PANAMERICAN CONSULTANTS, INC.
Experts in Cultural Resource Management

REPORT OF FINDINGS

ABPP Grant No. GA2055-10-020

SUBMERGED CULTURAL RESOURCES SURVEY OF AN AREA ADJACENT TO PRINCE FREDERIK'S BATTERY, HASSEL ISLAND, ST. THOMAS, U.S. VIRGIN ISLANDS

SUBMITTED TO:

St. Thomas Historical Trust
St. Thomas, U.S. Virgin Islands

SUBMITTED BY:

Panamerican Consultants, Inc.
Memphis, Tennessee

NOVEMBER 2011

"This material is based upon work assisted by a grant from the Department of the Interior, National Park Service. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the view of the Department of the Interior."

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ABSTRACT

From late May to early June 2011, underwater archeologists with Panamerican Consultants, Inc. of Memphis, Tennessee conducted a submerged cultural resources investigation for the St. Thomas Historical Trust of an area surrounding Prince Frederik's Battery on the southeastern end of Hassel Island which comprises the western side of St. Thomas Harbor of the U.S. Virgin Islands. The focus of the investigation is an 1801 engagement between the battery and a British Naval vessel. Funded under the American Battlefield Protection Program (Grant No. GA2055-10-020) of the National Park Service, the investigation focused on the "Key Terrain; Observation and Fields of Fire; Cover and Concealment; Obstacles; and Avenues of Approach and Retreat (KOCOA)" of this naval engagement and comprised a magnetometer survey of the KOCOA-defined Project Area in order to identify submerged cultural resource sites or artifacts, diver probing of a grid pattern at a selected area in order to detect buried nonferrous artifacts or sites, and conduct an underwater metal detector survey of the foreshore area adjacent to the battery.

The remote sensing survey of the KOCOA-defined area and diver investigation showed the area is free of large anomalies or anomaly clusters that would indicate potential cultural resource sites, like a shipwreck. A number of relatively small anomalies with short durations were recorded throughout the area and three were identified for additional investigation. The source for one was modern debris, while the sources for the other two were unable to be located through probing or metal detecting.

Probing and metal detecting along the selected transect through the KOCOA-defined area located at least one and possibly two cannonballs.

With respect to the metal detection and visual inspection of the foreshore area, the survey revealed numerous metal targets. The majority of all finds were non-significant debris with the exception of the numerous observed cannonballs that most certainly are associated with the battery and fort, possibly even with the engagement itself. All cannonballs were visible on the surface, but metal detection of this area indicates the high likelihood for more buried round shot.

Unless additional information suggests otherwise, the naval engagement battlefield does not appear to meet National Register of Historic Places Criteria A, B, or C. And with respect to the presence of the ordnance, while there is the possibility these could represent isolated artifacts from the engagement, they could as well represent ordnance of training fire or other unassociated firing episodes, and relative to those adjacent to the fort, could well be lost or discarded shot unassociated with the battle. Because of the equivocal association of the ordnance to the naval battle, coupled with the fact that no vessels were lost during the engagement, it is our opinion that the battlefield is not likely to yield any archeological data and, therefore, does not meet National Register of Historic Places Criterion D as well.

ACKNOWLEDGEMENTS

The successful completion of this project is the direct result of the input and hard work of numerous individuals. Panamerican Consultants, Inc. would first like to thank the St. Thomas Historical Trust; and specifically Mr. Charles Consolvo, Chairman of the Hassel Island Task Force of the St. Thomas Historical Trust and Project Manager of the investigation grant, for allowing Panamerican Consultants, Inc. the opportunity to conduct this investigation. We also wish to extend out sincerest appreciation to Mr. Consolvo and his family for the hospitality shown to us during our stay at his home. The view of the harbor was spectacular and the paninis were superb.

Panamerican Consultants, Inc. would also like to thank the participants who, with their local knowledge and skills, helped make the field investigations successful. Mr. Consolvo provided and captained the dive vessel; Erik Miles, an island-based cinematographer, acted as project photographer; and Sean Loughman, owner of *The Pirates Chest* and an experienced local diver, performed the metal detector searches. All served as archeological divers. Also on board and diving with us for a day was Territorial Archeologist Brooke Persons.

In-house Panamerican Consultants, Inc. personnel, who must be thanked for their assistance with this report production, include Kate Gilow, Office Manager and Anna Hinnenkamp-Faulk, Editor.

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I. INTRODUCTION

From late May to early June 2011, Underwater Archeologists with Panamerican Consultants, Inc. (Panamerican), of Memphis, Tennessee conducted a submerged cultural resources investigation for the St. Thomas Historical Trust (Trust) of an area surrounding Prince Frederik's Battery on the southeastern end of Hassel Island which comprises the western side of St. Thomas Harbor of the U.S. Virgin Islands (Figure 1). The focus of the current investigation is the 1801 running engagement between a Danish and a British Naval vessel. The *HMS Arab* (formerly the 18-gun French privateer *Le Brave* captured by the British in 1798) was a 22-gun ship that, while patrolling local waters, challenged the Danish brig *HDMS Lougen* off St. Thomas. Begun with a broadside, after an engagement of approximately 40 minutes in which both vessels were damaged, the *HDMS Lougen* managed to escape into the harbor under the protective guns of Prince Frederik's Battery, which were firing round and grape shot at the *HMS Arab*, causing the British ship to break off the engagement.

Figure 1. General Project Area location map ("Eastern St. Thomas, V.I." USGS 1982).

Funded by the American Battlefield Protection Program (ABPP; Grant No. GA2055-10-020) of the National Park Service (NPS), the investigation focused on the "KOCOA" of this naval engagement. The NPS employs a traditional military analysis of battlefields called the KOCOA approach. KOCOA analysis uses defining features categorized into: **K**ey Terrain; **O**bservation and Fields of Fire; **C**over and Concealment; **O**bstacles; and **A**venues of Approach and Retreat. The defining features associated with the above battle would be the Observation and Fields of Fire, and Avenues of Approach.

Illustrated in Figure 2, the KOCOA of the Prince Frederik's Battery naval engagement was defined by Arcadia Preservations, LLC for and in concert with the Trust, and the submerged cultural resources investigation area was subsequently delineated within the KOCOA. Once defined, Panamerican's investigation was implemented between May 30 and June 3 and included the following components:

- Conduct a magnetometer survey of the KOCOA-defined Project Area in order to identify submerged cultural resource sites or artifacts
- Diver probing of a grid pattern at a to-be-selected area in order to detect buried nonferrous artifacts or sites (i.e., ballast pile)
- Direct and conduct an underwater metal detector survey of the foreshore area adjacent to the battery.

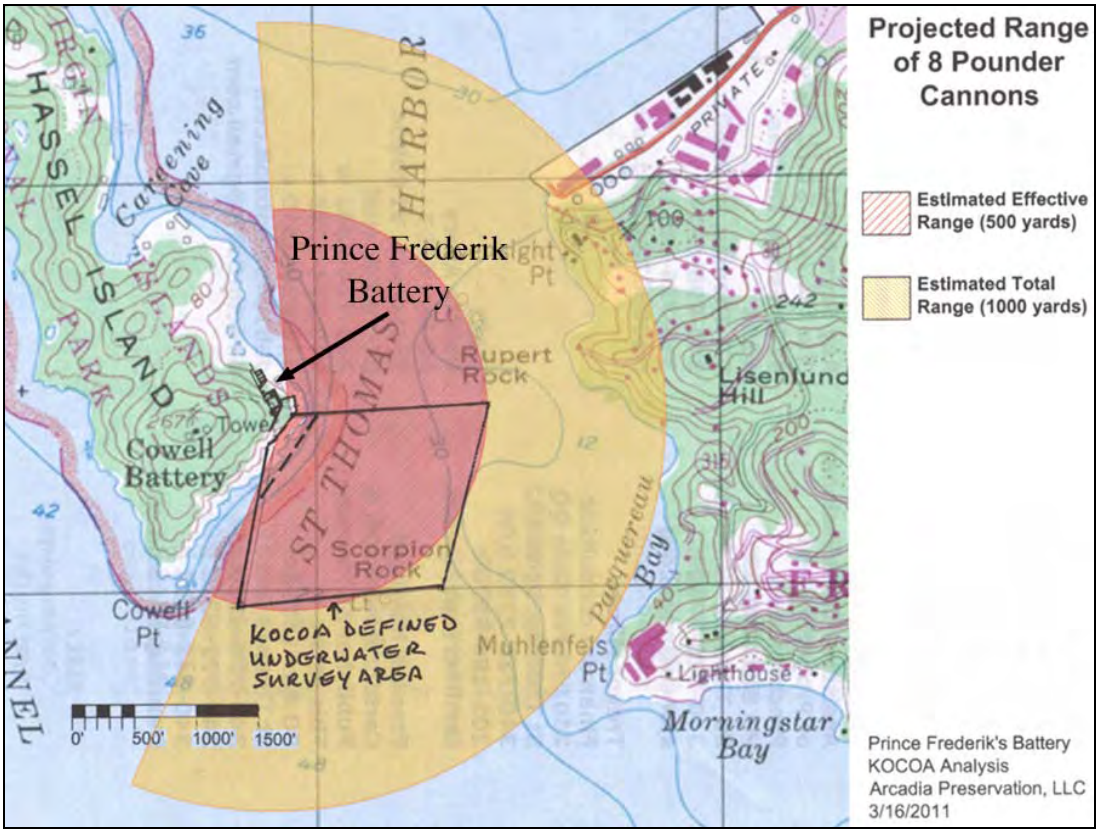

Figure 2. Underwater survey area within the KOCOA (courtesy of Arcadia Preservation, LLC).

Divided into chapters on *Historical Background*, *Field Methods*, *Investigative Findings*, and *Conclusions and Recommendations*, the following report presents the conduct and results of the investigation.

II. HISTORICAL BACKGROUND

The following chapter presents a broad overview of the historic development of the U.S. Virgin Islands in general and St. Thomas in particular, as well as project area site-specific backgrounds for both Charlotte Amalie Harbor and Hassel Island.

GEOLOGY

Charlotte Amalie Harbor is located on the southern-central coast of St. Thomas, U.S. Virgin Islands. The primary geologic features of St. Thomas are volcanic in origin and date to the Cretaceous era (about 100 million years old; Donnelly 1982:90). The underlying geology of St. Thomas is primarily andesite (commonly containing ferromagnetic minerals, which will affect magnetometer readings), and is composed mainly of volcanic tuffs and breccias. The geology of the island is closely related to the earlier geologic series in Puerto Rico, and is geologically more closely related to Puerto Rico and islands of the Greater Antilles than to the islands of the Lesser Antilles to the east and southeast (Kemp 1926:5). There is currently disagreement over whether to classify the U.S. Virgin Islands within the Greater Antilles or the Lesser Antilles, although the geologic link to the Greater Antilles is clear.

CLIMATE

The climate of the U.S. Virgin Islands is classified as maritime tropical, and the islands are too small to exert much effect on the surrounding climate of the Caribbean. There is little difference in the average temperature of summer and winter. The hottest month is August, with a daily average maximum temperature of 89° F. The coolest months are January and February, which have an average daily maximum temperature of 83° F. The daily minimum average temperature in August is 76° F, while the average daily minimum temperature in January and February is 70° F (Rivera et al. 1970:73-74).

The average annual rainfall varies widely by location in the U.S. Virgin Islands. Higher elevations normally receive 50–60 inches of rain annually, while areas of lower elevation receive 20–30 inches. The trade winds invariably blow from the east to west, but vary daily in velocity. The eastern (windward) end of St. Thomas is exposed to the constant effects of the trade winds, which increases evaporation and decreases the benefits of rainfall. The increased evaporation caused by the trade winds on the eastern end of St. Thomas is exacerbated by the fact that the area receives less rainfall annually than the western (leeward) end. This same situation prevails on the eastern end of St. John (Rivera et al. 1970:73).

Droughts have played a major role in the agricultural history of the U.S. Virgin Islands and were doubtless factors in population maintenance and increase during prehistoric periods as well. Rivera et al. state:

> "…periods of deficient rainfall occur almost every year in some parts of the Virgin Islands. Although some of these periods are of short duration, they have a serious impact on farming and dairying activities, on the urban water supply, and on the general economy. The islands have no large rivers and no large storage reservoirs. Inner Brass, specifically, has no permanent or even temporary, seasonal drainages. Consequently, even a few months of drought can be damaging. Droughts are most prevalent late in fall, in winter, and early in the spring" [Rivera et al. 1970:75].

The severity of drought on the islands has been computed by the Palmer Index that was developed by the Environmental Data Service. This computation is based on the difference between the amount of rainfall received and the amount needed to maintain an average for the

area. It indicates that mild to extreme droughts can be expected about half the time, severe to extreme droughts 15% of the time, and mild to moderate droughts about a third of the time. Since 1931, there have been 14 droughts indexed by the Palmer system. The longest was for 48 months, from February 1945 to February 1949. The drought of 1964–1965 was the most recent, and also the most severe.

The drought cycles on the islands were factors in the historic settlement and development of the U.S. Virgin Islands, and remain factors in terms of maintaining reliable water supplies for the populations of the islands.

GEOGRAPHIC SETTING OF THE PROJECT AREA

Located about 40 miles east of Puerto Rico and situated on the southern-central coast of the Island of St. Thomas, Charlotte Amalie Harbor is one of the best harbors in the Caribbean, with its deep waters and protection by surrounding mountains. The main island of St. Thomas forms the harbor's northern and eastern side, while Hassel Island, which stretches south-southwest, forms the western landmass that delineates and protects the harbor (Figure 3). The town of Charlotte Amalie covers the entire northern waterfront of the harbor from Frenchtown to the west to Havensight to the east, the site of the West Indian Company (WICO) cruise ship dock which is almost opposite the Prince Frederik Battery. The waters of the harbor in the KOCOA Project Area ranged from 40 feet in the navigation entrance channel to 15 feet immediately adjacent to the battery.

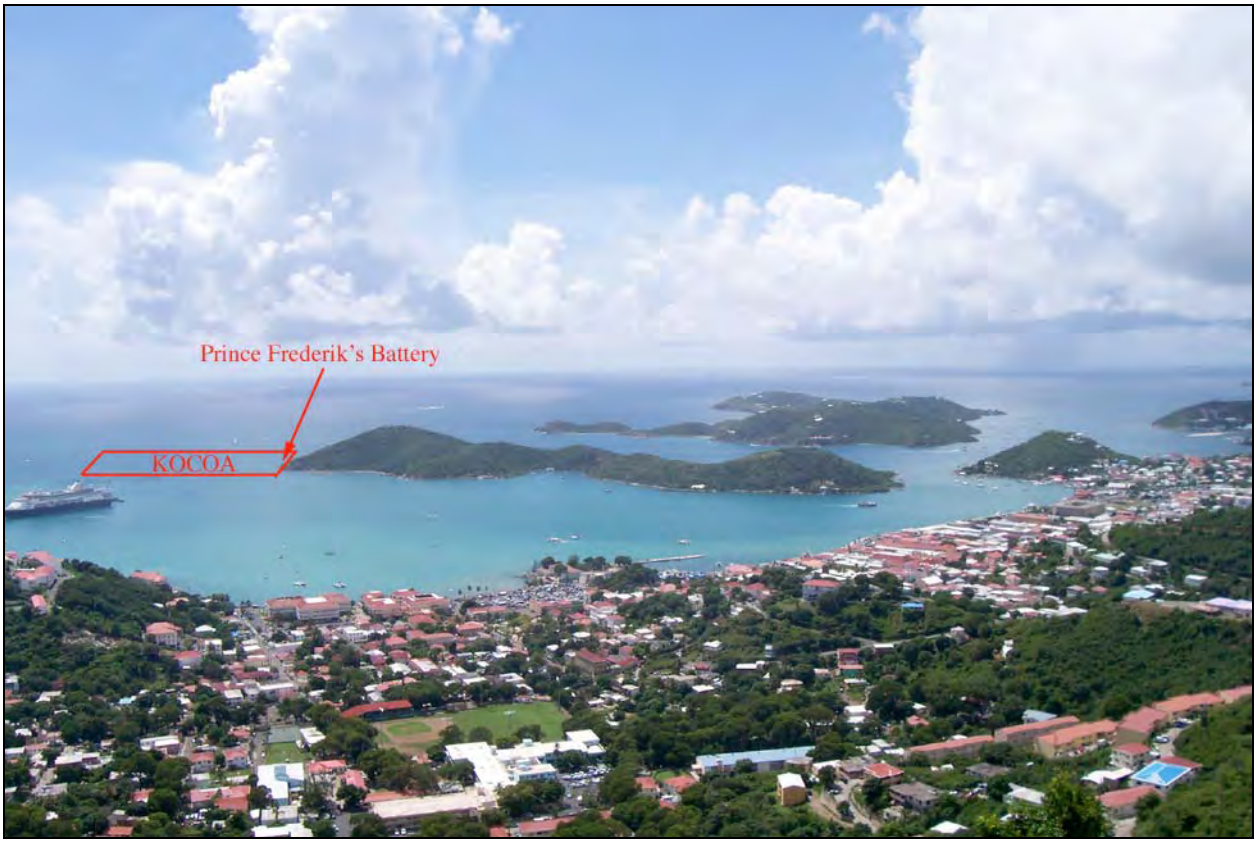

Figure 3. Charlotte Amalie Harbor, looking south from the Skyline Drive overlook. Prince Frederik's Battery on the southeastern point of Hassel Island guards the entrance into the harbor.

HISTORICAL OVERVIEW

GENERAL HISTORY OF ST. THOMAS

St. Thomas was among those Caribbean islands that Christopher Columbus encountered and claimed for Spain during his second voyage to the New World in 1493. His captains, who did not make landfall, reported it as uninhabited. The Spanish turned their attention elsewhere during the early exploration and settlement period of the Caribbean, and did not revisit the Virgin Islands until 1550. They made no attempt to settle, but instead raided the islands to capture Indian slaves (Krieger 1938; Vescelius 1952:3). The Virgin Islands were soon depopulated, and no Indians survived on the islands to greet the explorers and settlers that followed in the mid- to late seventeenth century.

Early settlements on St. Thomas in the 1650s and 1660s by the Danes, Dutch, and English were generally unsuccessful. The first Danish attempt to settle St. Thomas took place in 1666, when Erik Smidt landed and took possession of the island for Denmark. Smidt attempted to settle a small colony on St. Thomas, but that attempt ended when the Dutch interceded and removed the colony (Zabriskie 1918:1-2).

The permanent settlement of St. Thomas was accomplished in 1672, following a charter given by the government of Denmark to the Danish West India Company (Company) in 1671 (Westergaard 1917:2). As with other colonial efforts in the West Indies, the Danes were intent on establishing a plantation system for the production of tropical exports into the European economy. St. Thomas was parceled and distributed to planters in lots of 75–150 acres in size. The system promoted rural population settlement based on large-scale plantation crops rather than subsistence agriculture, a pattern that predominated on the island well into the twentieth century (Tyson and Figueredo 1987).

One of the initial difficulties faced by the settlers of St. Thomas was access to a reliable labor source. Indentured laborers—many who were convicts transported to St. Thomas to serve their terms on the plantations on the island—were first used to fill the needs of the planters, but few of the indentured laborers were able to survive the privations of life on the island at that time (Westergaard 1917:39-40). The planters of St. Thomas soon turned to slave labor, and the first African slaves landed at St. Thomas in 1673. The Company set up a slave factory on the Guinea coast at that time, and henceforth the slaves of St. Thomas were all imported from that area (Westergaard 1917:40). The population of St. Thomas grew from a total of 100 in 1673 to 156 whites and 175 blacks by 1680 (Westergaard 1917:41).

The growth and stability of St. Thomas was generally aided through time by the fact that Denmark remained neutral in many of the wars that plagued Europe through the period of exploration and settlement. St. Thomas was attacked by a French force in February 1678, but the attack was defeated at the cost of a few slaves and free blacks who were taken by the French (Westergaard 1917:42).

The population and economy of St. Thomas continued to grow slowly through the seventeenth century. Waldemar Westergaard (1917:122) provides excellent insights into the nature of St. Thomas in 1688, just 16 years after its initial settlement. He states:

> "St. Thomas can scarcely be said to have assumed its placed as a regular plantation until 1688, when the Company's accounts first began to be kept in money instead of sugar. In that year, the first census was taken, and although not a scientific affair, its results are not without interest. This report shows there were 90 plantations surveyed, and a total white population of record of just 148. These were distributed among eleven nationalities as follows: 66 Dutch, 31 English, 17 Danes and Norwegians, 17 French, 4 Irish, 4 Flemish, 3 Germans, 3 Swedes, and one each of

> Scotch [sic], Brazilians, and Portuguese. Of the 76 adults listed, 56 are entered as planters, 5 as carpenters, 2 as planters and merchants, and one each as minister (Lutheran), schoolmaster, fisher, captain of the Company's bark, tavern keeper, overseer, turner, planter and tailor, and planter and miller" [Westergaard 1917:122].

Seventeenth-century planters produced a variety of export crops, including indigo, pockwood, tobacco, foodstuffs, sugar, rum, and most commonly, cotton. Some properties, however, were little more than subsistence plots (Westergaard 1917). The first estates were relatively small, ranging in size from 10–150 acres. Most aggregated 25–50 acres. They were typically rectangular in shape, with one narrow end fronting on the coastline, and their length extending inland, often 2,000–3,000 feet, toward the mountain tops (Rigsarkivet 1688-1915).

During the first half of the eighteenth century, these small estates were progressively consolidated into larger units of production, and diversified agriculture gave way to concentration on sugarcane and cotton cultivation. In 1733, the number of occupied plantations had dropped to 118. By 1754, only 71 properties remained in production, of which, 41 cultivated cotton, 24 produced sugar, and 6 grew both cotton and sugarcane (Rigsarkivet 1688-1915). The number of plantations remained rather constant over the next 150 years, although their sizes changed periodically due to land transfers.

The half-century after 1750 was characterized by an expansion of sugar cultivation. The proportion of sugar plantations rose from 34% in 1754 to 57% in 1805 (Rigsarkivet 1688-1915). In the latter year there were only 12 cotton estates, averaging 17 acres planted in cotton, 207 total acres, and 34 slaves. By comparison, the 38 sugar estates averaged 61 acres of cane land, 308 total acres, and 61 slaves. Cane land accounted for 92% of all cropland, and 80% of the rural population lived on the sugar plantations (Rigsarkivet 1805). By this time, however, only about 50% of the total population lived in the countryside. The other half resided in the port town of Charlotte Amalie, which prospered due to its virtual free port status (Tyson 1986).

St. Thomas plantations, like those elsewhere in the Caribbean, contained four human activity zones, each with its own set of structures and features. These were:

- *The Great House Complex*, which included the owner's and/or manager's residence, kitchen and other service buildings, servant's quarters, wells, cisterns, privy, garden, fowl house, and graveyard;

- *The Factory Complex*, which on the cotton estates consisted of a ginning house and store house, and on the sugar estates a grinding mill, boiling and still house(s), curing shed, craft shops, storehouses, stables, pens, cisterns, and overseer/bookkeeper rooms or house;

- *The Worker's Village*, which included small houses, garden plots, communal yards, and burial grounds;

- *The Field System*, which included stone walls, fencing, terraces, water troughs, watch houses, wells, ponds, provision grounds, roads, paths, and graveyards.

The first three of these complexes were usually concentrated together on high ground, near the center of the property, or close to the shoreline. In most cases, they occupied no more than 10–15 acres for the sugar estates and 3–5 acres for the cotton estates, whose complexes were considerably smaller than the sugar estates. The remaining land was used almost exclusively for agricultural purposes.

Plantation settlement sites were inhabited primarily by slave laborers imported from West Africa and other Caribbean islands to work the soil. Before 1800, slaves accounted for over 90% of the

total population, their numbers rising from 422 in 1688 to a peak of 4,490 in 1725, and then slipping to 3,335 by 1800 (Rigsarkivet 1688-1915; Westergaard 1917). Initially, they lived in village compounds consisting of wattle and daub houses. Wood and stone houses were built for them on a few of the more prosperous plantations after 1800, but this practice was not as widespread as on St. Croix and St. John. Barracks-type housing, such as occurred on St. Croix and other islands in the late nineteenth century, was also uncommon in St. Thomas.

The planters came from various European countries, with Dutchmen predominating until the late eighteenth century (Hall 1985). Most preferred to live in the port of Charlotte Amalie, leaving managers or overseers in charge of plantation operations (Figure 4). Consequently, residential structures tended to be rather austere. Sugar factory complexes were also relatively small (Gjessing and Maclean 1987), due to the limited amount of suitable cane land.

Figure 4. 1843 painting of the town and harbor of Charlotte Amalie (courtesy of the Library of Congress).

Charlotte Amalie boasted a population of 37 in 1688, which included 12 men, nine women, and 11 children. Occupations listed among the inhabitants of Charlotte Amalie included "...tailor (2), innkeeper (1), seamstress (1), shoemaker (1), carpenter (2), blacksmith (1), [and] cotton ginner (1)" (Westergaard 1917:122).

The population and plantation figures for St. Thomas from 1688 to the end of administration by the Company in 1754 present excellent insights into the growth of the island and the nature of its economy through time (Tables 1 and 2). The number of plantations increased between 1688 and 1725, due in part to the expansion into unclaimed land. Another factor was the tendency for some planters to sell off land in order to raise investment capital (Tyson and Figueredo 1987).

Table 1. Population statistics for St. Thomas, 1688-1754.*

Year	1688	1691	1715	1720	1725	1733	1740	1745	1754
White									
men		212	155	155	155	173	121	144	139
women			145	127	169	159	128	127	89
children		177	247	183	not given				
Total	***317***	***389***	***547***	***565***					
Negro									
men		361	1,157	1,507	1,633	2246	837	635	909
women			613	873	979		750	748	849
manquerons‡				694	684	1495	968	933	979
children		194	1,272	1,113	1194		578	678	744
Total	***422***	***555***	***3,042***	***4,187***	***4,490***	***3,741***	***3,133***	***2,994***	***3,841***

Source: Westergaard 1917

‡ Manquerons are defined as "those incapacitated by reason of age, injury, etc.: defective."

Table 2. Plantations on St. Thomas, 1688-1754.

Year	1688	1691	1715	1720	1725	1733	1740	1745	1754
cotton		81	1	11	13	9	10	5	6
cotton w/works			69	61	74	68	66	55	64
Sugar		3	8	34	24	11	8	4	9
sugar w/works			32	24	31	32	28	34	28
kill-devil works			16	10	8	6	3	0	1
mixed		17	34	24	27	27	38	8	46
Total	***90***	***101***	***160***	***164***	***177***	***148***	***153***	***108***	***154***

Source: Westergaard 1917

The white adult population of St. Thomas grew slowly from 1691–1715, and then either remained fairly constant or declined slightly by 1754. The black population grew at a good rate from 1688–1725, but declined by over a fourth from 1725–1745. The black population exhibited a minor increase from 1745–1754. "Manquerons" are defined by Westergaard (1917:Appendix H) as slaves "...incapacitated by age, injury, etc.; defectives." They accounted for 16.5% of the population in 1720, and a high of 31.2% in 1745. While those figures may reflect an aging and maturing slave population, it is also possible that the figures reflect sale off-island of a percentage of the slave workforce, with those incapable of work being unsalable and assuming a larger and larger percentage of the population.

The decrease in black population and increase in "Manquerons" within the black population is paralleled by the drop in the overall number of plantations from 1725–1745. One hundred and seventy-seven plantations were present on St. Thomas in 1725. These included 13 cotton plantations, 74 cotton plantations with works (probably meaning plantations with cotton processing equipment), 24 sugar plantations, 31 sugar plantations with works (sugar processing mills), eight "Kill-devil works" (rum distilleries), and 27 "mixed" plantations that produced a diversity of products (including provisions). St. Thomas contained 108 plantations by 1745, with

five sugar plantations (38.5% of the 1725 total), 55 cotton plantations with works (74.3%), four sugar plantations (16.7%), 31 sugar plantations with works (109.7%), no "Kill-devils works," and eight "mixed" plantations (29.6%). It is evident from the figures that larger plantations (i.e., cotton and sugar plantations with works) suffered less during the population and economic decline than did smaller plantations that produced cotton, sugar, or diverse crops.

The decline in the population and the number of plantations parallels the accumulation of debts owed by planters to the Company (Westergaard 1917:Appendix M). The debts of the St. Thomas planters to the Company that had amounted to 210,129 rixdollars (rdl.) in 1725 had grown to 503,515 rdl. in 1754. The disparity in debt levels is even greater than those figures show, however, as the Company owed the St. Thomas planters 80,197 rdl. in 1725, versus 34,409 rdl. in 1754.

A number of reasons can be advanced for the economic decline of St. Thomas during the first half of the eighteenth century. The weather has always played a role in the success or failure of the agricultural economy of the islands of the Caribbean, and St. Thomas has always been subject to destructive hurricanes and prolonged droughts. Westergaard (1917:6) notes that 128 "...destructive hurricanes have visited the West Indies during the past 350 years..." A further complication is droughts, which are quite common on St. Thomas. An additional reason for the decline appears to have been exhaustion of soil fertility over large portions of the island. Westergaard (1917:160) notes, "St. Thomas did not reach its maximum cultivation until towards the end of the first quarter of the eighteenth century." That statement is reflected in the population and plantation figures, and exhaustion of the soil and lack of new lands undoubtedly accelerated the economic decline.

The economic decline was exacerbated by the very tenuous nature of white-black relations that existed from the time of early settlement. Slaves appear to have suffered most grievously during times of drought and accompanying food shortages, and whites turned to harsh legal codes to control their slaves. A serious slave rebellion began on St. John on November 13, 1733. That rebellion appears to have been in response to a slave code that was imposed the year before that included the following punishments:

> "The leader of runaway slaves was to be pinched three times with a red hot iron and then hanged; his followers were to lose a leg each, or, if pardoned by their owners, an ear, and receive 150 lashes. Slaves withholding information of the intention of others to run away were to be burned in the forehead and given 100 lashes; informers received ten dollars for each slave involved in the plot. The penalty for absenteeism for eight days was 150 stripes; for twelve weeks the loss of a leg; for six months, death. Slaves lifting a hand to strike a white person or threatening him with violence were to be pinched and hanged. Torture was permitted in the trial of slaves suspected of crimes. A slave meeting a white person was to step aside under pain of flogging. Slaves were not to sell provisions without permission of the overseer. Slaves found in town after nightfall were to be flogged" [Williams 1984:196].

The slave rebellion on St. John lasted until August 15, 1734, and resulted in the death of a quarter of the whites on the island and damage to half of the plantations (Westergaard 1917:176-177). The death toll among the slaves was never accurately determined, although at least 27 were captured and executed (Williams 1984:197). Legend states that 300 slaves committed suicide by jumping off a cliff to avoid capture, but that legend has never been confirmed. Many escaped slaves took to the wilds of St. Thomas and the surrounding cays.

Rule of the Virgin Islands by the Company ceased in 1754, when the Danish Crown took over the islands to satisfy the Company's debts (Westergaard 1917:240). Much of the attention of the Danish Crown that was exerted in the following years was devoted to collecting the planters' debts that had accumulated in the last years under Company rule. It was also during this period

that drastic changes in the nature of plantation production were occurring. The number of plantations decreased from 154 in 1754, to 72 in 1780. No doubt the new taxation administered by the Crown contributed to this decrease. However, many small land holdings were absorbed by the growing number of larger estates concentrating on sugar cultivation. Land devoted to sugar production increased from 63% of all cropland in 1754 to over 80% in 1796 (Tyson and Figueredo 1987:19).

St. Thomas maintained its cosmopolitan population mix through the eighteenth century, and in 1765, the largest single national group on the island was Dutch, followed by Danish, French, German, English, and Irish (Westergaard 1917:247). Black-white relations continued to be tenuous, and slave revolts were crushed or averted on St. Croix in 1746 and 1759 (Westergaard 1917:246).

The population of St. Thomas grew steadily from 1773–1835, with an increase from 4,371 to 14,022. The population dropped to 13,666 in 1850 and 13,463 in 1860, but increased to 14,389 in 1880. From that point, the population declined to 11,012 in 1901 (Westergaard 1917:253). The population of St. Thomas increased dramatically during the twentieth century, and has currently surpassed 45,000 people.

Slavery was abolished in the Virgin Islands on September 22, 1848, when an Emancipation Proclamation issued by the Governor-General was approved by the Danish Government. The proclamation was the result of a slave revolution organized by a slave named Buddoe on St. Croix. The revolution involved sacking the homes of officials and merchants in Frederiksted and an ultimatum to burn the city if an Emancipation Proclamation was not issued (Williams 1984:326-327). The proclamation read (Williams 1984:327):

- All unfree in the Danish West India Islands are from today free.
- The estate Negroes retain for three months from this date the use of the houses and provision grounds of which they have hitherto been possessed.
- Labor is in future to be paid for by agreement, but allowance of food to cease.
- The maintenance of the old and infirm, who are not able to work, is, until further determined, to be furnished by the late owners.

The Emancipation Proclamation did not end the revolution, which was finally stopped with the help of Spanish troops and a British warship. No lives were lost in the revolution, though, despite a great deal of property damage (Williams 1984:327).

Sugar production, which had dominated the agrarian economy since the late eighteenth century, declined drastically after the Emancipation Proclamation. In 1847, 1,125 acres were devoted to sugarcane, but this number fell to only 8 acres by 1915. This drop corresponds to the increase in the number of acres in pasture. While the number of estates dropped accordingly, by 1915 there were still 58 plantations controlling over 85% of land on St. Thomas. This trend of large land ownings continued well into the twentieth century (Tyson and Figueredo 1987:19-20).

The St. Thomas plantation system buckled but did not collapse under the twin impacts of slave emancipation and the decline of the sugar industry. In 1915, there were still 58 plantations that controlled over 85% of the land resources, some of which had ceased agricultural activity, but most still had some acreage in use, mainly as pasture (Rigsarkivet 1688-1915).

During the second half of the nineteenth century, the plantation system relinquished some control over land resources to smallholders (misnamed “squatters”), most of whom practiced a mixed

economy based on the cultivation of ground provisions, stock raising, and charcoal production. The number of smallholdings (50 acres or less) rose from zero in 1845, to 20 in 1875, to 79 in 1915 (Rigsarkivet 1688-1915).

Concurrently, some planters began renting a few acres to the working class, partially to keep them in the countryside and also to encourage production of foodstuffs for local consumption. In 1875, for example, there were 393 leaseholders. Most were on the outskirts of Charlotte Amalie and were used mainly for residential purposes, though occupants usually had small food gardens. About 25% of the leaseholds were agricultural plots located mostly on the northern side of the island between Magens and Caret bays (Rigsarkivet 1688-1915; National Archives and Records Service [NARS] 1926).

A survey of land under cultivation in 1926 found 119 small producers, 11 of whom owned their own land and 108 were tenants. Collectively they had 170 acres, or a little more than an acre each, planted in food crops such as bananas, tanyas, sweet potatoes, pigeon peas, yams, cassava, and pineapples (Quinones 1927).

About 40% of the smallholdings in 1926 belonged to French immigrants from St. Barts, whose relatives began settling on the northern side of St. Thomas during the 1860s. Initially, they rented plots from estate owners, or entered into sharecropping arrangements. By the beginning of the twentieth century, a few had managed to obtain the title to their leaseholds.

These post-emancipation land tenure trends did little to alter the historic settlement pattern. Too little land was distributed, and many smallholders chose to live in town or in the old plantation villages and commute to their grounds. The number of smallholders residing on their plots in small wattle and daub or wood frame cottages was never high. The field maps of St. Thomas prepared in 1918–1919 by the U.S. Coast and Geodetic Survey show a total of 232 small settlements scattered around the island. About 35% of these were on the northern side, 20% were on the southern side to the west of Charlotte Amalie, 15% were in the Tutu Valley, and 20% were on the eastern end, mostly in the vicinity of Frydendahl (Smith Bay).

By 1930, over 90% of the land was still engrossed by 52 large (100+ acres each) properties (Kramer 1930). About 40 estates remained occupied, and several old estate houses were used as part-time residences by well-to-do mercantile families. There were 2,798 rural inhabitants, most who still lived in or around the old plantation settlements (Shaw 1935). The settlement pattern changed very little during the next two decades. A government sponsored homestead program in the 1930s contributed only slightly to settlement dispersion. While a total of 77 plots were distributed on Mandahl and Mosquito Bay estates, by 1938 fewer than 20 houses had been built by the homesteaders (Taylor 1938). In 1950, the rural population had decreased by 16% to 2,344, with more than half living on the outskirts of Charlotte Amalie (U.S. Dept. of Commerce 1950). Thus, except in a few areas, such as Hull, Lerkenlund, Mafolie, and Frydendahl estates, the plantation settlement pattern persisted into the 1950s, when the advent of a tourist economy and welfare statism began pushing residential and resort development into the countryside.

The appearance of the U.S. into the history of the Virgin Islands first came in 1865, when Secretary of State Seward began negotiations with the Danish Government to purchase the islands. Negotiations proceeded, and by 1867, an offer of $7.5 million was made for St. Thomas and St. John and the sale was approved by the Danish Landsting. The U.S. Senate failed to ratify the purchase, and the purchase treaty lapsed in 1870. Consideration was again given to the purchase of the islands during the Harrison and Cleveland administrations, but both attempts failed. A treaty for the purchase of the islands was again formulated in 1901 that included St. Croix at the price agreed upon in 1867. The Danish Landsting failed to ratify the treaty in this case, following ratification by the U.S. Senate in 1902. Another attempt was made to negotiate the sale in 1911–1912, but that also came to nothing. The U.S. finally purchased the U.S. Virgin

Islands in 1917, for a total of $25,000,000. The purchase price and the acreage involved made the U.S. Virgin Islands the most expensive territory ever purchased by the U.S. Government, and the final successful purchase attempt was directly influenced by strategic military considerations and a desire to deprive Germany of a potential Caribbean naval base (Westergaard 1917:257-261).

The administration of the Virgin Islands originally rested with the Navy. Administration was transferred to the Department of the Interior in 1931. In 1927, citizens were granted U.S. citizenship. Virgin Island citizens were allowed to elect a governor for the first time in 1970. The Virgin Islands has one nonvoting member in Congress, and residents enjoy all rights and privileges of U.S. citizens except the right to vote in presidential elections. Tourism currently accounts for much of the economic base of St. Thomas, and the population of the islands stands at more than 45,000.

MARITIME HISTORY OF CHARLOTTE AMALIE HARBOR

Beginning in the late seventeenth century, St. Thomas was the scene of considerable maritime activity. Besides Denmark, trade with British American colonies in the 1700s was extremely important to the efficient operation of island plantations. Maritime activity included trade with British, Dutch, French, and Spanish colonies in the West Indies (Dookhan 1974; Tyson 1983).

Most seaborne commerce, as indicated by several eighteenth- and nineteenth-century charts (Bellin 1764; Jeffreys 1775: Rohde 1822), approached the island's main harbor from the south (Figure 5). When the St. Thomas plantation system was flourishing during the seventeenth and eighteenth centuries, some trans-oceanic ships sailed along the northern coast in order to put into northern side bays, where they took on cargoes of sugar, rum, molasses, and cotton, and/or engaged in illegal trade from nearby estates. Small, inter-island coasters also regularly transported plantation produce between the northern side bays and St. Thomas Harbor (Olsen 1988).

St. Thomas's proximity to regular trade routes used by sailing ships entering or leaving the West Indies made it an ideal site for piracy during the seventeenth and eighteenth centuries. Additionally, the attitudes of the island's earlier governments allowed piracy and smuggling to exist and even flourish. While St. Thomas never acquired the fame of notorious pirate havens of some islands like Jamaica, it was visited by well-known practitioners of the trade such as Le Paine, and possibly Captain Kidd (Dookhan 1974), owing in part to the "tolerant eye" of Governor Adolph Esmit. At least two of their vessels, *La Trompeuse*, captained by the French pirate Jean Hamelin and *Trinity* captured by Bartholomew Sharp and sailed without the famed pirate to the port by his crew, were burned and sunk by *HMS Francis* in the harbor in 1683.

St. Thomas made the transition from an agricultural economy to a trade based economy during the second half of the eighteenth century. The port of St. Thomas was opened to free trade with other European colonies in 1764, a step that was reversed about ten years later. Free trade returned in 1782, when Danish ships trading through St. Thomas were allowed free trade with European ports. All restrictions on trade were lifted in 1815, and St. Thomas has remained a free port ever since (Westergaard 1917:250). An average of 2,809 ships called on St. Thomas during the 1821–1830 period, with 2,769 from 1841–1850. The amount of tonnage represented by those ships increased until 1850, when the increased number of steamships plying the Caribbean decreased the role of St. Thomas in the Caribbean trade (Westergaard 1917:252). The role of St. Thomas was reduced to that of a coaling station by the second half of the nineteenth century, in part due to the fact that the rise of steamships made possible the direct shipment of goods to markets through the region. However, a hurricane and tsunami that devastated the islands in 1867 accounted for a reduction in the importance of Charlotte Amalie Harbor during the latter half of the nineteenth century, as its destruction initiated a period of depressed trade for the area.

Extensively damaging the town and the harbor and sinking most ships at anchor (Figure 6), one account states:

> "Harbor was strew with wrecks, the lighthouse gone, and many houses roofless, A confused mass, near the middle of the harbor, built up of crushed hulls, broken spars, and loose cordage, was formed by the ship British Empire; alongside her was the steamer Columbian, now showing nothing but funnel, masts, and rigging above water; right underneath these were a French bark and brig. Nearer to the shore lay the Spanish war steamer Nunez de Velasco, and a French mail steamer" [*Harpers Weekly* 28 December 1867].

The latter part of the nineteenth century saw an improvement to the economy, most of which had some connection to the harbor and its shipping. By 1908, a total of 682 ships larger than 25 tons visited St. Thomas, with an increase to 749 ships in 1910 (Figure 7). With a total of "...38 war-ships, 446 merchant steamers, and 265 sailing ships," the mixture of ship types that entered the port in 1910 underscores the nature of the change in Caribbean trade by that time, (Westergaard 1917:253).

Figure 5. 1799 map showing the southern entrance to the harbor with Hassel Island on the left (as presented in Cinquino et al. 1996). Note Prince Frederik's battery on the eastern tip of Hassel Island guarding the harbor's entrance.

Figure 6. Lithograph of 1867 tsunami aftermath in Charlotte Amalie Harbor (courtesy of *Harpers Weekly* 28 December 1867).

Figure 7. 1901 photo mosaic of the harbor looking north. What would become the WICO dock is behind the schooner at right (courtesy of the Library of Congress). Compare this photograph with the vantage of the 1867 lithograph of the tsunami in Figure 6 above.

SITE-SPECIFIC HISTORY OF HASSEL ISLAND

Facilitating this maritime commerce, Hassel Island, which forms the western boundary of the Charlotte Amalie Harbor and the current project area, served the maritime industry with both repair and fueling yards, as well as housing the offices of many of the larger shipping companies in the West Indies. Stretching south-southwest and forming the western landmass that protects the Charlotte Amalie Harbor, the 134-acre island is referred to in early land records as Estate Orkanhullet, the name of the estate meaning hurricane hole in Danish. The earliest reference of ownership of the island by the Hassel family is in 1806, and the earliest use of the family name for the island dates to around 1872 (Gjessing 1981:2).

As part of fortifying the harbor, Prince Frederik's Battery was constructed in the late 1770s on the southern end of the island. However, little is known or written about Hassel Island until the Napoleonic War, when English forces fortified the island during their occupation of St. Thomas in 1801. The earlier battery was retained and named Fort Willoughby and two additional batteries were constructed on higher elevations. When the British occupation of the Virgin Islands ended in 1802, "they left behind on the peninsula 36 structures associated directly with their occupation and nine structures 'owned by Mr. Hassel,' as well as such ruins of earlier construction that at the time were considered not important enough to record" (Gjessing 1981:11). The British again occupied St. Thomas in 1807 when war broke out with Denmark. The fortifications and associated military facilities were repaired and expanded.

After the war and when restrictions on trade were lifted in 1815, James Hazzel (Hassel) benefited from the increased maritime trade by expanding a ship repairing operation in Careening Cove and renting out portions of the peninsula to other business firms. One of the firms was the Royal Mail Steam Packet Company (RMSPC), which was founded in London in 1839, and was granted mail contracts with the British government for various ports in the Caribbean, Central America, and South America. St. Thomas was a popular port due to its central location along shipping routes between the east coast of Europe and South America, Panama, and New York. Additionally, the harbor of Charlotte Amalie was deep and well protected. Although a Danish island, the port became a station for British packets in 1819. St. Thomas was made the transshipment point for trans-Atlantic steamers with mail, cargo and passengers for the Caribbean and Central and South America. During 1841, the company's main operations were established on the northern end of the island, including a coaling station that cemented the port as a focal point for the company (Dookhan 1974:100-101). The RMSPC was of tremendous importance to the economy of St. Thomas, and research conducted at the Enid M. Baa Library in Charlotte Amalie has revealed a wealth of information concerning many RMSPC vessels and their West Indies routes (Figure 8). By 1869, the RMSPC was replacing its smaller, older vessels that visited the port of Charlotte Amalie. The *St. Thomas Tidende* states that the RMSPC ships "*Conway*, *Solent* and *Tamar*, all three wooden-hulled paddlewheels to be sold as larger ships are to take their routes" (May 12, 1869). Iron-hulled sidewheelers and screw driven vessels replaced these older vessels, and one of the first to arrive as a branch-route steamer was the *Eider* in 1869 (Nicol 2001:226; *St. Thomas Tidende* July 10, 1869).

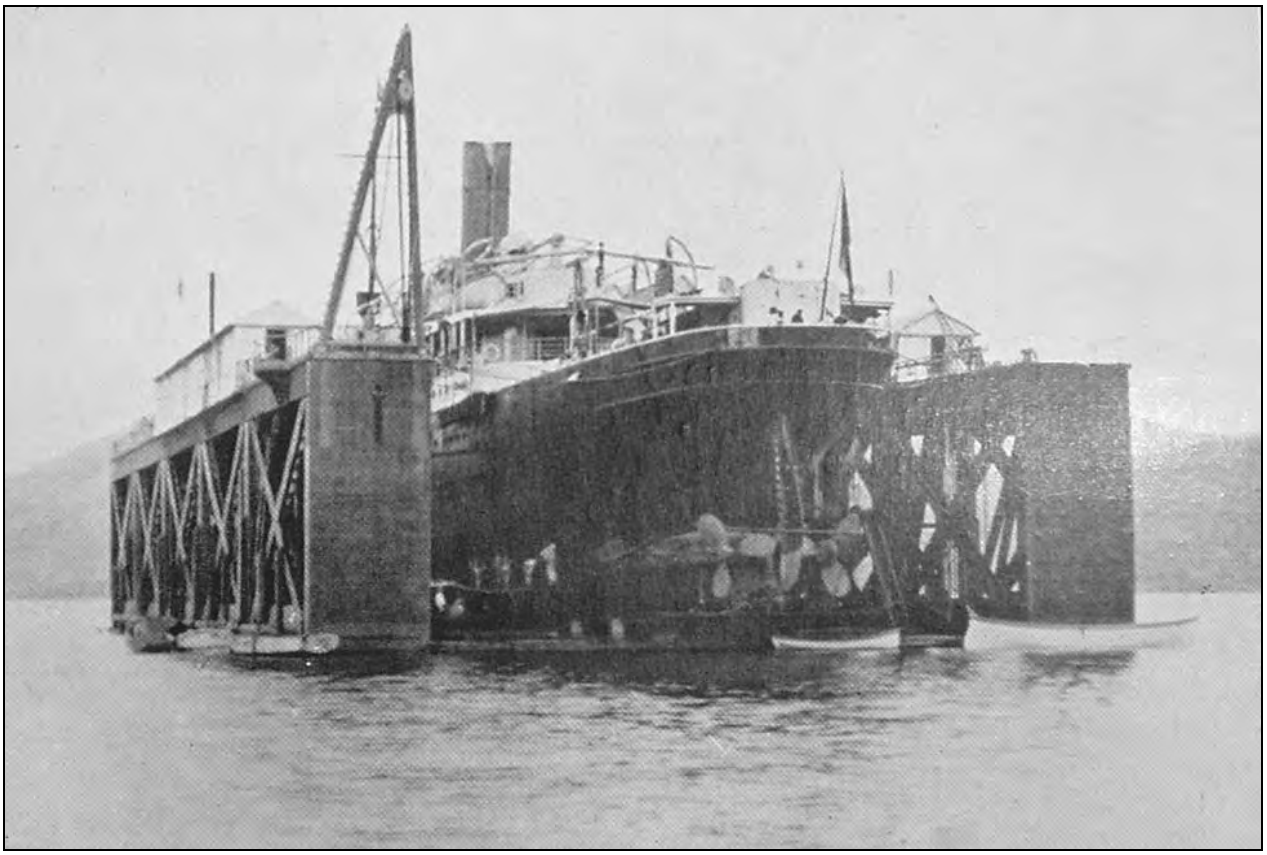

Figure 8. A turn-of-the-century photograph showing the SS *Balantia*, a RMSPC steamer being repaired in the floating drydock off the East Asiatic Wharf. In full operation by 1875, the idea of a floating drydock was put into motion when it was recognized that it would augment the existing repair facilities of Creque Marine Railway and attract vessels that would have to go to Havana or North American ports (as presented in MacMillan 1911:296).

From 1841–1860, the RMSPC constructed the wharfage, a warehouse, a machine shop, water catchments, water storage tanks, and a coaling depot. These facilities were extensively damaged during the hurricane and tidal wave of 1867. The destruction was one impetus toward moving their headquarters to Barbados in 1871.

Located at the northern end of the island and just above the RMSP Company's wharf and docks, the Creque Marine Railway was constructed in the 1840s by the Orkanshull Island Coal and Oil Fuel Depot Company (Figure 9). Capable of handling ships up to 400 tons, during World War I the facility was leased to the U.S. Navy and was operating as a marine slip until the 1960s by the Creques (National Register Nomination Form).

Figure 9. Photograph of Charlotte Amalie Harbor and the northern end of Hassel Island. The property of the RMSP Company is located to the left, and a vessel can be seen on the Creque Marine Railway at the tip of the island (as presented in MacMillan 1911).

During 1871, the Hamburg-America line acquired and set up shop on the southern side of Careening Cove (Figure 10). The line would take the place of the RMSPC with weekly scheduled ship sailings. Operating an extensive coal depot at its wharves, by 1911, 60,000 tons of American coal were conveyed annually to the line's steamers in the harbor, with 14 ships arriving and leaving monthly. With the transfer of the Danish Virgin Islands to the U.S. in 1917, the German-owned Hamburg-America Careening Bay properties were confiscated and turned into a U.S. Naval Station.

Figure 10. Photograph of a steamer docked at the Hamburg-American Steamship Company docks on the southern side of Careening Cove. The photograph looks north toward the East Asiatic Company's wharf and docks as well as the floating drydock off in the distance (as presented in MacMillan 1911).

Just to the north, the East Asiatic Company completed its coaling depot in 1905 and created the Danish West Indian Company. Located on the eastern shore between the RMSPC property and Careening Cove, it consisted of a 300-foot long wooden wharf as well as a large stone wharf (Figures 11 and 12). While the maritime economy was robust during the early years of operation, the effects of World War I were disastrous, and by 1916, the company's wharf was abandoned.

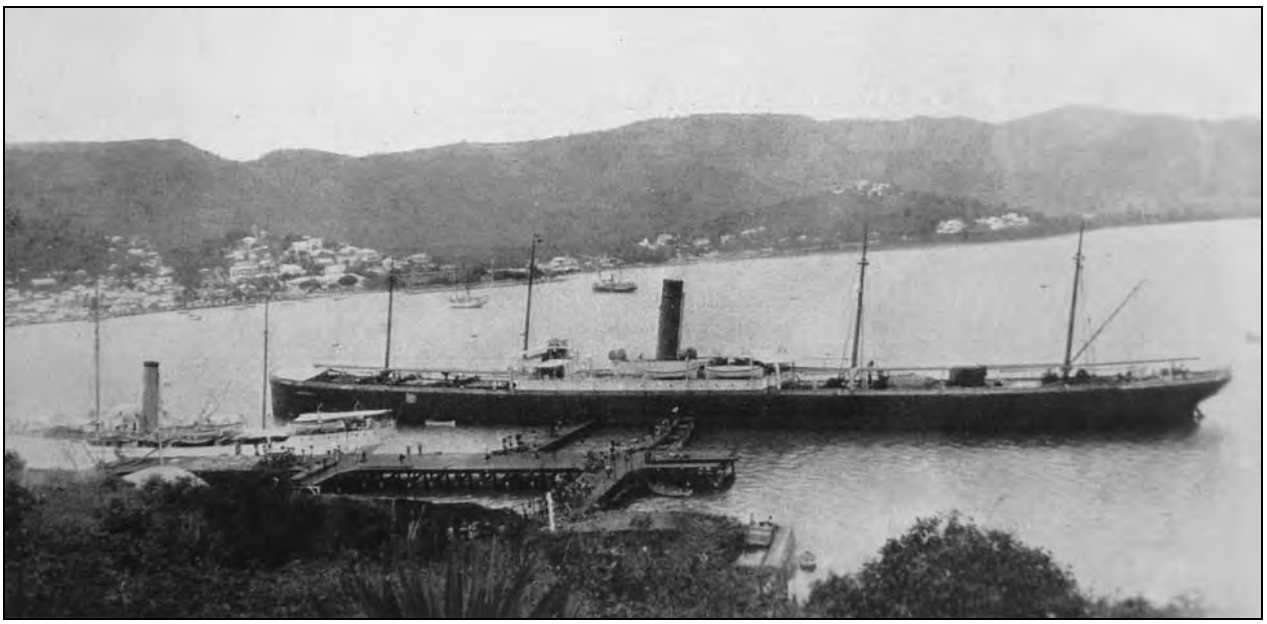

Figure 11. Photograph of the SS *Massachusetts* loading 1,700 tons of coal at the East Asiatic Company's wharf (as presented in MacMillan 1911:296).

Figure 12. Photograph of women offloading coal from a vessel at the East Asiatic Company wharf (as presented in MacMillan 1911:295).

After the war, efforts were made to revive the ship service for the harbor. Spearheaded by Isaac Paiewonsky, these efforts were doomed to failure because ships of new design had far greater ranges and could easily bypass the port. Although the floating drydock and some coaling stations existed on the island for some time after the war (Figure 13), these and other facilities would be slowly abandoned by all commercial maritime activity, and Hassel Island would fall by the wayside in the shifting Virgin Island economy.

Figure 13. 1931 view of the harbor. Note the tugs towing coal barges to service the anchored steamers, as well as the floating drydock to the far right (courtesy of the Library of Congress).

Offsetting this trend, the West Indian Company docks were taking shape on the mainland, and as evidenced by 1919 maps, were capable of handling large vessels with no need for lighterage of goods and cargos to and from Hassel Island (Figure 14). These new-improved facilities now serve as the main dock for the cruise ship industry, one of the most important economic engines in the islands.

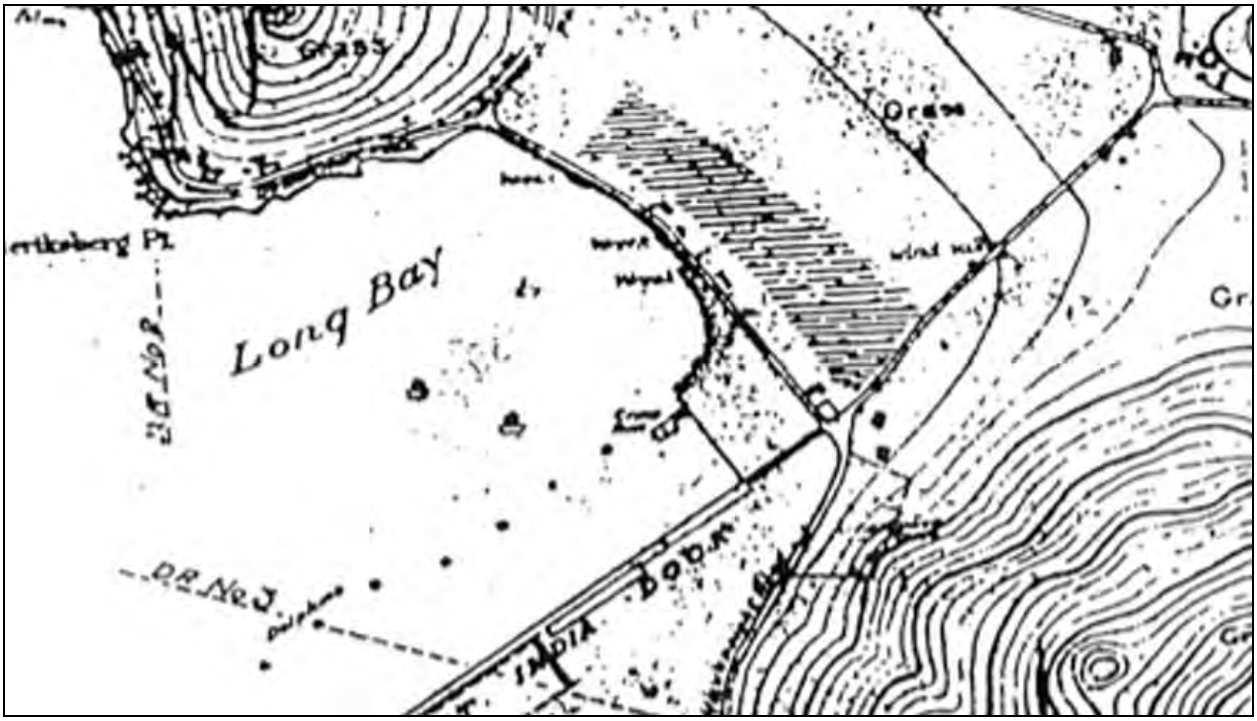

Figure 14. 1919 map showing the WICO dock, lower center (as presented in Cinquino et al. 1996).

Because of the significant role the island played in early St. Thomas history, as well as the amount of intact historic structures still in place, in 1976 the Virgin Islands Planning Office nominated the southern third of Hassel Island to the National Register of Historic Places (NRHP). In 1978, the island was granted National Park Status. This same year the northern two-thirds of the island were also nominated as a National Register Historic District entitled the Northern Hassel Island Historic District.

OVERVIEW OF THE ENGAGEMENT BETWEEN HDMS LOUGEN AND *HMS ARAB*

The focus of the current investigation is the 1801 running engagement between a Danish and a British Naval vessel. Formerly the 18-gun French privateer *Le Brave* captured by the British in 1798, the *HMS Arab* was a 22-gun ship that challenged the brig *HDMS Lougen* off St. Thomas. Established as a 6th rate Man of War with a compliment of 155 men, the *Arab's* armament was twenty 9-pounders and two 32-pounder carronades. The Danish Man of War *Lougen* had a compliment of 87 men and carried 20 guns (size unknown). On March 3, 1801, the British ship was patrolling her station to the south of the island of St Thomas, two days after receiving orders to stop all Danish, Swedish, and Russian ships. Sighting a sail, she went to investigate and encountered the Danish brig *Lougen*, who was thought to be attempting to get into St. Thomas Harbor. The *Arab* fired at the *Lougen* who responded with a broadside, after which a running engagement of about forty minutes took place before the *Lougen* managed to escape into the harbor under the protective guns of Prince Frederik's Battery, which were firing round and grape shot at the *Arab,* causing the British ship to break off the engagement. Both vessels were

damaged in the fight, though neither seriously. The *Lougen* would shortly fall to the British when St. Thomas surrendered later the same month (Donnithorne n.d.).

HARBOR IMPROVEMENTS

As the maritime economy of St. Thomas began to blossom during the second half of the eighteenth century and the early nineteenth century, European plantation owners attempted to revive their flagging agricultural fortunes by bringing more land into cultivation. Economic improvements for both commerce and agriculture required land modification. These modifications included both intentional alterations based on the needs of improved shipping and farming, and unintentional alterations based on sedimentation build-up due to run-off and frequent hurricanes.

Pre-1850 land modification activities involved European plantation owners draining and filling-in wet, swampy areas in a process of land reclamation. More dramatic land changes occurred in the 1860s, when concerns over the St. Thomas harbor becoming filled with debris began to be voiced. One local committee wrote in 1862:

> "It is quite clear that the Harbor is gradually filling up, in certain places, by Deposits of Earth, Sand, Stones, etc., carried down from the surrounding hills with every heavy shower of rain… There cannot…be a doubt about the Sand and Mud Banks in the Harbor…being the debris from the Hills, Town and Ships accumulating from generation to generation…" [Ragster 1986:44].

It is unclear how these concerns were addressed, but island residents began to consciously alter the contours of the harbor at about the same time. In 1865, these harbor modifications included the dredging of the central harbor for use by the larger steamships, then plying the Caribbean and the cutting of a channel to connect St. Thomas Harbor with the Gregerie Channels to the west, and the concomitant creation of Hassel Island (Ragster 1986:43,44). Harbor modification not only included the build-up of the shoreline, but the dredging of the harbor bottom. Between 1913 and 1914 the inner harbor was dredged in association with the building of the WICO wharf, which in its current status serves as the harbor's main cruise ship dock. It was dredged again in 1935 as a concerted maintenance effort to keep the depth at 30 feet (Mistovich 1989:1).

During the twentieth century, shore reclamation efforts continued as dredged soil and other material were used as fill to build up the shoreline. According to deJongh and Gjessing, "…to the east and west [of Fort Christian] landfills of the nineteenth and twentieth centuries have projected the shoreline into the bay and reduced the peninsula character of the site" (1982:98). This statement is supported by the Sedimentation Rate map that indicates the incidence of shoreline growth (Figure 15).

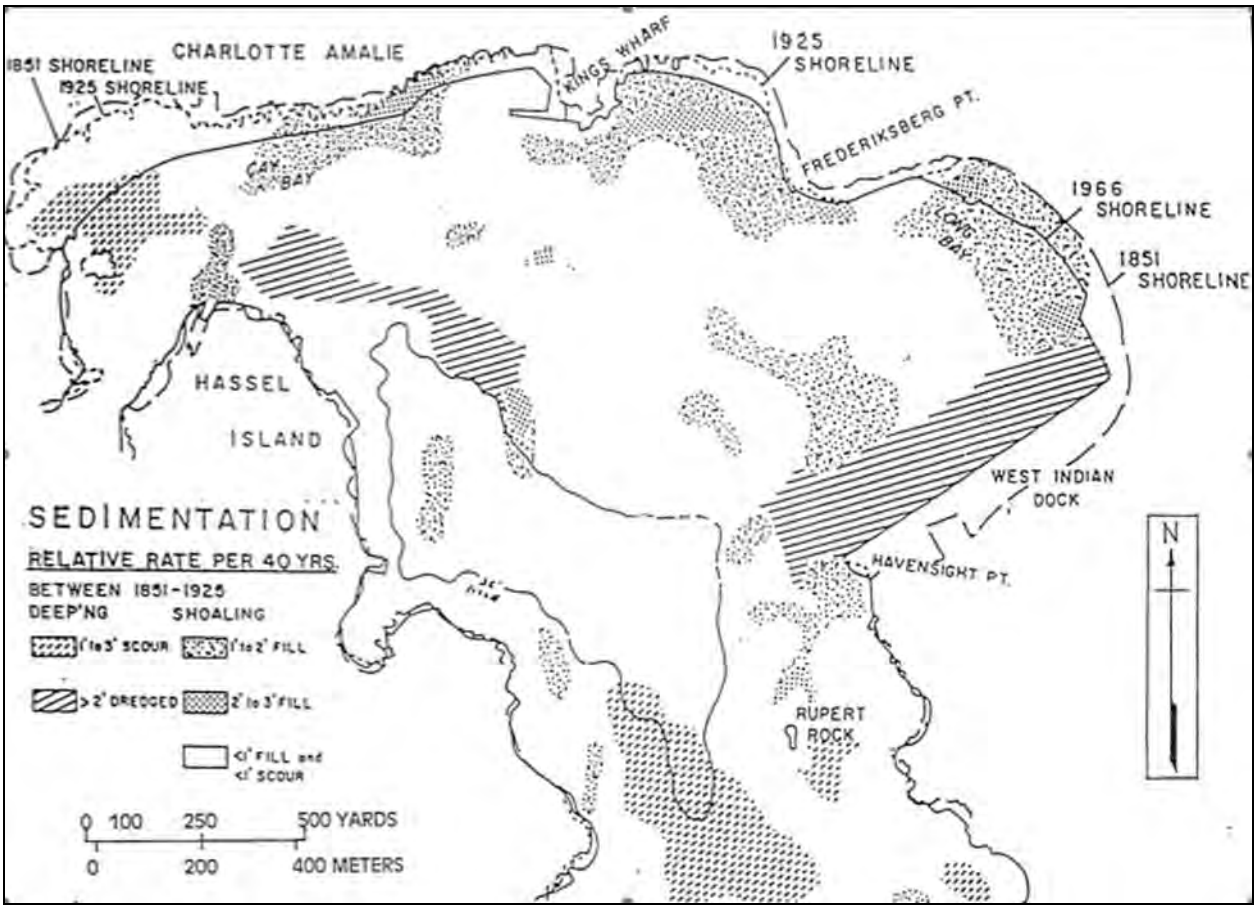

Figure 15. Harbor changes from 1851–1966 (as presented in Cinquino et al. 1996:48). Note the southern dredging area is within the KOCOA.

During the late 1940s and early 1950s, construction commenced on Veteran's Drive, eliminating the "boat basin to the west of Christians Fort and projected the shoreline to the east and west of the fort into the harbor…" (deJongh and Gjessing 1982:16). Part of this project resulted in another change in harbor contour with the construction of a waterfront highway around Gordon Bay and Long Bay, which included "the removal of the old waterfront and wharfs" and "the reclaiming of land at Long Bay and Crown Bay" (Ragster 1986:47). Fill for the project was derived from dredging the western side of Cay Bay, a portion of the central harbor, and the removal of Ballast Island.

PREVIOUS INVESTIGATIONS WITHIN OR ADJACENT TO THE PROJECT AREA

Due to the extensive maritime history of Charlotte Amalie Harbor, there is a possibility for submerged cultural remains (i.e., shipwrecks) to be located throughout. While most have had negative results, a number of submerged cultural resource studies have been undertaken in the general vicinity of the project area.

In 1975, a magnetometer survey was conducted by Alan R. Albright of Charlotte Amalie Harbor (and portions of other surrounding islands). The survey located one anomaly, the remains of a nineteenth-century vessel off Frederik Point (to the west of the current Project Area) as well as a variety of historic artifact deposits. Regarding Charlotte Amalie Harbor, Albright commented:

> "No intact wreck sites were found in the inner harbor, but the harbor is almost paved with old bottles, ceramic fragments, ship remains, and modern debris, in a mixed and scattered conglomeration that precludes a serious search and excavation program but does not lend itself to pot hunting to enrich a collection" [Albright 1975:7].

Relative to the current investigation, Albright identified one site on the eastern edge of Hassel Island (near the Hassel Island Reach) as a "Magnetic anomaly, probably nineteenth century, miscellaneous debris, sand and coral bottom" (Albright 1975:10).

In 1976, an inventory of shipwrecks in the Virgin Islands (1523–1825) was compiled by Edward L. Towle, Robert F. Marx, and Alan B. Albright. Review of this inventory lists several vessels such as *La Trompeuse* as sunk in the harbor and mentions that a "Dreadful hurricane struck St. Thomas on 20–22 September, as well as throughout the other Leeward Islands. At St. Thomas Island alone, 104 vessels were totally lost" (Towle et al. 1976:14).

In 1981, Erik Olsen conducted a magnetometer study of Crown Bay (to the west of the current Project Area). It remains unclear how large of an area was surveyed during this project. No shipwreck remains were located.

By 1983, George F. Tyson, Jr. completed both a "Register of Virgin Islands Shipwrecks" and a "Virgin Islands Inventory of Historic Shipwrecks." More specific to Charlotte Amalie Harbor, Tyson states:

> "In its heyday between 1815 and 1870, its [St. Thomas] prosperous port of Charlotte Amalie played host to over 2,000 vessels annually. During this period it was arguably the principal port in the entire Caribbean Basin, attracting ships and merchants of all nations by its myriad and lucrative commercial opportunities, its extensive repair and bunkering facilities, and its banking, insurance, marine casualty and communication services, which were among the best in the hemisphere. Moreover, its substantial merchant class owned and operated a large fleet of ships which engaged in a regular trade with North and South America, as well as other Caribbean islands" [Tyson 1983:2].

Tyson's shipwreck inventory indicates that over 100 vessels were lost within St. Thomas Harbor. Specific to this investigation, Tyson's research includes two vessels lost off Hassel Island and two more vessels lost off Rupert's Rock (earlier called Prince Rupert's Rock); they are presented in Table 3 below.

Table 3. Four wreck sites historically documented in or near the current project area(s).

Date of Wreck	Name	Type	Nationality	Place Wrecked	Source
Sept. 4, 1804	*Goliah*	Schooner	Unknown	Rupert's Rock	St. Thomas Notarial Documents 1803-18
Aug. 18, 1833	*Snelahide*	Brig	Dutch	Rupert's Rock	*St. Thomas Tidende*
Jun. 28, 1851	*Thorvaldsen*	Schooner	Unknown	Hassel Island	Kal Larsten "Bromberg"
Sept. 23, 1852	*Mathilda*	Schooner	French	Hassel Island	*St. Thomas Tidende*

(Spreadsheet list of wreck sites provided by Mr. Charles Consolvo; Courtesy of George F. Tyson, Jr.)

Crown Bay and Gregerie Channel were again surveyed by magnetometer in 1984 by Edward Towle with similar results. Edward Towle conducted another magnetometer study for WICO's Proposed Dredge Area in Long Bay in 1985. Although a number of historical references

indicated the possibility of shipwrecks within the Long Bay area, none were found in the 26-acre dredge area (Mistovich 1989:3).

Mistovich (1989) conducted a thorough review of secondary sources, previous marine archeological reports, and communications with locals knowledgeable in the subject of Charlotte Amalie's rich maritime past. All sources (Marx 1987; Towle et al. 1976; George Tyson, personal communication January 3, 1989; AWOIS 1992) were unaware of any significant submerged cultural resources within the general project area.

Another investigation west of the current Project Area was conducted by the National Park Service (Wild et al. 1992). A cultural resources study of Water Island, the study examined all beaches, bays, undeveloped level areas, and areas of reported historic structures. Overall, 11 prehistoric and historic archeological sites were found, five of which had been previously recorded (Wild et al. 1992:122). The underwater cultural resources surrounding Water Island were brought to the attention of the investigators by area divers, but were not considered part of the survey area and were not documented (Tuttle 1998:16).

Between 1994 and 1996, Panamerican was contracted by Parsons, Brinckerhoff, Quade, & Douglas of Maitland, Florida to conduct Phase IA and Phase IB cultural resources investigations of the proposed Veteran's Drive Improvement Project in Charlotte Amalie. The project intended to identify and assess (based on NRHP eligibility criteria) any prehistoric or historic cultural resources within the proposed project boundaries. Specific to the underwater investigations (sidescan sonar survey), "The results of the underwater archaeological investigation were negative. No historic remains were discovered" (Cinquino et al. 1996:iv).

In 1997, an underwater investigation was undertaken by Panamerican for the West Indian Company of St. Thomas. The area surveyed (with sidescan sonar) was immediately north and adjacent to the existing Havensight cruise ship pier in Charlotte Amalie Harbor and extended the entire length of the pier, plus an additional 300 feet off the western end of the pier (Krivor and Tyson 1997). The remote-sensing survey identified three targets; a section of modern pipe and two prop scours (in the bottom sediment) from cruise ships (Krivor and Tyson 1997:21). No other objects were documented above the seafloor except for an occasional scatter of rocks.

The most relevant studies to the current investigation are two surveys conducted by Panamerican that overlap portions of the KOCOA investigation area. The first was the intensive remote sensing survey and diver investigations conducted in 2000 by Panamerican of three areas in the harbor for the Virgin Islands Port Authority (VIPA). Overlapping portions of the current survey areas, the project area(s) included the Hassel Island Reach, the Rupert Rock Reach, and the Inner Harbor Reach (Figures 16 and 17).

Results of the magnetometer survey, important in the analysis of the current survey's data, documented four potentially significant magnetic anomalies within the Rupert Rock Reach; one potentially significant magnetic anomaly within the Hassel Island Reach; and no potentially significant magnetic anomalies within the Inner Harbor Reach (Figures 18 and 19). Diver investigations of the five anomalies identified only modern debris, and no potentially significant submerged cultural resources (in the form of shipwrecks) within any of the reaches (Krivor 2000).

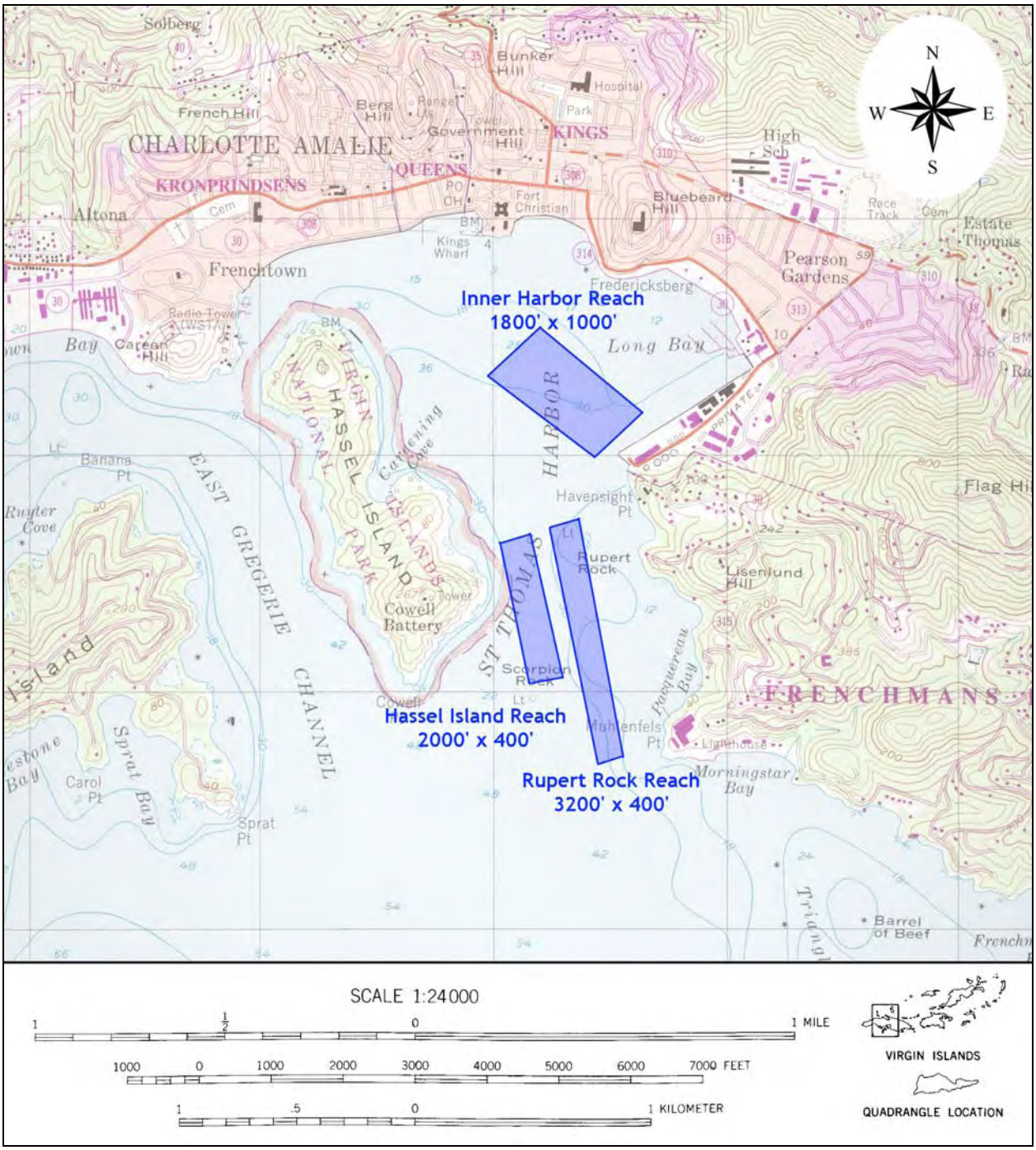

Figure 16. Reaches surveyed during the 2000 Panamerican investigation for VIPA (as presented in Krivor 2000).

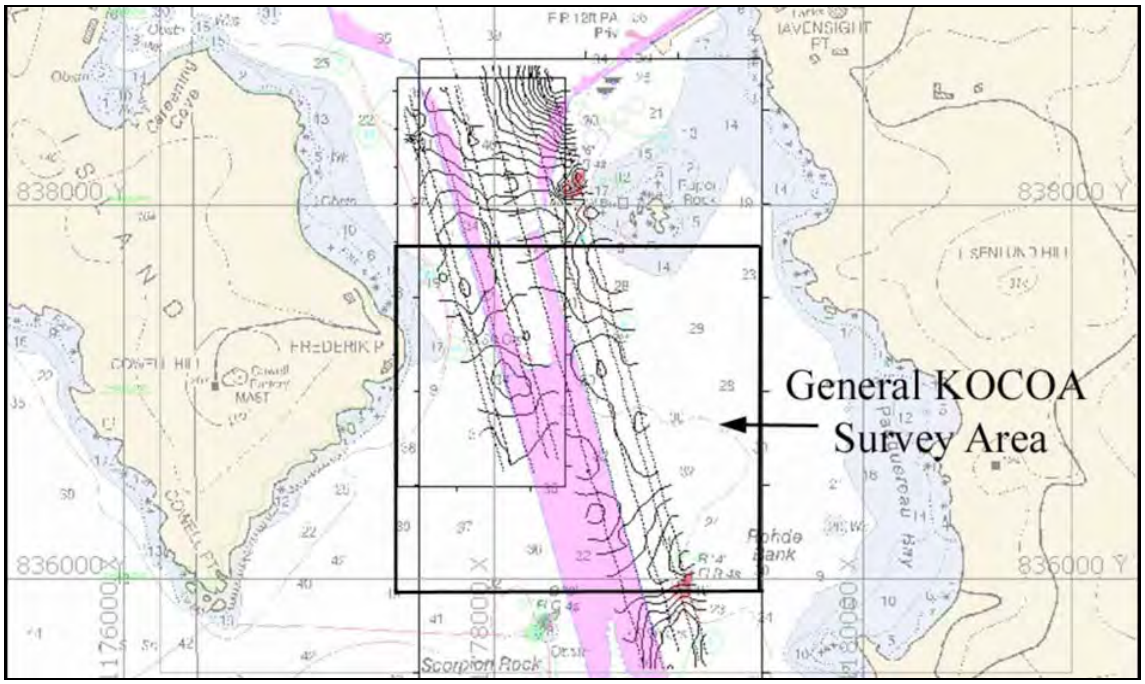

Figure 17. 2000 survey areas overlain with general KOCOA boundary.

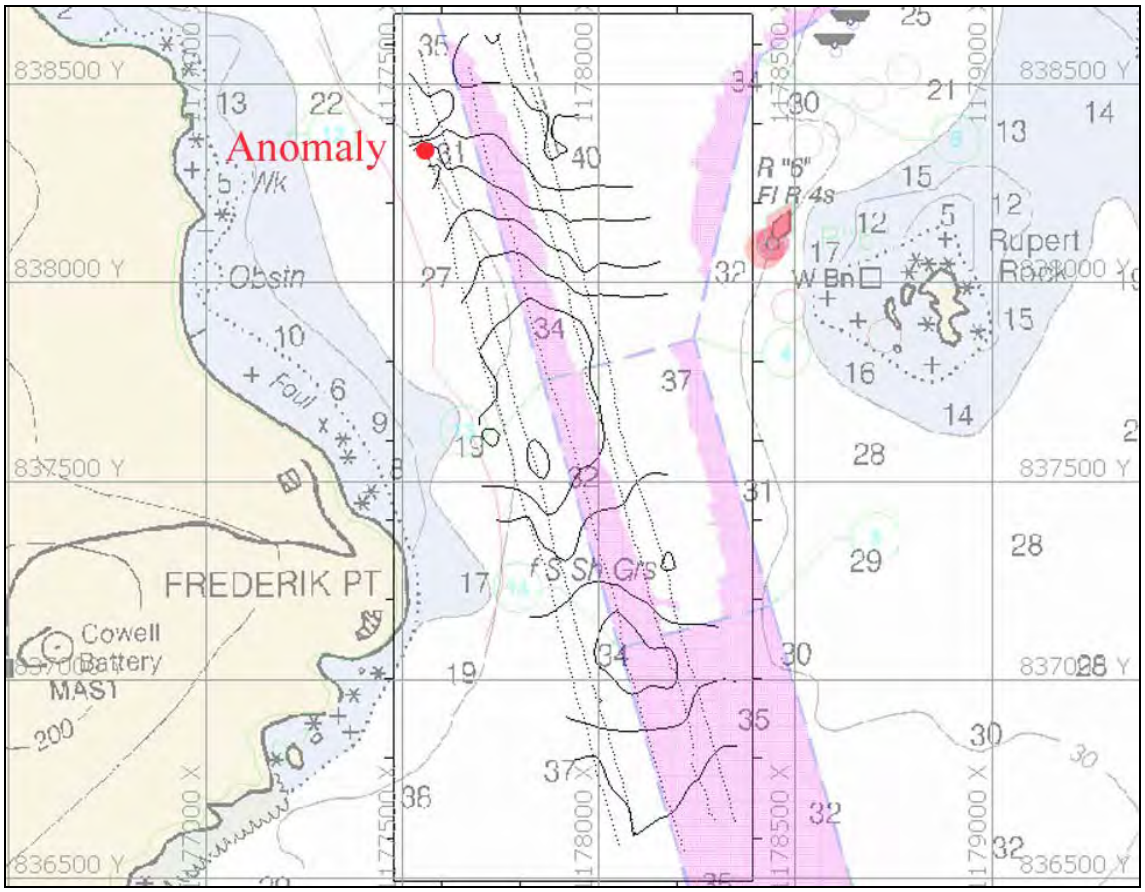

Figure 18. 2000 magnetic contour map of Hassel Island Reach. Note single anomaly well to the north of KOCOA area.

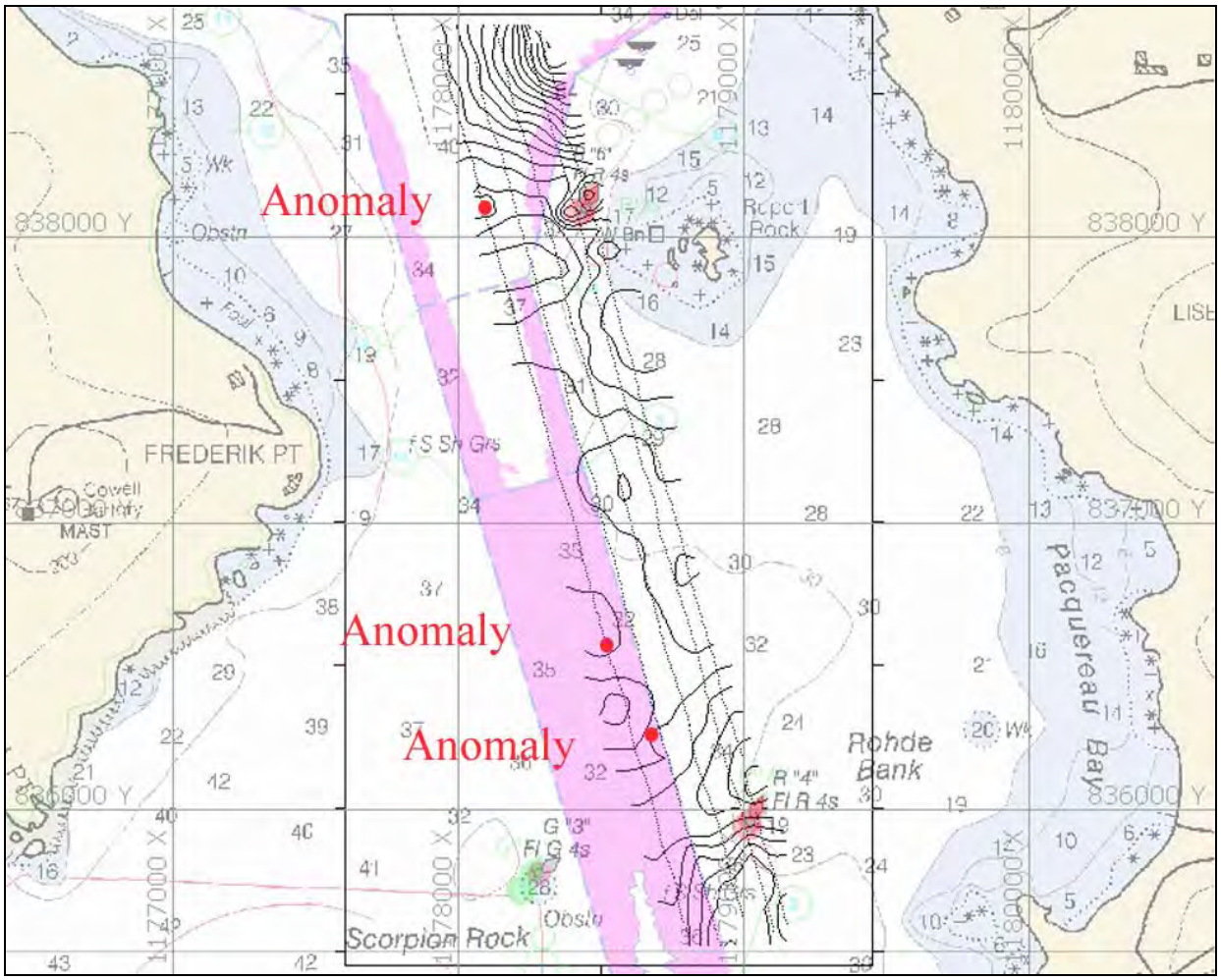

Figure 19. 2000 magnetic contour map of Hassel Island Reach. Note three anomalies identified as small iron debris (i.e., wire cable), the southern two within the KOCOA area. Purple is 2008 survey area discussed below.

The second survey that overlaps the current KOCOA investigation area was conducted in 2008 for WICO in anticipation of entrance channel and harbor dredging. Actually composed of two field investigations, the original survey covered a portion of the KOCOA area and resulted in the recordation of anomalies that, when diver verified, were found to be non-significant (Figure 20). However, during the original survey, the Virgin Islands Department of Natural Resources, Division of Archeology and Historic Preservation (DPNR) was notified that a historic wreck was possibly located adjacent to or in the proposed dredge locations within Charlotte Amalie Harbor, U.S. Virgin Islands. Panamerican expanded the survey to accommodate where DPNR thought the wreck might be located, but results were negative. Several weeks after having conducted the original survey, Panamerican received a location map from Mr. Charles Consolvo that identified two areas: Area 1, the general location for a "17th century Spanish wreck" south of the red navigation buoy #4 at the entrance to the harbor; and Area 2, the location of wreckage thought to be *La Trompeuse*, a seventeenth-century pirate wreck (this latter wreck site was not in Panamerican's original discussions with DPNR). The location of wreckage in Area 1 was based on decades old "memories" while the wreckage in Area 2 was based on recent diver discoveries. Because the wreck site(s) were possibly in or adjacent to the proposed dredging areas, DPNR stated that they would like these areas assessed further (Figure 21).

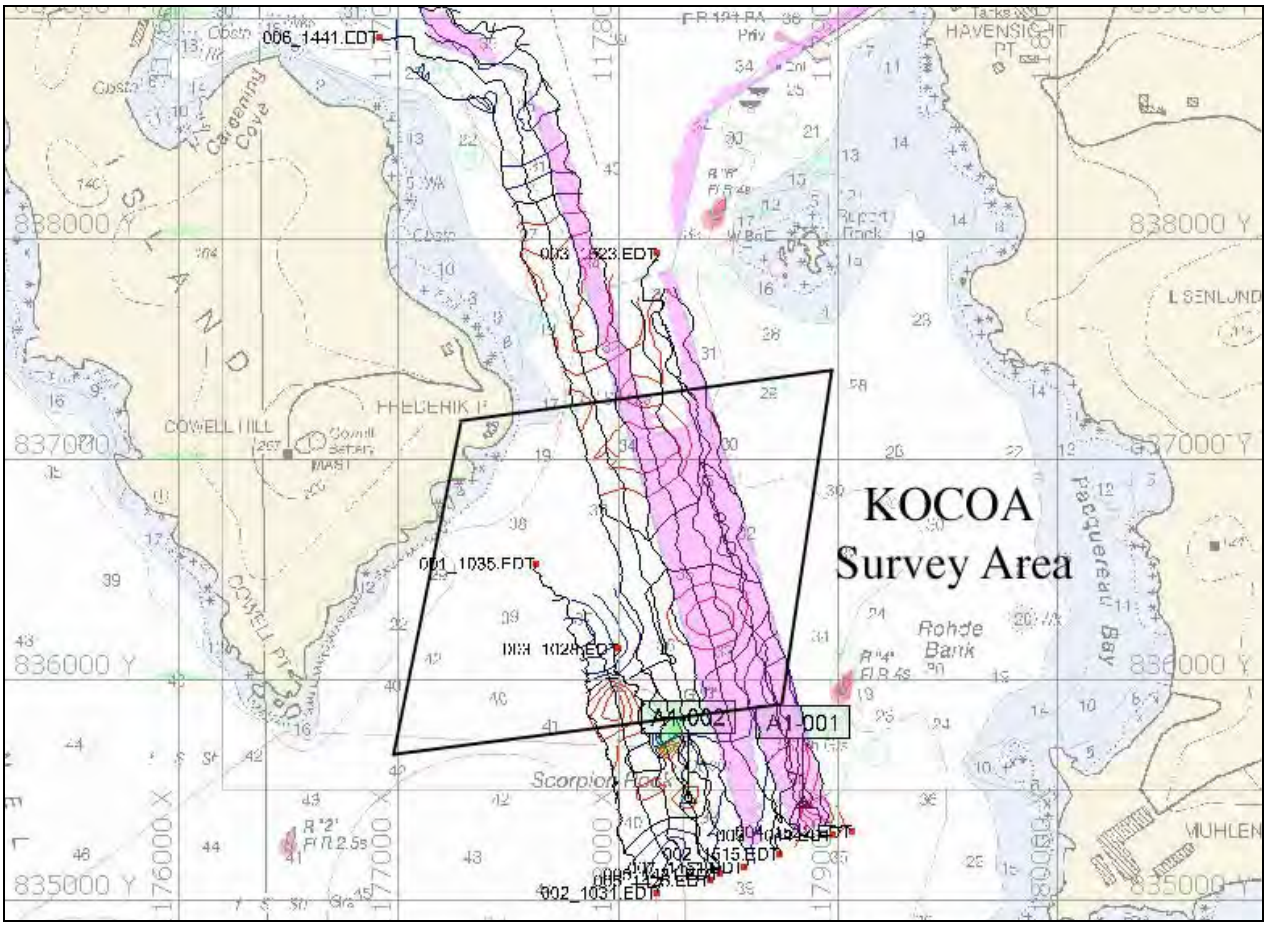

Figure 20. Panamerican's original 2008 remote sensing survey area in relation to the KOCOA (James 2008).

Illustrated in Figure 21, both possible wreck locations were surveyed. Several anomalies were located in Area 2 while none were located in Area 1. Diving on the anomalies in Area 2, revealed no significant anomalies. As nothing was located in Area 2, an additional remote sensing survey was conducted south of the first survey grid and contained an expanded area in line with the proposed dredge channel. Illustrated in Figure 22, several large anomalies were recorded in this new survey grid and an assessment by archeological divers indicated they represented nineteenth-century wreck vessel components. This location is to the south and outside the KOCOA.

A large, steam-powered windlass, over 14 feet in length, comprises the southern end of the largest anomaly (Figure 23); just to the north of the windlass, an anchor lies mostly buried. The folding stock-type anchor is attached by a large shackle to 6-inch stud-link chain that goes through a nearby 2-foot long hawse pipe, suggestive of a thick hull, and its folding stock is in an unlocked position. Both its location adjacent to the hawse pipe and its unlocked stock indicate it was not deployed but most likely was above the waterline at the bow. Another long run of chain (100 feet or more) disappears to the southwest and most likely represents a deployed anchor that is buried. These site attributes and the one anchor's location adjacent to the windlass indicate this is the bow of the vessel and suggest they lay where the vessel originally came to rest. We do know that the anchors, chain and stem section lie buried or partially buried, but it is unknown to what extent additional buried hull remains are present. The presence of numerous bronze hull plank spikes and copper sheathing fragments suggest that a portion of the vessel's hull has disintegrated (Figures 24 through 27). This would be expected if the ship went down at anchor. However, it is quite likely that some buried portion of the hull does exist.

Based on observable vessel components and characteristics, preliminary findings indicate the wreck site represents only one vessel, the remains of a large (>150-foot), copper-sheathed, wooden sailing ship dating to the latter half of the nineteenth century. No artifacts observed would suggest the presence of a second wreck that was suspected to be in the area (i.e., seventeenth-century Spanish). However, it must be stated that Charles Consolvo, with the Trust, recovered from the site a bronze spike surrounded by the remains of a plank or frame. Sending it to Beta Analytic Inc. for radiocarbon dating, a date of approximately 1650 A.D. (cal 300 BP) was obtained from the wood surrounding the spike. Regardless of the discrepancy with the date versus the majority of observable material, the site is considered to meet criteria for nomination to the NRHP (James 2008).

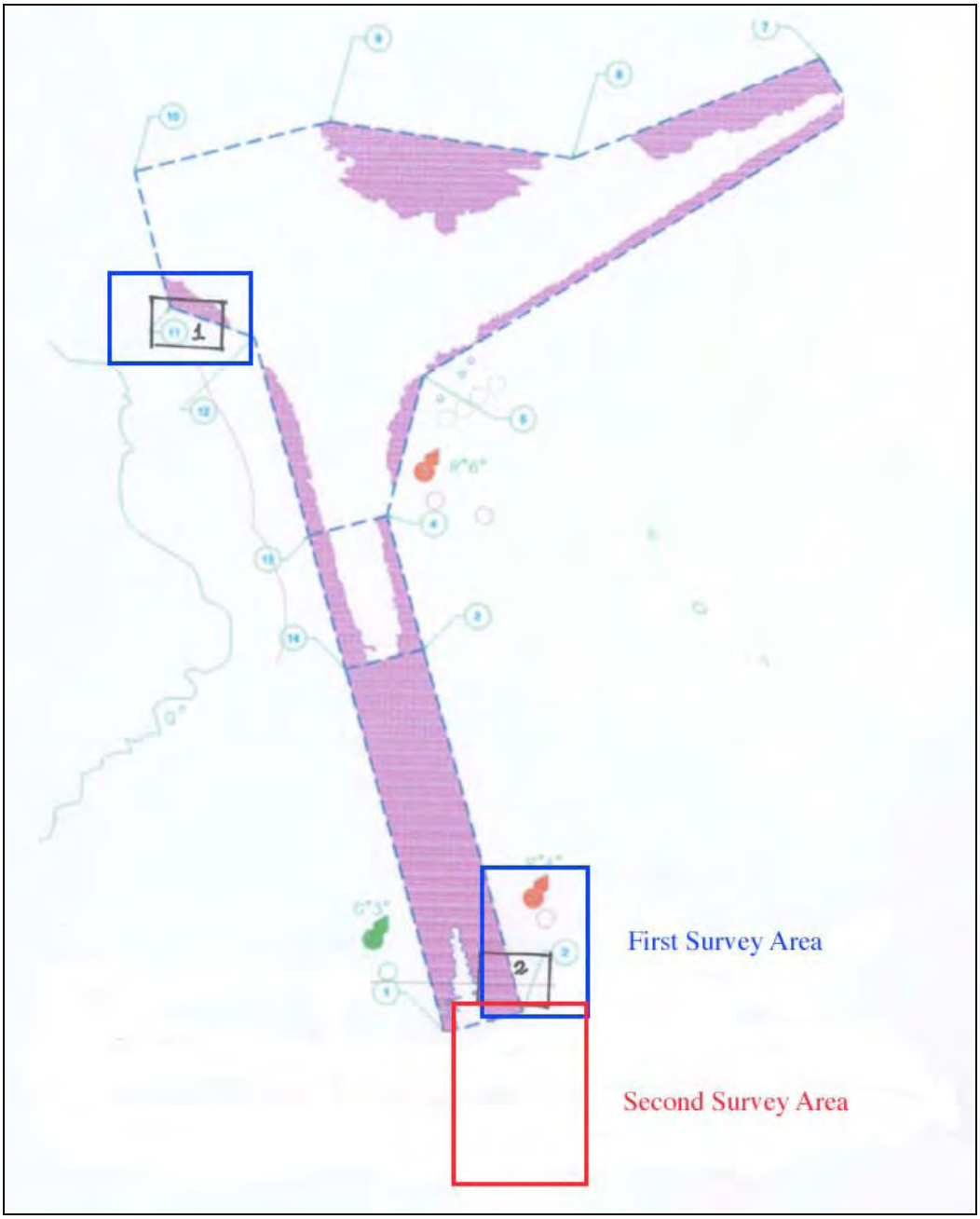

Figure 21. First (blue) and Second (red) additional survey areas in relation to original possible wreck locations. The areas in purple denote the planned dredging and original 2008 survey areas.

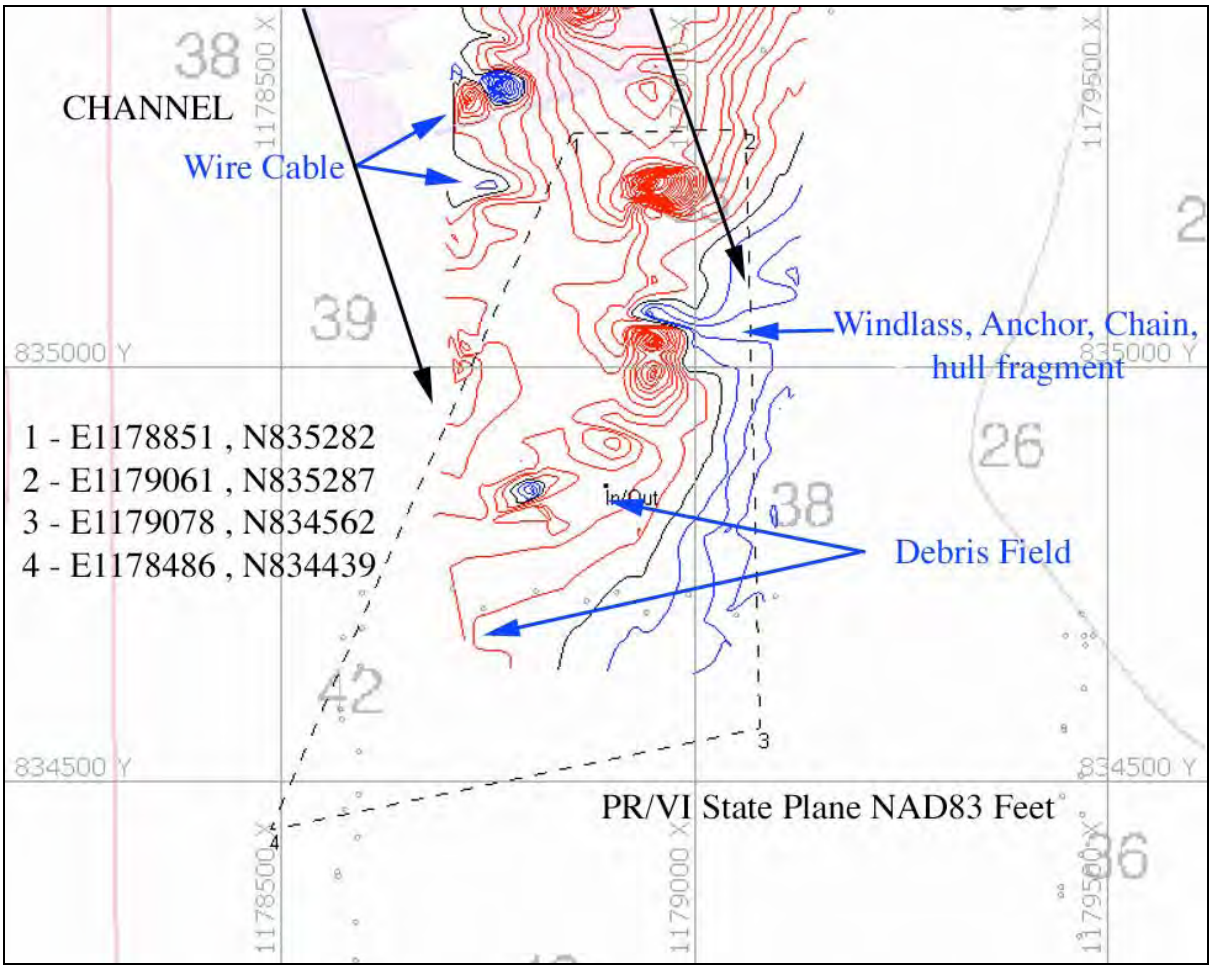

Figure 22. Location of the wreck site (hatched area) in relation to the channel alignment (black). The channel will be dredged to the 40-foot contour.

Figure 23. Windlass. Steam driven gears are central, warping barrels are on either end.

Figure 24. Copper or bronze alloy hull spikes are common at the windlass wreck site (courtesy of Charles Consolvo).

Figure 25. Copper or bronze alloy drift pin, which was a common characteristic of nineteenth-century ship construction (courtesy of Charles Consolvo).

Figure 26. Section of what is most likely copper sheathing. Note the heads of the sheathing tacks and the pre-punched holes (courtesy of Charles Consolvo).

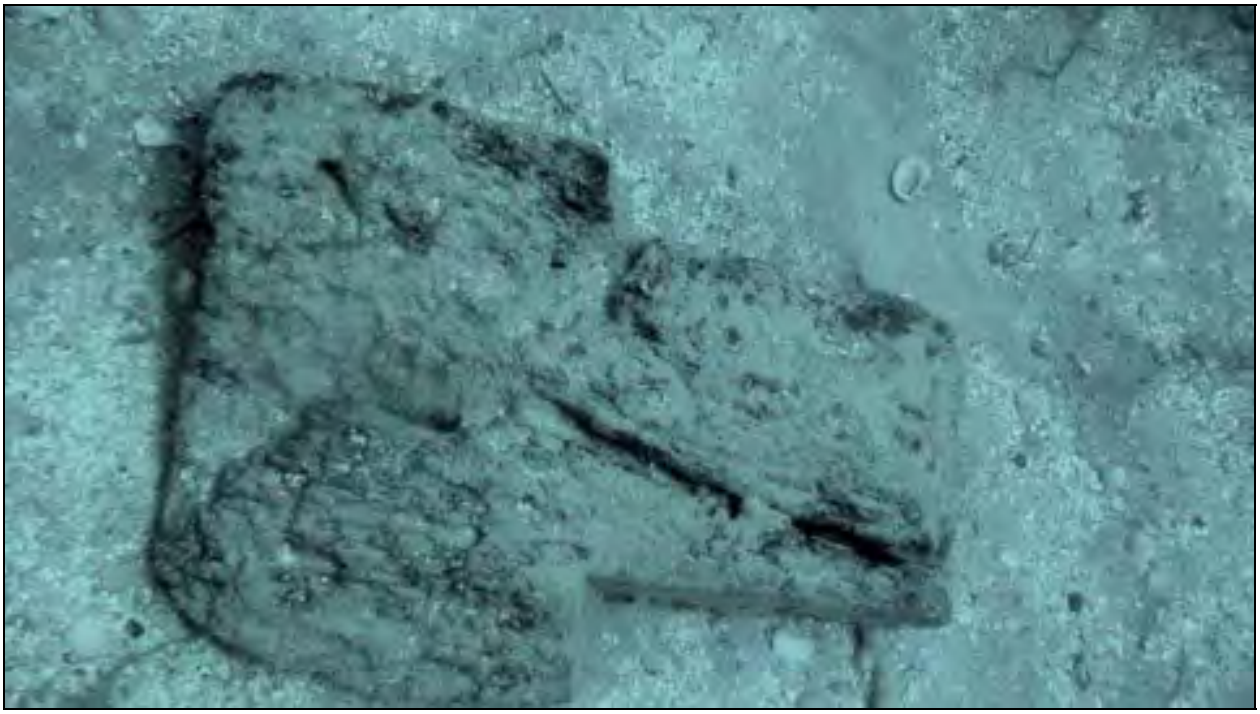

Figure 27. Large wood fragment, possibly from the gripe or stem area (courtesy of Charles Consolvo).

In addition to the two Panamerican investigations, SEARCH, Inc. conducted an inshore survey that overlaps a portion of the foreshore area in 2007 (Krivor 2007). Illustrated in Figure 28, the island was divided into numerous survey areas with the Southeast and South Reaches covering the inshore areas of the current KOCOA investigation area (Figure 28). Illustrated in Figure 29, one principal anomaly was located within the Southeast Reach immediately off Frederik's Battery. Diver investigation of magnetic target SE24 indicated it was modern debris in the form of iron strapping and a 12-foot section of iron pipe. These targets were observed during Panamerican's visual survey and metal detector search of the inshore area.

Five magnetic targets were recorded in the South Reach just to the south of the Battery and include S3, S6, and S12 (Figure 30). Diver investigation of the anomaly locations identified a debris field of metal. Small isolated objects, they were not considered significant.

Illustrated in Figures 31 and 32, two isolated anomalies were located farther offshore. Although the source for S1 was buried, it was considered an isolated, non-significant object. Similar to S1, S2 was also buried, and was considered an isolated, non-significant object (Krivor 2007).

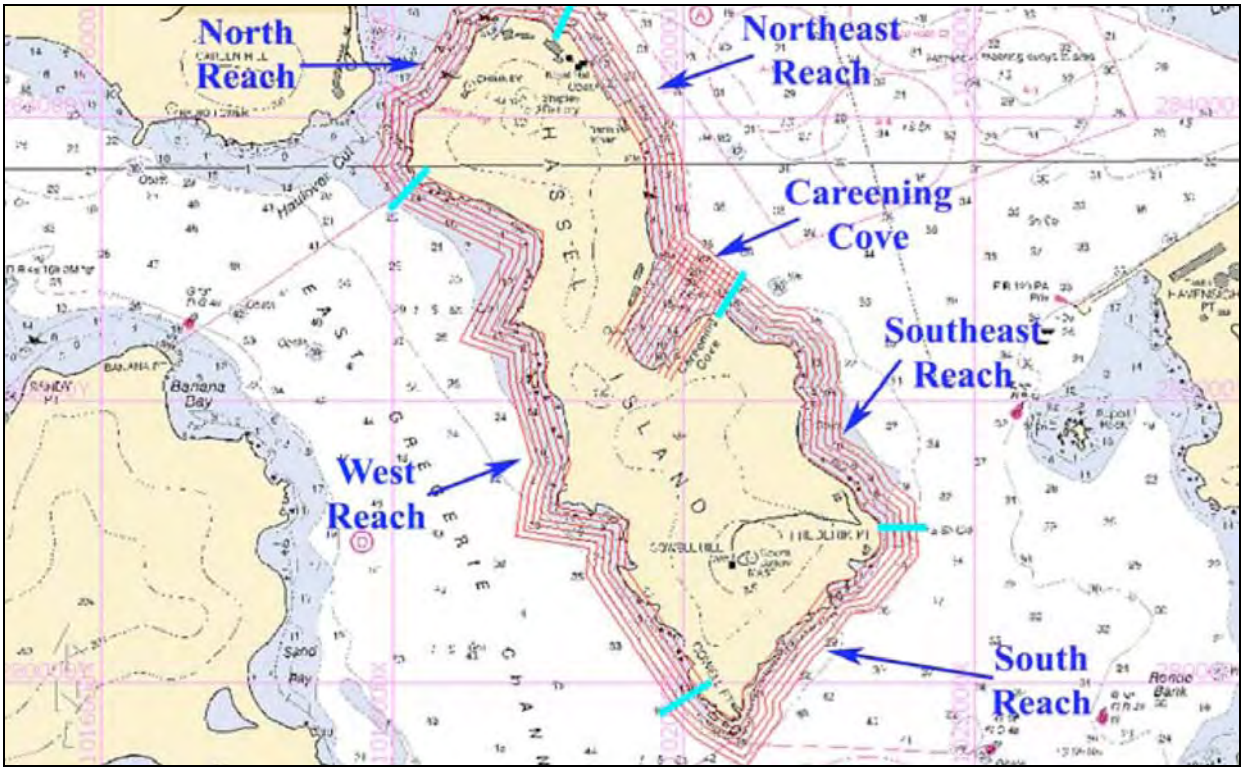

Figure 28. 2007 SEARCH, Inc. survey areas of Hassel Island (as presented in Krivor 2007).

Figure 29. Magnetic target SE24 located immediately offshore Frederik's battery (as presented in Krivor 2007).

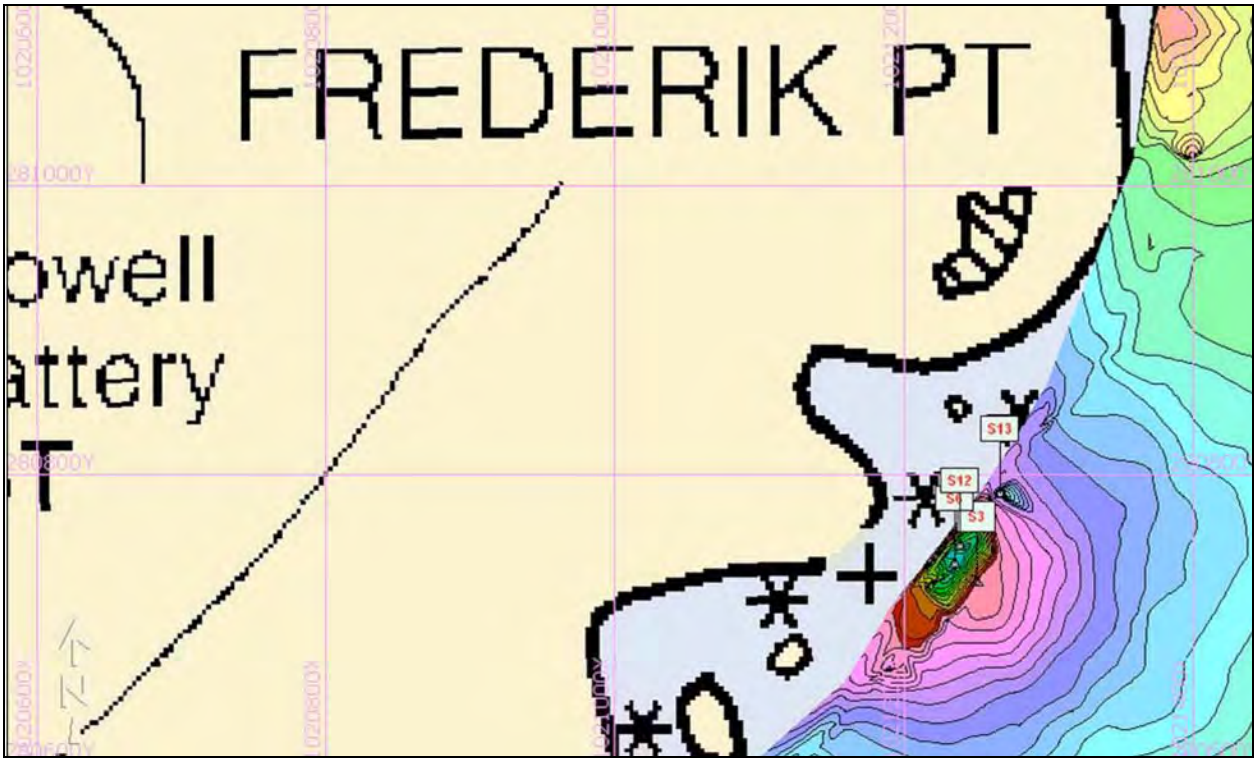

Figure 30. Magnetic target S3, S6, and S12 located just south of Frederik's battery (as presented in Krivor 2007).

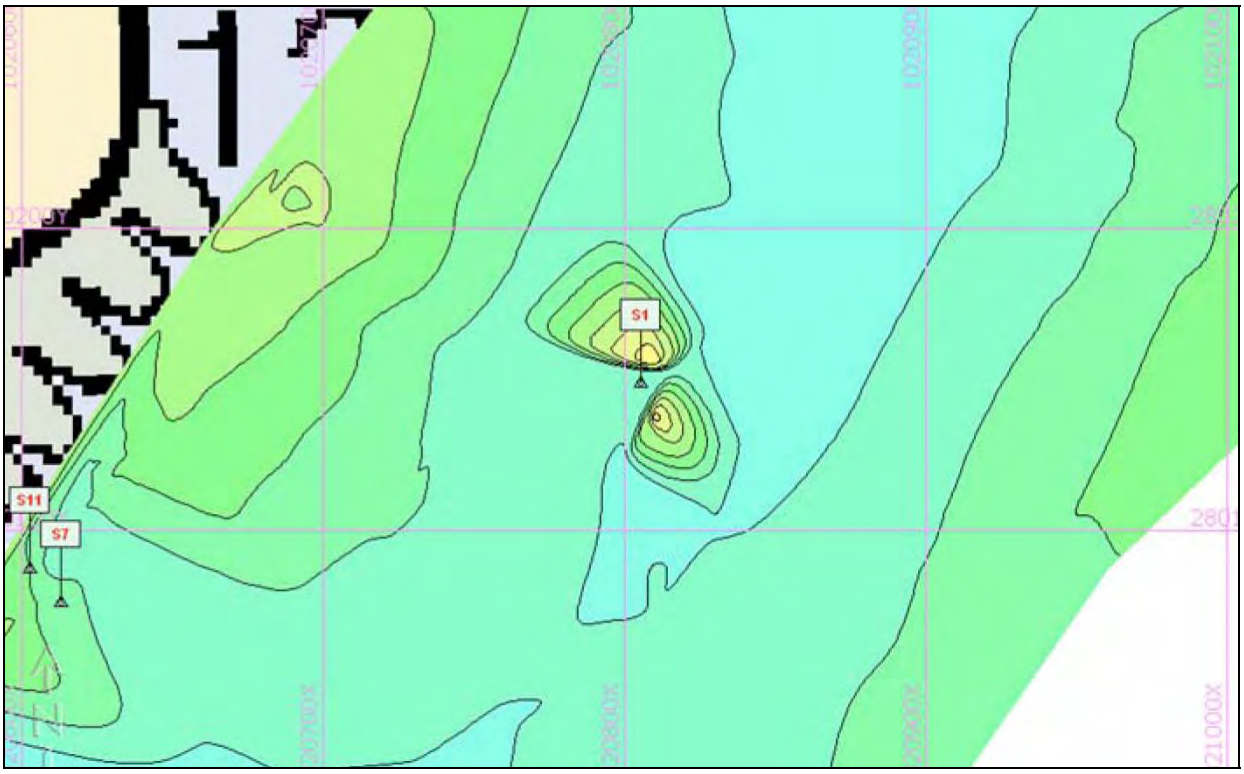

Figure 31. Magnetic target S1, although buried, was considered an isolated, non-significant object (as presented in Krivor 2007).

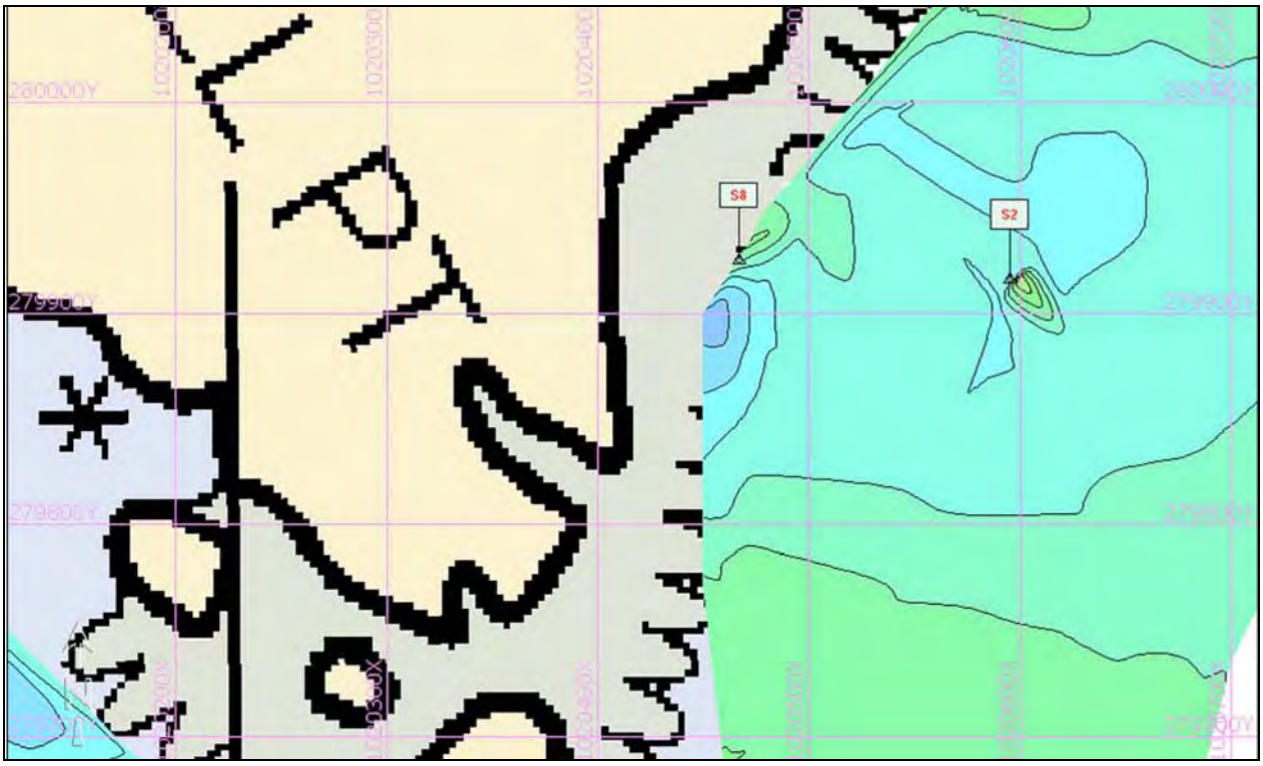

Figure 32. Magnetic target S2, although buried, was considered an isolated, non-significant object (as presented in Krivor 2007).

III. METHODS

PERSONNEL

Personnel involved in the investigation included Mr. Charles Consolvo of the Trust and Project Manager of the Trust's NPS ABPP grant; Erik Miles, an island-based cinematographer who acted as project photographer; Sean Loughman, owner of *The Pirates Chest* and an experienced local diver who performed the metal detector searches. All served as archeological divers. Also on board and diving with us for a day was Territorial Archeologist Brooke Persons. Panamerican personnel included Stephen R. James, Jr., M.A., RPA, who served as the Principal Investigator, and Andy D.W. Lydecker M.A., RPA, who served as the Remote-Sensing Specialist.

UNDERWATER INVESTIGATION PROCEDURES

Implemented between May 30 and June 3, the investigation included the following components:

- a magnetometer survey of the KOCOA-defined Project Area in order to identify submerged cultural resource sites or artifacts
- diver probing of a grid pattern at a to-be-selected area in order to detect buried nonferrous artifacts or sites (i.e., ballast pile)
- conduct an underwater metal detector survey of the foreshore area adjacent to the battery

The procedures for each component are described in detail below.

REMOTE SENSING SURVEY OF THE KOCOA

The remote-sensing survey of the KOCOA-defined Project Area was conducted with equipment and procedures intended to facilitate the effective and efficient search for magnetic anomalies and to determine their exact location. Remote-sensing instruments included a Marine Magnetics SeaSPY overhauser magnetometer, incorporated with a Trimble DSM12/212, Integrated 12-channel Differential Global Positioning System (DGPS), and navigation computer.

DIFFERENTIAL GLOBAL POSITIONING SYSTEM

A primary consideration in the search for magnetic anomalies is positioning. Accurate positioning is essential during the running of survey tracklines, and for returning to recorded locations for supplemental remote-sensing operations or ground-truthing activities. The positioning functions were accomplished on this project with a Trimble Navigation DSM12/212 global-based positioning system interfaced to the navigation computer (Figure 33).

The DSM12/212 is a Global Positioning System (GPS) that attains differential capabilities by internal integration with a dual-channel MSK Beacon receiver. This electronic device interprets transmissions from satellites in Earth's orbit and from a shore-based station to provide accurate coordinate positioning data for offshore surveys. This Trimble system has been specifically designed for survey positioning. This positioning was provided through continuous real-time tracking of the moving survey vessel by utilizing corrected position data provided by an on-board GPS, which processed both satellite data and differential data transmitted from a shore-based GPS station utilizing Radio Technical Commission for Maritime Services (RTCM) 104 corrections. The shore-based differential station monitored the difference between the position

that the shore-based receiver derived from satellite transmissions and that station's known position. Transmitting the differential that corrected the difference between received and known positions, the DGPS aboard the survey vessel constantly monitored the navigation beacon radio transmissions in order to provide a real-time correction to any variation between the satellite-derived and actual positions of the survey vessel. Puerto Rico–Virgin Islands State Plane coordinates (survey feet), based on the 1983 North American Datum (NAD 83) coordinate system were employed for this project.

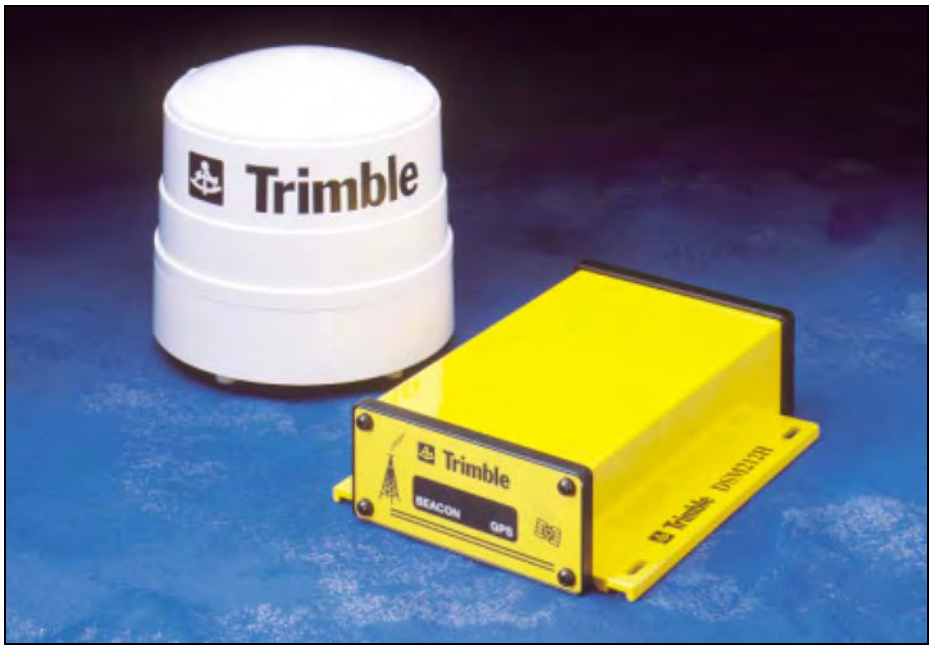

Figure 33. Trimble Navigation DSM 12/212 DGPS used during the investigation.

Both the satellite transmissions and the differential transmissions received from the shore-based navigation beacon were entered directly into a Sony VAIO® computer. The computer and associated hardware and software calculated and displayed the corrected positioning coordinates every second and stored the data. The level of precision for the system is considered by the manufacturer "…to achieve positions accurate to the sub-meter level" (Trimble Navigation Limited 1998:1-2). Computer software (Hypack Max®) used to control data acquisition was written and developed by Coastal Oceanographics, Inc. specifically for survey applications. Positioning information was stored on magnetic disk aboard the survey vessel.

All positioning coordinates are based upon the position of the antenna of the DGPS. The magnetometer was oriented to the antenna, and its orientation relative to the antenna (known as a layback) was noted (Figure 34). This information is critical in the accurate positioning of targets during the data analysis phase of the project, and repositioning for any subsequent archeological activities. The layback of the magnetometer sensor was 75 feet aft and 1 foot to starboard.

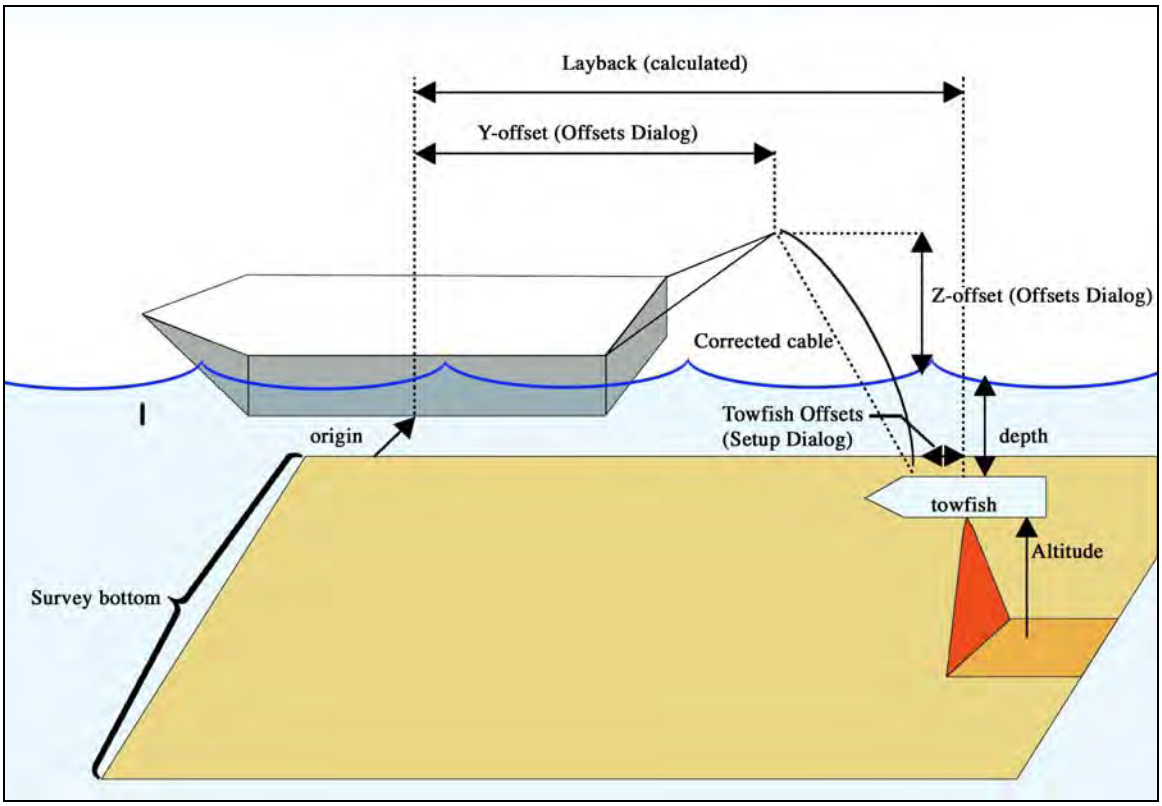

Figure 34. Equipment schematic illustrating layback (courtesy of Coastal Oceanographics, Inc.).

MAGNETOMETER

The remote-sensing instrument used to search for ferrous objects on or below the harbor floor of the survey area was a Marine Magnetics SeaSPY overhauser magnetometer (Figure 35). The magnetometer is an instrument that measures the intensity of magnetic forces. The sensor measures and records both the Earth's ambient magnetic field and the presence of magnetic anomalies (deviations from the ambient background) generated by ferrous masses and various other sources. These measurements are recorded in gammas, the standard unit of magnetic intensity (equal to 0.00001 gauss). The SeaSPY is capable of sub-second repeatability, but data was collected at 1-second intervals both digitally and graphically, providing a record of both the ambient field and the character and amplitude of anomalies encountered. This data was stored electronically in the navigation computer.

The ability of the magnetometer to detect magnetic anomalies, the sources of which may be related to submerged cultural resources such as shipwrecks, has caused the instrument to become a principal remote-sensing tool of marine archeologists. While it is not possible to identify a specific ferrous source by its magnetic field, it is possible to predict shape, mass, and alignment characteristics of anomaly sources based on the magnetic field recorded. It should be noted that there are other sources, such as electrical magnetic fields surrounding power transmission lines, underground pipelines, navigation buoys, or metal bridges and structures, that may significantly affect magnetometer readings. Interpretation of magnetic data can provide an indication of the likelihood of the presence or absence of submerged cultural resources. Specifically, the ferrous components of submerged historic vessels tend to produce magnetic signatures that differ from the characteristics of isolated pieces of debris.

While it is impossible to specifically identify the source of any anomaly solely from the characteristics of its magnetic signature, this information in conjunction with other data (historic accounts, use patterns of the area, diver inspection), other remote-sensing technologies, and prior knowledge of similar targets, can lead to an accurate estimation.

For this project the magnetometer was interfaced with a Sony VAIO® laptop computer, utilizing Hypack® software applications for data storage and management. Hypack® is the industry standard for marine navigation applications. The computer also interfaced with the DGPS, allowing the positioning of fix points to be integrated with each magnetometer data point (Figure 36).

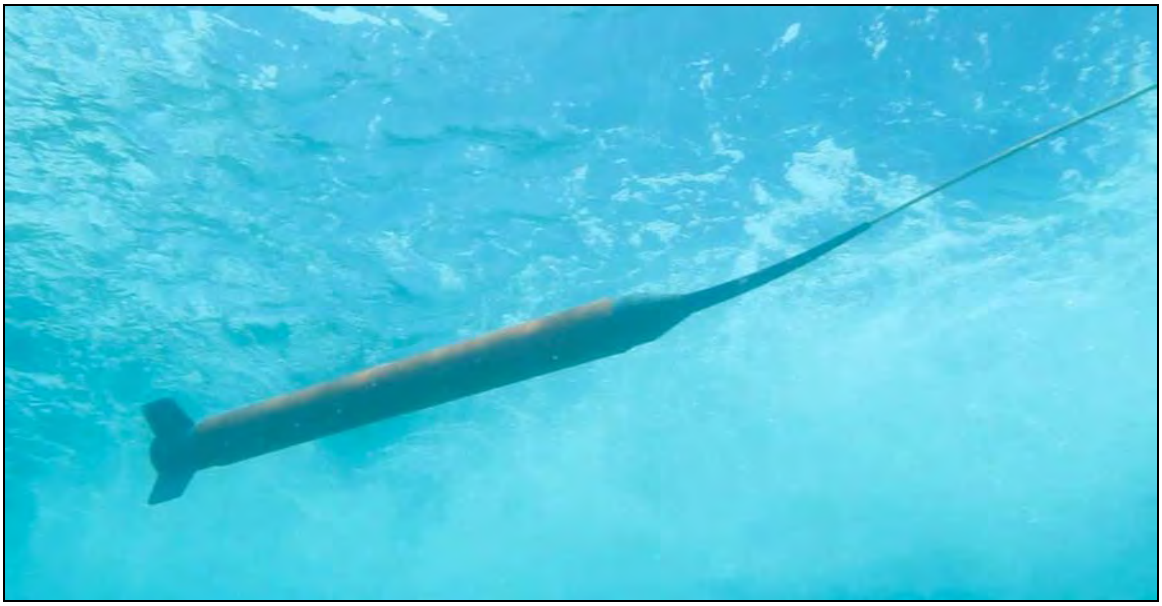

Figure 35. Marine Magnetics SeaSPY overhauser magnetometer used during the survey (courtesy of Erik Miles).

Figure 36. Navigation computer on the center console of the survey vessel (courtesy of Erik Miles).

SURVEY VESSEL

The vessel utilized for the remote-sensing survey was the *Shell Seeker V*, a 26-foot, shallow-draft, center-console, modified V-hull, fiberglass Grady-White with twin 250-horsepower Evinrude outboards (Figure 37). Provided by Mr. Charles Consolvo of the Trust and Project Manager of the investigation, the Grady-White had a stand-up center console and ample deck area for the placement and operation of the necessary remote-sensing equipment.

The vessel conformed to all U.S. Coast Guard specifications according to class, and had a full complement of safety equipment. The vessel carried appropriate emergency supplies including lifejackets, spare parts kit, tool kit, first-aid materials, etc.

Figure 37. The *Shell Seeker V*, a 26-foot center-console, Grady-White employed for both survey and diving. Mr. Charles Consolvo, Director of the Trust, Project Manager of the investigation, and vessel owner is at the helm. Pictured is the magnetometer being deployed (courtesy of Erik Miles).

SURVEY PROCEDURES

Based on the KOCOA area defined by Arcadia, coordinates for each survey area were entered into the navigation program Hypack® and pre-plotted tracklines were produced with 50-foot offsets. A total of 30 transect lines were planned to adequately cover the KOCOA-defined survey area (Figure 38). After the magnetometer and DGPS were mobilized, tested, and found operational; the running of pre-plotted tracklines began. The helmsman viewed a video monitor, linked to the DGPS and navigational computer to aid in directing the course of the vessel relative to the individual survey tracklines. The monitor displayed the real-time position of the path of the survey vessel along the trackline. The speed of the survey vessel was maintained at approximately 3–4 knots for the uniform acquisition of data, and the magnetometer was towed at a depth of 20 feet, which kept the towfish within 20 feet of the bottom.

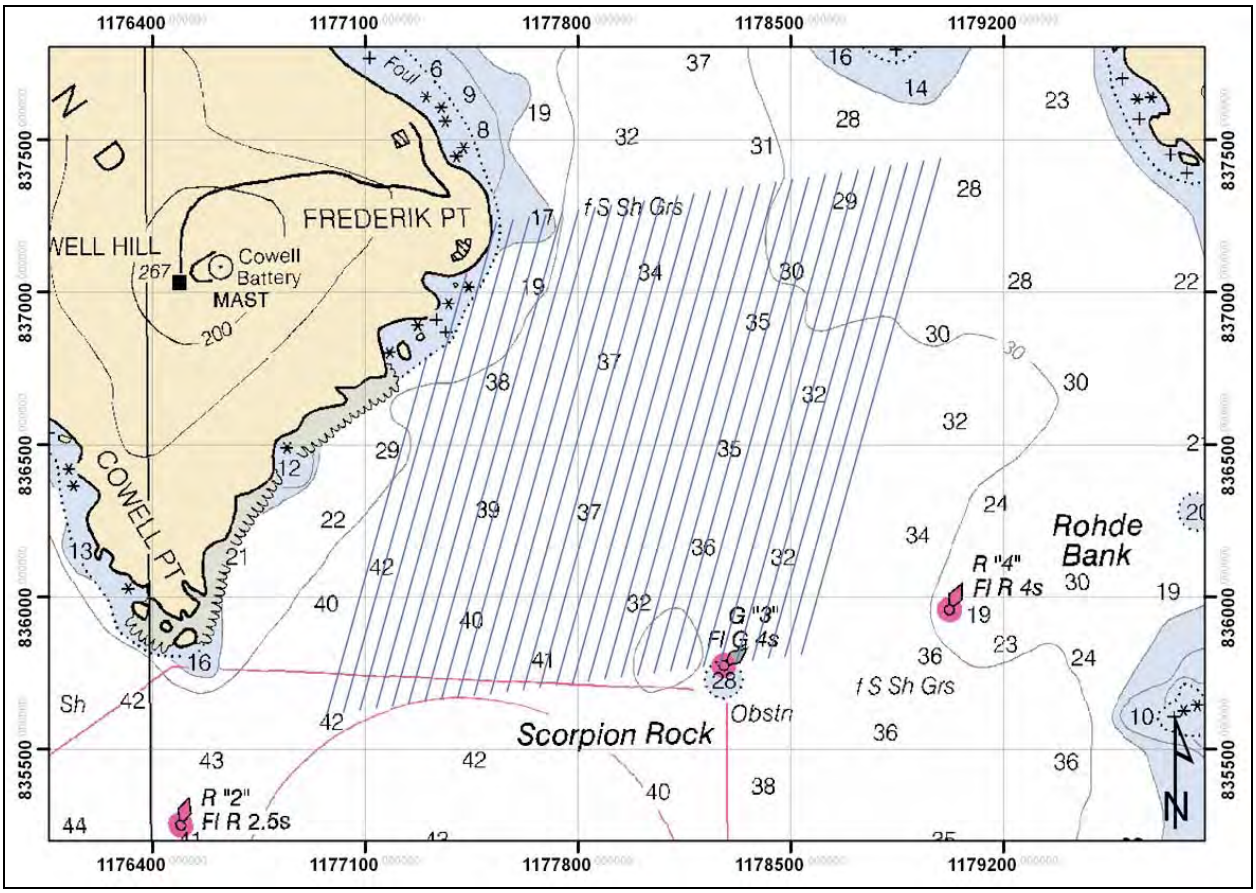

Figure 38. Pre-planned lines for the KOCOA-defined survey area.

As the survey vessel maneuvered down each trackline, the navigation system determined vessel position along the actual line of travel every second. The computer recorded positioning and magnetometer data every second. Vessel speed was between 3 and 4 feet per second, acquiring magnetic readings every second. The positioning points along the line traveled were recorded on the computer hard drive and the magnetic data were stored digitally.

Each of the tracklines was run until completed. Any navigational errors, problems with the remote-sensing instruments, or with the DGPS during the running of a line resulted in the termination of that run. Problems with remote-sensing instruments were resolved before repeating the run of an aborted line. A total of 30 survey lines were run for the KOCOA-defined survey area as illustrated in Figure 39.

Upon completion of the magnetometer survey, the raw positioning and magnetometer data were edited within the Hypack® computer program. The edited file was input into the system's contouring program to produce magnetic contour maps. The maps, field notes, and magnetometer digital strip charts were then analyzed to create a list of any magnetic anomalies that were possibly indicative of potentially significant cultural resources.

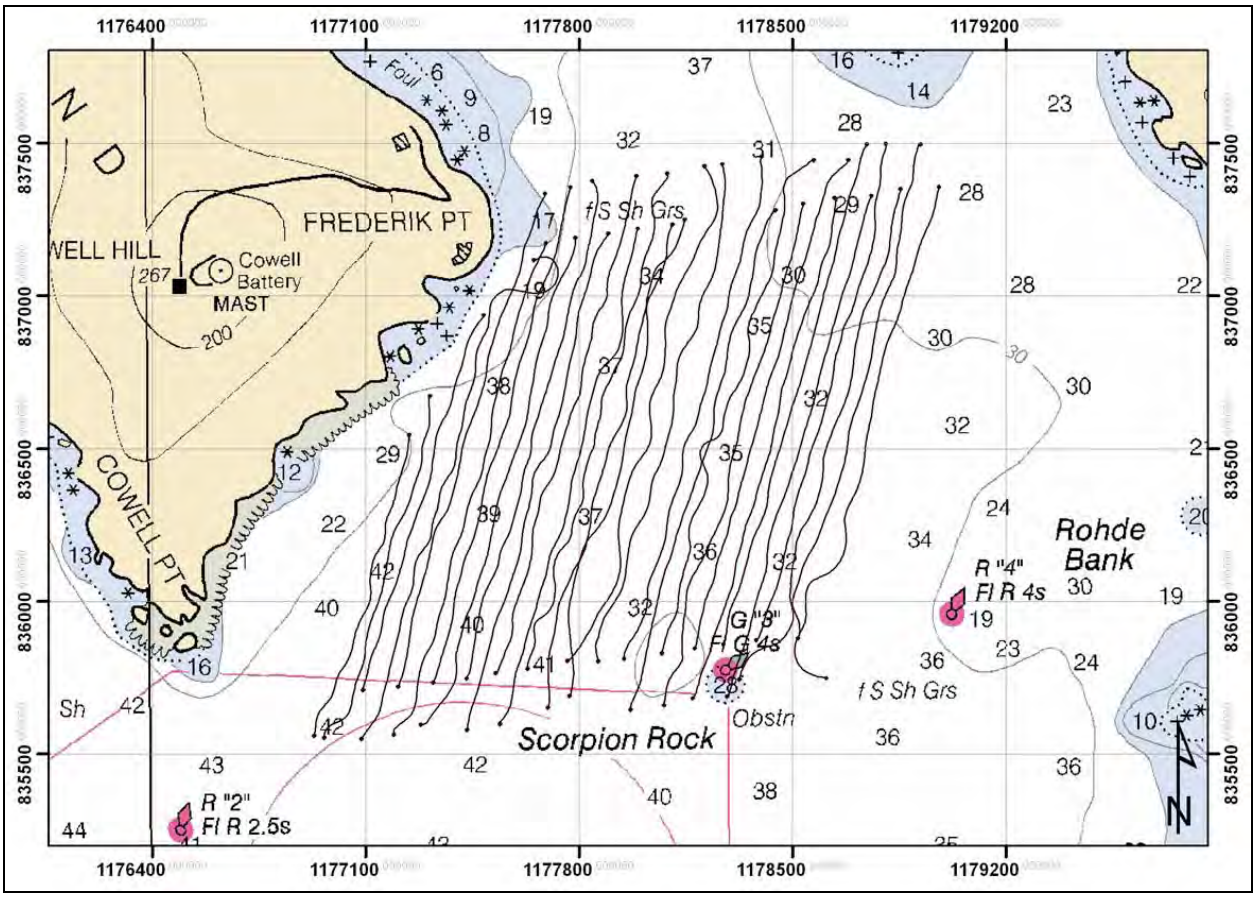

Figure 39. Survey lines conducted in the KOCOA-defined survey area.

It should be stated that before contour map production, a review of each survey trackline was conducted in Hypack®. Magnetic anomalies present on each survey trackline are labeled at this time, and locational information (Easting, Northing) as well as gamma deviations are taken from the electronic strip-chart data and tabulated, the data table appearing in the report. Once all survey tracklines have been analyzed and all anomalies along each line have been labeled and tabulated, the contour map is then produced.

Concerning analysis of anomalies relative to potential significance, the evaluation of the potential cultural significance is dependent on a variety of factors. These include the detected signal characteristics of the individual targets (e.g., magnetic anomaly strength and duration), association with other magnetic targets on the same or adjacent lines, and relationships to observable target sources such as channel buoys or vessels, as well as correlation to the historic record. If an anomaly represents a single-source object (a localized deviation), it is generally identified as non-significant, especially in an area with the type of commercial activity as the harbor area. With that said, targets that were likely to represent potential historical shipwrecks or other potentially historic submerged resources were identified, and recommendations were made for subsequent assessment by archeological divers. With respect to the naval engagement, no vessels were lost, but shots were fired from both sides. Possibly representing round shot from the engagement, several small anomalies were selected for investigation.

DIVING INVESTIGATIONS

Subsequent to the magnetometer survey, diving investigations consisted of the following components:

- assessment of anomalies located during the magnetometer survey of the KOCOA-defined Project Area in order to identify submerged cultural resource sites or artifacts
- diver probing of a grid pattern at a to-be-selected area in order to detect buried nonferrous artifacts or sites (i.e., ballast pile)
- conduct an underwater metal detector survey of the foreshore area adjacent to the battery

Diver inspection of all magnetic anomalies considered potentially significant was conducted first upon completion of the remote-sensing survey and analysis of survey data. Targets considered potentially significant were positioned with the DGPS and the vessel's anchor was dropped on the target coordinates. This allowed the divers, who utilized self contained underwater breathing apparatus (SCUBA) dive equipment, to descend the anchor line and be immediately at the target location. The target area was then visually inspected, probed in a cruciform pattern by archeologists, and also metal detected by Sean Loughman. If any targets were acquired, the diver then delineated the target's spatial extent. Erik Miles conducted the underwater photography. Due to the type of targets investigated, sub-sediment investigations were generally not required, but some hand fanning was conducted (Figures 36–39).

Figure 40. Archeological divers ascending the anchor line after anomaly inspection (courtesy of Erik Miles).

Following completion of anomaly inspection, a 1,250-foot long probing transect was identified and positioned with DGPS. Divers employing a compass and a 100-foot measuring tape laid out the transect in 100-foot increments, visually inspecting and metal detecting along its length and

probing every 50 feet. Probing was conducted with a 5.5-foot steel spear gun shaft that worked extremely well in the sand and shell hash. Upon completion of the probing transect, a metal detector and visual survey was conducted of the near-shore area immediately adjacent to the battery.

It should be stated that before the start of diving operations, all participants received a thorough briefing on the content and objectives of the dive. Safety was a primary goal of this project and diver safety was given priority in all decisions and actions undertaken during diving operations.

Figure 41. Sean Loughman conducting metal detector survey (courtesy of Erik Miles).

Figure 42. Hand fanning conducted at metal detector "hits" (courtesy of Erik Miles).

Figure 43. Probing was conducted with a 5.5-foot steel spear gun shaft at anomaly locations as well as at 50-foot intervals along the 1,250-foot long probing transect (courtesy of Erik Miles).

IV. INVESTIGATIVE FINDINGS

INTRODUCTION

Implemented between May 30 and June 3, the investigation included the following components:

- a magnetometer survey of the KOCOA-defined Project Area in order to identify submerged cultural resource sites or artifacts
- diver probing of a grid pattern at a to-be-selected area in order to detect buried nonferrous artifacts or sites (i.e., ballast pile)
- conduct an underwater metal detector survey of the foreshore area adjacent to the battery

The results for each component are described in detail below.

REMOTE SENSING SURVEY OF THE KOCOA AND DIVER ASSESSMENT OF TARGETS

The magnetometer survey of the KOCOA-defined area covered an area of approximately 1,500 feet by 1,500 feet, with a total of 30 anomalies recorded. Figure 44, the magnetic contour map contoured at 5-gamma intervals, shows that while several large geologic gradients are present, the area is free of large anomalies or anomaly clusters that would indicate potential cultural resource sites like a shipwreck. This is due in large part to the fact that the entrance of the navigation channel runs directly through the KOCOA-defined area and the channel has been repeatedly dredged. Additionally, the absence of significant cultural resources in the form of shipwreck remains within the navigation channel has been verified by previous marine archeological investigations conducted in both 2000 and 2008. The combined coverage of these surveys in relation to the KOCOA-defined area is presented in Figure 45. With that said, a number of relatively small anomalies with short durations were recorded throughout the area and three were identified for additional investigation based on the fact that they had not been previously investigated and were small single source objects that might represent ordnance from the battery engagement. The three targets chosen for investigation included M-02, M-03, and a cluster represented by M-28, 29, and 30 (Table 4, Figure 44). As illustrated in Figure 44 and 41, M-02 falls just on the edge of the 2000 survey and just outside the navigation channel. Anomaly M-03 is located within the channel and is between two anomalies that were investigated in the 2000 survey and found to be non-significant debris. The cluster comprised of Anomalies M-28, 29, and 30 falls outside of any previously investigated area.

Table 4. Investigated Anomalies.

Anomaly	Total Gamma Deviation	Duration
M-02	33	90 feet
M-03	25	88 feet
M-28	10	50 feet
M-29	10	50 feet
M-30	13	50 feet

M-02

Located on the eastern edge of the 2000 survey and just outside of the navigation channel, Anomaly M-02 was a small dipole (Figure 46). Visual examination of the target area was negative, and probing in 5-foot increments in a cruciform pattern covering a 20-foot diameter area was also negative. The area was inspected with the metal detector and two coins were located. Buried less than 1 foot deep, the coins included a 1974 Eisenhower dime and an unknown copper coin possibly early French or Danish (Figures 47 and 48). The coins however were not the cause of the anomaly whose source remains unknown. The dime was left on site and the copper coin was retained by the Trust to be conserved and curated. While the anomaly is too small to represent a shipwreck, and most likely represents modern, non-significant debris, there is a possibility it could represent ordnance from the engagement.

M-03

Located within the navigation channel, Anomaly M-03 was a small dipole (Figure 49). Diver examination of the target area showed that the anchor, which was dropped on the target coordinates, lay directly atop a 20-foot long I-beam (Figure 50). Further visual examination of the general area located a cluster of debris approximately 40 feet to the northwest that at first appeared to be large ballast rock. Upon closer examination it was found the debris, which was one-layer thick and covering an area approximately 10 feet in diameter, was comprised of: several rocks; what is thought to be a solidified bag of concrete; several small pieces of miscellaneous iron including a small iron knee 2 feet to a side; the neck and shoulder fragment of an eighteenth century bottle; and a modern (circa WWII?) artillery round (Figures 51 and 52). Approximately 6–8 inches in diameter and 18 inches in length, the origination of the shell is unknown, however there were coastal batteries on nearby Water Island that might be associated with its presence. Regardless, the area of debris, which was not the source of the anomaly, appears to be a cluster of unassociated materials and was not considered historically significant.

M-28, 29, AND 30

Comprised of M-28, 29, and 30, the third target examined was a cluster of small anomalies located to the west of the navigation channel and outside of all previous survey areas (Figure 53). Visual examination of the target area was negative, and probing of a 20-foot diameter area was also negative, although probing was easily accomplished at this area, as there was little shell in the soil matrix. The area was inspected with the metal detector, but proved negative as well. A 2-inch diameter metal pipe protruding from the bottom was located approximately 50 feet east of the target, but was not considered the anomaly source. While the anomaly cluster is too small to represent a shipwreck, and most likely represents modern, non-significant debris, there is a possibility it could represent ordnance from the engagement.

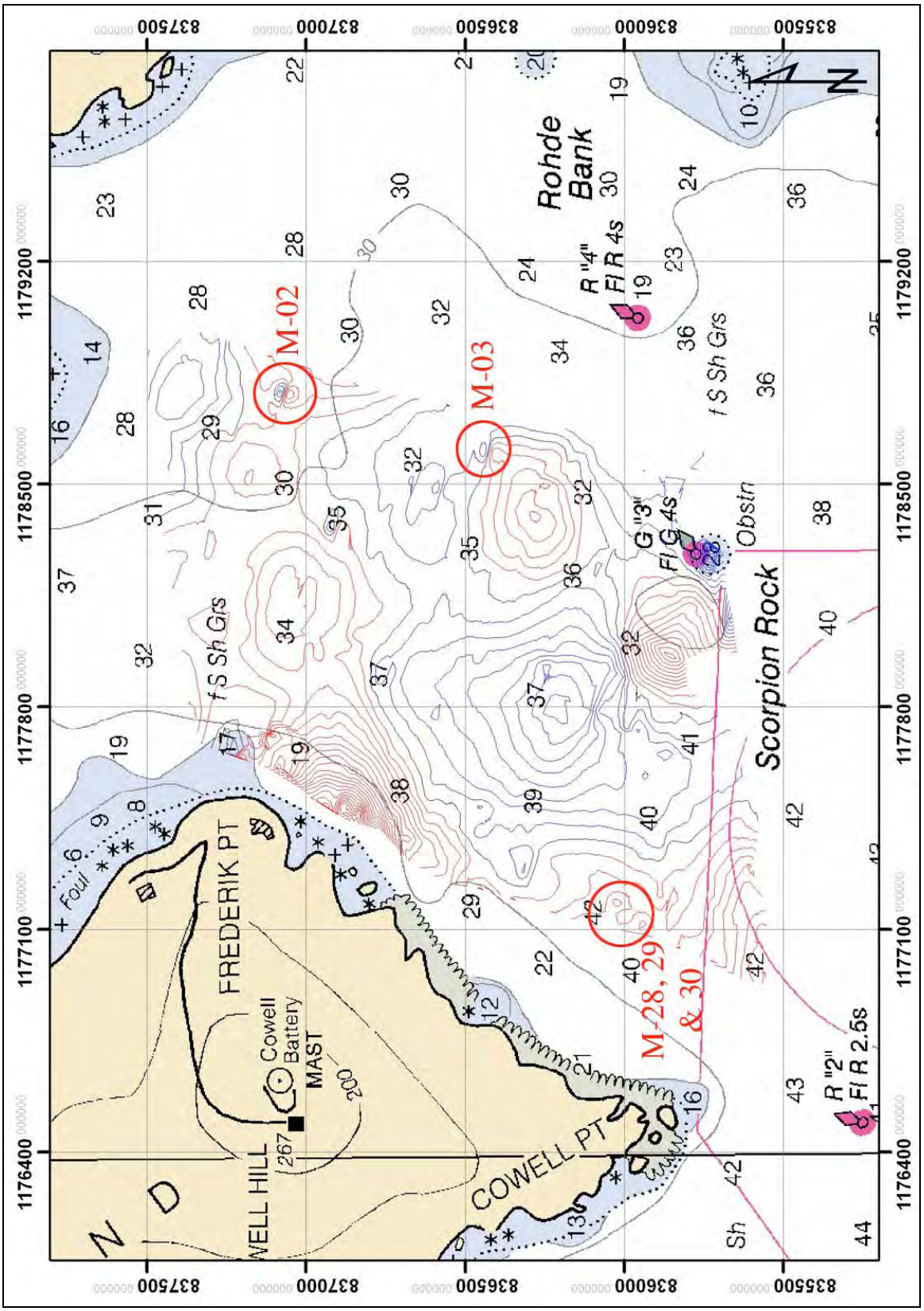

Figure 44. Magnetic contour map of the KOCOA-defined project area (5-gamma contour).

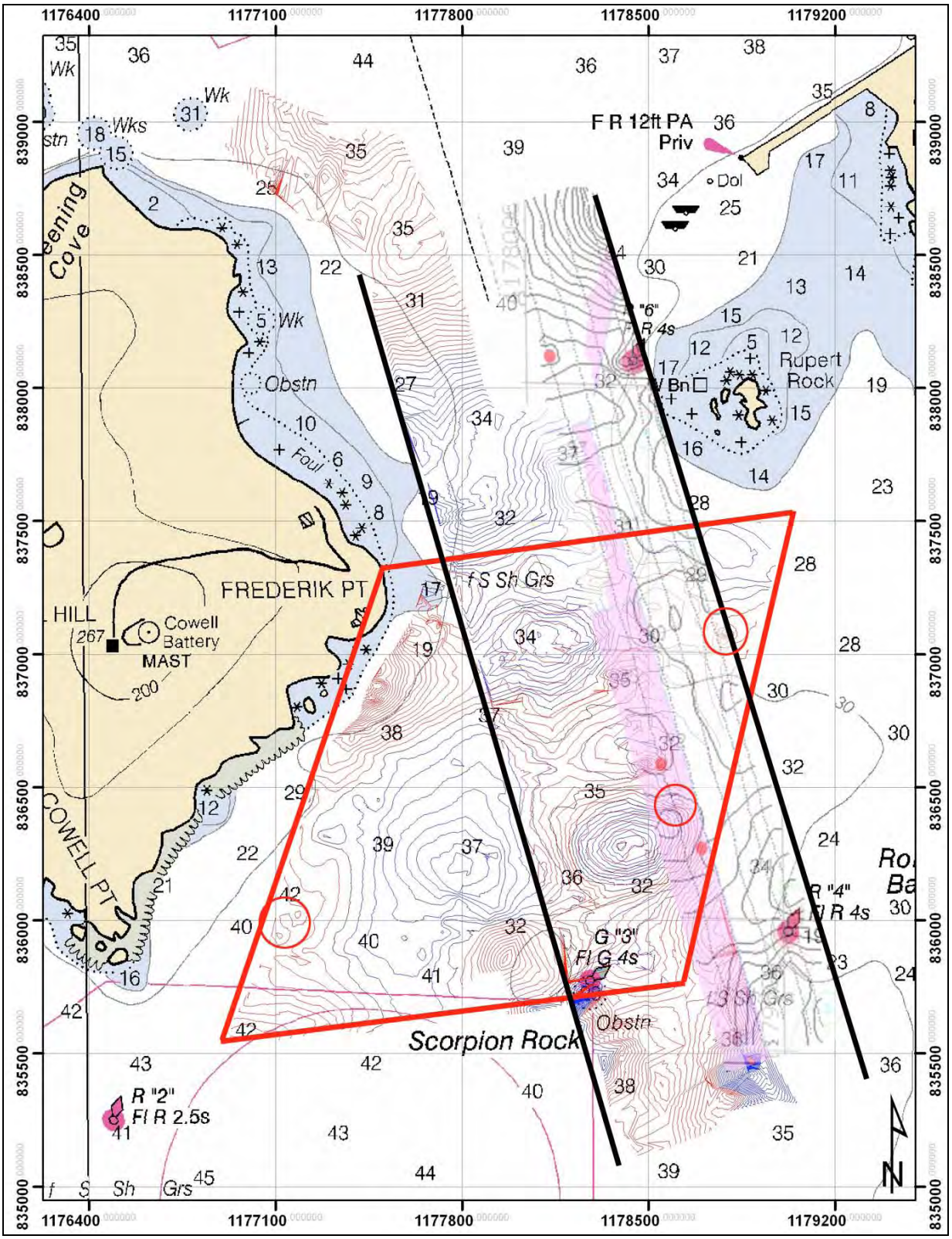

Figure 45. Magnetic contour map of the KOCOA-defined project area (red) with the 2000 and 2008 surveys' magnetic contour maps superimposed (between black lines). Large red circles denote current investigated anomalies. Note two small red dots to the north and south of M-03 which are anomalies investigated during the 2000 investigation.

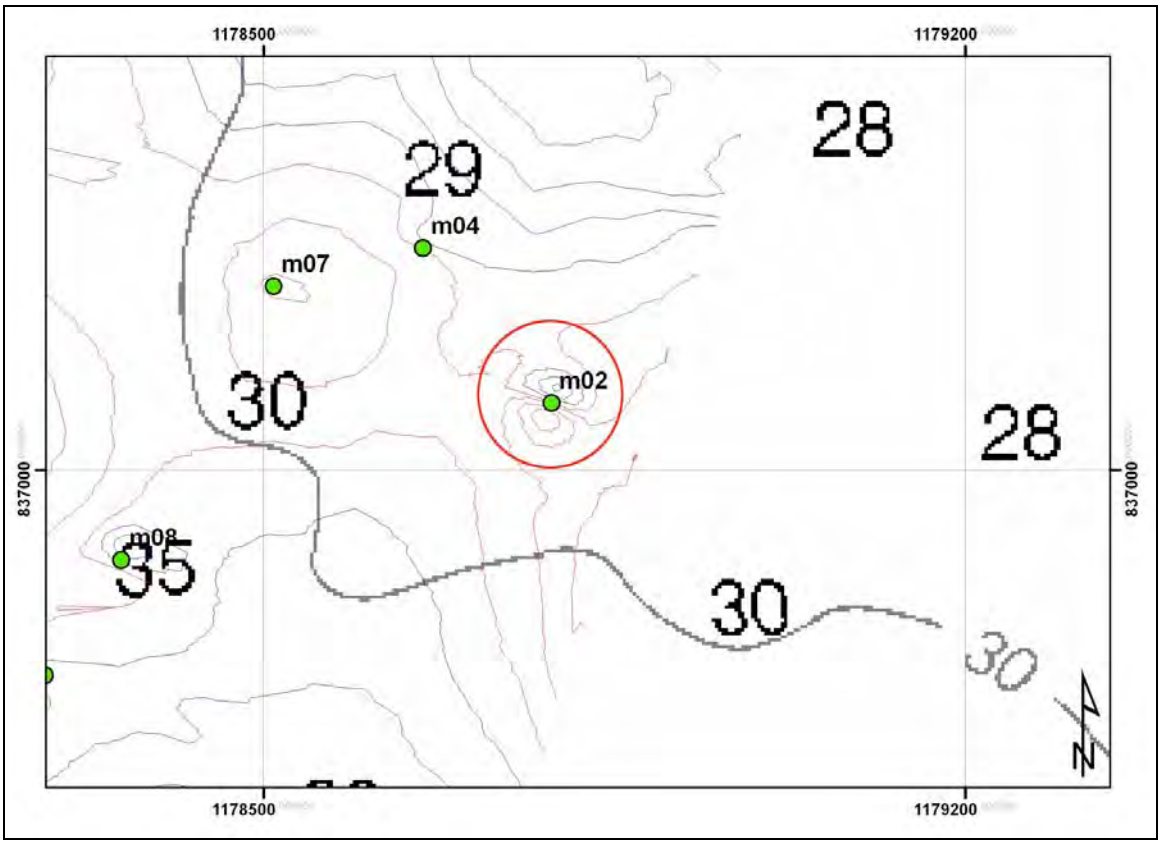

Figure 46. Magnetic contour of Anomaly M-02 showing it is a small dipole.

Figure 47. 1974 Eisenhower Dime located with the metal detector at M-02 (courtesy of Erik Miles).

Figure 48. Unknown type of copper coin located with the metal detector at M-02 (courtesy of Erik Miles).

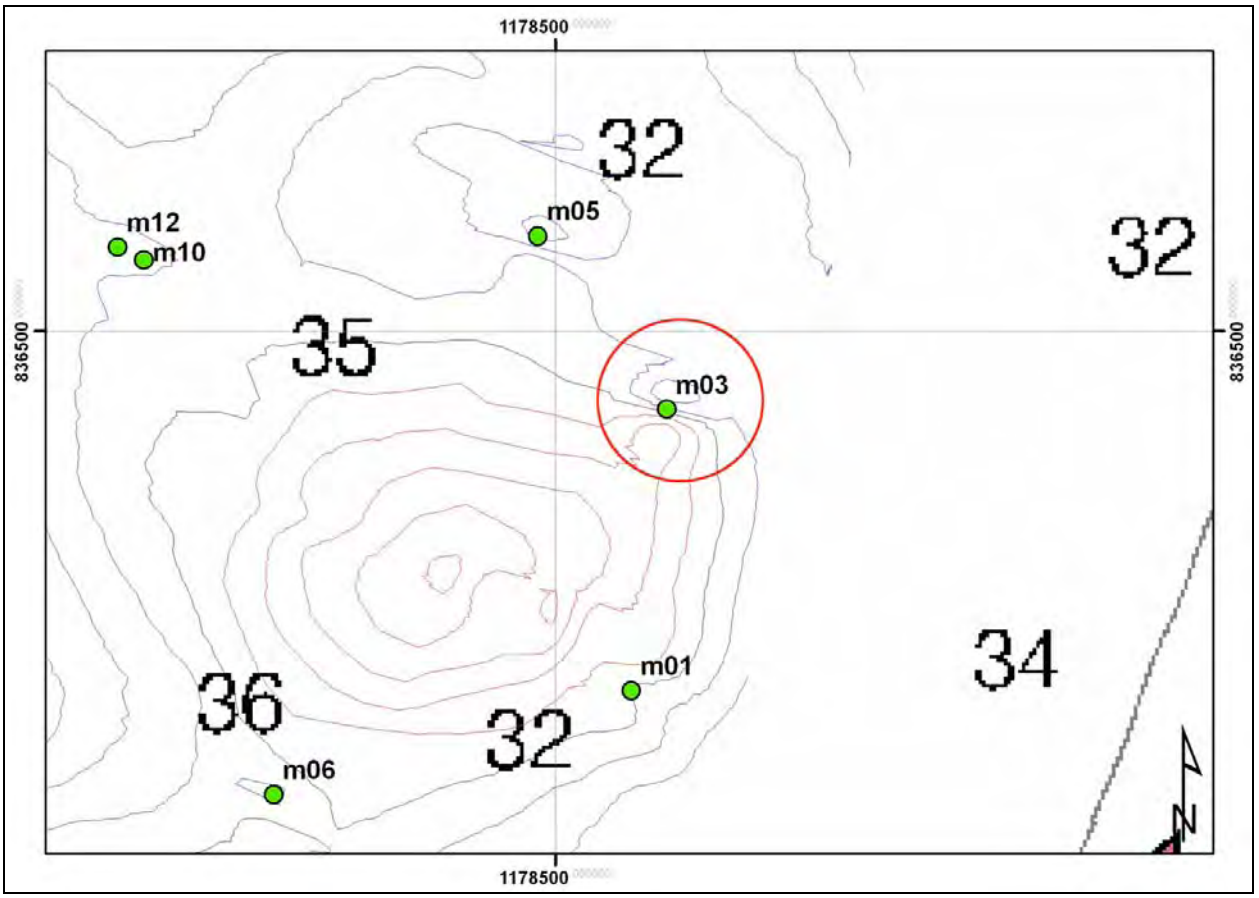

Figure 49. Magnetic contour of Anomaly M-03 showing it is a small dipole.

Figure 50. Magnetic source of Anomaly M-03, a 20-foot long I-beam (courtesy of Erik Miles).

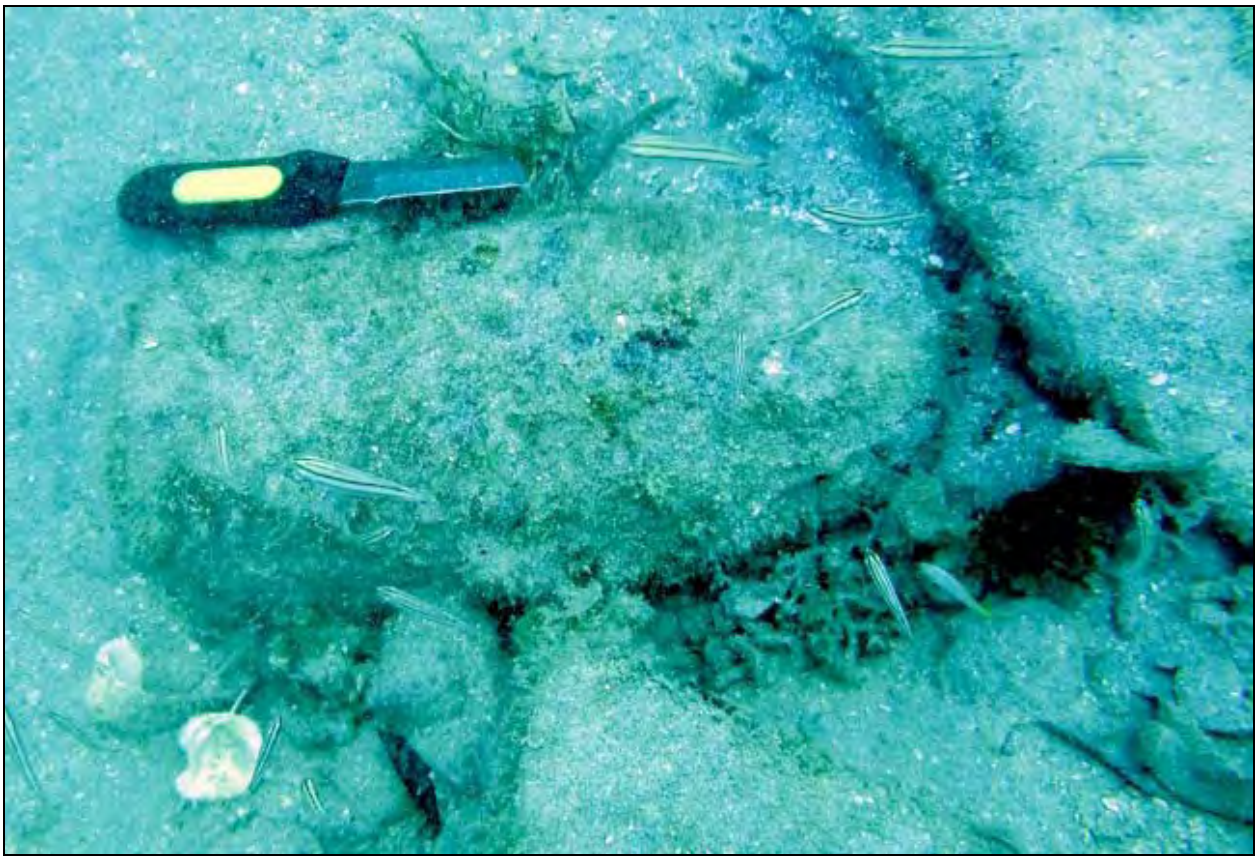

Figure 51. Close up of what is believed to be an artillery shell. Knife is 7 inches in length (courtesy of Erik Miles).

Figure 52. Debris cluster to the northwest of Anomaly M-03. Note bottle fragment in the foreground, large rock to the right, and the artillery shell adjacent to the metal detector at top (courtesy of Erik Miles).

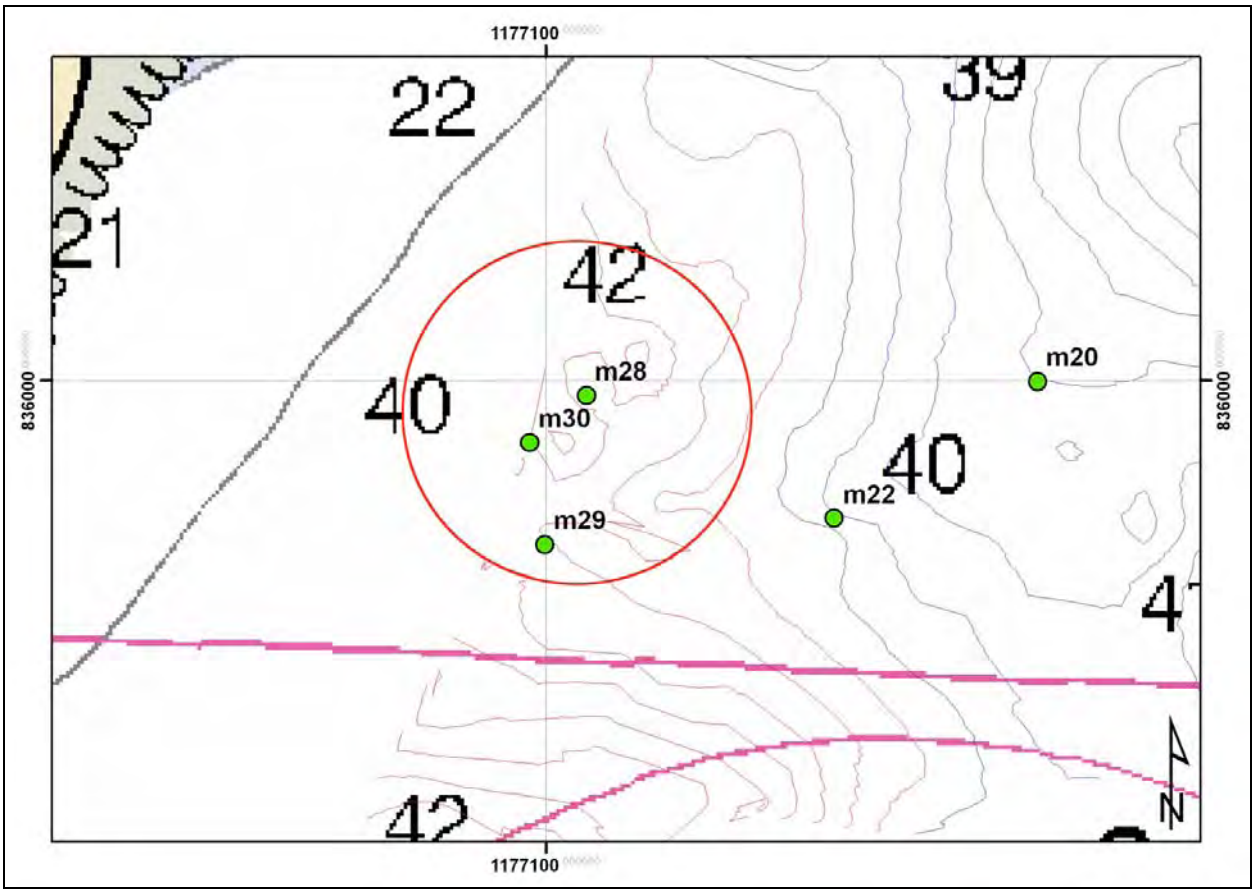

Figure 53. Magnetic contour of the cluster comprised of Anomalies M-28, 29, and 30.

PROBING TRANSECT

Following the completion of the anomaly inspection, a 1,250-foot long probing transect was identified and positioned with DGPS (Figure 54). Divers employing a compass and a 100-foot measuring tape laid out the transect in 100-foot increments beginning at the southeastern end, visually inspecting and metal detecting along its length and probing with a 5.5-foot probe every 50 feet. All probes were negative up to the 450-foot mark, when the bottom changed from a grass covered shell hash to a consolidated coral rubble bottom that made probing impossible, the interchange was marked distinctly by the coral rubble bottom sloping upward. At the base of the slope interface and approximately 10 feet south of the transect line, Sean Loughman located a single cannonball buried approximately 6 inches (pictured in Figure 55). Based on metal detector readings, he thought that another was present, but was too deep to uncover by hand fanning. While an exact measurement was not taken of the approximately 6-inch diameter shot, it is possible it is associated with the engagement. Adjacent to the cannonball and buried within the same matrix is a fragment of rope or cloth. Its association with the shot is unknown (i.e., sail or rigging entangled with the ball?).

Further probing was precluded by the coral rubble matrix after the 450-foot mark on the transect. The transect was then only visually surveyed out to the 700-foot mark with negative results.

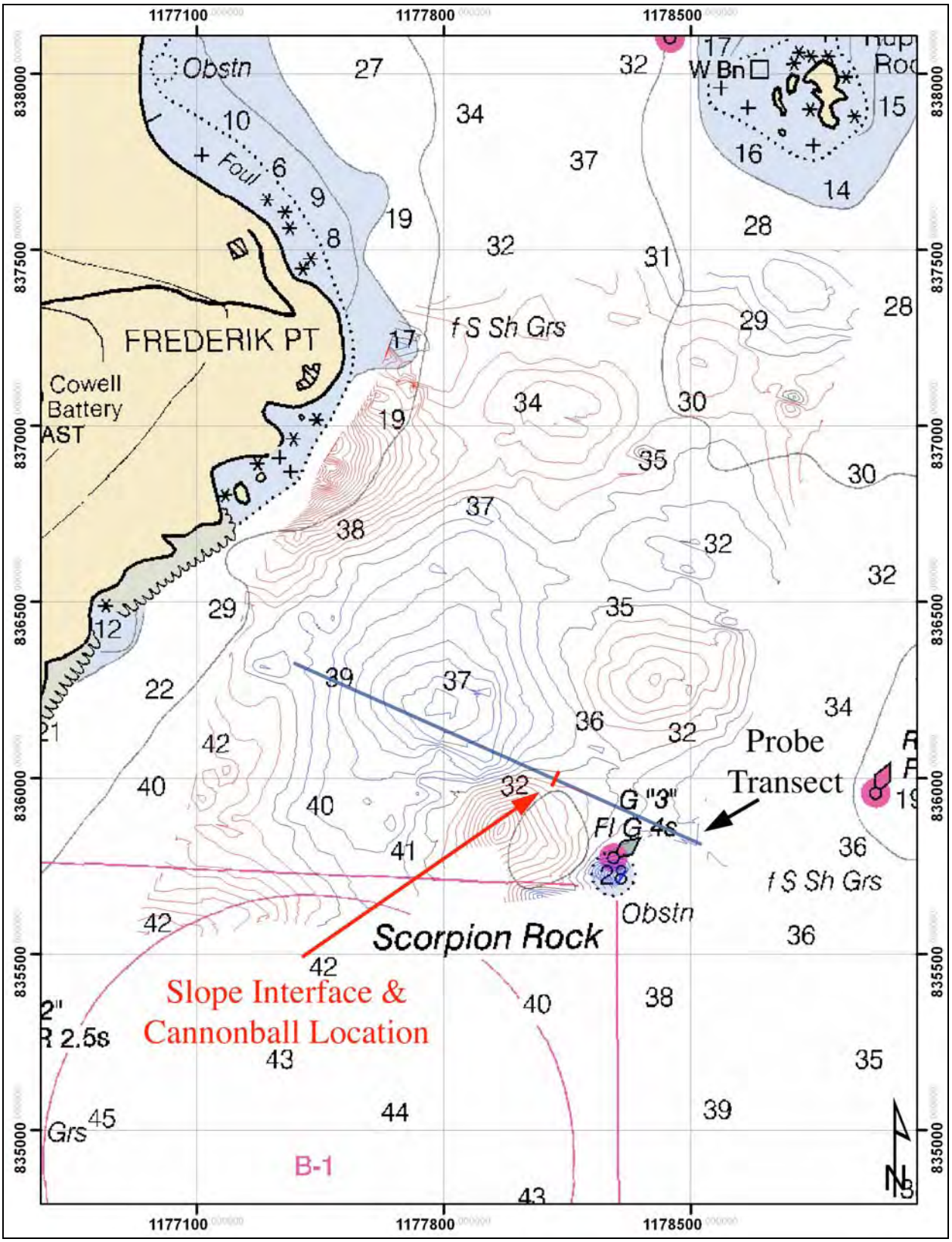

Figure 54. Probing transect in the KOCOA-defined study area. Note location of the slope interface where cannonball was located and where coral rubble began that precluded further probing along the transect.

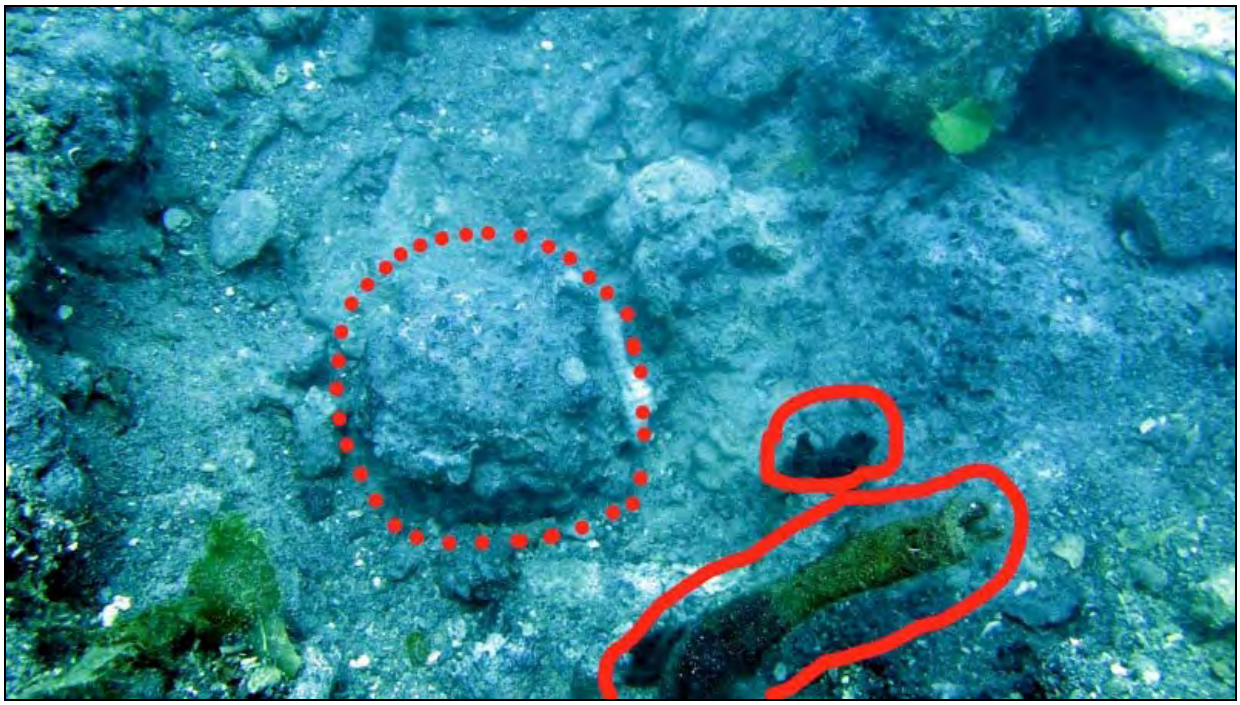

Figure 55. Cannonball located along the probing transect at the slope interface at the 450-foot mark. Shot, approximately 6 inches in diameter, is in the center of the photograph (red dots). Fabric or rope is outlined in solid red. Note coral rubble matrix that precluded further probing (courtesy of Erik Miles).

METAL DETECTOR SURVEY OF THE FORESHORE BATTERY AREA

Upon completion of the probing along the transect, a metal detector and visual survey was conducted of the foreshore area immediately adjacent to and opposite the battery (Figure 56). Illustrated in Figure 57, the magnetic contour map of the foreshore area shows extensive anomaly readings adjacent to the battery. The visual inspection and metal detector survey revealed the source of the magnetics: numerous pieces of metal debris including both large and small pipe sections; miscellaneous iron bars; and lengths of wire cable (Figures 58 and 59). The majority of all finds were non-significant debris with the exception of the numerous observed cannonballs that most certainly are associated with the battery and fort, possibly even with the engagement itself.

The first cannonball observed was an approximately 4-inch diameter ball located with the metal detector. Buried at the base of the slope, the ball, which is not pictured, was found approximately 100 feet directly in front of the battery wall. Figure 60 and 57 are field drawings that show the location of the cannonball finds. Figure 62 is an aerial photograph that shows their location as well. As illustrated in the figures, the majority of the cannonballs were located immediately opposite the battery as if they had been thrown from the fort, fired at the fort and bounced down the exposed rock face into the water, or lost during transport and offload by small launch. Directly below the battery wall is a steep cliff face that projects vertically from the water depths a height of approximately 15 feet. A small valley formed by this sheer cliff face and a nearby finger of rock reef runs the length of the cliff wall for the entire distance in front of the battery. It appears as dark water on the aerial (Figure 62).

A visual survey of the valley located a 20-foot length of 8-inch stud link chain immediately at the base of the cliff opposite the battery wall. The cannonballs were visually located in the valley opposite the kitchen/latrine building. Illustrated in Figures 63–65, a total of three clusters of balls were located. The first is a cluster of two loose balls (6-inch) opposite the northern wall

of the kitchen/latrine building. Five feet up the valley to the north is a concreted cluster of three 6-inch balls, and next to this is a one extremely large ball or several concreted together. All these finds were visible on the surface, but metal detection of this area indicates the high likelihood for more buried round shot.

Figure 56. Foreshore area of Prince Frederik's battery/Fort Willoughby (courtesy of Erik Miles).

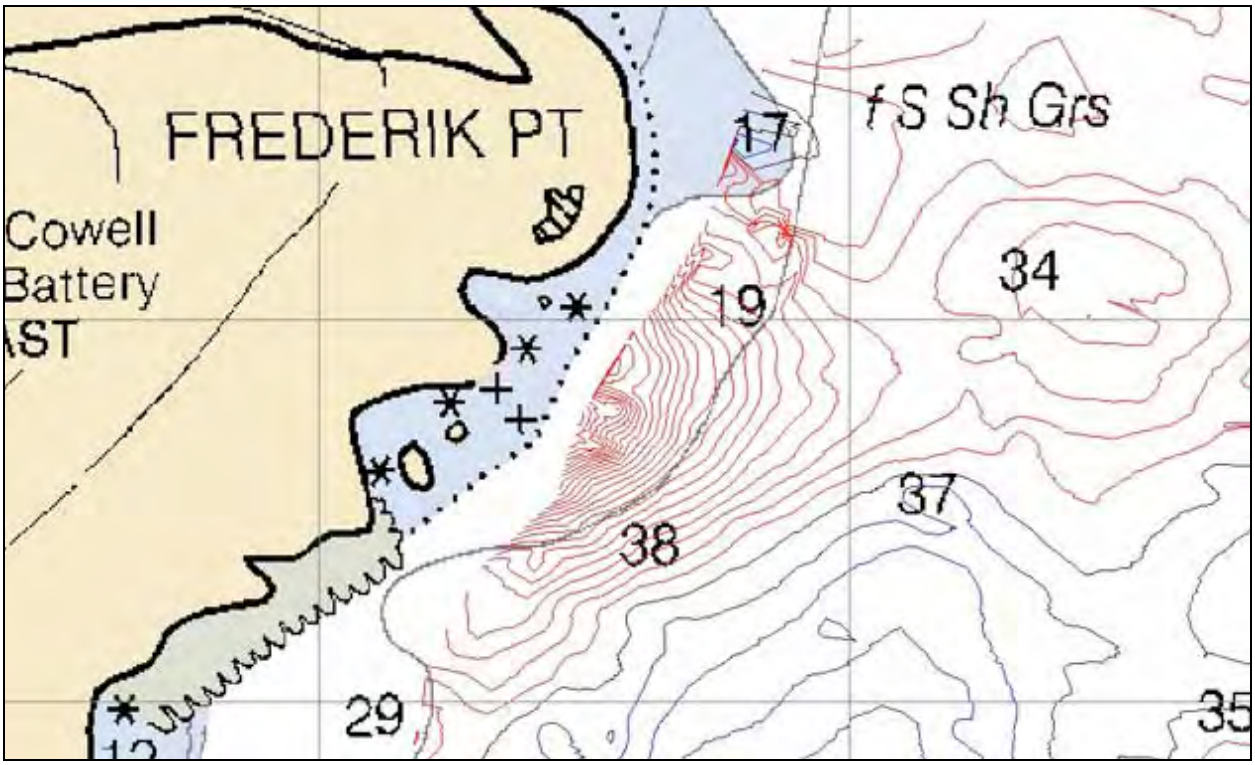

Figure 57. Contour map showing extensive magnetics (red) of foreshore area adjacent to the battery.

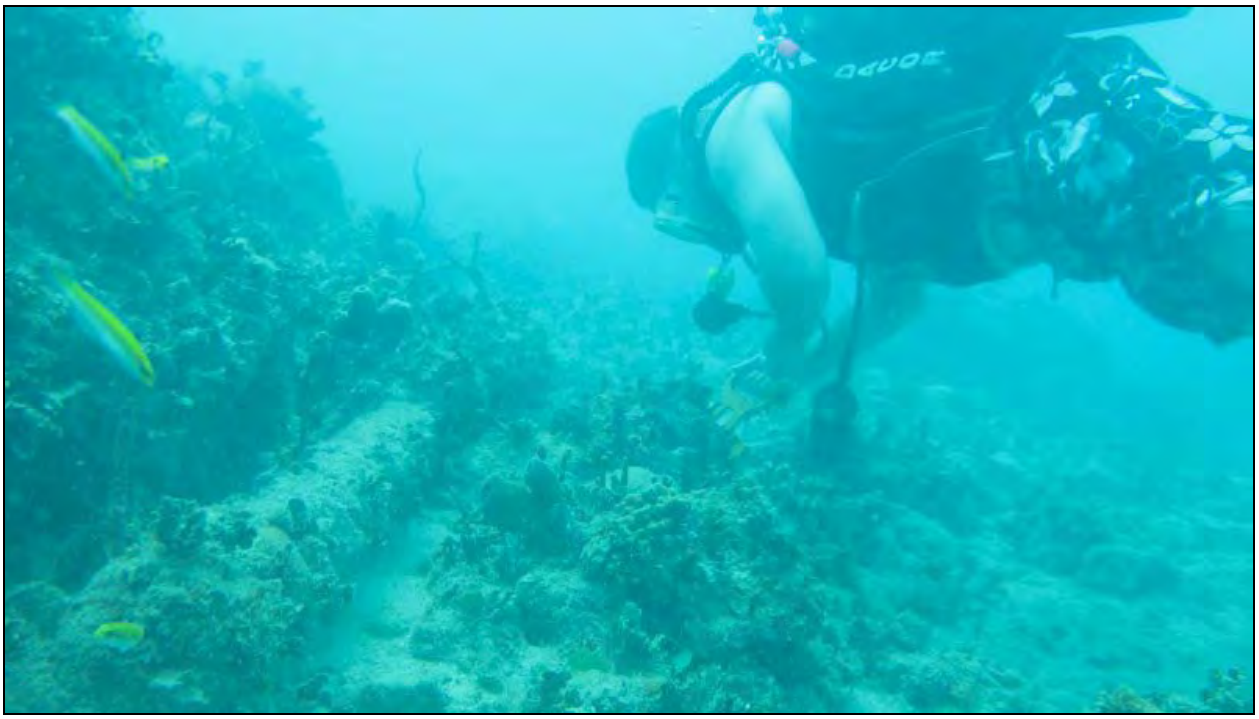

Figure 58. Eight-foot section of pipe at slope base opposite battery (courtesy of Erik Miles).

Figure 59. Metal detector find of a small section of pipe initially thought to possibly represent a musket barrel; the pipe was reburied (courtesy of Erik Miles).

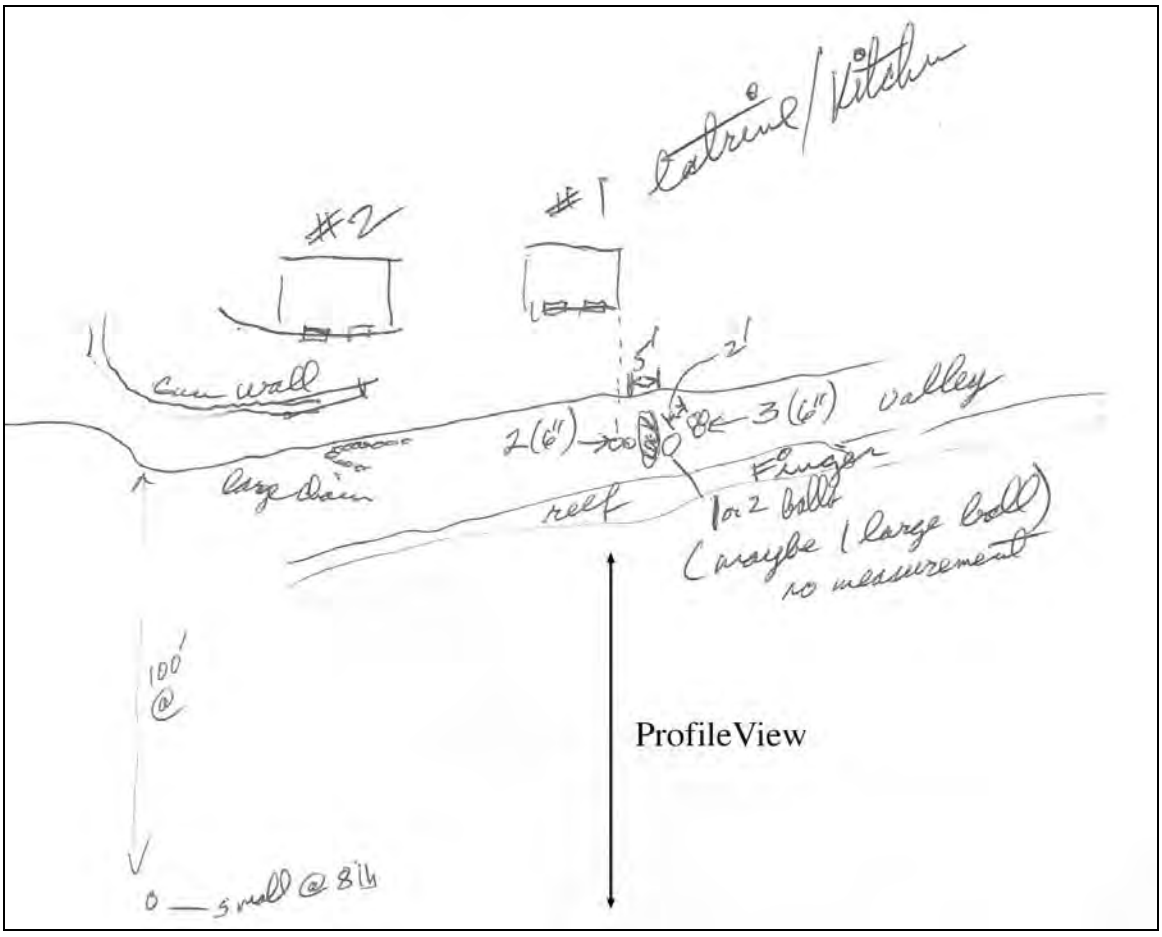

Figure 60. Plan view field sketch showing location of cannonball finds in relation to battery, as well as profile location (see below).

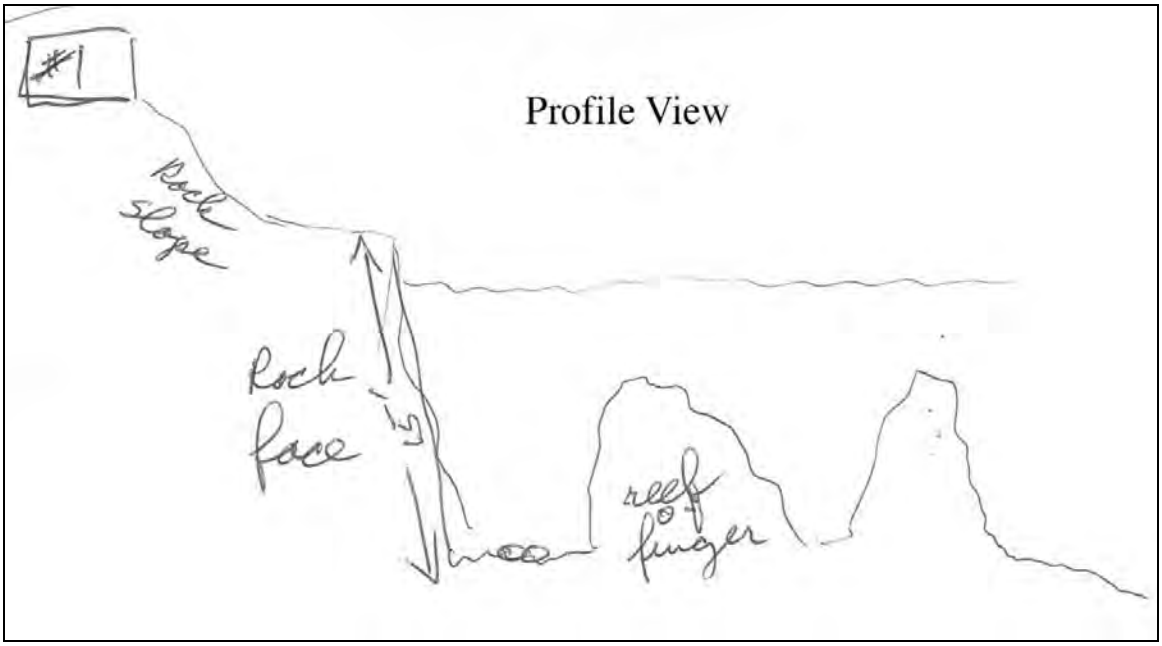

Figure 61. Profile view field sketch showing location of cannonball finds in relation to Kitchen/Latrine. Note valley between vertical rock/cliff face and reef finger where finds were located.

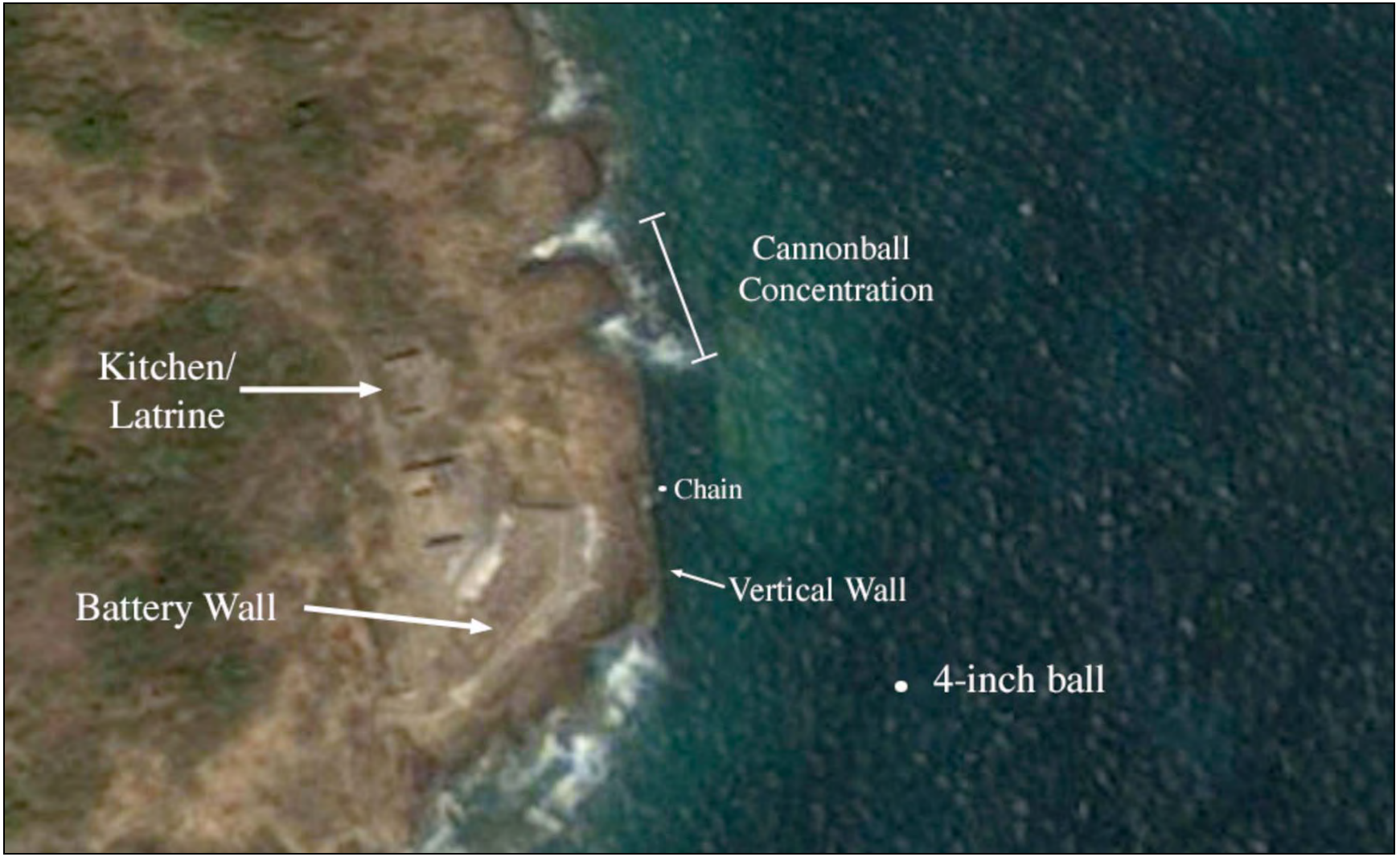

Figure 62. Aerial photograph showing location of finds in relation to battery. Note dark water of valley immediately adjacent vertical rock/cliff face and reef finger, as well as cannonball concentration opposite and north of kitchen/latrine building.

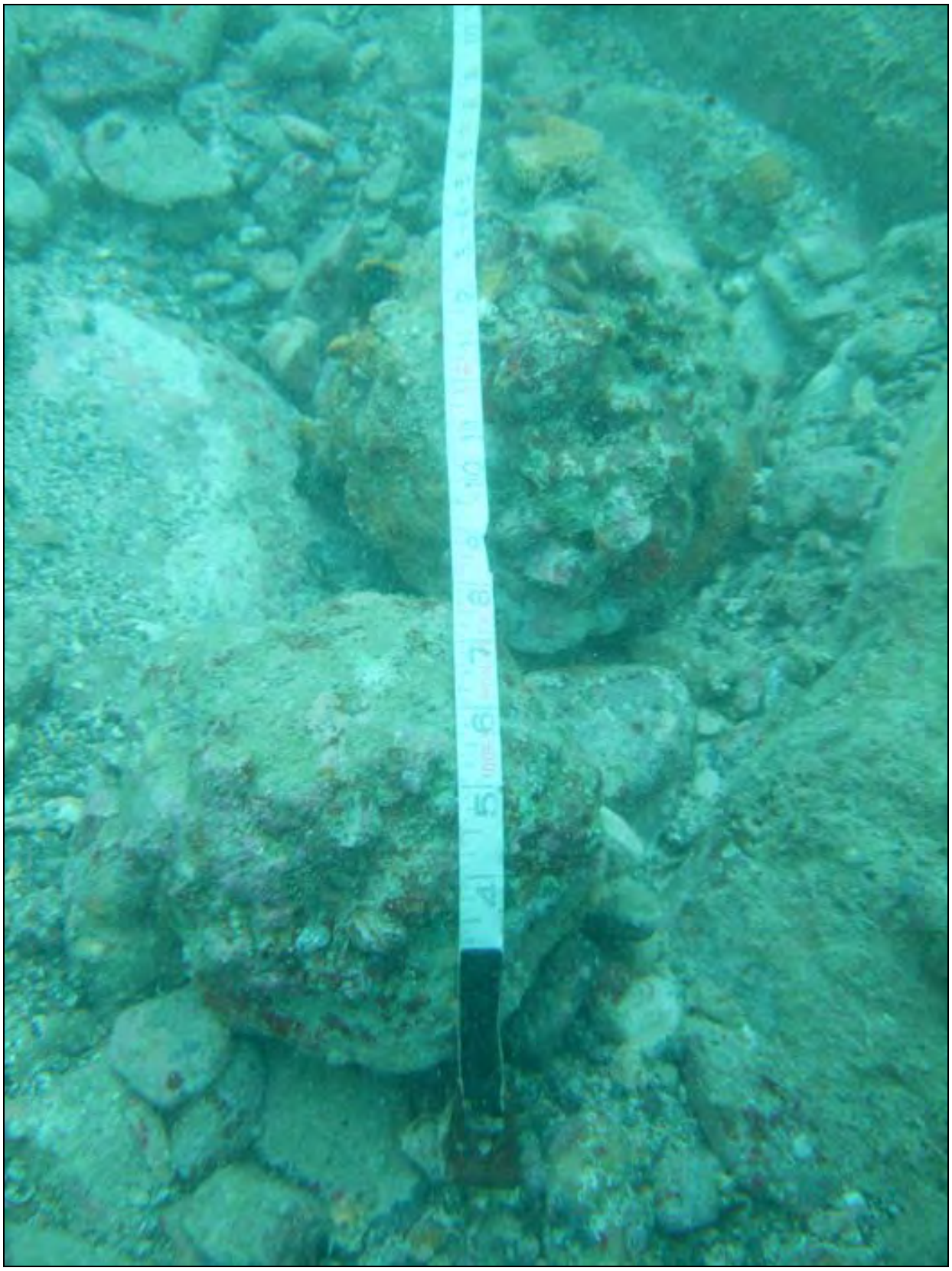

Figure 63. Cluster of two 6-inch cannonballs opposite the northern wall of the kitchen/latrine building. Balls were lying loose on the surface (courtesy of Sean Loughman).

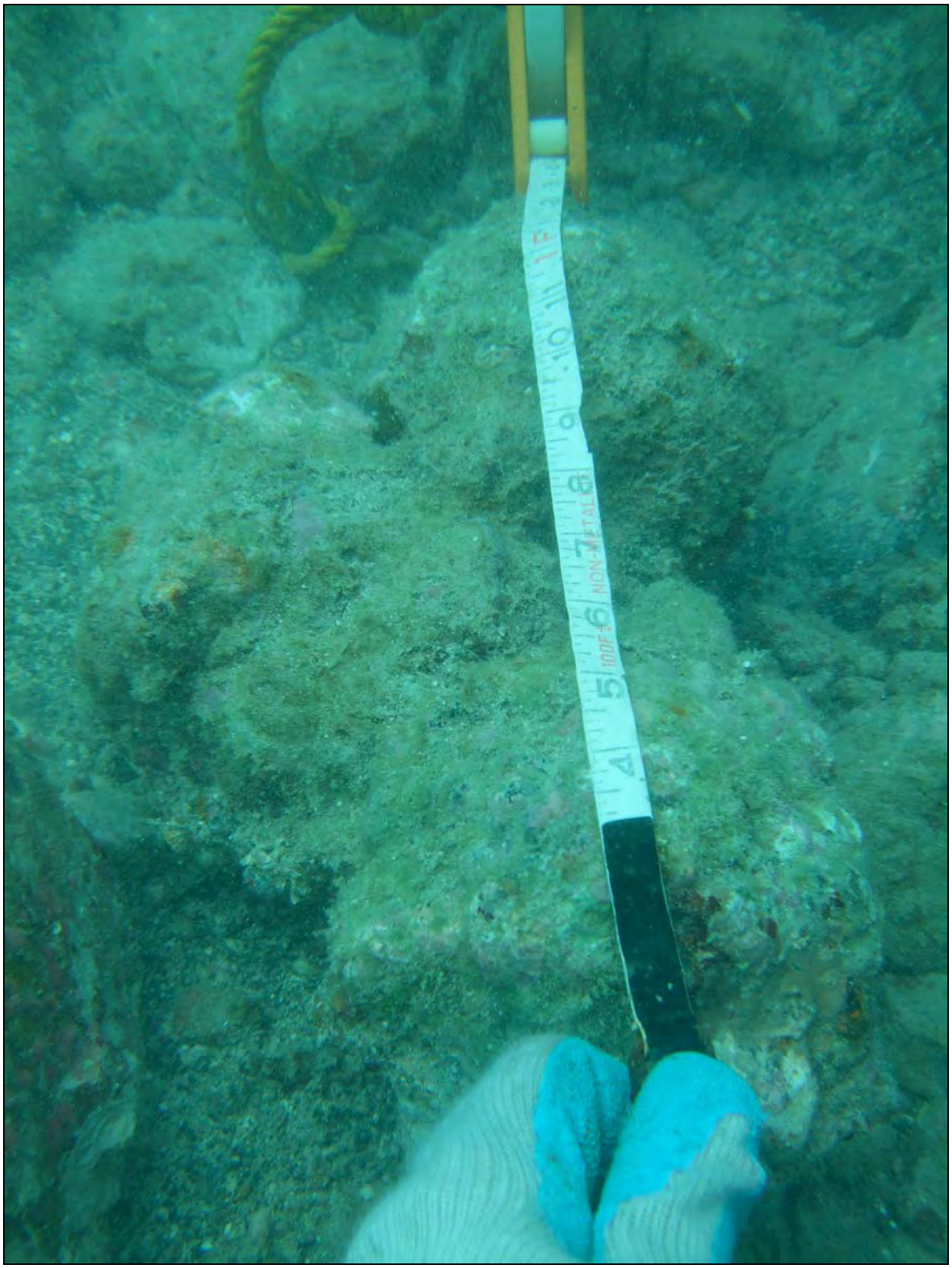

Figure 64. Concreted cluster of three 6-inch cannonballs opposite the northern wall of the kitchen/latrine building. Balls were lying loose on the surface (courtesy of Sean Loughman).

Figure 65. One extremely large ball or several concreted together. While these balls were lying loose on the surface, metal detection indicated a high likelihood of additional buried shot (courtesy of Sean Loughman).

ADDITIONAL ASSESSMENT OF ENTRANCE CHANNEL SHIPWRECK

In addition to the investigation components discussed above, the shipwreck located at the southern end of the harbor's entrance channel and just south of the KOCOA-defined area was briefly visited and examined. The main visible components of the wreck site include a large, folding-stock type anchor with attached chain and hawse pipe, a steam driven windlass, and a stove (Figures 66–69).

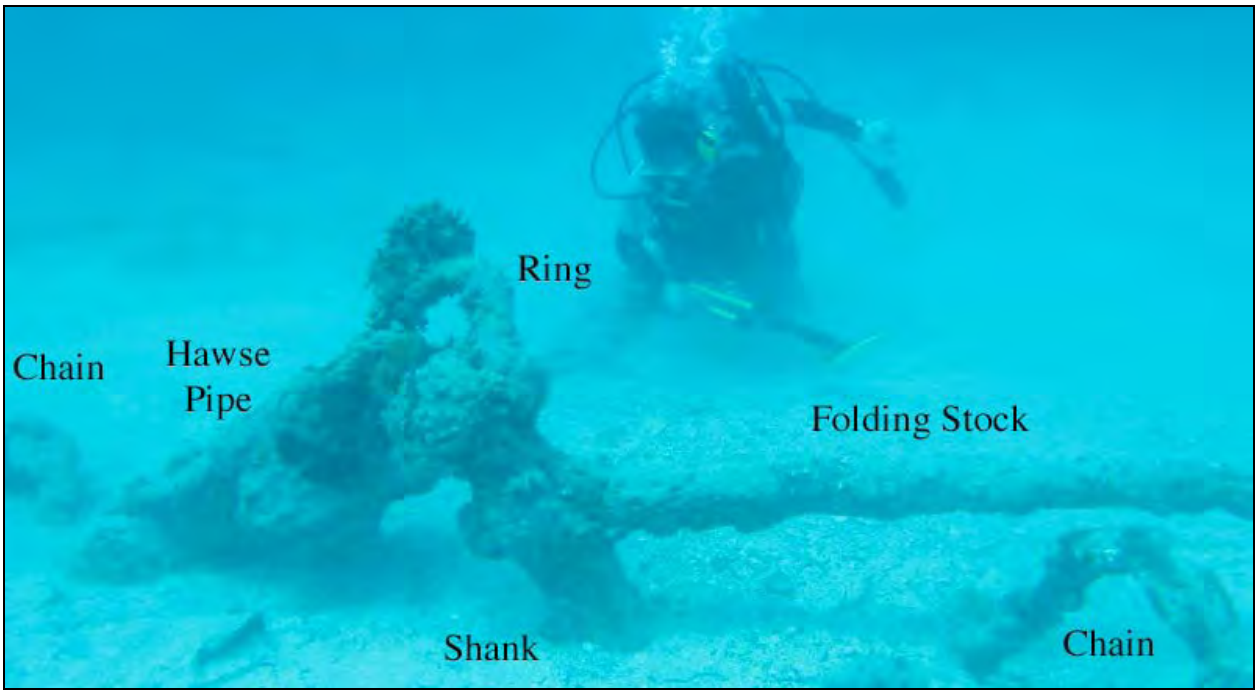

Figure 66. Folding stock anchor with attached chain (courtesy of Erik Miles).

Figure 67. Steam driven windlass, warping barrels are on either end (courtesy of Erik Miles).

Figure 68. Invasive lion fish on the windlass (courtesy of Erik Miles).

Figure 69. Stove thought to be associated with the wreck (courtesy of Erik Miles). The stove was completely exposed during recordation in 2008 indicating burial and reburial of objects possibly from cruise ship turbulence.

V. CONCLUSIONS AND RECOMMENDATIONS

From late May to early June 2011, underwater archeologists with Panamerican conducted a submerged cultural resources investigation for the Trust of an area surrounding Prince Frederik's Battery on the southeastern end of Hassel Island which comprises the western side of St. Thomas Harbor of the U.S. Virgin Islands. The focus of the investigation was an 1801 engagement between the battery and a British Naval vessel. Funded by the ABPP (Grant No. GA2055-10-020) of the NPS, the investigation focused on the KOCOA of this naval engagement and comprised a magnetometer survey of the KOCOA-defined Project Area in order to identify submerged cultural resource sites or artifacts, diver probing of a grid pattern at a selected area in order to detect buried nonferrous artifacts or sites, and conduct an underwater metal detector survey of the foreshore area adjacent to the battery.

Beginning with a review of NRHP criteria and their application, this chapter describes in detail the conclusions and recommendations relative to the results of the field investigations.

As stated in National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation (National Park Service 1985), "the quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association". To be considered significant, and therefore eligible for nomination to the NRHP, the property must meet one or more of the four NRHP criteria:

> "A. Be associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B. Be associated with the lives of persons significant in our past; or
>
> C. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D. Yield, or likely to yield information important in prehistory or history" [National Park Service 1985:5-6].

Viewing the current findings for this project with these considerations in mind, an assessment as to the historic significance of the naval engagement battlefield can be confidently made.

The remote sensing survey of the KOCOA-defined area and diver investigation showed the area is free of large anomalies or anomaly clusters that would indicate potential cultural resource sites, like a shipwreck. A number of relatively small anomalies with short durations were recorded throughout the area and three were identified for additional investigation. The source for one was modern debris, while the sources for the other two were unable to be located through probing or metal detecting.

Probing and metal detecting along the selected transect through the KOCOA-defined area located at least one and possibly two cannonballs.

With respect to the metal detection and visual inspection of the foreshore area, the survey revealed numerous metal targets. The majority of all finds were non-significant debris with the exception of the numerous observed cannonballs that most certainly are associated with the battery and fort, possibly even with the engagement itself. All cannonballs were visible on the surface, but metal detection of this area indicates the high likelihood for more buried round shot.

Unless additional information suggests otherwise, the naval engagement battlefield does not appear to meet NRHP Criteria A, B, or C. And with respect to the presence of the ordnance, while there is the possibility these could represent isolated artifacts from the engagement, they could as well represent ordnance of training fire or other unassociated firing episodes, and relative to those adjacent to the fort, could well be lost or discarded shot unassociated with the battle. Because of the equivocal association of the ordnance to the naval battle, coupled with the fact that no vessels were lost during the engagement, it is our opinion that the battlefield is not likely to yield any archeological data, and, therefore, does not meet NRHP Criterion D as well.

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