http://whc.unesco.org/archive/convention-en.pdf

Heritage can be divided into two categories namely tangible and intangible heritage. Tangible heritage is considered to be the physical heritage both in the natural and built environment and intangible cultural heritage constitutes the past and continuing cultural practices, living ethnicities, knowledge, and living experiences (Bakar *et al.* 2011, 2).

Plantation Esthersrust can, therefore, be categorized as tangible heritage under the 3rd point by UNESCO's definition of cultural heritage listed above. Plantation

Esthersrust is an example of colonial landscape adjustment by past people and is currently an archaeological site. Since it was one of the last cotton plantations, many of the structures and objects used there are left behind as ruins. There aren't any examples left of Surinamese cotton plantations and this being the reason why Plantation Esthersrust position is unique. Not only does it give an outstanding opportunity to further research about cotton plantations settings, but the plantation beds are still visible and add to the outstanding value of this site. The only problem left is to figure out the possibilities to help protect this site and what the steps are that need to be taken in order to protect it. Enforceable legislation is needed.

6.3. Legislation

International Laws

Convention concerning the protection of the world cultural and natural heritage 1972 (see article 1 above) and the convention on the means of prohibiting and preventing the illicit import, export, and transfer of ownership of cultural property 1970, are two UNESCO's conventions that affect the countries that have signed the treaties. Since October 1997, Suriname has been in "acceptance" and bound to UNESCO's 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage instrument.[89] What the convention of 1972 encompasses was partially discussed earlier (See appendix 5 for additional articles).

For a site to be inscribed onto the World Heritage list, it must first be nominated by the country in which it is located. In Suriname, the Suriname Build Heritage foundation established in 1997 has been the official nominator since 1988. They are the official overseers of restoration work, the National World Heritage Authority in Suriname, conduct preparatory work to designate to the World Heritage List and public outreach.

Because Suriname is a member of the Caribbean Community (CARICOM) it is bound to follow certain regional and international conventions, as do all the other

[89] This international convention can only be of use, when fully implemented by the member state in their own local legislation. For Suriname it is still a work in progress, because it has only been implemented partially.

member states. The CARICOM Regional Cultural Policy is one such set of criteria for best practices. The following is stated on Archaeological and Historical Sites and Artefacts under policy and framework and objectives:

(section 4)
Archaeological and Historical Sites and Artefacts

1. *Actively promote and support all efforts aimed at the preservation and restoration of the Regional patrimony and create or strengthen legislation to support such efforts, including the repatriation of artefacts and other cultural property;*
2. *Promote and support educational efforts aimed at developing an active and felt appreciation of the National and Regional patrimony.*

National laws

Suriname has two World Heritage Sites, the historical inner city of Paramaribo[90] and the Central Suriname Nature Reserve[91]. The settlement of Jodensavanna and the Cassipora cemetery remains on the World Heritage tentative list of UNESCO and has been submitted by the Suriname Built Heritage Foundation (SBHF) on 30th June 1998 with the criteria (iv)[92] and (vi)[93](www.whc.unesco.org). The Monuments Act of 2002 is the most important national law at the moment concerning the protection of Surinamese heritage. The physical characteristics of a monument are clearly described in this law and has different components to it. Article 1b states that a monument is considered all real estate or parts thereof that are at least fifty years old and are considered to be of general interest because of their beauty, their artistic value, their significance for science, for archaeology, the history of the country, their ethnological value of architecture.

[90] The historical inner city of Paramaribo is a World Heritage Site because of the criteria (ii) and (iv).
[91] The Suriname Central Nature Reserve is a World Heritage Site because of Criteria (ix) and (x).
[92] To be an outstanding example of a type building, architectural or technological ensemble or landscape with illustrates(a) significant stage(s) in human history.
[93] To be directly or intangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance.

Many historical sites that are of historical and archaeological value (such as Plantation Esthersrust) and thus part of Surinamese heritage are under direct threat. Many of these places are yet to be listed as monuments and face the constant threat of being looted by humans and/or natural deterioration. The act of 2002 states that archaeological sites can be assigned as 'archaeological monuments' on the advice of the Archaeological Services Suriname (AD) to the ministry of Education, Science, and Culture.[94] It is the minister who decides, based on advice by the AD, whether or not research should be done. In practice, this means that no prospective archaeological research has been conducted until the introduction of this act (Meulenberg 2017, 54). Not only was the AD inactive, the procedure of whether or not to conduct archaeological research and with which standards have not been outlined in the Monuments Act of 2002 (Meulenberg 2017, 54). The Monuments Act of 2002 is an avenue for integrating specific national policy objectives.

The SBHF, an entity discussed previously, is also a national asset. They tend to all subsequent restoration initiatives in the historical centre of Paramaribo is (UNESCO World Heritage site) and throughout Suriname. Furthermore, the Suriname constitution chapter 8 article 47 states the State shall safeguard and protect the cultural heritage of Suriname, stimulate its preservation and promote the use of science and technology in the context of the national development aims. All of these national laws can help contribute to the strengthening of a better heritage protection strategy in the near future.

6.4. Concerning Plantation Esthersrust

Plantation Esthersrust holds special importance to Suriname because it's an opportunity to learn about the spatial layout of cotton plantations and a space that serves as a memory of a specific period in Surinamese history. Therefore, trying to protect this site is very important. Due to the 30-year cycle, this site now lies exposed. This poses two new problems. The first being that there is no certainty how long it will remain exposed and when it will once again be submerged by migratory mudflats. Secondly, being exposed increases the risk of it being looted and by being looted, information is slowly but surely lost. Plantation Esthersrust is the only exposed cotton plantation known to researchers. Furthermore, due to the

[94] *Archaeologische Dienst*

threat of looting something needs to be done on a national level. This site has not yet been listed as a national monument and is thus not protected by the Monuments Act of 2002. Plantation Esthersrust is part of a shared heritage linking Suriname, Belgium, and the Netherlands together. This makes this site even more interesting. The quickest way to help protect this site would be for the Archaeological Services of Suriname to recommend that the Minister appoint the site as an official (maritime) archaeological site empowered by the Monuments Act of 2002. This will at least help give this site a chance to gain protection and in this way create other venues by which further research can take place.

6.5. Awareness and appreciation

Effective law and its enforcement are not the only factors important for the protection of heritage. Creating awareness of the importance of heritage to the general public is equally important. The term heritage values is the keyword here. When individuals and groups of people value a site, they are less inclined to allow it to fall into a deleterious state. It often due to this valuation of heritage by people, that plays an important role in the reinforcement and implementation of legislation to protect heritage sites (Diaz-Andreu 2017, 2). This is why it is crucial to try to find out what heritage means for individuals and groups of people (Marmion 2012, 294). It is also crucial to determine just how aware the public is about local heritage. A survey could facilitate this process.

Public outreach may help people understand their heritage better, which brings them into the heritage cycle (figure 66). The heritage cycle begins with understanding what a site encompasses and its historic environment. This will spur a sense of the sites importance is, and individuals and groups of people will start to value it. Once the sites value is recognized there should be greater impetus to take care of it. These processes lead to an increase in interaction with the site vis-à-vis others, and thereby cultivating a sense of enjoyment. When people enjoy the site, they become more interested and curious about it, and in this way they want to understand it even more. By trying to understand it better the value for the site increases and in this way the cycle continues. When people understand the value of heritage for the present and the future, they will understand that looting is the

destruction of valuable information. Although looting cannot be stopped completely, understanding and appreciating heritage and heritage sites can be a powerful tool to help minimize it.

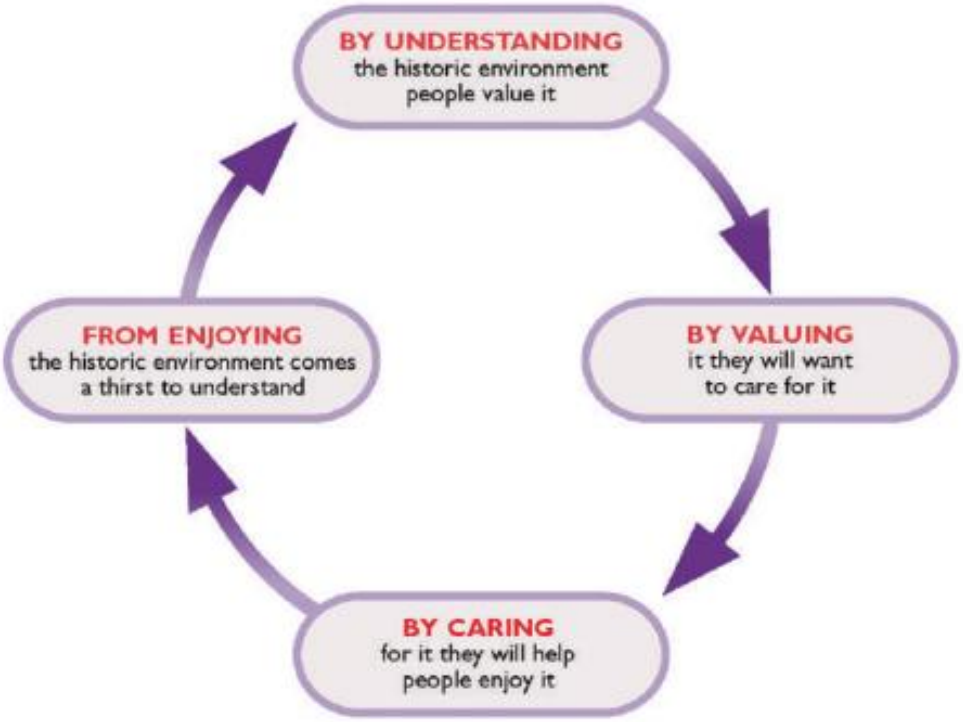


Figure 66. The Heritage Cycle. Source: (Manders *et al.* 2012, 4).

Conclusion

Though Suriname is a work in progress, there are a series of laws protect to protect its heritage. International conventions only work when they are implemented via local legislation. Implementation and executing legislation is important, but so is public participation. If the public understands, values, cares for and enjoys a site, protecting it is made easier.

Chapter 7. Conclusion

7.1. Research questions

The main aim of this thesis was to research attributes of the plantocracy and the colonial defence system of Suriname between the 17th and 19th centuries from a maritime perspective. Surinamese history and archaeology have often been written from a terrestrial perspective, while an maritime explanatory tool to understand the historical period has been little investigated. The questions of this thesis were therefore formulated as follows:

Main question:

- How important was water in the functioning of plantations in general?

Sub-questions:

- How did the maritime landscape look like?
- What was the role of water in the defence system of Suriname in the Dutch Colonial Period and how did that maritime landscape look like?
- What role did the military post at the mouth of The Warappa Creek have with the national defence system and the plantation?
- What are the present threats for Plantation Esthersrust?
- How does the current maritime landscape look like?
- What are the effects of coastal morphology at Esthersrust?
- Is it worth protecting the site and how could this be done?

7.2. Methodology

This thesis uses primary sources to help answer the historical related questions regarding the plantocracy and colonial defence systems. Some of the primary sources were studied at the National Archives of Suriname and the Netherlands. Due to the pandemic COVID-19 outbreak, this was disrupted and much of the research was done online. Together with literature study, these sources showed the importance of water in colonial Suriname (maritime perspective). An archaeological survey was conducted onsite of Plantation Esthersrust. During fieldwork, several archaeological methods were applied to help uncover valuable

information, including a pedestrian survey and drone survey. There was better access to the site during the full moon period, when there is a maximum six hours of low tide. Due to the restrictive site access, and tidal wash, subsurface excavations were not possible. The site is remote (expensive by boat) and due to a small budget and limited availability of the crew, fieldwork lasted for four days. Fieldwork was followed by two weeks of lab work. During lab work artefacts were cleaned, analysed, labelled and catalogued.

7.3. Results

Chapter 2 and 3 focused on the role of water on the plantations and the colonial Dutch defense system. The role of water for the plantocracy of Suriname is evident. The surrounding water bodies were initially seen as an obstacle due to flooding in the lower coastal area. When Governor van Sommelsdijck introduced the polder system and fortifications began to rise in the coastal plains, the plantations started to spread in this region. The usage of grachten was important for both the main fortifications such as Fort Sommelsdijk and Fort Nieuw Amsterdam, but also essential for the plantations. The plantations and the fortifications were mainly found near rivers and creeks. The fortifications were intelligently designed using the rivers and the surrounding flora as a natural defence as is the case with Fort Nieuw Amsterdam and Fort Sommelsdijk. The maritime landscape had a strong impact on the residents of colonial Suriname. The same is true of the opposite. The landscape characteristics were both favourable for the defence system as well as for the economy of the colony in terms of plantations and trade. Suriname was connected by water and the need for vessels both for international as well as for local routes were more than evident. To reach Suriname, ships were needed. However, for the travel within Suriname, vessels were also very crucial. Suriname was a hydraulic (maritime) society.

Chapter 4 discussed the maritime perspective and its importance to this thesis. To understand the maritime landscape seems to be very crucial to understand the Surinamese colonial plantocracy and defence system. The aspect of man in landscape and landscape in man was used in an attempt to understand the cognitive landscape of those that settled Suriname. It is evident that the landscape influenced the people to adapt to the landscape, but it is also clear that while adapting, the

landscape was manipulated to better suit the expectations of the people. One of the ways to understand this is by trying to understand it via a culturalpurview.

Furthermore, chapter 4 also looked at the coastal morphology of the Surinamese coast, with the focus on the area near the mouth of the Warappa Canal. The coastal area of Suriname is subject to change and can be understood by the different cycles throughout time. Due to the 30-year cycle of shifting mudbanks, Plantation Estherust has now resurfaced, but it is unclear how long it will remain so or eventually be covered again.

Chapter 5 discussed the results of the field and lab work. The fieldwork and lab work unveiled interesting information about the plantation. The drone imagery showed the layout of the site and the plantation beds. Although no sign of military presence was uncovered, further research may indeed reveal the military post that stood there, according to historical accounts.

Chapter 6 briefly looked at the heritage laws relevant to Suriname and what it could mean for Plantation Esthersrust. Though Suriname is a work in progress there are national laws that recognize sites with obvious structural integrity. International conventions or guidelines only work when they are implemented as national legislation. Implementation and execution of legislation is important, but so is public participation. If the public understands, values, cares and enjoys a site, protecting it is made easier.

The sub and main questions are answered as follows:

Sub questions:

How important was water in the functioning of plantations in general?
Water was very important to all plantations not only for the growing of crops, but also for the transportation of people and goods. Suriname was a hydraulic society. The waterways were the highways of colonial period. That is why each plantation had a *botenhuis* and a few vessels that were used on the plantation itself and for transportation to other places.

What did the maritime landscape look like?

Plantation Esthersrust was located near the mouth of the Warappa Canal, where it connects with the Atlantic Ocean. This area is known as the lower coastal area and is situated in the young coastal plain. The young coastal plain is roughly six meters above the sea level and soft fluvial clays and sand ridges are common here. The surrounding area was named the *biri biri lands* and was first thought to be useless and uncultivatable lands. The surrounding water bodies were initially seen as an obstacle due to flooding in the lower coastal area. When Gouvernour van Sommelsdijck introduced the polder system and fortifications started to rise in the coastal plains, the plantations started to spread in this region.

Suriname is home to an array of rivers, swamps and creeks. As mentioned previously, they were very important for the society as they were the only means of efficient transportation. Different types of ships and vessels sailed the waters of Suriname some came from other continents, but the local traffic of ships was far greater. The plantation barges transported people and goods all the time and they were rowed by enslaved people (regular routes of transportation) (transport zones). To have vessels on a plantation was a necessity. There were specific vessels meant to be used on the plantations themselves to increase the efficiency and production such as the *keenponten,* but there were also plantation barges used specifically for longer distances such as the *tentboot* primarily used for the transportation of people and the *matrozenpont* and the *kroes kroes (lastdragers)* primarily used for the transportation of goods from the plantations to Paramaribo and vice versa.

Some natural creeks were extended to connect to other waterbodies such as the Warappa Canal dug from the Warappa Creek and extended to the Atlantic Ocean. In these areas, plantations were further established. The digging did not stop there. They further manipulated the landscape by introducing dikes, smaller canals (*grachten en trenzen*). They did so on the lower coastal plain in order to control the excessive water and made it favourable to their situation. The *vaartrenzen* were canals that intersected the plantations and extended as far as possible through the plantation fields. The *keenponten* floated on them and during the harvest time, the produce would be transported on them to the mill, where they would be processed. *Loostrenzen* were equally important, because they regulated the water on the plantations. Smaller loostrenzen were connected to larger ones and they were

connected to the creeks and rivers. The water locks were used to let in the water when needed. The dikes surrounded the plantations and in this way each plantation had its own independent water system.

What was the role of water in the defence system of Suriname in the Dutch Colonial Period and how did that maritime landscape look like?

Because the waterways were the most efficient and often the only way to go about in Suriname, it was used in the defence system as an advantage. The city of Paramaribo (where the administration was centred) was directly accessible via the estuary of the Suriname River. Because the coastal area of Suriname has a series of mud banks, it made it difficult for enemy ships to sail, without knowledge of the fairway. The depths of the sea at the estuary varies and most of them are shallow. Ships could easily get stuck. The entrance was therefore a one way in and one way out. Knowing this the forts, redoubts, and posts were strategically placed. In chapter two it was mentioned that the defensive system had three components namely the naval power, the army on land, and the militia. The naval power was spread all over the coast and had well-equipped ships to defend their colony (coastal transport zone). Another way water was used in the defensive system was to help fortify the forts. The main forts were surrounded by moats, which made an entrance for local and international enemies a troubling one.

What role did the military post at the mouth of The Warappa Creek have with the national defence system and the plantation?

The first plantations were established away from the coastal zone deeper in the rainforest along the Suriname River. When the forts and military posts were introduced in the coastal area, the number of plantations started to grow in that area. They were better protected; the area was more fertile than areas and it was well connected to Paramaribo. Military posts were often placed to strengthen the surrounding fortresses and they also served as signal posts. Due to the high maintenance costs, they were eventually all abandoned. The military post near Plantation Esthersrust leaves many questions unanswered. In the *gouvernements journaal* mention a post by the name Fredericiszorg. Plans were made to bring it further inland. Archival maps do depict a military post near the mouth of the Warappa Canal, but not based on the vicinity of any plantation. In 1804 the British

also attacked a military post on the Warappa Canal to secure enough plantation vessels to carry their soldiers to the rear end of Fort Nieuw Amsterdam; allowing them to successfully attack and capture Suriname. Further research on this post is required to find its exact location.

What are the present threats for Plantation Esthersrust? How does the current maritime landscape look like? What are the effects of coastal morphology at Esthersrust?

Suriname's coast is subject to change. This can be seen on a micro, macro, and mega-scale calculated in years. Due to the 30-year cycle, Plantation Esthersrust now lies between two mud banks. This area is known as the interbank area. This area is left at the mercy of the ocean waves. Mud banks protect the coastal area because they break the waves and thereby allows the growth of vegetation such as the mangrove, a natural land defence mechanisms. The area between the mud banks that is deprived of mud, slowly erodes away. If there is any presence of sand or shell in the area, it is deposited on this area. It is unclear at what point in the 30 year mud flat cycle Plantation Esthersrust sits. It is therefore uncertain how long the site will remain visible.

Being looted is another threat that this site faces. The site is now exposed and an innumerable number of artefacts are also exposed. Although this site is remote, many local people, fishermen, and tour services come to the area. Picking up artefacts is an easy job. What has been looted is lost, out of context, and in most cases unusable (loss of valuable information). Luckily the site is underwater most of the time and can only be accessed at super low tide, for the time being. This temporarily minimizes the possibility of looting.

Is it worth protecting the site and how could this be done?

Protecting the site is worth it because not much is known of cotton plantations of Suriname. It should be protected for future research. This will allow science to extend its knowledge on cotton plantations, through archaeological techniques. The plantation beds and in situ site features increase the value of this site. To date they are the only plantation beds found in Suriname and give a vivid representation of the real thing. The beds survived the destruction of time and therefore allow us to

see what once was. Plantation Esthersrust existed in a time when cotton production was at its prime. It is an example of a bygone era. Most of the plantations that are still known and visited by people and tourists are mostly sugar plantations. The easiest and quickest way to initiate the protection of the site would be for the AD to present it to the Minister of Education Science and Culture to declare it an official (maritime) archaeological site of Suriname and give it a protected status. This will facilitate more awareness and create avenues by which further research can be done. Although implementing the legislation is important, raising public awareness is as crucial than the former. Simply placing a placard at the site with content about the relevance of the site and no longer looting statement, may help By engaging the public in understanding the value heritage, they will appreciate it even better. By appreciating it they would want to protect it and know more about it.

Main question:

What is and was the role of water at the site of the former Plantation Esthersrust?

The role of water at Plantation Esthersrust was an important one. When this plantation was functional, it was fully dependent on the water from the ocean to help grow the crops and in some cases, it was also used to help fight against plagues as mentioned in chapter 2. There was also a constant fight to help keep the water at bay through the dikes and polder system. The landscape was altered by the people, but it also forced them to adapt to that same landscape. The Warappa Creek was indeed very important to this plantation because it was the easiest and quickest way to and from Paramaribo. The transportation of goods and people all happened on water and thus the crucial aspect of water for this plantation is proven.

Not much can be said about the military post. According to primary sources, there were plans to relocate the post further inland. It can be inferred that this was due to the erosion of the coast. The water did not only have an effect on Plantation Esthersrust, but also on the military post.

Even though agricultural activity ceased at Plantation Esthersrust for over a century, the natural coastal activity never stopped. Due to the cyclical character of coastal growth and erosion, Plantation Esthersrust was once submerged. In recent years it has resurfaced, but it is uncertain for how long it will remain this way. The influence

of water on Plantation Esthersrust seems to be never-ending. This happens with or without the intervention of humans.

7.4. Recommendations

This research only gives a glimpse of what Plantation Esthersrust entails. More research is needed to gain more knowledge of one of Suriname's last cotton plantations. There was no sign of any military related construction or influences. The military post remains undiscovered and thus gives more reason to research the site even further. In the meantime, it is important that the site receives a protected status, by declaring it a maritime archaeological site. Alongside this, the public needs to get involved. By public engagement, the Suriname citizens will gain more knowledge on their own heritage and its values. In this way with proper legislation, distribution of knowledge and creating awareness, looting can be brought to a minimum.

Abstract

This thesis is about the 19th century Plantation Esthersrust and the military post on the confluence of the Warappa Canal and the Atlantic Ocean. Archaeology in Suriname is a growing field. Most of the archaeological research that has been conducted throughout the years were mainly focused on pre-Columbian cultures. Recently archaeologists (both professional and in training) started archaeological research on different cultural periods. Although water played an important role in the history of Suriname, it is often not the focus. Both history and archaeology sources were written using the terrestrial point of view. This thesis therefore tries to contribute to the maritime perspective of Suriname's history and archaeology disciplines. For this theories by Christer Westherdahl are used as a basis. The focus lies on the role the water had on the plantations and defence system and the also looks at relationship between humans and the surrounding waters. For this study, a wide range of primary sources were studied to answer the research question, alongside a week of fieldwork on Plantation Esthersrust.

Appendix 1. Artefact analysis sheet

To catalogue the artefacts a specific code was used. The code ER20 is derived from the provenience and the year of fieldwork. ER20 stands for Esthersrust 2020. The artefacts were then numbered starting with the artefacts from feature 1. The first thus resulted as ER20-1. The artefacts were sorted by type and according to their provenience (feature or surface collection). The date that the artefacts were found is also taken into account. If the artefacts were from one feature, but found on different days, they were put into different smaller bags. For each feature, there was a large bag which contained all the other smaller bags of a particular feature. If artefacts were of the same type, found on the same date, and had the same provenience they were all put into one bag after being catalogued. To continue with the example mentioned above, they were catalogued in the following way. If a bag contained three artefacts, the following catalogue numbers would be ER20-1A, ER20-1B, and ER20-1C.

ARTIFACT ANALYSIS SHEET (Example)

Provenience: Esthersrust Feature 1 25/01/20 **Catalog # ER20- 1A**

Item: Pottery sherd - Glass shard - Metal - Organic - Ceramic – Other- UID[95]

Paste type(ceramics): Terracotta - Clay - Earthenware – Stoneware- NA[96]

Temper: Grit - Sand - Fiber – Other- UID

Color: Dark red - Light brown - Pink - Dark grey - Light red - Grey - White - Green - Red grey- Dark brown - Light brown - Red - Dark orange- Other

Surface Treatment: Plain - Patina - Burnish - Glaze - Film – Other - UID

Design Motif / decoration: Punctuates - Linear - Incised - Curvilinear - Incised - Appliqué inlay- Other- UID - None

Measurement to nearest mm: Length: 20mm / Width: 10mm / Thickness: 2mm / Count: 1

Schematic Drawing/ Photo# 9441: 

[95] Unidentified object
[96] Not Applicable

Appendix 2. Types of international ships in colonial Suriname

Fregat (frigates)[97]

Many Frigates (figure 67) came to the shores of Suriname and brought with them goods and passengers. Examples mentioned are the Jongste Elias[98] brought stock goods and passengers from Amsterdam, Frigate Betsy[99] loaded with goods from Rhode Island, and Frigate Frederikslust[100] with goods and passengers from Amsterdam. Frigates used for war could easily carry approximately 250 people (Wolbers 1861, 595). When the British arrived near the Surinamese coast in April 1804, they arrived with 31 ships. Among these ships, many frigates and brigs were present (Wolbers 1861, 503).

Figure 67. French Frigate Pénélope. Source: en.wikipedia.org

De Schoener (Schooner)[101]

Schooners (figure 68) were also no exception to Suriname. The government journal of 1971 mentions De Schooner two friends[102] with goods from Salem, French Goulette[103] (a type of Schooner) *la coureuse de pierre* loaded with soap from Cayenne, The American schooner favourite[104] loaded with goods, fish, and planks

[97] "Frigates came into use as naval vessels noted for their speed and light construction, but vessels classified as ''frigate built'' were also used as merchant ships" (Vanhorn 2004, 24).
[98] Page 88
[99] Page 107
[100] Page 108
[101] "Schooners were the first high seas craft to rely mainly on a fore-and-aft rig; while offering a reduction in crew size, during the eighteenth century the schooner rig was only manageable on small vessels, usually of 100 tons or less" (Vanhorn 2004, 34).
[102] Page 110
[103] Page 177
[104] Page 119

from Boston and The American schooner Minerva[105] with goods and other materials for a new establishment (came from Saramacca). This same ship delivered goods to the Marowijne area earlier. This shows that coastal transport zone was also applicable to Suriname in the historical period.

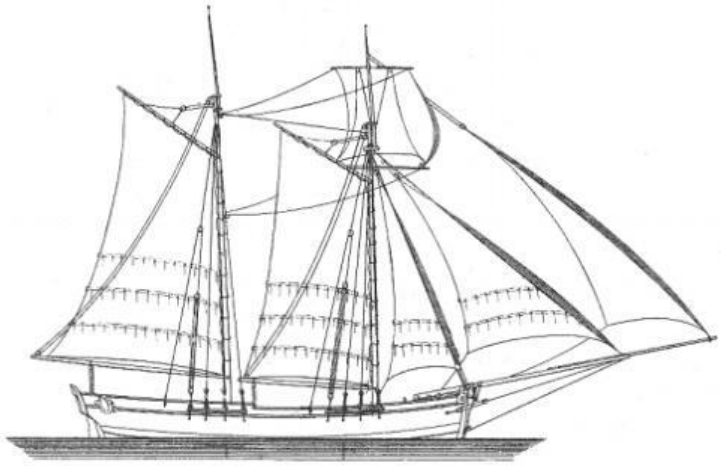


Figure 68. Representation of a topsail Schooner. Source: (Vanhorn 2004, 37)

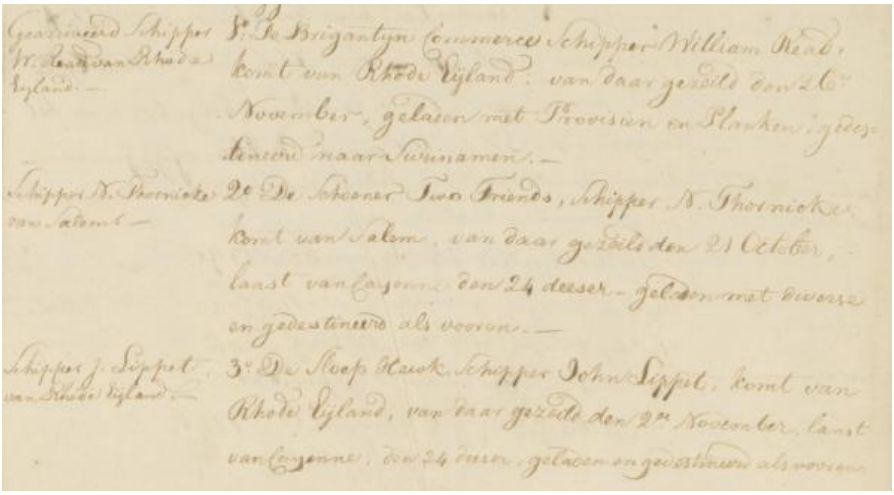


Figure 69. A Brigantine, Sloep and Schooner arrive in Suriname on the same day. Source: *Gouvernements Journaal* 1791

Brigantijn (Brigantines)[106]

Examples of Brigantines mentioned in the *Gouvernements Journaal* of 1791 are the De Brigantine Pomone[107] loaded with flour, salted meat (zoutvlees) and wooden

[105] Pages 111, 123, 151-156

[106] "By 1780, the brigantine is identified as the same vessel as a brig, with two square-rigged masts and a large fore and aft mainsail hung with a gaff yard and boom" (Vanhorn 2004, 31).

[107] Page 114

planks which came from Newberry port via Cayenne, Brigantine Commerce[108] loaded with goods and planks from Rhode Island and Brigantine Desire[109] loaded with flour, fish, meat, and planks from Newberry port.

De Sloep (Sloop)*[110]*

Examples of sloops (figure 70) mentioned in the *Gouvernements Journaal* of 1791 are the Sloop Suriname Packet[111] loaded with goods from Rhode Island and came via Baltimore, The English sloop[112] Stedwell with goods from Barbados and the Danish sloop[113] that came with goods and passengers.

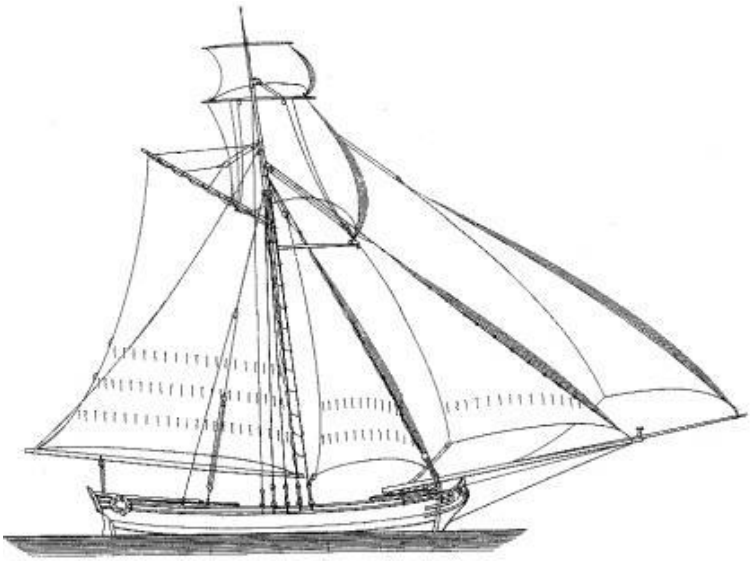


Figure 70. Representation of a sloop rig. Source: (Vanhorn 2004, 37).

Snauw schip (snow or snaw)

An Example of a snow (figure 71) mentioned in the Gouvernements Journaal of 1791 is the Hollandse Snauw Schip that came to Suriname from Vlissingen via Angola with a cargo of 300 enslaved Africans.

[108] Page 110
[109] Page 136
[110] "The term "sloop" is often another matter of some confusion, as it can denote a rig type or be used as a general term. sloops were small, single-masted vessels that had a gaff and boom fore-and-aft mainsail. The "sloop of war" was the smallest vessel of war and was rigged either as a ship or snow" (Vanhorn 2004, 37).
[111] Page 121
[112] Page 123
[113] Page 110

Figure 71. Representation of a Snauw. Source: www.vaartips.nl

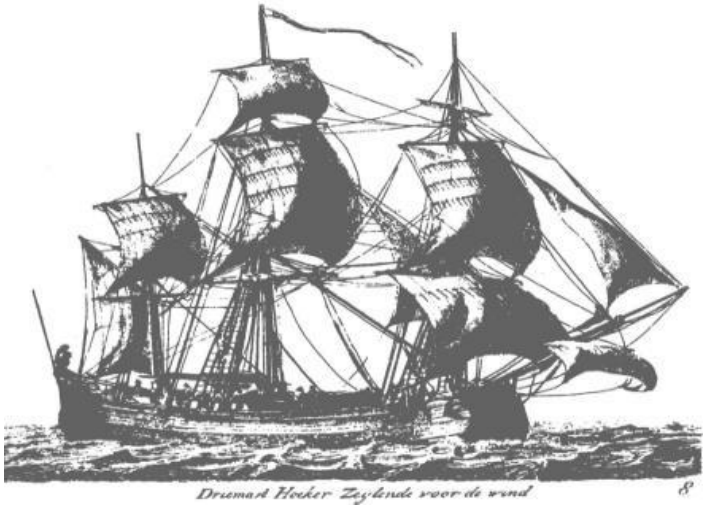


Figure 72. Representation of a Hoeker type ship. Source: (Collins 2001, 71)

De Dutch hoeker[114]

De hoeker[115] Tropenburg brought passengers and goods. This is but one example. The *gouvernement journalen* (1795) mention different ship types such as the hoeker. To name them all will not be possible for this research.

Other primary sources, such as Hartsinck (1770), van Sijpestijn(1854), and Wolbers(1861), who are but a few, also mention names of the ships listed above

[114] "A very seaworthy Dutch fishing vessel type, characterized by a sailing rig designed to give maximum working space on the foredeck, a long bowsprit, a tall square-rigged main mast stepped amidships, and a small mizzen mast aft" (Collins 2001, 67).

[115] Page 155

and other types as well. Ships such as the *Fluitschip* (flutes)[116], *Brikken* (brigs)[117], Bark[118], and *Katschip* (Catship)[119] were also mentioned. The frigate ships made the most voyages by far. Almost all mentioned ship types were used for both direct shipping in the West Indies and used for slave journeys (van de Voort 1973, 46).

Figure 73. View of the City of Paramaribo. This gives a depiction of the busy water traffic on the Suriname River. Source: (Stedman 1796, 287)

[116] "The Dutch wars resulted in the capture of hundreds of Dutch merchantmen, many of which were sold into the English market as prizes of war. Flutes were designed to maximize cargo capacity and require a small crew, thereby increasing efficiency" (Collins 2001, 27).

[117] "The brig rig consisted of a foremast with square sails and a mainmast with square topsails and topgallants, but a spanker fore-and-aft mainsail instead of a square course and a special yard called a crossjack was used to secure the foot of the main topsail" (Collins 2001, 32).

[118] "During the first part of the eighteenth century, the word "bark" referred to a hull form, but it came to represent a rig by the middle of the period. The mid-eighteenth-century bark rig was like a ship rig, except there was no topsail on the mizzen, like the barque of the nineteenth century" (Collins 2001, 27).

[119] "Cats were developed in northern England around 1700 in response to Dutch flutes; they generally measured 250-300 tons and were used in bulk cargo trades such as coal and timber" (Collins 2001, 28).

Appendix 3. Proclamation. Playing at dice and gambling by slaves

104 Proclamation. Playing at dice and Gambling by Slaves.

1797 July 4
ARA OASE 26 no 4.
See 1784 August 4, no 59.

As there have been sundry complaints taking place related to gambling and gaming by slaves, at this time here as it has greatly come into vogue thereby frequently resulting in unpleasantnesses and greatly frustrating the slaves' work, which has given great prejudices to their owners.

So it is that the Captain Commandeer and Council of these islands so it is desired, indications provide that without distinction every slave who plays at dice, cards or any other game whatever, if caught, whether in the town, in the country, or any other place where this might come to pass, they will be punished.

Equally, everyone, whether white or free people, likewise are forbidden to play at dice or cards with slaves or any other game or to encourage them for that purpose by providing them a place to do so, either in their houses, yards or otherwise, and if that is the case they will be punished.

In order that no one can claim to be ignorant, this proclamation will be published and affected in the customary place.

Thus done by return on St. Eustatius Tuesday the 4th of July 1797. By the Captain Commandant D. RODA and Council L. GODET, H. SAMPSON and L. J. HOLM. To order same. HENDRIK WILLEM PANDT first confirmed by oath Clerk, Interim Secretary.

Figure 74. Proclamation playing by dice and gambling by slaves (St. Eustatius). Source: (Gilmore 2013, 299)

Appendix 4. UNESCO articles concerning heritage

UNESCO, through the provisions of the World Heritage Convention (1972) which was the first international legal instrument for the protection of the cultural landscapes, established the following classification for cultural landscapes during the World Heritage Committee in 1992:

4. **Clearly defined landscape:** The most easily identifiable is the clearly defined landscape designed and created intentionally by man. This embraces garden and parkland landscapes constructed for aesthetic reasons which are often (but not always) associated with religious or other monumental buildings and ensembles (WHC 2008, 86).

5. **Organically evolved landscapes:** The second category is the organically evolved landscape. This results from an initial social, economic, administrative, and/or religious imperative and has developed its present form by association with and in response to its natural environment. Such landscapes reflect that process of evolution in their form and component features. They fall into two sub-categories:
    - a relict (or fossil) landscape is one in which an evolutionary process came to an end at some time in the past, either abruptly or over a period. Its significant distinguishing features are, however, still visible in material form.
    - a continuing landscape is one which retains an active social role in contemporary society closely associated with the traditional way of life, and in which the evolutionary process is still in progress. At the same time, it exhibits significant material evidence of its evolution over time (WHC 2008, 86).

6. **Associative cultural Landscape:** The final category is the associative cultural landscape. The inscription of such landscapes on the World Heritage List is justifiable by virtue of the powerful religious, artistic or cultural associations of the natural element rather than material cultural evidence, which may be insignificant or even absent (WHC 2008, 86).

Appendix 5. Additional UNESCO articles conerning heritage

The following articles issued by UNESCO state the following additional articles:[120]

Article 4

Each State Party to this Convention recognizes that the duty of ensuring the identification, protection, conservation, presentation, and transmission to future generations of the cultural and natural heritage referred to in Articles 1 and 2 and situated on its territory, belongs primarily to that State. It will do all it can to this end, to the utmost of its own resources and, where appropriate, with any international assistance and cooperation, in particular, financial, artistic, scientific and technical, which it may be able to obtain.

Article 5

To ensure that effective and active measures are taken for the protection, conservation, and presentation of the cultural and natural heritage situated on its territory, each States Party to this Convention shall endeavour, in so far as possible, and as appropriate for each country:

(a) to adopt a general policy which aims to give the cultural and natural heritage a function in the life of the community and to integrate the protection of that heritage into comprehensive planning programmes;

(b) to set up within its territories, where such services do not exist, one or more services for the protection, conservation, and presentation of the cultural and natural heritage with an appropriate staff and possessing the means to discharge their functions;

(c) to develop scientific and technical studies and research and to work out such operating methods as will make the State capable of counteracting the dangers that threaten its cultural or natural heritage;

[120] https://whc.unesco.org/document/102033

(d) to take the appropriate legal, scientific, technical, administrative, and financial measures necessary for the identification, protection, conservation, presentation, and rehabilitation of this heritage; and

(e) to foster the establishment or development of national or regional centres for training in the protection, conservation, and presentation of the cultural and natural heritage and to encourage scientific research in this field.

The UNESCO convention of 1970 states the following:[121]

Article 1

For the purposes of this Convention, the term "cultural property" means property which, on religious or secular grounds, is specifically designated by each State as being of importance for archaeology, prehistory, history, literature, art, or science and which belongs to the following categories:

(a) Rare collections and specimens of fauna, flora, minerals, and anatomy, and objects of palaeontological interest;

(c) products of archaeological excavations (including regular and clandestine) or of archaeological discoveries;

Article 6

The States Parties to this Convention undertake:

(a) to introduce an appropriate certificate in which the exporting State would specify that the export of the cultural property in question is authorized. The certificate should accompany all items of cultural property exported in accordance with the regulations;

(b) to prohibit the exportation of cultural property from their territory unless accompanied by the above-mentioned export certificate;

(c) to publicize this prohibition by appropriate means, particularly among persons likely to export or import cultural property.

[121] http://portal.unesco.org/en/ev.phpURL_ID=13039&URL_DO=DO_TOPIC&URL_SECTION=201.html

Article 10

The States Parties to this Convention undertake:

(a) to restrict by education, information, and vigilance, movement of cultural property illegally removed from any State Party to this Convention and, as appropriate for each country, oblige antique dealers, subject to penal or administrative sanctions, to maintain a register recording the origin of each item of cultural property, names and addresses of the supplier, description and price of each item sold and to inform the purchaser of the cultural property of the export prohibition to which such property may be subject;

(b) to endeavour by educational means to create and develop in the public mind a realization of the value of cultural property and the threat to the cultural heritage created by theft, clandestine excavations, and illicit exports.

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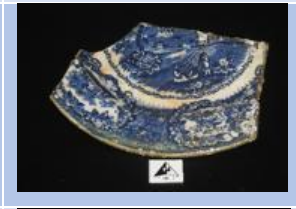
Appendix 6. Ceramic types found at Plantation Esthersrust during fieldwork.

#	Object	Provenience	Photo object	Surface treatment	Paste type	temper	Notes
1	Refined earthenware	Surface Collection		Lead glaze with tin-oxide	Kaolin clay	Sand, feldspar, petuntse	Makers mark on plate: P. REGOUT & CO MAASTRICHT.
2	Refined earthenware	Surface Collection		Lead glaze with tin-oxide	Kaolin clay	Sand, feldspar, petuntse	Date range: 1795-1830
3	Refined earthenware	Surface Collection		Lead glaze with tin-oxide	Kaolin clay	Sand, feldspar, petuntse	Date range: 1708-1786
4	Refined earthenware	Surface Collection		Lead glaze with tin-oxide	Kaolin clay	Sand, feldspar, petuntse	Makers mark on the plate: SARDINIA J.& M.P.B.& Co.

5	Faience	Feature 7		Tin-glazed	Clay	Sand, lime, marl	Date range polychrome flowers: before and after 1750; rim lines: 1729-1793
6	Faience	Feature 5		Tin-glazed	Clay	Sand, lime, marl	Date range rim lines: 1729-1793; geometric figures: unknown
7	Refined earthenware	Feature 5		Lead glaze with tin-oxide	Kaolin clay	Sand, feldspar, petuntse	Date range: post-1820
8	Refined earthenware/Yellowware	Surface Collection		Lead glaze with tin-oxide	Kaolin clay	Sand, feldspar, petuntse	Date range: late 18th century

9	Redware	Surface Collection		Lead glaze	Clay	Sand, quartz	Date range: 1715-1900
10	Stoneware	Surface Collection		Salt-glazed	Clay	Sand, iron-oxide, quartz	Bartmann Krug, produced between 1500-19th century
11	Faience	Surface Collection		Tin-glazed	Clay	Sand, lime, marl	Date range: 1795-1867
12	Faience	Surface Collection		Tin-glazed	Clay	Sand, lime, marl	Date range: late 17th-mid 18th century
13	Refined earthenware	Surface Collection		Lead glaze with tin-oxide	Kaolin clay	Sand, feldspar, petuntse	Date range: 1793-1868

14	Faience	Surface Collection		Tin-glazed	Clay	Sand, lime, marl	Date range: before and after 1750
15	Refined earthenware	Surface Collection		Lead glaze with tin-oxide	Kaolin clay	Sand, feldspar, petuntse	Date range: 1793-1870
16	Refined earthenware	Surface Collection		Lead glaze with tin-oxide	Kaolin clay	Sand, feldspar, petuntse	Date range continuous flower border: 1784-1856/ Exotic view: 1793-1868
17	Refined earthenware	Surface Collection		Lead glaze with tin-oxide	Kaolin clay	Sand, feldspar, petuntse	Date range: 1815-1837
18	Refined earthenware	Surface Collection		Lead glaze with tin-oxide	Kaolin clay	Sand, feldspar, petuntse	Date range: 1795-1867
19	Stoneware	Surface Collection		Salt-glazed	Clay	Sand, iron-oxide, quartz	Date range: 17th-20th century

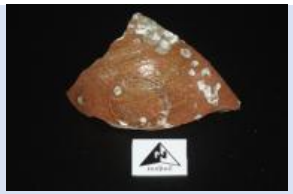
20	Stoneware	Surface Collection		Speckled brown slip and salt-glazed	Clay	Sand, iron-oxide, quartz	Date range: 17th-20th century
21	Refined earthenware	Surface Collection		Glaze	Kaolin clay	Sand, feldspar, petuntse	Popchi Globo, manufactured in Aruba/Curaçao. Date range: 1896-1920

Table 6. Unique Ceramic objects found at Plantation Esthersrust. Made by Sushmeeta Ganesh and edited by Santosh Singh. Photos by Stephan Fokké

Table 6 shows the ceramics that are unique in their decoration and surface treatment. Some of these have a maker's mark which makes it easier to determine their country of origin and in what timeframe they were created and used in.

Appendix 7. List of artefacts found at Plantation Esthersrust

#	Photo #	Date	Artefact	Catalogue #	Remarks	Weight	Length	Width	Thickness	Diameter	Cnt
1	9353	24-01-20	1x faience	ER20-122	S.C.	33 gr.	55.04 mm	31.11 mm	12.16 mm	-	1
2	9353	24-01-20	1x metal UID	ER20-108	S.C.	12 gr.	56.94 mm	26.48 mm	0.71 mm	30.63 mm	1
3	9354	24-01-20	1x glass bottleneck (green)	ER20-154	S.C.	41 gr.	(depth) 23.64 mm	-	10.34 mm	-	1
4	9355	24-01-20	1x button	ER20-136A	S.C.	7 gr.	-	-	3.75 mm	25.07 mm	1
			1x button (wood)	ER20-145A	S.C.	1 gr.	-	-	-	10.33 mm	1
			1x button (wood)	ER20-145B	S.C.	1 gr.	-	-	-	11.18 mm	1
5	9356	24-01-20	1x faience (powdering ensp.)	ER20-96	S.C.	42 gr.	-	-	4 mm	-	1
6	9358	24-01-20	1x glass base	ER20-188A	S.C.	19 gr.	31.82 mm	-	6.01 mm	-	1
7	9362	24-01-20	1x coin	ER20-151	S.C.	-	-	-	0.53 mm	19.62 mm	1
			1x button	ER20-152A	S.C.	1 gr.	-	-	1.38 mm	18.21 mm	1
			1x belt buckle	ER20-152B	S.C.	3 gr.	26.62 mm	29.58 m	2.44 mm	-	1
			1x glass cork	ER20-150	S.C.	36 gr.	-	(depth) 20.44 mm	-	41.31 mm	1
8	9363	24-01-20	1x faience (one colour)[122]	ER20-88	S.C.	-	101.67 mm	83.11 mm	6.78 mm	-	1
			1x glass sherd (Praag & Co)	ER20-89	S.C.	69 gr.	92.11 mm	61.73 mm	15.13 mm	-	1
			1x stoneware (barbamang)	ER20-90	S.C.	202 gr.	107.80 mm	80.64 mm	10.44 mm	-	1
9	9364	24-01-20	1x R.E.	ER20- 47	S.C.	27 gr.	55.11 mm	47.94 mm	5.52 mm	-	1
10	9365	24-01-20	1x stoneware with mark	ER20- 111	S.C.	36 gr.	79.03 mm	60.89 mm	5.96 mm	-	1
			1x pipe with mark	ER20-110	S.C.	19 gr.	45.06 mm	24.06 mm	2.50 mm	-	1
11	9366	24-01-20	1x faience knob	ER20-118	S.C.	19 gr.	-	-	-	37.54 mm	1
12	9367	24-01-20	1x faience	ER20-117	S.C.	15 gr.	-	-	-	28.61 mm	1
13	9368	24-01-20	1x stoneware with mark	ER20-73	S.C.	10 gr.	-	-	4.38 mm	-	1
14	9369	24-01-20	1x stoneware handle	ER20-124	S.C.	85 gr.	61.32 mm	84.99 mm	(rim) 11.59 mm	-	1
15	9370	24-01-20	1x glass base	ER20-131B	S.C.	42 gr.	17.49 mm	64.54 mm	6.97 mm	-	1

[122] Tin glazed and hand painted flowers

			1x R.E.	ER20-132A	S.C.	27 gr.	32.88 mm	36.23 mm	4.38 mm	-	1
			1x R.E.	ER20-132B	S.C.	1 gr.	16.76 mm	16.20 mm	5.13 mm	-	1
			1x glass shard (Gin)	ER20-131A	S.C.	20 gr.	37.41 mm	45.51 mm	7.36 mm	-	1
16	9371	24-01-20	1x glass cork???	ER20- 134	S.C.	59 gr.	56.14 mm	49.77 mm	3.61 mm	-	1
			1x UID (tooth)	ER20-133	S.C.	2 gr.	20.36 mm	20.11 mm	7.77 mm	-	1
			1x R.E. (pearlware 4x cows)	ER20-135	S.C.	31 gr.	49.72 mm	63.56 mm	5.60 mm	-	1
17	9372	24-01-20	1x faience	ER20-119	S.C.	17 gr.	47.18 mm	37.38 mm	0.23 mm	-	1
18	9373	24-01-20	1x pipe	ER20-108	S.C.	12 gr.	56.94 mm	24.18 mm	4.92 mm	-	1
			1x faience (handpainted flowers)	ER20-107	S.C.	17 gr.	38.84 mm	38.34 mm	6.66 mm	-	1
			1x glass bottleneck (darkgreen)	ER20-106	S.C.	47 gr.	-	-	4.15 mm	42.29 mm	1
19	9374	24-01-20	1x stoneware handle	ER20-128	S.C.	179 gr.	101.28 gr.	85.38 gr	(Rim) 7.62mm	-	1
20	9375	24-01-20	1x R.E.	ER20-70	S.C.	79 gr.	95.52 mm	59.23 mm	8.15 mm	-	1
21	9376	24-01-20	1 x Pipe	ER20-142	S.C.	27 gr.	51.05 mm	31.32 mm	4.31 m	-	1
			1x faience	ER20-76A	S.C.	9 gr.	59.53 mm	41.03 mm	4.17 mm	-	1
22	9377	24-01-20	1x faience	ER20-76B	S.C.	2 gr.	28.33 mm	26.17 mm	3.79 mm	-	1
23	9378	24-01-20	1x bone	ER20-148	S.C.	1 gr.	-	-	-	17.97 mm	1
24	9379	24-01-20	1x faience (handpainted) polychrome flower	ER20-75	S.C.	22 gr.	72.33 mm	48.82 mm	4.55 mm	-	1
			1x R.E.	ER20-46 A	Feature 5	13 gr.	47.69 mm	35.65 mm	5.38 mm	-	1
25	9381	24-01-20	1x button	ER20-147	S.C.	2 gr.	-	-	-	17.22 mm	1
			1x blue bead (Diamond cut)	ER20-140	S.C.	1 gr.	-	-	-	9.03 mm	1
			1x R.E.	ER20-115	S.C.	2 gr.	49.40 mm	39.14 mm	4.29 mm	-	1
26	9382	24-01-20	1x faience base (floral with people)	ER20-129	S.C.	31 gr.	76.77 mm	40.72 mm	4.57 mm	-	1
			1x glass cork (circular dots)	ER20-48	Feature 5	29 gr.	94.13 mm	52.51 mm	3.25 m	-	1
			1x UID	ER20-127	S.C.	-	-	-	9.09 mm	12.35 mm	1
			1x glass base	ER20-40	Feature 5	18 gr.	-	-	-	90.62 mm	1
27	9383	24-01-20	1x R.E.	ER20-37	Feature 5	12 gr.	47.08 mm	26.71 mm	3.37 mm	-	1
			1x pipe with mark	ER20-114	S.C.	20 gr.	47.34 mm	26.46 mm	2.19 mm	-	1
			1x ceramic pipe	ER20-37	Feature 5	12 gr.	47.08 mm	26.71 mm	3.37 mm	-	1
			1x glass	ER20-188B	S.C.	4 gr.	20.43 mm	18.56 mm	6.26 mm	-	1

28	9385	24-01-20	1x wood piece	ER20-143	S.C.	326 gr.	160.20 mm	49.30 mm	-	-	1
			1x pipe	ER20-39	Feature 5	20 gr.	54.80 mm	26.90 mm	4,28 m	-	1
29	9386	24-01-20	1x stoneware bottleneck	ER20-130A	S.C.	46 gr.	60.03 mm	28.92 mm	7.61 m	-	1
			1x button (trumpet)	ER20-136B	S.C	3 gr.	-	-	2.41 mm	18.64 mm	1
			1x button (wood)	ER20-139	S.C.	1 gr.	-	-	-	16.77 mm	1
30	9387	24-01-20	1x faience	ER20-27	Feature 5	12 gr.	-	-	5.89 mm	-	1
			1x metal UID	ER20-26	Feature 5	3 gr.	-	-	0.48 mm	27.91 mm	1
31	9388	24-01-20	1x R.E.	ER20-101	S.C.	31 gr.	56.31 mm	51.87 mm	6.63 mm	-	1
			1x glass	ER20-81C	S.C.	4 gr.	39.78 mm	17.57 mm	5.48 mm	-	1
32	9390	24-01-20	1x green bead	ER20-8	Feature 3	1 gr.	-	-	08.25 gr.	10.90 mm	1
			1x bottle	ER20-9	Feature 3	20 gr.	43.23 mm	22.99 mm	02.40 mm	-	1
33	9391	24-01-20	1x R.E. (whiteware edge molded)	ER20-60	Feature 8	-	77.77 mm	48.61 mm	04.19 mm	-	1
			1x stoneware bottleneck	ER20-62	Feature 8	-	85.02 mm	-	5.72 mm	-	1
			1x glass base	ER20-61	Feature 8	14 gr.	19.24 mm	37.42 mm	02.76 mm	-	1
34	9392	24-01-20	1x bottleneck	ER20-125	S.C.	61 gr.	59.63 mm	28.02 mm	2.90 mm	-	1
			1x musket ball	ER20-126	S.C.	8 gr.	-	-	-	20.09 mm	1
35	9393	24-01-20	1x faience base (blue lines)	ER20-97	S.C.	234 gr.	-	-	4 mm	6.64 mm	1
			1x glass bottleneck	ER20-81A	S.C.	18 gr.	126.27mm	-	2.97 mm	28.71 mm	1
			1x glass sherd	ER20-81B	S.C.	8 gr.	61.15 mm	42.54 m	2.97 mm	-	1
36	9394	24-01-20	1x button	ER20-138	S.C.	1 gr.	-	-	-	13.21 mm	1
37	9395	24-01-20	1x metal UID (circular marking)	ER20-144	S.C.	4 gr.	-	-	1.64 mm	27.06 mm	1
38	9396	24-01-20	1x stoneware with mark	ER20-95	S.C.	31 gr.	-	-	5.76 mm	-	1
39	9397	24-01-20	1x bone	ER20-68	S.C.	11 gr.	99.66 mm	5.02 mm	2.89 mm	-	1
40	9398	24-01-20	1x bone	ER20-25	Feature 4	20 gr.	106.03 mm	-	10.75 mm	-	1
41	9399	24-01-20	1x metal UID	ER20-24	Feature 4	664 gr.	166.51 mm	-	03.90 mm	-	1
			1x metal UID	ER20-23A	Feature 4	68 gr.	-	-	03.30 mm	-	2
			1x metal UID	ER20-23B	Feature 4	50 gr.	-	-	03.64 mm	-	
42	9401	24-01-20	1x R.E. doll (popchi globo)	ER20-99	S.C.	12 gr.	36.35 mm	11.70 mm	-	-	1

43	9402	24-01-20	1x cologne bottle	ER20-123	S.C.	172 gr.	123.16 mm	44.30 mm	3.54 mm	-	1
44	9403	24-01-20	1x glass bottle	ER20-66A	S.C.	468 gr.	228.50 mm	68.09 mm	06.92 mm	-	3
			1x glass bottle	ER20-66B	S.C.	279 gr.	186.26 mm	56.28 mm	06.29 mm	-	
			1x glass bottle	ER20-66C	S.C.	213 gr.	192.60 mm	52.08 mm	04.54 mm	-	
			1x round shaped glass	ER20-67	S.C.	46 gr.	-	-	-	107.81 mm	1
45	9404	24-01-20	1x coin	ER20-98A	S.C.	1 gr.	-	-	1.35 mm	1.12 mm	1
			2x coins (stuck together)	ER20-98B	S.C.	3 gram	-	-	1.12 mm	20.64 mm	1
46	9405	24-01-20	1x R.E. (whole plate with mark)	ER20-71	S.C.	694 gr.	-	-	6.59 mm	259.35 mm	1
47	9406	24-01-20	1x glass base with marking	ER20-4	Feature 2	292 gr.	-	-	368 mm	101.27mm	1
48	9407	24-01-20	3x metal pieces	ER20- 1ABC	Feature 1	233 gr.	130.03 mm	-	09.96 mm	-	3
			1x metal UID	ER20-155	S.C.	109 gr.	60.62 mm	17.24 mm	17.47 mm	-	1
			1x metal UID	-	-	-	-	-	-	-	1
49	9408	24-01-20	1x glass seal with description	ER20-74	S.C.	13 gr.	-	-	5.73 mm	35.29 mm	1
50	9409	24-01-20	1x R.E. (partial plate with mark)	ER20-69	S.C.	374 gr.	-	-	5.24 mm	230.79 mm	1
51	9410	24-01-20	1x marble	ER20-102	S.C.	2 gr.	-	-	-	13.35 mm	1
			1x glass cork???	ER20-103	S.C.	17 gr.	45.12 mm	9.09 mm	2.85 mm	-	1
52	9411	24-01-20	1x coin	ER20-121	S.C.	2 gr.	-	-	111 mm	-	1
			1x R.E. (rouletted rim)	ER20-93	S.C	22 gr.	88.65 mm	73.93 m	4.41 mm	-	1
53	9412	24-01-20	1x coin (modern)	ER20-120	S.C.	1 gr.	-	-	-	15.80 mm	1
54	9413	24-01-20	1x R.E. rim (romantic scene)	ER20-65	Feature 9	46 gr.	80.31 mm	76.34 mm	4.96 mm	-	1
55	9474	25-01-20	1x faience (broken bowl)	ER20-59	Feature 7	291 gr.	115.31 mm	-	115.31mm	-	

56	9475	25-01-20	1x metal UID	ER20-58	Feature 6	1 gram	38.41mm	31.50mm	02.01mm	-	1
			1x button (plastic)	ER20-57	Feature 6	1 gram	-	-	02.85 mm	16.60mm	1
57	9476	24-01-20	1 x glass object	ER20-56A	Feature 6	196 gr.	115.15 mm	94.08 mm	13.02 mm	-	2
			1x glass cork	ER20-56B	Feature 6	25 gr.	28.41 mm	-	07.65 mm	-	
58	9477	25-01-20	1x glass bottleneck	ER20-51	Feature 6	39 gr.	62.69 mm	-	03.03 mm	29.04 mm	1
			1x coin	ER20-55	Feature 6	0 gr.		-	0.71 mm	21.10 mm	1
			1x bead (diamond cut)	ER20-52	Feature 6	2 gr.	-	-		11.19 mm	1
59	9478	25-01-20	1x R.E. (countryside)	ER20-45	Feature 5	33 gr.	75.17 mm	49.47 mm	5.35 mm	-	1
60	9479	25-01-20	1x R.E.	ER20-30	Feature 5	61 gr.	64.04 mm	44.07 mm	8.69 mm	-	1
			1x R.E	ER20-50A	Feature 5	48 gr.	86.25 mm	39.92 mm	3.95 mm	-	1
			1x stoneware handle	ER20-50B	Feature 5	164 gr.	100.60 mm	39.92 mm	-	-	1
61	9480	25-01-20	1x black bead (diamond cut)	ER20-35B	Feature 5	1 gr.	-	-	9,44 mm	10.26 mm	1
			1x faience	ER20-36A	Feature 5	49 gr.	56.56 mm	45,75 mm	35.10 mm	-	1
			1x stoneware handle	ER20-36B	Feature 5	70 gr.	82,89 mm	68.35 mm	3.98 mm	-	1
			1x blue bead	ER20-35A	Feature 5	1 gr.	-	-	7.08 mm	9.38 mm	1
62	9481	25-01-20	1x metal knife	ER20-42A	Feature 5	238 gr.	202.28 mm	48.81 mm	09.43 mm	-	5
			1x metal knife	ER20-42B	Feature 5	96 gr.	112.28 mm	46.76 mm	07.05 mm	-	
			1x metal knife	ER20-42C	Feature 5	256 gr.	205.26 mm	46.72 mm	11.32 mm	-	
			1x metal knife	ER20-42D	Feature 5	65 gr.	79.93 mm	38.69 mm	07.76 mm	-	
			1x metal knife	ER20-42E	Feature 5	362 gr	224.49 mm	47.63 mm	16.37 mm	-	
63	9482	25-01-20	1x metal UID	ER20-22A	Feature 3	40 gr.	36.77 mm		02.72 mm	-	3
		25-01-20	1x metal UID	ER20-22B	Feature 3		36.58 mm	18.09 mm	03.24 mm	-	
		25-01-20	1x metal UID	ER20-22C	Feature 3		67.81 mm	45.21 mm	0.71 mm	-	
64	9483	25-01-20	1x faience	ER20-21	Feature 3	14 gr.	53.01 mm	42.38 mm	4.31 mm	-	1
			1x metal UID	ER20-19	Feature 3	12 gr.	39.16 mm	-	1.90 mm	-	1
			1x button	ER20-146	S.C.	1 gr.	-	-	-	17.95 mm	1
			1x stoneware	ER20-20 A	Feature 3	79 gr.	-	-	-	7.24 mm	1
			1x R.E.	ER20-20 C	Feature 3	50 gr.	-	-	8.52 mm	-	1

65	9484	25-01-20	1x glass (brown)+ description	ER20-10	Feature 3	12 gr.	-	-	5.18 mm	35.29 mm	1
66	9485	25-01-20	1 x R.E. rim	ER20-109A	Feature 3	107 gr.	133.26 mm	140.48 mm	6.04 mm	-	2
			1x R.E. handle	Er20-109B	Feature 3	23 gr.	76.19 mm	17.89 mm	12.53 mm	-	
67	9486	25-01-20	1x spoon	ER20-17	Feature 3	81 gr.	173.02 mm	40.19 mm	03.77 mm		1
			1x R.E. (architecture + landscape) makers mark	ER20-16	Feature 3	23 gr.	67.32 mm	45.57 mm	6.84 mm	-	1
			1x pipe with makers mark	ER20-15	Feature 3	24 gr.	57.47 mm	25.93 mm	02.07 mm		1
68	9487	25-01-20	1x metal UID	ER20-11	Feature 3	19 gr.	-	-	5.18 mm	54.81 mm	1
69	9489	25-01-20	1x glass (blue)	ER20-6	Feature 3	87 gr.	-	-	7.91 mm	-	1
			1x R.E. (architecture + landscape) makers mark	ER20-7	Feature 3	146 gr.	-	-	7.78 mm	-	1
70	9490	25-01-20	1x metal UID	ER20-12A-C	Feature 3	77 gr.	-	-	3.62 mm	-	3
			1x metal UID	ER20-53	Feature 6	6 gr.	-	-	0.64 mm	31.32 mm	1
			1x metal UID	ER20-32C	Feature 5	1 gr.	-	-	-	13.32 mm	1
			1x faience	ER20-20 B	Feature 3	48 gr.	-	-	-	4.95 mm	1
71	9491	25-01-20	1x Glass bottle	ER20-31B	Feature 5	55 gr.	37.83 mm	39.72 mm	3.54 mm	-	1
			1x spoon	ER20-32A	Feature 5	40 gr.	73.77 mm	48.52 mm	2.10 mm	-	1
			1x metal UID	ER20-32B	Feature 5	6 gr.	30.99 mm	21.70 mm	1,80 mm	-	1
			1x glass sherd with mark	ER20-31A	Feature 5	3 gram	43.77 mm	23.15 mm	3.16 mm	-	1
			1x glass piece	ER20-31C	Feature 5	27 gram	59.87 mm	15.19 mm	4.14 mm	-	1
			1x decorated pipe stem	ER20-28	Feature 5	1 gr.	21.63 mm	7.40 mm	5.04 mm	-	1
			1x coin	ER20-29	Feature 5	3 gr.	-	-	-	21.25mm	1
			1x button	ER20-18	Feature 3	1 gr.	-	-	1.98 mm	14.31 mm	1
			1x faience knob	ER20-44	Feature 5	20 gr.	44.84 mm	29.27 mm	12.72 mm	-	1
72	9492	25-01-20	1x dice	ER20-13	Feature 3	12 gr.	21.06 mm	-	-	-	1
			1x belt buckle	ER20-14C	Feature 3		32.45 mm	22.95 mm	1.44 mm	-	1
			1x metal UID’s	ER20-14B	Feature 3		38.53 mm	25.05 mm	0.77 mm	-	1
			1x metal UID	ER20-14A	Feature 3	31 gram	43.95 mm	24.85 mm	0.72 mm	-	1
			1x metal UID	ER20-14D	Feature 3		43.91 mm	46.25 mm	3.05 mm	-	1

73	9493	25-01-20	1x glass base	ER20-5	Feature 3	109 gr.	-	-	6.74 mm	62.70 mm	1
74	9494	25-01-20	1x glass base	ER20-34A	Feature 5	12 gr.	-	-	07.56 mm		1
			1x R.E. (geometric motive with Chinoi serie) (makers mark: n. stone. China) dark blue/ white	ER20-33	Feature 5	14 gr.	-	-	04.96 mm	-	1
			1x glass handle	ER20-34B	Feature 5	28 gr.	-	-	04.55 mm	-	1
75	9498	25-01-20	1x R.E.	ER20-41	Feature 5	204 gr.	-	-	5.50 m	-	1
76	9499	25-01-20	1x globular object	ER20- 43	Feature 5	8 gr.	-	-	-	19.40 mm	1
77	9500	25-01-20	1x R.E.	ER20-94	S.C.	11 gr.	-	-	6.81 mm	-	1
78	9501	25-01-20	1x button (fresh break)	ER20- 2ABC	Feature 2	1 gr.			02.02 mm	17.80 mm	3
79	9502	25-01-20	1x glass sherd (transparent)	ER20- 116	S.C.	14 gr.	-	-	-	23.38 mm	1
80	9505	25-01-20	1x marble (transparent green)	ER20- 63	Feature 9	9 gr.	-	-	-	18.08	1
			1x decorated pipe (Napoleon)	ER20- 64	Feature 9	29 gram	43.98 mm	30.92 mm	02.90mm		1
82	1	25-01-20	1x R.E..	ER20-50C	S.C.	18 gr.	46.88 mm	41.79 mm	6.52 mm	-	1
83	2	25-01-20	1x bone	ER20-80	S.C.	41 gr.	170.25 mm	18.55 mm	11.25 mm	-	1
			1x stoneware	ER20-77G	S.C.	202 gr.	-	-	5.61 mm	118.85 mm	1
			1x R.E. (makers mark)	ER20-72	S.C.	-	128.95 mm	58.52 mm	6.23 mm	-	1
			1x R.E.	ER20-77D	S.C.	11 gr.	45.47mm	31.39 mm	5.21 mm	-	1
			1x R.E.	ER20-77H	S.C.	11 gr.	41.98 mm	29.07 mm	4.82 mm	-	1
			1x R.E.	ER20-77E	S.C.	78 gr.	87.77 mm	57.66 mm	7.69 mm	-	1
			1x R.E. handle	Er20-77F	S.C.	13 gr.	41.51 mm	22.70 mm	8.83 mm	-	1
			1x pipe stem	ER20-78	S.C.	1 gr.	36.03 mm	5.34 mm	2.09 m	-	1
			1x marble	ER20-79	S.C.	5 gr.	-	-	-	15.45 mm	1
84	3	25-01-20	1x glass base (blue Calcutta)	ER20-91A	S.C.	216 gr.	-	-	3.35 mm	78.88 mm	1
			1 x glass cork (light blue)	ER20-91B	S.C.	66 gr.	-	(Depth) 24.93 mm.	-	49.40 mm	1
85	4	25-01-20	1x R.E.	ER20-77A	S.C.	95 gr.	118.75 mm	76.15 mm	5.17 mm	-	1
			1x decorated rim (faience)	ER20-77B	S.C.	37 gr.	81.20 mm	31.73 mm	6.31 mm	-	1

86	5	26-01-20	1x brick with initials (RTI)	ER20-160	S.C.	-	23 cm	100.26 mm	58.43 mm	-	1
87	6	26-01-20	1x L- shaped brick	ER20-162	S.C.	-	22 cm	102.35 mm	66.22 m	-	1
88	7	26-01-20	1x faience (blue rim)	ER20-87B	S.C.	89 gr.	138.35 mm	69.67 mm	4.73 mm	-	1
			1x faience (green rim)	ER20-87C	S.C.	30 gr.	81.54 mm	65,15 mm	4.06 mm	-	1
			1x faience base	ER20-87A	S.C.	142 gr.	120.81 mm	63.25 mm	6.62 mm	-	1
			1x faience appendage	ER20-87D	S.C.	12 gr.	42.57 mm	15.80 mm	10.08 mm	-	1
			1x belt buckle	ER20-86A	S.C.	17 gr.	-	-	4.36 mm	-	1
			1x button brown (wood)	ER20-85A	S.C.	1 gr.	-	-	-	17.94 mm	1
			1x button white (plastic)	ER20-85B	S.C.	1 gr.	-	-	-	16.59 mm	1
			1x button white (shell)	ER20-85C	S.C.	1 gr.	-	-	-	9.36 mm	1
			1x blue bead (longshaped)	ER20-105B	S.C.	1 gr.	-	-	0.76 mm	4.50 mm	1
			1x metal UID	ER20-86B	S.C.	8 gr.	-	-	4.89 mm	33.72 mm	1
89	8	25-01-20	1x glass bottleneck (Bacardi)[123]	ER20-149	S.C.	10 gr.	109.47 mm	49.33 mm	5.27 mm	-	1
90	9	25-01-20	1x stoneware base	ER20-153	S.C.	3549 gr.	245.91 mm	-	7.72 mm	141.27 mm	1
91	10	26-01-20	1x lead piece	ER20-161A	S.C.	610 gr.	24 cm	11 cm	3.35 mm	-	1
			1x lead piece	ER20-161B	S.C.	935 gr.	36 cm	11 cm	3.84 mm	-	1
92	11	26-01-20	1x stone base	ER20-163	S.C.	-	30 cm	20 cm	51.62 mm	-	1
93	12	26-01-20	1x red/orange tile	ER20-159	S.C.	>2 kg	22 cm	22 cm	24.60 mm	-	1
94	13	26-01-20	1x grey tile	ER20-156	S.C.	>2 kg	21 cm	21 cm	26.37 mm	-	1
95	14	26-01-20	1x brick teja orange	ER20-157	S.C.	2615 gr.	35 cm	26 cm	17.57 mm	-	1
96	15	26-01-20	1x teja teja black	ER20-158	S.C.	2375 gr.	36 cm	26 cm	15.65 mm	-	1
97	16	26-01-20	1x shell brick (klipsteen)	ER20-164	S.C.	481 gr.	17 cm	97.79 mm	21.45 mm	-	1
98	17	25-01-20	1x wooden cross	ER20-167	S.C.	-	177cm	70 cm	-	-	1
99	18a	26-01-20	1x wooden plank	ER20-172A	S.C.	-	43 cm	11 cm	1 cm	-	2
	18b	26-01-20	1x wooden plank	ER20-172B	S.C	-	53 cm	16 cm	1 cm	-	

[123] Transparent

100	19	09-02-20	1x belt buckle	ER20-168A	S.C	-	5 gr.	79.46 mm	-	0.58 mm	1
			1x belt buckle	ER20-168B	S.C	-	6 gr.	80.13 mm	-	0.70 mm	1
			1x stoneware + mark	ER20-169	S.C.	9 gr.	47.64 mm	37.86 mm	5.21 mm	-	1
101	20	09-02-20	1x R.E.	ER20-190A	S.C.	6 gr.	34.22 mm	34.51 mm	4.19 mm	-	1
			1x R.E.	Er20-190B	S.C.	8 gr.	43.32 mm	19.67 mm	9.22 m	-	1
			1x metal UID	ER20-179A	Feature 3	1 gr.	-	-	1 mm	10.59 mm	1
			1x bead (light blue)	ER20-105A	S.C.	1 gr.	-	-	3.03 mm	4.50 mm	1
			1x bead (blue)	ER20-83	S.C.	1 gr.	-	-	-	6.79 mm	1
			1x button	ER20-177A	Feature 3	1 gr.	-	-	-	3.18 mm	1
			1x button	ER20-177B	Feature 3	1 gr.	-	-	-	1.86 mm	1
			1x metal UID (gold-plated)	ER-176	Feature 3	3 gr.	30.98 mm	26.12 mm	0.52 mm	-	1
			1x marble	ER20-179C	Feature 3	4 gr.	-	-	-	15.55 mm	1
			1x button (metal)	ER20-175	Feature 5	22 gr.	-	-	-	19.03 mm	1
			1x metal UID	ER20-179B	Feature 3	1 gr.	15.50 mm	14.24 mm	1.61 mm	-	1
102	21	09-02-20	1x porcelain (base)	ER20-166A	Feature 5	46 gr.	82.62 mm	65.85 mm	2.92 mm	-	1
			1x porcelain	ER20-166B	Feature 5	64 gr.	93.44 mm	84.58 mm	3.35 mm	-	1
			1x other	ER20-189A	S.C.	4 gr.	34.38 mm	5.45 mm	-	-	1
			1x 0ther	ER20-189B	S.C.	6 gr.	78.80 mm	7 mm	-	-	1
103	22	09-02-20	1x Amerindian Ceramic (body)	ER20-171A	Feature 4	15 gr.	59.30 mm	41.69 mm	6.47 mm	-	3
			1x Amerindian Ceramic(base)	ER20-171B	Feature 4	60 gr.	89.80 mm	79.43 mm	7.12 mm	-	
			1x Amerindian Ceramic (Base+)	ER20-171C	Feature 4	211 gr.	149.76 mm	131.67 mm	7.64 mm	-	
			1x marble	ER20-182A	S.C.	5 gr.	-	-	-	16.08 mm	2
			1x marble	ER20-182B	S.C.	6 gr.	-	-	-	17.39 mm	
104	23	09-02-20	1x pipe	ER20-180A	S.C.	23 gr.	100.49 mm	-	1.62 mm	-	1
			1x pipe stem	ER20-180B	S.C	8 gr.	152 mm	-	6.71 mm	-	1
105	24	09-02-20	1x button (wood)	ER20-187A	S.C.	1 gr.	-	-	-	12.74 mm	5
			1x button (wood) (4 holes)	ER20-187B	S.C.	1 gr.	-	-	-	16.11 mm	
			1x button (wood) (4 holes)	ER20-187C	S.C.	1 gr.	-	-	-	19.00 mm	
			1x button (metal)	ER20-187D	S.C.	1 gr.	-	-	-	19.42 mm	
			1x button (metal)	ER20-187E	S.C.	1 gr.	-	-	-	25.70 mm	

	1x marble	ER20-170A	Feature 4	2 gr.	-	-	-	12.38 mm	2
	1x marble	ER20-170B	Feature 4	9 gr	-	-	-	19.47 mm	
	1x bead (white)	ER20-186A	S.C.	1 gr.	-	-	-	15.69 mm	5
	1x bead (linear)(green)	ER20-186B	S.C.	1 gr.	-	-	-	09.65 mm	
	1x bead (light blue)	ER20-186C	S.C.	1 gr.	-	-	-	10.26 mm	
	1x bead (diamond cut)(blue)	ER20-186D	S.C.	1 gr.	-	-	-	04.88 mm	
	1x bead (dark brown)	ER20-186E	S.C.	1 gr.	-	-	-	09.84 mm	
	1x glass (light blue bead)	ER20-178B	Feature 3	1 gr.	-	5.29 mm	-	6.71 mm	1
	1x glass (yellow bead)	Er20-178C	Feature 3	1 gr.	10.42 mm	9.56 mm	3.41 mm	5.61 mm	1
	1x R.E	ER20-165	Feature 5	35 gr.	72.56 mm	51.63 mm	3.86 mm	-	1
	1x nail	ER20-184A	S.C.	8 gr.	24.22 mm	5.82 mm	5.78 mm	-	2
	1x nail	ER20-184B	S.C.	11 gr	73.86 mm	4.38 mm	4.30 mm	-	
	1x coin	ER20-185A	S.C.	1 gr.	-	-	-	16.24 mm	3
	1x coin	ER20-185B	S.C.	1 gr.	-	-	-	19.91 mm	
	1x coin	ER20-185C	S.C.	1 gr.	-	-	-	20.17 mm	
	1x pipe	ER20-15	Feature 5	24 gr.	57.47 mm	25.93 mm	2.07 mm	-	1
	1x metal	ER20-169	S.C.	5 gr.	79.46 mm	9.15 mm	0.70 mm	-	1
	1x metal UID	ER20-183	S.C.	21 gr.	53.55 mm	25.28 mm	2.76 mm	-	1
	1x metal UID	ER20-178A	Feature 3	1 gr.	5.61 mm	5.20 mm	2.69 mm	5.61 mm	1
	1x redware	ER20-181	S.C.	172 gr.	118.67 mm	-	6.58 mm	-	1
	1x redware (slipdecorated)	ER20-104	S.C.	15 gr.	-	-	6.08 mm	-	1

Table 7. Artefact list of Plantation Esthersrust

R.E.. = Refined Earthenware

S.C.= Surface Collection (not associated with a feature)

UID= Unidentifiable Object

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