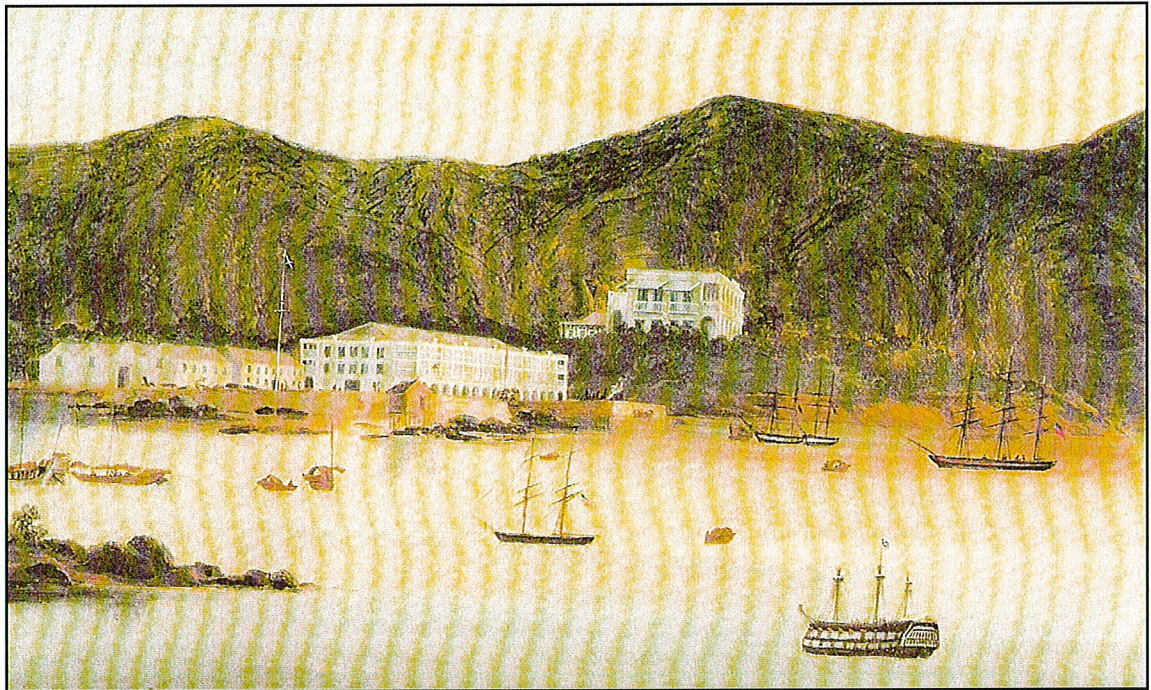


Appendix 11.1
Marine Archaeological Investigation

**MARINE ARCHAEOLOGICAL INVESTIGATION FOR
WANCHAI DEVELOPMENT PHASE II
PLANNING AND ENGINEERING REVIEW**



This view shows the premises of Jardine Matheson erected in 1843 at East Point

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1 SUMMARY

A Marine Archaeological Investigation was carried out for the seabed that will be affected by the reclamation required by Wan Chai Development Phase II. The reclamation will have a significant impact on the seabed: the total volume of dredged sediment will be 1.1Mm³.

The aim of the investigation was to locate and assess underwater archaeological resources which may be damaged by the dredging and reclamation. In accordance with AMO Guidelines, the MAI consisted of a Baseline Review and Geophysical Survey.

The combination of the 2001 MAI and the scope of the current work combine to provide 100% coverage of the study area for Wan Chai Development Phase II.

The Baseline Review indicated a high potential for marine archaeological resources.

The presence of seawalls prevented 100% coverage with the swath multi beam and seismic data could not be collected due to the presence of raw sewage on the seabed. However, it was still possible for the side scan sonar to achieve 100% coverage so the conclusions drawn are based on reliable data.

The geophysical survey provided very detailed information about features on the seabed. Within the study area, the seabed is characterised by the presence of dumped materials, trawl marks, scars and other evidence of previous disturbance. The geophysical survey located one significant sonar contact but its intact linear shape indicated it was a shipwreck of modern origin. There were no other sonar contacts which merited further investigation.

It is therefore concluded that there are no marine archaeological resources within the study area. It follows that there are no related constraints on the proposed development. There is no need for any further archaeological investigation or mitigation measures.

2 INTRODUCTION

The study area is shown on Figure 1 and includes both permanent and temporary reclamation areas. There will be a significant impact on the seabed in the area marked green. The total volume of dredged sediment will be 1.1Mm³.

In accordance with the requirements set out in Section 3.4.13 of the EIA study brief Agreement No. CE/2005 (DS), the relevant requirements in the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) and guidelines issued by the Antiquities and Monuments Office (AMO), SDA Marine Ltd was asked to complete the following work:

- Task 1: Review a previous Marine Archaeological Investigation report for Wan Chai Reclamation Phase II completed in May 2001 (SDA8827)
- Task 2: Carry out a Baseline Review for the study area at North Point
- Task 3: Identify the scope of geophysical survey required for the areas not covered by the previous work
- Task 4: Commission geophysical survey to ensure 100% coverage of the study area
- Task 5: Analyse survey data to establish archaeological potential
- Task 6: Combine results of Tasks 1- 5 into a final report

3 LEGISLATIVE FRAMEWORK FOR MARINE ARCHAEOLOGICAL INVESTIGATIONS IN HONG KONG

Since the introduction of the 1998 Environmental Impact Assessment (EIA) Ordinance CAP. 499, S16, (Hong Kong Environmental Protection Department, 1977), the Antiquities and Monuments Office (AMO) have the power to request a MAI for developments affecting the seabed. The EIA Ordinance stipulates that consideration must be given to issues associated with cultural heritage and archaeology as part of the EIA process. Annexes 10 and 19 of the EIA Technical Memoranda (TM) outline the criteria for evaluating the impacts on sites of cultural heritage and guidelines for impact assessment, respectively. The EIA TM identifies a general presumption in favour of the protection and conservation of all sites of cultural heritage and requires impacts upon sites of cultural heritage to be '*kept to a minimum*'. There is no quantitative standard for determining the relative importance of sites of cultural heritage, but in general sites of unique, archaeological, historical or architectural value should be considered as highly significant.

3.1 THE ANTIQUITIES AND MONUMENTS ORDINANCE

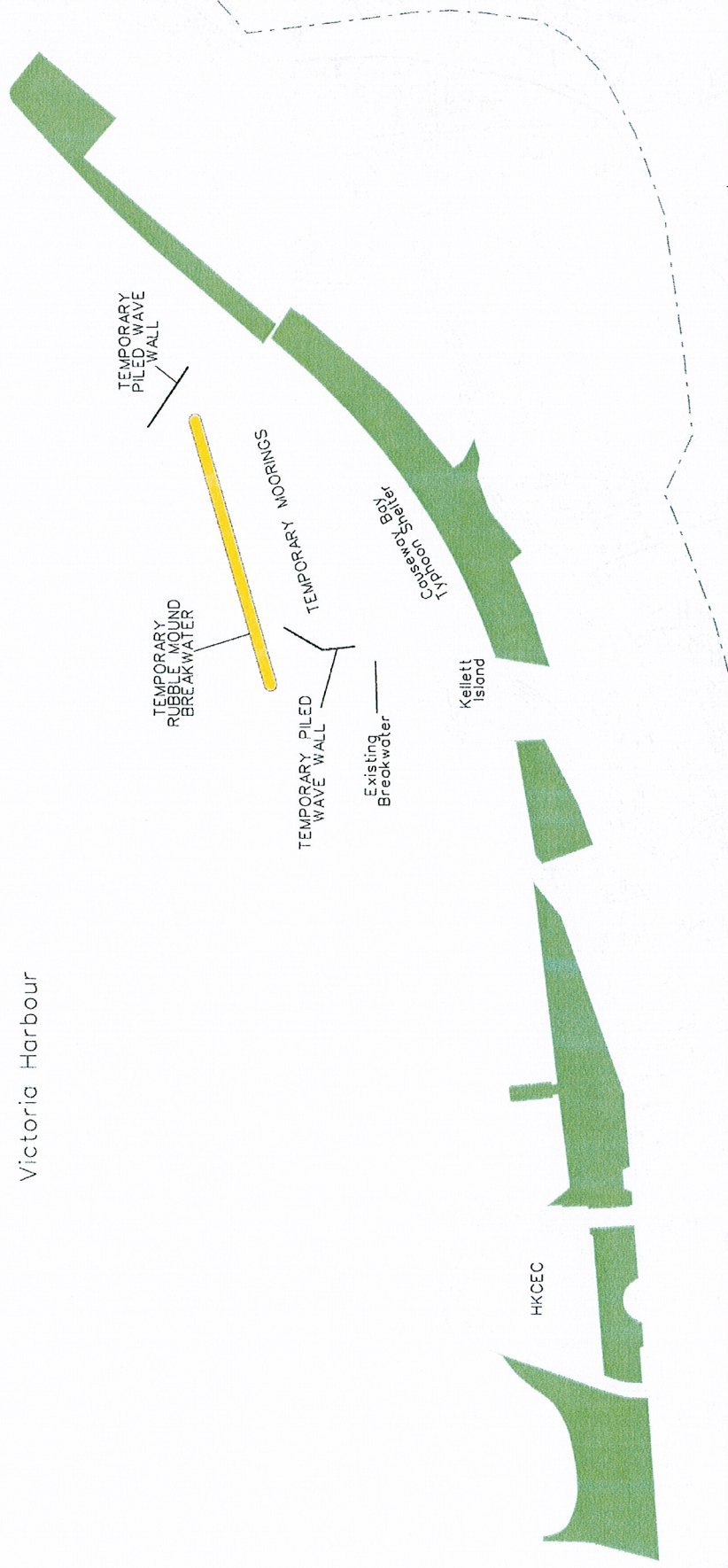
Legislation relating to antiquities is set out in the Antiquities and Monuments Ordinance (Chapter 53 of the Laws of Hong Kong), which came into force on January 1st 1976. The AM Ordinance provides statutory protection against the threat of development on Declared Monuments, historical buildings and archaeological sites to enable their preservation for posterity. The legislation applies equally to sites on land and underwater. The purpose of the Ordinance is to prescribe controls for the discovery and protection of antiquities in Hong Kong. A summary of the key aspects of the legislation relevant to the current study is presented below:

LEGEND:

PROPOSED PERMANENT AND/OR TEMPORARY RECLAMATION AREA INDICATIVE



Victoria Harbour



MAUNSELL AECOM

Maunsell Consulting Asia Ltd

WAN CHAI DEVELOPMENT PHASE II - PLANNING AND ENGINEERING REVIEW

STUDY AREA OF CULTURAL HERITAGE IMPACT ASSESSMENT

FIGURE 1

K:/A01604/DRAWING/REPORT/MA/FIG1.DGN

SCALE 1:7000 (A3)

- Human artefacts, relics and built structures may be gazetted and protected as monuments. The Antiquities Authority may, after consultation with the Antiquities Advisory Board (AAB) and with the Chief Executive's approval, declare any place, building, site or structure which the Antiquities Authority considers to be of public interest by reason of its historical, archaeological or palaeontological significance, to be a monument, historical building, archaeological or palaeontological site or structure.
- Once declared a site of public interest, no person may undertake acts which are prohibited under the Ordinance, such as to demolish or carry on building or other works, unless a permit is obtained from the Antiquities Authority.
- The Ordinance defines an antiquity as a relic (a moveable object made before 1800) and a place, building, site or structure erected, formed or built by human agency before the year 1800. Archaeological sites are classified into two categories, as follows:
 - Declared Monument* – those that are gazetted in accordance with Cap. 53 by the Antiquities Authority and are to be protected and conserved at all costs;
 - Recorded Archaeological Sites* – those which are considered to be of significant value but which are not yet declared as monuments and should be either protected, or if found not possible to protect these sites, mitigation measures should be proposed and implemented to preserve the archaeological resources.
- The Legislation sets out the procedures for the issuing of Licenses to Excavate and Search for Antiquities, the effect of which is to forbid all such activities being undertaken without such a License. It also provides for the penalties exacted for infringement of the Ordinance, including fines and imprisonment.

4 METHODOLOGY

The study was undertaken using standard MAI techniques described below which follow the Guidelines issued by the Antiquities and Monuments Office.

4.1 REVIEW OF REPORT SDA8827

In 2001 the Antiquities and Monuments Office commissioned a MAI for Wanchai Reclamation Phase II. As this report covered some of the current study area it was reviewed to assess its relevance and application. SDA Marine Ltd was given a full copy of the report to review.

4.2 BASELINE REVIEW

A comprehensive review was carried out to determine the archaeological potential of the study area. This included archaeological and historical publications.

4.3 ARCHIVE SEARCH

All archives holding information on shipwrecks in Hong Kong were explored for relevant data.

4.4.1 GEOPHYSICAL SURVEY

In accordance with Antiquities and Monuments Office (AMO) Guidelines a geophysical survey was undertaken. The survey aim was to locate any possible marine archaeological resources on the seabed. The survey was planned to optimise the acquisition of archaeological data.

SDA Marine Ltd commissioned EGS Ltd to carry out the survey. EGS completed the primary interpretation of the raw data which was then passed to SDA Marine Ltd for verification.

The final drawings were prepared to include the comments from SDA Marine Ltd and the AMO.

Due to the presence of a sewage outfall nearby, it was not possible to collect good seismic profiler data. This is due to the presence of raw sewage on the seabed. Anaerobic decomposition of organic materials trapped within the upper part of the seabed sediment results in the release of gas bubbles. The gas bubbles so generated absorb the seismic energy, thereby preventing or degrading reflections from deeper horizons.

This is described as acoustic blanking or gas blanking. It appears on seismic records as zones of chaotic reflectors which obliterate any other reflectors within or beneath these zones, (Judd, 1989). Therefore, only side scan sonar and multi-beam survey were carried out for this project. It was not possible to acquire swath data very close to the seawalls as the equipment cannot function properly closed to such structures. However, it was possible to obtain 100% coverage with side scan sonar. There was sufficient high quality data to facilitate accurate assessment.

4.4.2 SURVEY PERIOD AND LOCATION

The location of the survey area is shown in Figure 2 and it could be considered as a busy area for surveying. The survey location is close to the shore and there were a number of vessels moored along the seawall during the surveying period. Part of the survey lines were blocked by these vessels and infilling was required when these vessels had left.

The survey area in the North Point end was under the Island Eastern Corridor Bridge and the surveying vessel was unable to get in safely. Moreover, the reception of the positioning data was restricted under the bridge and so no survey lines were run under the bridge. It is assumed that the seabed in the immediate vicinity of the bridge would have been extensively disturbed during construction of the bridge.

The survey lines designed for the survey area were parallel to the shore with a 25 metres spacing between them.

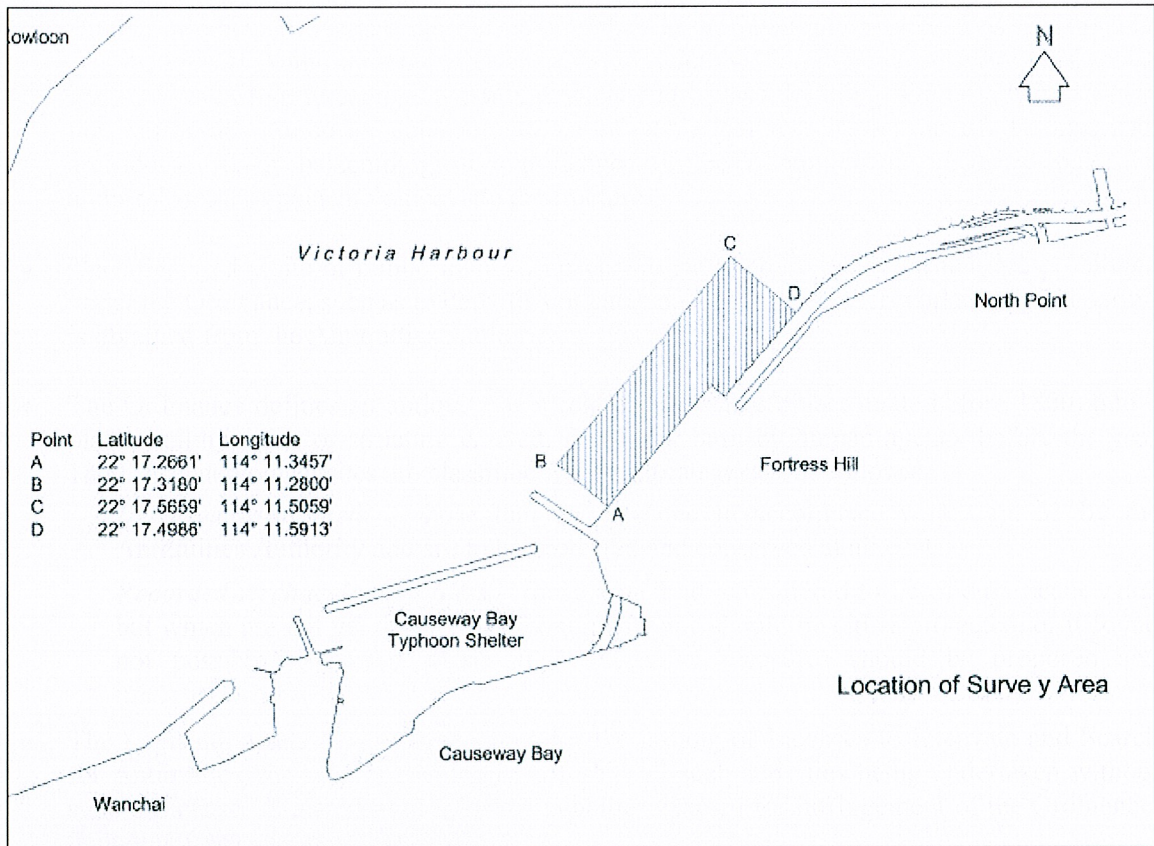


Figure 2: Location of survey: from Watson's Pier to North Point

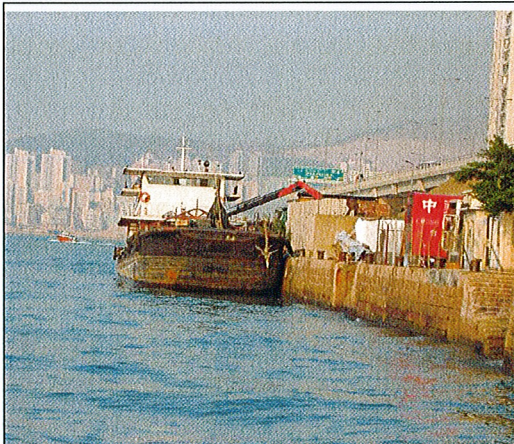


Figure 3: There were a number of vessels performing loading tasks during the surveying period. The survey lines were blocked by these vessels. They survey boat returned to the area once they had been moved.



Figure 4: The surveying area was close to the mound of waste metals that could be the source of scattered debris found on the seabed.



Figure 5: The survey area under the Island Eastern Corridor Bridge was not suitable for survey as the surveying vessel could not get in safely and the positioning system would be interfered with.

4.4.3 EQUIPMENT

The main items of equipment are listed below:

Survey System	Manufacturer	Model Number
Side Scan Sonar	Klein Associates Inc	System 3000
Swath Bathymetry	Reson A.s.	400 kHz 8125
Positioning	C&C Technologies Inc	C-Nav GcDGPS
Navigation	C-Products Ltd	C-View Nav

The survey was carried out from the Class III commercially licensed survey vessel Wing Hung 2.

4.4.4 SWATH BATHYMETRY

The navigation receiver was placed vertically above the swath transducer mounted on the side of the survey vessel. As the vessel travelled along the survey traverses, the system transmitted a fan of echo sounder beams down into the water column to map the shape of the seabed in great detail. The geometry is illustrated below:

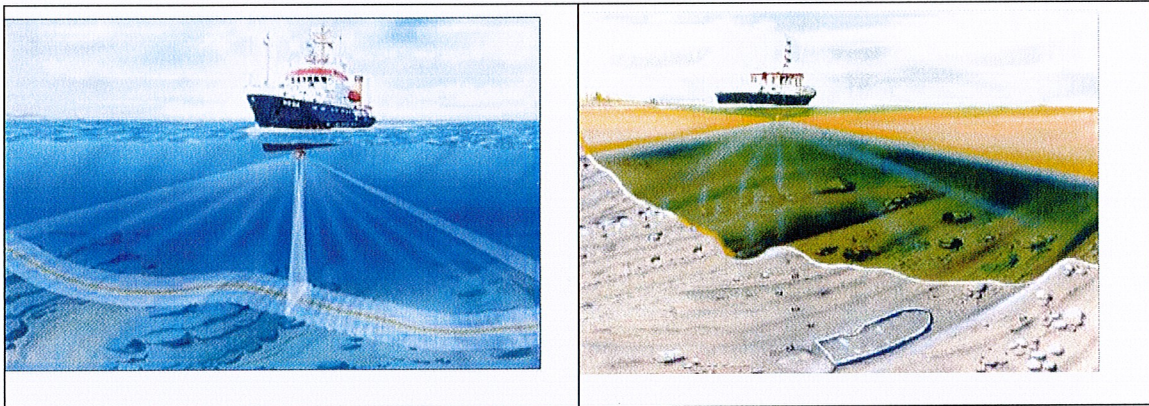


Figure 6: Illustrations of swath bathymetry systems

In the case of the Seabat 8125 system used in this survey, the fan subtends an angle of up to 120° at the survey vessel; the consequence is that water column thickness/sea bed level data is obtained over a swath centred on the vessel track and having a width of some 4 times the water depth. In this area, the data density is about one sounding in every square of side 0.2m to 0.5m, depending on vessel speed.

The accuracy of soundings decreases with increasing distance from the vessel track. Depth accuracy requirements have shown that selection of data within a 120° fan will generate soundings within the accuracy required for this survey, giving a swath width around 4 times the water depth.

The swath system requires a 5-component motion compensator to be placed above and next to the swath transducer, in order to correct for the following types of movements:

- Vertical
- Horizontal (along track and across track)
- Heave
- Pitch
- Yaw

An accurate gyro-compass to $\pm 0.1^\circ$ horizontal is also required to precisely measure the orientation of the 'fan' with respect to the vessel centreline and track.

The QinSys processing software supplied with the swath system was used to process the raw data collected during the survey. The level of each sounding has been colour coded, using a spectrum of colours to represent the range of levels found at each location. To give the impression of looking at a particular sonar contact from different directions, the image is rotated in three dimensions before capturing the image.

4.4.5 SIDE SCAN SONAR

The side scan sonar tow fish was towed from the stern of the survey vessel, at a depth of between 3m beneath the sea surface, depending on the water depth. As it travelled along a survey line, the transducers emitted sound pulses to either side and measured the echoes from features on the seabed. The arrangement is illustrated in Figure 7:

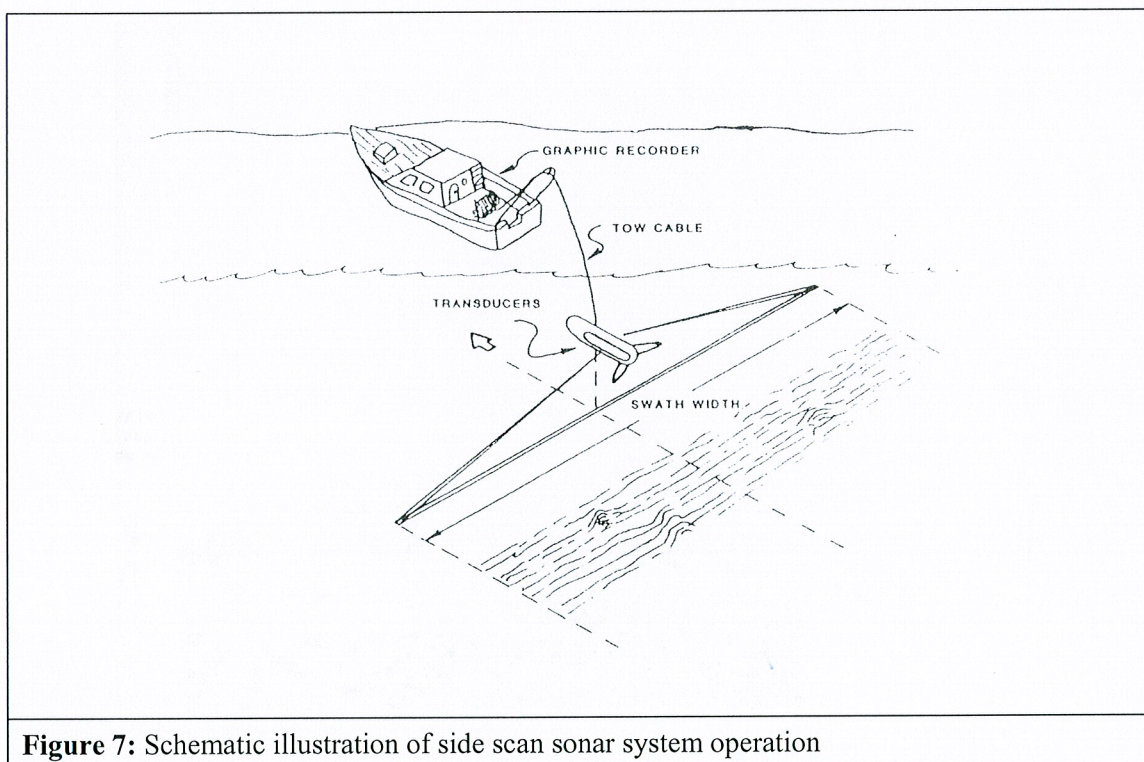


Figure 7: Schematic illustration of side scan sonar system operation

The recording parameters for the side scan survey were as follows:

- Vessel Speed: 1.4 – 2.0 m/sec
- Fix Interval: 10 seconds
- Tow fish depth: 3m beneath sea surface
- Source frequency: 100 and 500 kHz
- Gain setting: Manually controlled

All data was logged to the C-View SDMP where four channels (100kHz port and starboard and 500 kHz port and starboard) were simultaneously recorded with navigation, fix, vessel heading, cable out angle and length, fish heading, water depth.

Detailed logs were recorded with unique survey line number, start and end of line fix, range, frequency and cable out value and angle. The corresponding C-View data file name was also recorded in these logs.

The images for each sonar contact were examined and the clearest images for each contact were selected for printing in the results.

4.4.6 SWATH PROCESSING DURING DATA ACQUISITION

Software written by the system manufacturer and supplied with the Seabat 8125 system was used.

4.4.7 REMOVAL OF SPURIOUS SOUNDINGS

Manufacturer's software was used to display data sets for each survey traverse in turn. Tidal corrections were then applied. The data were then subjected to a simple filter to remove obvious 'noise'.

The data sets were then edited manually. Judgement is required at this stage, to identify small features which are real reflections from low-level noise; for guidance, two or more mutually consistent soundings which are higher or lower than the general sea bed level would be accepted, especially if the same anomalous soundings are present on separate survey traverses.

4.4.8 SIDE SCAN SONAR DATA

Processing and interpretation of side scan sonar data was carried out using the C-View interpretation and processing software. All features were individually marked or grouped into regions using on screen digitising. All offsets and laybacks are automatically calculated by the C-View system. The subsequently generated interpretation files were then imported to the Auto CAD environment on a line by line basis where the interpretation was reconciled and a detailed check was performed.

The interpretation of the side scan sonar records in this area sought to identify contacts with archaeological potential. It also provided detailed mapping of the following features:

- High reflectivity zones caused by coarser sediments (Figure 8)
- Low reflectivity zones caused by finer sediments (Figure 12)
- Numerous scars (Figure 13)
- Scattered debris (Figure 11)
- Disturbed seabed (Figure 8)
- Abandoned tyres (Figure 10)
- Sonar contacts including unknown objects and linear features (Figures 12 & 13)

The following six Figures present data showing the above features (Figures 8 – 13).

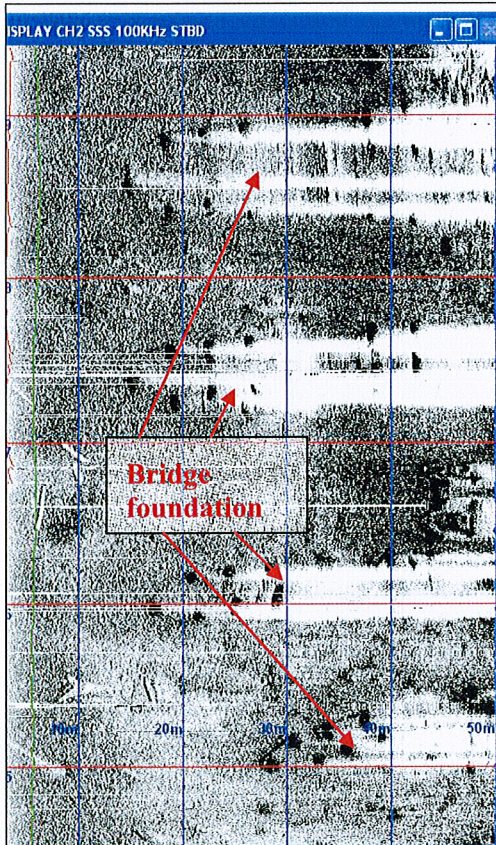


Figure 8: The above image shows the Bridge Foundation of the Island Eastern Corridor and the condition was not favourable for surveying by the vessel.

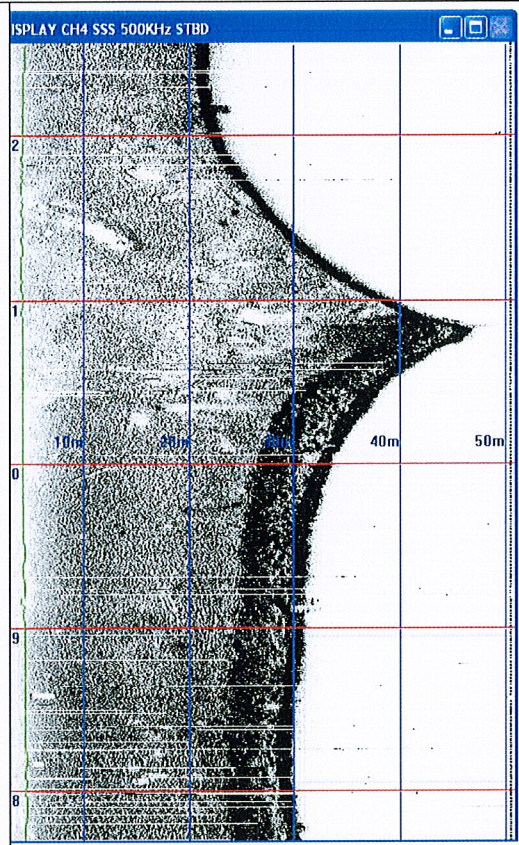


Figure 9: The vessel turned at a right angle from the rubble mount seawall of the typhoon shelter to the vertical seawall of the Watson's Pier.

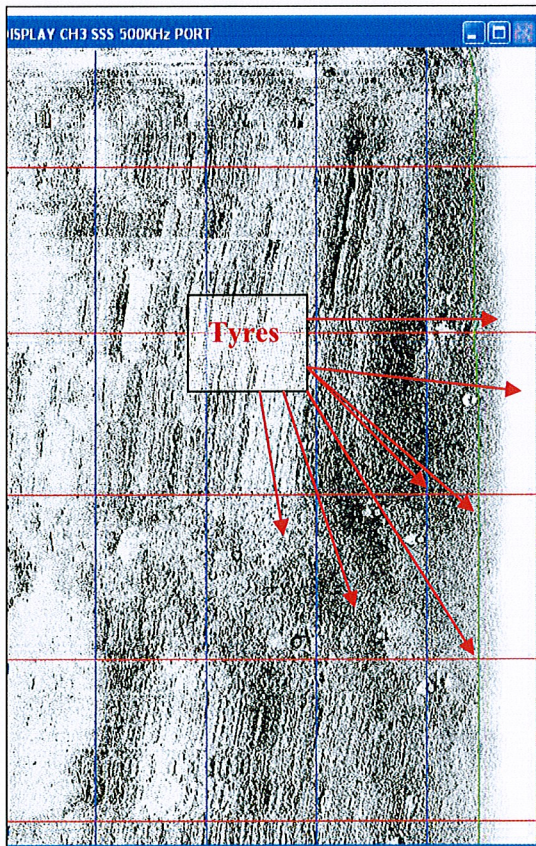


Figure 10: A lot of abandoned tyres were found from the side scan images.

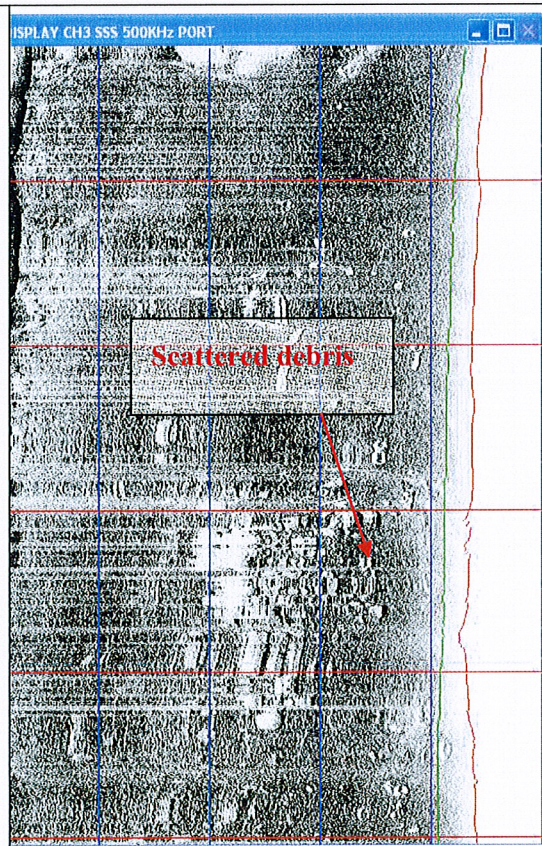


Figure 11: Several lumps of scattered debris, probably dumped building materials were found along the seawall.

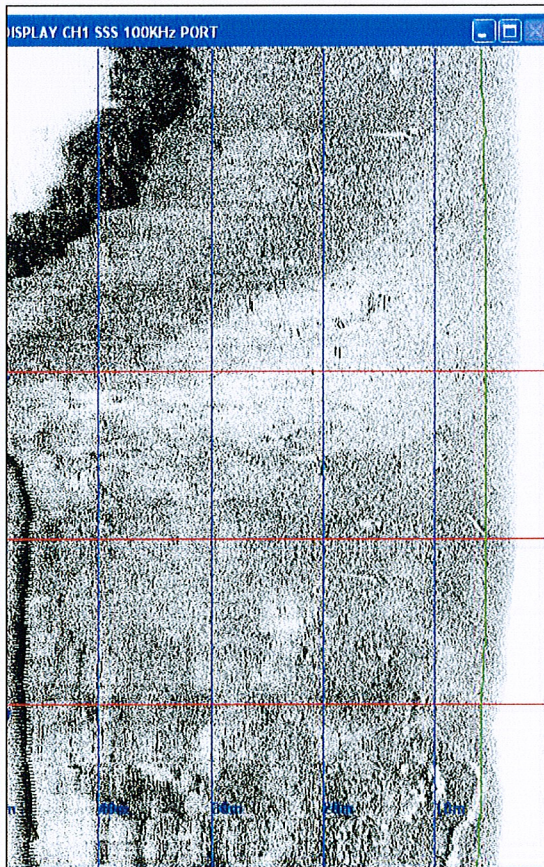


Figure 12: A linear feature found in side scan image but not found in swath. The surrounding seabed is low reflectivity.

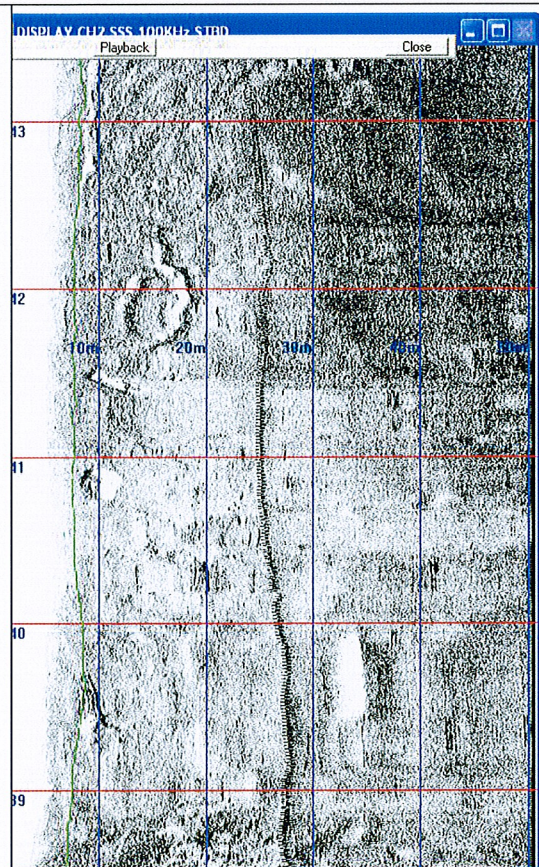


Figure 13: The same linear feature found in side scan image but not found in swath.

5. RESULTS

5.1 REVIEW OF REPORT NO: SDA8827

In May 2001 the Antiquities and Monuments Office (AMO) commissioned SDA Marine Ltd to undertake a Marine Archaeological Investigation (MAI) for Wanchai Reclamation Phase II. In accordance with AMO Guidelines the MAI comprised: Baseline Review, Geophysical Survey and Underwater Inspection.

The study area exactly replicated the current study area with the exception of a small section at North Point adjacent to the Causeway Bay typhoon shelter. It can therefore be assumed that the results of the previous study are directly applied to the current project.

The Baseline Review indicated a high marine archaeological potential as the study area has always been at the centre of development and industry within Victoria Harbour. However, the marine archaeological potential is diminished by the existing reclamation and associated disturbance on the seabed.

The geophysical survey deployed: echo sounder, seismic profiler and side scan sonar. The survey was commissioned to meet the needs of the MAI and therefore the methodology was designed to enhance acquisition of archaeological data.

The survey provided 200% coverage of the seabed and subsurface sediments. Nine anomalies were identified in the survey data. A diver inspection was carried out to obtain accurate information about their archaeological potential. Each anomaly was successfully located and examined by a diver. There were two modern shipwrecks, four pieces of metal construction material, two large concrete blocks and a small metal container.

It was concluded that there were no archaeological resources within the study area and no need for any mitigation measures or constraints on the proposed development.

5.2 BASELINE REVIEW FOR STUDY AREA AT NORTH POINT

The aim of the review was to examine the evidence for maritime activity in the study area to predict the potential for historic shipwrecks.

5.2.1 ARCHIVE SEARCH

The UK Hydrographic Office (UKHO) holds a database of surveyed shipwrecks in Hong Kong, including those not shown on Admiralty Charts. There are no records of wrecks within the study area. However, it should be noted that the Hydrographer's main concern is with navigation and only wrecks or material which may be a hazard to navigation are recorded.

5.2.2 HISTORICAL RESEARCH

North Point lies within the busiest section of Victoria Harbour. It was established as a safe anchorage en route to Canton long before the colony was officially established in 1841. Victoria Harbour has always been a hazardous location for shipping. Dr J. Berncastle, a physician who had passed through Hong Kong on his way to England from Canton in 1850 recorded the following comments:

'Piracy is not of infrequent occurrence, even in the harbour, within musket shot of our men-of-war ... There is seldom a week without some attack taking place upon fishing boats or passage-boats, in these waters.'

Navy records show that the year before this was written 83 pirate junks were destroyed by the navy. Piracy remained a persistent problem during the early days of Hong Kong and inevitably resulted in many shipwrecks.

5.2.3 WANCHAI

In pre-British times, Wanchai (meaning "small bay" in Cantonese) began as a small Chinese settlement around the present Tai Wong Temple on Queen's Road East.

For generations, it was also known as Ha Wan, or Lower Bay. The development of modern Wanchai began in the 1840's with the intention of creating a high-class residential and commercial centre. The major foreign firms all had substantial buildings in the area facing the sea, and included godowns and wharves. This area, known as Spring Gardens, was centred around the present-day Spring Garden Lane. For a variety of reasons, the area did not develop into a European quarter, though a significant but declining European presence remained a feature of the area for many years. The hillsides leading from Queens Road East to Wanchai Gap had scattered groups of European houses. Only in a few areas do the original buildings remain extant.

Due to a sharp population rise in the 1850's, demand for land increased. The Government responded by developing the area around Stone Nullah Lane and the southern side of Hospital Hill for Chinese residences. This area is now Wanchai Road and the eastern side of Spring Gardens.

The first formal praya reclamation scheme was partly carried out in 1951, by the filling of a creek in the Bonham Strand area. However, there was strong opposition for affected lessees who claimed marine rights. This, compounded by the destruction of part of the original praya wall by severe typhoons in 1867 and 1874 delayed matters further. By 1886 an 8km long near continuous strip of land (the major break being the section adjacent to the naval and military areas) averaging 100m wide was formed between Kennedy Town and North Point. The seawalls provided much needed access for handling marine cargo. In 1887, further reclamation was recommended to alleviate the overcrowding in the city (Guilford, 1998).

As a result, the Praya Reclamation Ordinance was gazetted in 1890. A year later Paul Chater initiated a band of reclamation, totalling 26 hectares and extending 3km westward from Murray Road along the northern foreshore of the Island. This was completed in 1904, partly with filling material obtained from Chinese territory. The limits of these two reclamations are marked by Des Voeux Road and Connaught Road respectively. The tramway opened in 1904 along that section of the waterfront known as the eastern Praya (now Johnston and Hennessy Roads).

During the next thirty years reclamation continued on Hong Kong Island. The largest schemes being those at Tai Koo for the dockyard (21ha which included 13ha for the land site formation completed in 1908), Wanchai (36ha, completed 1929) and around North Point (nearly completed before the Pacific War).

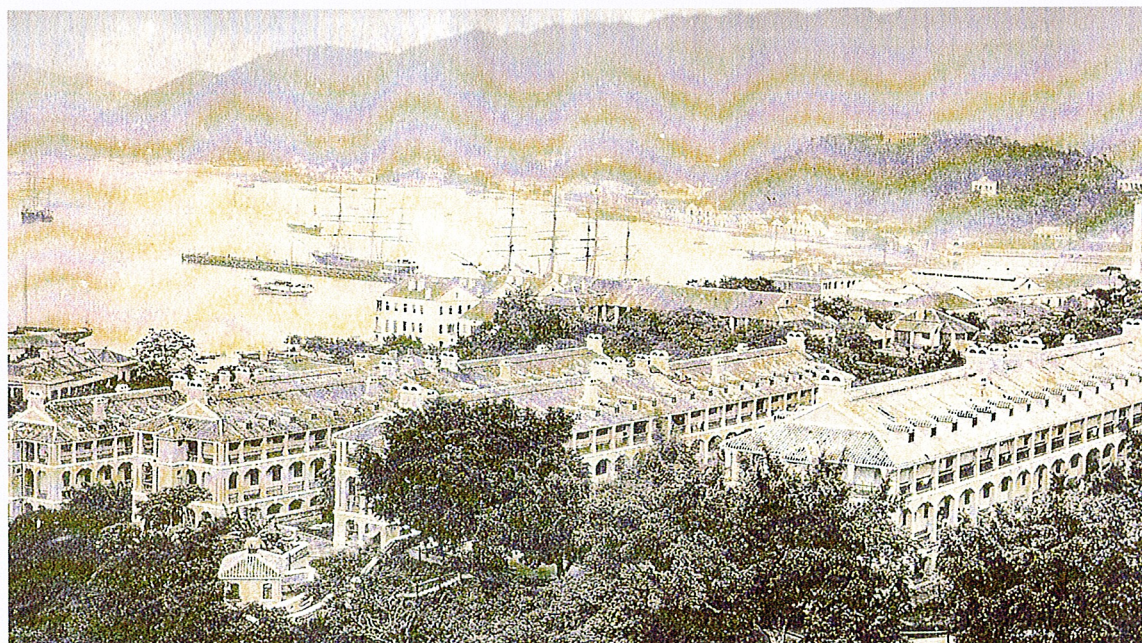


Figure 14. Victoria Barracks c.1870. Located west of the Arsenal and east of the Royal Dockyard, the Victoria Barracks comprised five blocks of buildings. Looking east is the Wanchai waterfront, previously known as Praya East, but later named Johnson Road. Many ships are seen berthed along the waterfront, where several warehouses are located here.

Tenements were built to accommodate the large numbers of Chinese who moved to Hong Kong in the late 1930's in response to the unsettled conditions on the mainland. Gloucester Road, with its substantial and distinctive police station remained as the Wanchai waterfront until further reclamation work started in the late 1970's.

Industrial and commercial enterprises were active in Wanchai from the mid 19th century onwards. Godowns were established and businesses related to shipping such as small dockyards, timber, coal and metal works were set up. Wanchai was also a major distribution centre for rattan goods, a precursor of the many rattan shops still found in the area, especially along Queen's Road East. Soya-bean processing works were set up in the area around Stone Nullah Lane. Many of these businesses were very noisy, and a government ordinance, partly to control noise was enacted in 1905. By the 1930's, other large-scale operations were the Nanyang Brothers Tobacco Co. Ltd. factory near Canal Road and the British-American Tobacco Co. Ltd. works at Gloucester Road.

5.2.4 CAUSEWAY BAY

Also known on some early maps as East Point, Causeway Bay takes its name from a causeway built in the 1860s linking East Point and North Point (the site of the present Causeway Road), that was extended across the Wong Nai Chung flood plain. Compared to Sheung Wan, Central District and Wanchai, the area to the east of Morrison Hill was developed later and was less densely populated. In the early years, the spur behind Morrison Hill was farmland and marshland. After the cessation of Hong Kong, the Government at one point planned to develop the area as the principal site of mercantile settlement. However, the plan was abandoned because of poor sanitary conditions.

Hong Kong's first properly built typhoon shelter was built adjacent to Jardine Matheson's East Point properties at Causeway Bay in 1886. The typhoon shelter was filled in 1950, and is now Victoria Park. Causeway Bay also had a gasworks established by the Hong Kong and China Gas Company, which supplied Hong Kong's street-lighting needs until electric light was introduced.

After the reclamation works of 1855 and the 1920's, the boundary of Causeway Bay was extended considerably. In the late 19th-early 20th centuries, Causeway Bay replaced Wanchai as the main industrial area. In the pre-war years, numerous well known factories the China Sugar Refining Company, the Hong Kong Cotton Spinning, Weaving and Dying Company and the Hong Kong Ice Company were established in Causeway Bay. With the rapid economic growth of the post-war years, the factories had moved out and Causeway Bay has now become a prosperous residential and commercial district.

5.2.5 NORTH POINT

The first land sale in Hong Kong was held on the island on 14th June 1841. Among the earliest merchants to buy land and build was Jardine Matheson who selected a spacious area at East Point which includes the current study area. The company constructed offices, godowns, dwelling houses and laid down a slip way. The natural promontory was disguised by subsequent reclamation which straightened the shoreline, but the company's godowns remained there for the next hundred years. Before the opening of the Suez Canal, Jardine Matheson had a period of great prosperity in the 1850's and 60's. It operated its own fleet of clippers trading in opium and tea; the best known were the *Flying Spur* and the *Cairngorm*, the latter winning the famous 'tea race' in 1858 when she made the passage to London in a record time of 93 days.

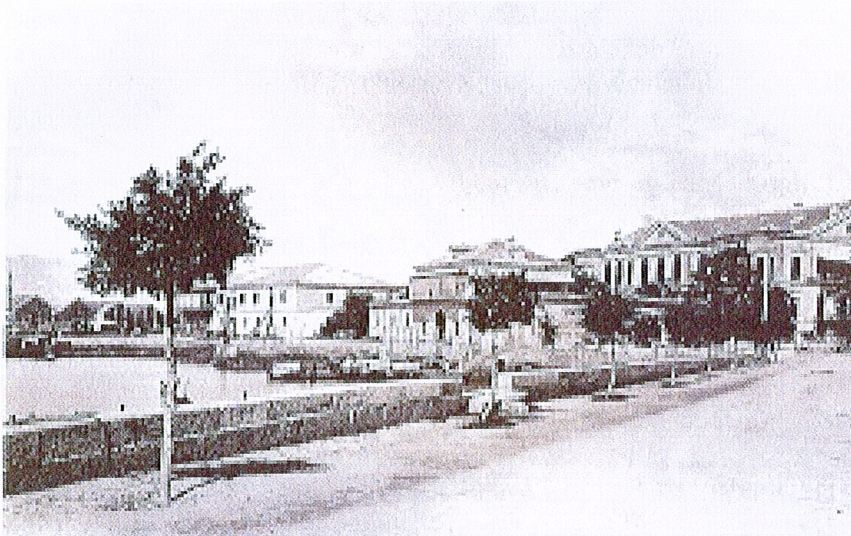


Figure 15: Jardine, Matheson & Co's premises at East Point, C.1868.

The residence of the company's taipans, the Number One House, was located at East Point Hill. Most of the original street names in this district are related to the company. In addition to the wharves and godowns, Jardine Matheson established a cotton mill and a full scale sugar refinery. The sugar factory covered several acres on the Causeway Bay and North Point waterfront and had its own wharves and godowns. The mill used raw sugar brought from Java, the Philippines and the Straights Settlements.

In time, Hong Kong's sugar mill could not compete with competition from China and the mill eventually closed. Another of the main Hong Kong merchant houses, Butterfield and Swire established the Tai Koo Sugar refinery at North Point in 1882 which became one of the most important and lasting of their local industries.

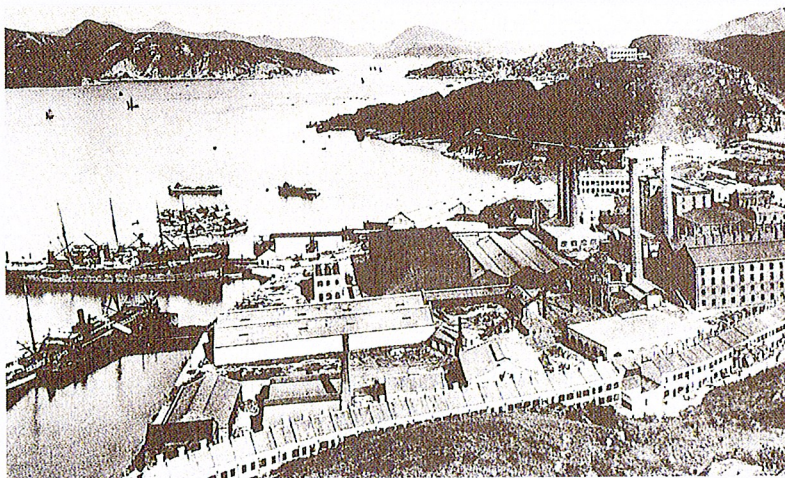


Figure 16: The Tai Koo Sugar Refinery at North Point c.1899.

In 1923, Lee Hysan purchased the plot of land from Jardine Matheson & Co to build an amusement park. The hill which became known as Lee Gardens, was later removed and developed into a residential area.

5.2.6 ARCHAEOLOGICAL POTENTIAL OF THE STUDY AREA

The study area has been at the centre of maritime activity in Hong Kong both before and during the establishment of the new city. During the 19th Century Victoria Harbour was one of the busiest in the world. It was also a dangerous place for ships due to the combined hazards of seasonal typhoons and persistent pirates. These factors give the area very high archaeological potential. This is somewhat diminished by the successive phases of reclamation which may have buried or damaged archaeological resources.

5.3 GEOPHYSICAL SURVEY

A total of thirteen significant sonar contacts were recorded. A copy of the survey data showing each contact is presented in Appendices A-L as follows:

Appendix	Sonar Contact
A	SC001
A	SC002
B	SC003
C	SC004
D	SC005
E	SC006
F	SC007
G	SC008
H	SC009
I	SC010
J	SC011
K	SC012
L	SC013

The data is also presented in three charts which provide a summary of the results of the study area. These are included as Chart Figures 1-3 in the Appendices.

Chart Figure 1 Track Plot
Chart Figure 2 Colour Contoured Swath Bathymetry
Chart Figure 3 Seabed Features

The details of each sonar contact are presented as figures and data records in the Appendices.

The details of the information in the Appendices are tabulated below:

Appendix	Contact number	Latitude Longitude	Easting Northing	Dimensions (m)	Description
A	SC-001	7° 22.814' N 126° 3.607' E	837868.0E 816943.0N	5.7x0.8x1.1m	Unknown object, possible pipe segment due to its linear shape
A	SC-002	7° 22.805' N 126° 3.593' E	837842.0E 816925.0N	1.6x0.9x0.4m	Debris
B	SC-003	7° 22.771' N 126° 3.572' E	837805.3E 816863.2N	1.2x1.1x1.1m	Debris
C	SC-004	7° 22.753' N 126° 3.570' E	837801.7E 816828.8N	1.3x0.5x0.4m	Debris
D	SC-005	7° 22.635' N 126° 3.439' E	837560.9E 816610.7N	1.1x0.5x0.2m	Debris
E	SC-006	7° 22.620' N 126° 3.435' E	837553.7E 816582.7N	2.2x0.4x0.5m	Debris
F	SC-007	7° 22.589' N 126° 3.387' E	837466.1E 816525.4N	1.6x0.6x0.6	Debris
G	SC-008	7° 22.608' N 126° 3.387' E	837466.3E 816559.2N	1.4x0.9x0.6m	Debris
H	SC-009	7° 22.625' N 126° 3.385' E	837462.6E 816591.0N	3.6x1.1x0.3m	Debris
I	SC-010	7° 22.627' N 126° 3.384' E	837459.8E 816594.4N	0.6x0.7x0.5m	Debris
J	SC-011	7° 22.649' N 126° 3.416' E	837518.5E 816636.0N	2.5x2.6x0.8m	Square, hard object possibly concrete
K	SC-012	7° 22.654' N 126° 3.422' E	837530.1E 816645.5N	6.3x1.2x0.3m	Modern wreck
L	SC-013	7° 22.660' N 126° 3.472' E	837622.3E 816655.8N	10.5mx2.5mx0m	Unknown feature, scattered modern debris

On the side scan sonar images, the fix numbers show the location and orientation of the measurements, corresponding with the track plot Figure.

The swath images consist of a plan view, complete with the survey grid to allow measurements to be scaled off, and a number of perspective views. However, some of the sonar contacts do not include swath images due to lack of coverage (SC04, SC007, SC008 and SC013). The multi beam swath system cannot operate close to seawalls and other vertical structures.

5.4 SEABED STRATIGRAPHY

As the presence of raw sewage on the seabed prevented the acquisition of seismic profiler data it was not possible to establish detailed stratigraphy beneath the seabed. The side scan sonar data confirmed that most of the seabed within the study area is soft mud or fined grained sediments.

These sediments are assigned to the Hang Hau Formation. The formation consists of relatively homogenous very soft to soft, greenish grey silty clay (Fyfe et al., 1997) and has high moisture content. Therefore, the Hang Hau Formation sediments potentially provide an excellent substrate for the preservation of archaeological material. Additionally, the soft nature of the sediments would make it possible for archaeological material to be buried within the formation, where it would have greater protection than if it were exposed on the seabed.

The previous MAI report which was reviewed as part of this project included detailed geological analysis. It concluded that within the study area adjacent to the current working area, the study area, the Hang Hau Formation is the most widely developed of the superficial deposits. The depth of the Marine Deposits generally varied between 10m PD and 18 m PD. Given the juxtaposition to the current study area it is assumed that the seabed stratigraphy will follow the same pattern but exact values for depth cannot be provided.

6. CONCLUSION

6.1 REVIEW OF REPORT NO: SDA8827

The previous work includes areas that will be affected by the current development proposals. It is therefore appropriate to apply the results directly.

The 2001 MAI was commissioned and reviewed by the AMO. It therefore satisfied their requirements for MAI. It is therefore concluded that it will be acceptable if the results of the 2001 study are applied to the current study since they cover the same seabed area, with the exception of North Point.

There have not been any significant changes to the seabed since 2001 which would have affected its archaeological potential.

The previous work did not identify any marine archaeological resources.

6.2 BASELINE REVIEW

The Baseline Review did not find any specific references to the presence of shipwrecks in the study area. However, as North Point is within one of the busiest sections of Victoria Harbour it will have been at the centre of maritime activity in Hong Kong since the city was established. The combined effects of piracy and typhoons would have increased the likelihood of shipwrecks. This is diminished by the extensive development and engineering works in the study area which will have served to disturb or destroy archaeological remains.

6.3 GEOPHYSICAL SURVEY

Detailed examination of the geophysical survey data enabled accurate assessment of the seabed within the study area. The area is characterised by extensive disturbance as evidence by trawl marks and a very significant amount of modern dumped material. This is compatible with its location within one of the busiest sections of Victoria Harbour and adjacent to existing reclamation and engineering works. These activities would have a negative impact on the seabed thereby reducing its archaeological potential. The mound of debris on the foreshore shown in Figure 4 is very likely to be the same type of material that was identified in the survey data.

There is one large non natural feature on the seabed (SC012) which has significant dimensions (6.3 x 1.2 x 0.3m) and it has clearly defined linear shape. The fact that it remains so intact leads to the conclusion that it is a small modern motorised work boat. In the context of the A.M. Ordinance (Cap. 53) the site is not an antiquity or relic. It would be impossible for a historic wreck to have such a cohesive structure after extensive exposure in such a dynamic underwater environment.

It is therefore concluded that there are no archaeological resources within the study area.

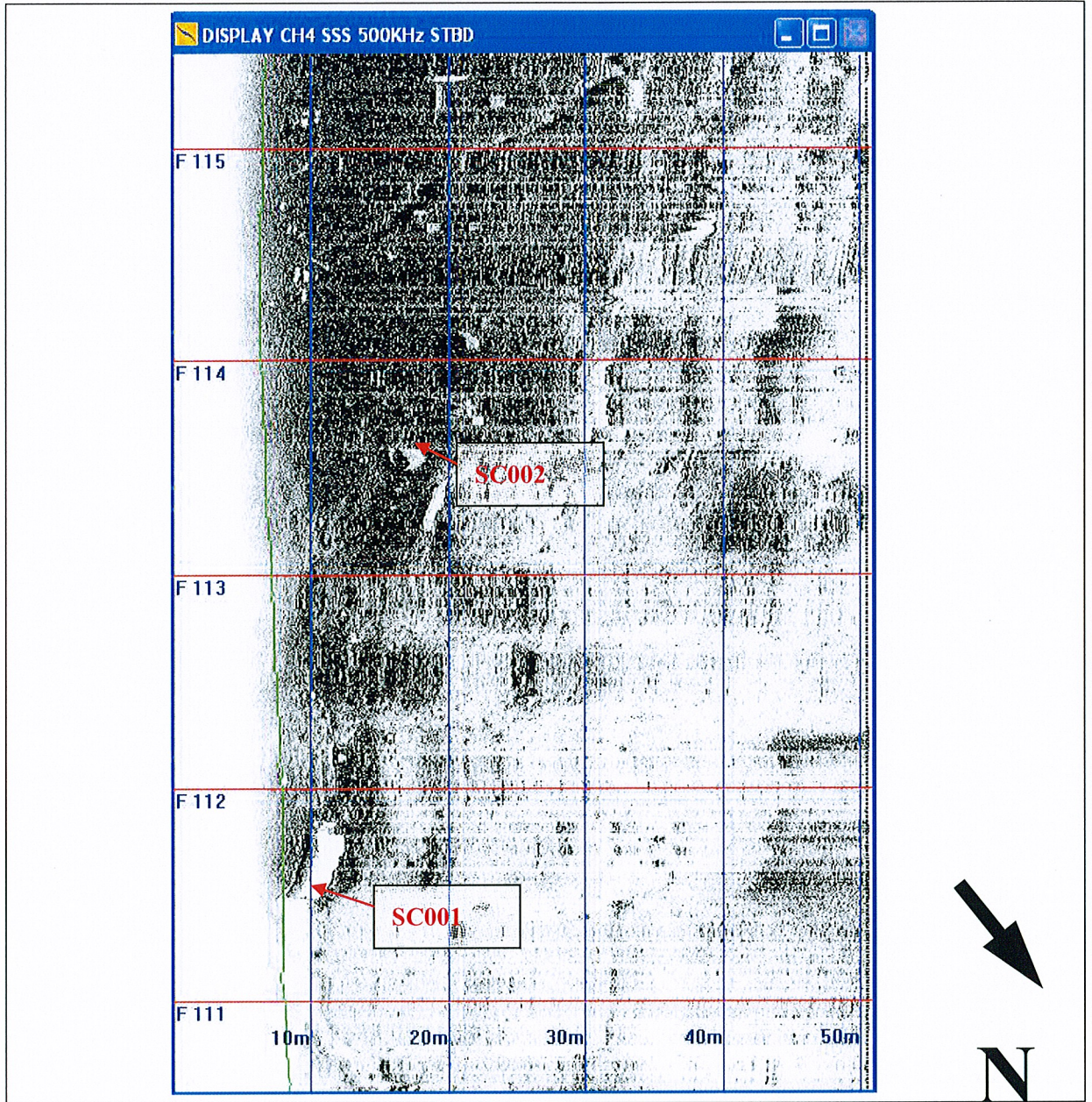
7 RECOMMENDATION

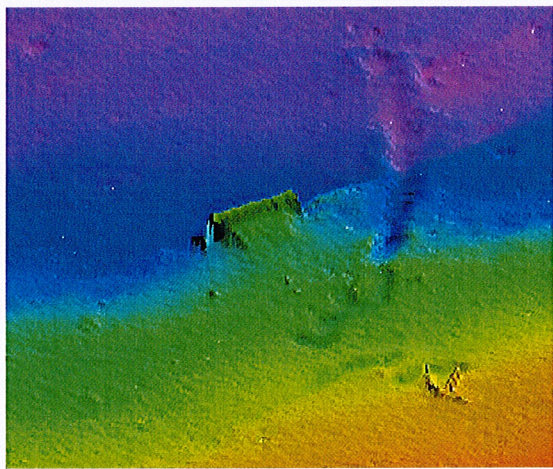
Since there is no archaeological material present within the study area, it follows that there are no related constraints on the proposed reclamation work. There is no need for any further archaeological investigation or mitigation measures.

8 REFERENCES

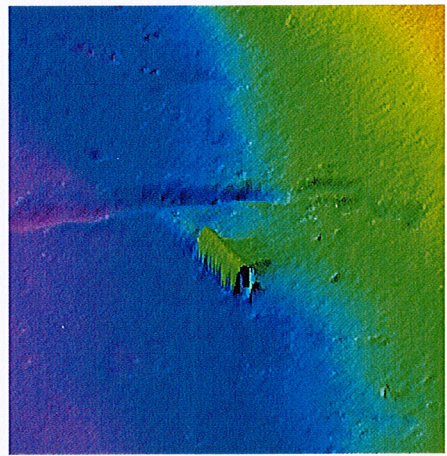
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Appendix A, SC001 & SC002

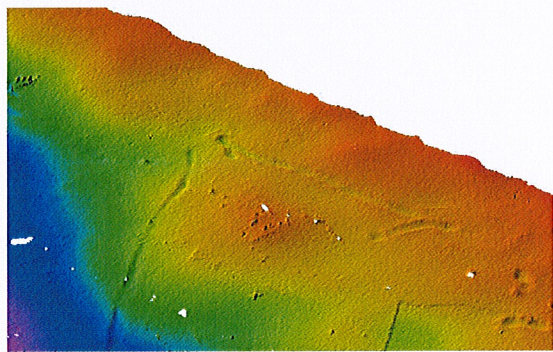




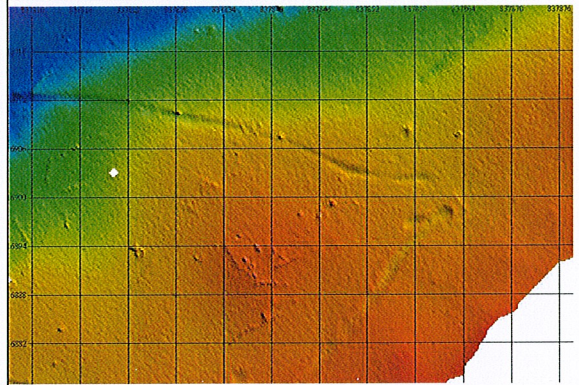
SC001



SC001

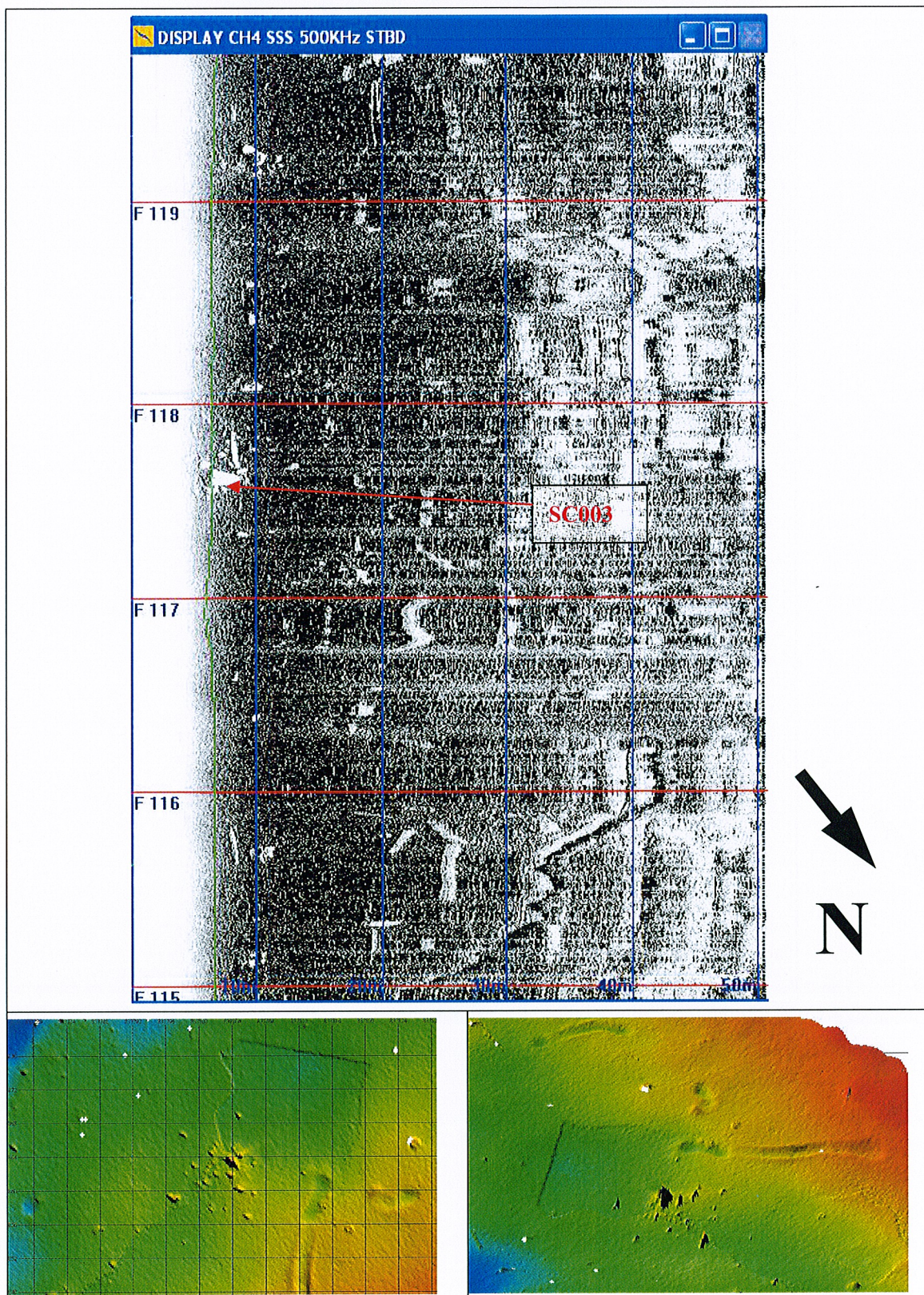


SC002

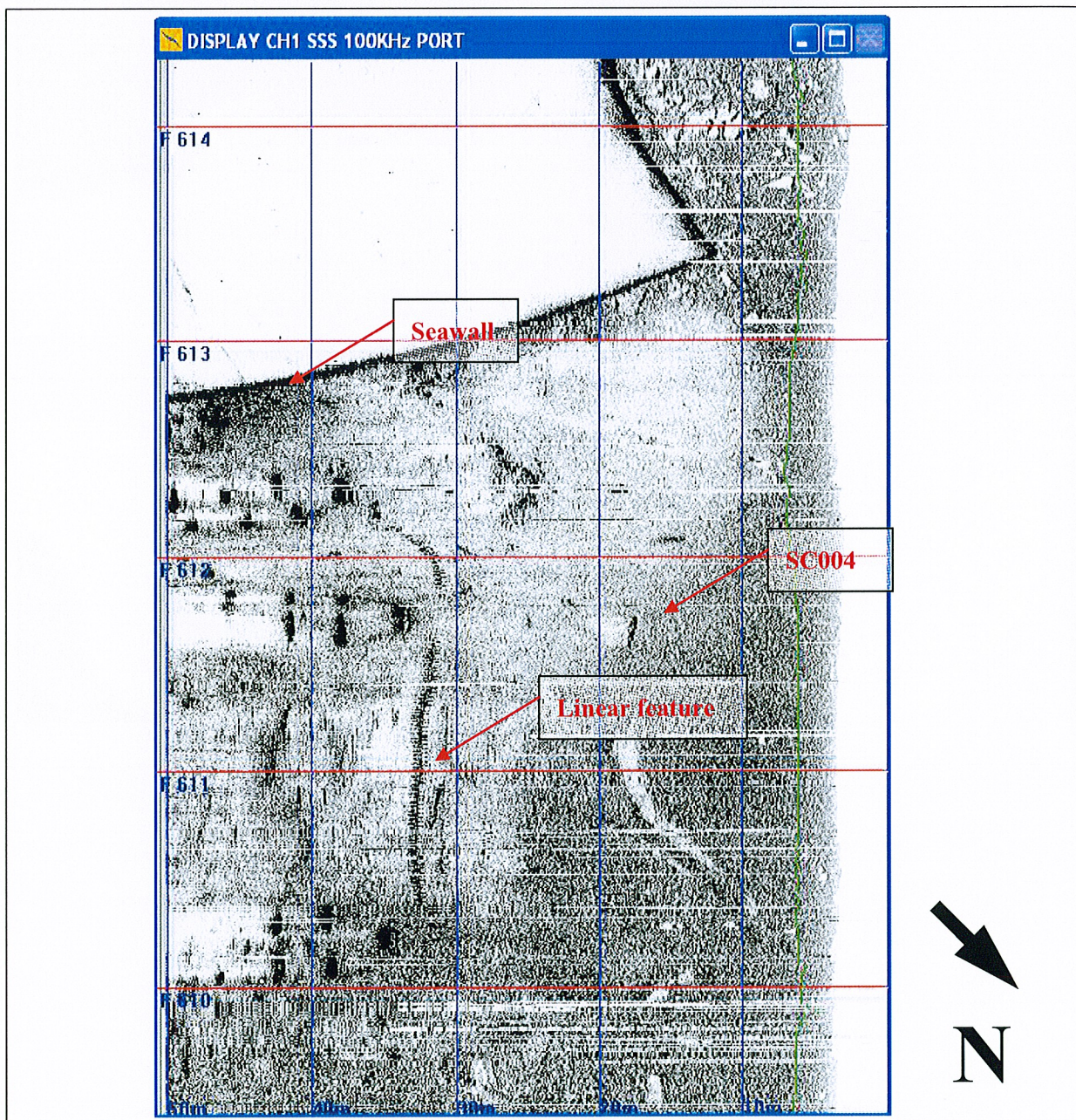


SC002

Appendix B, SC003

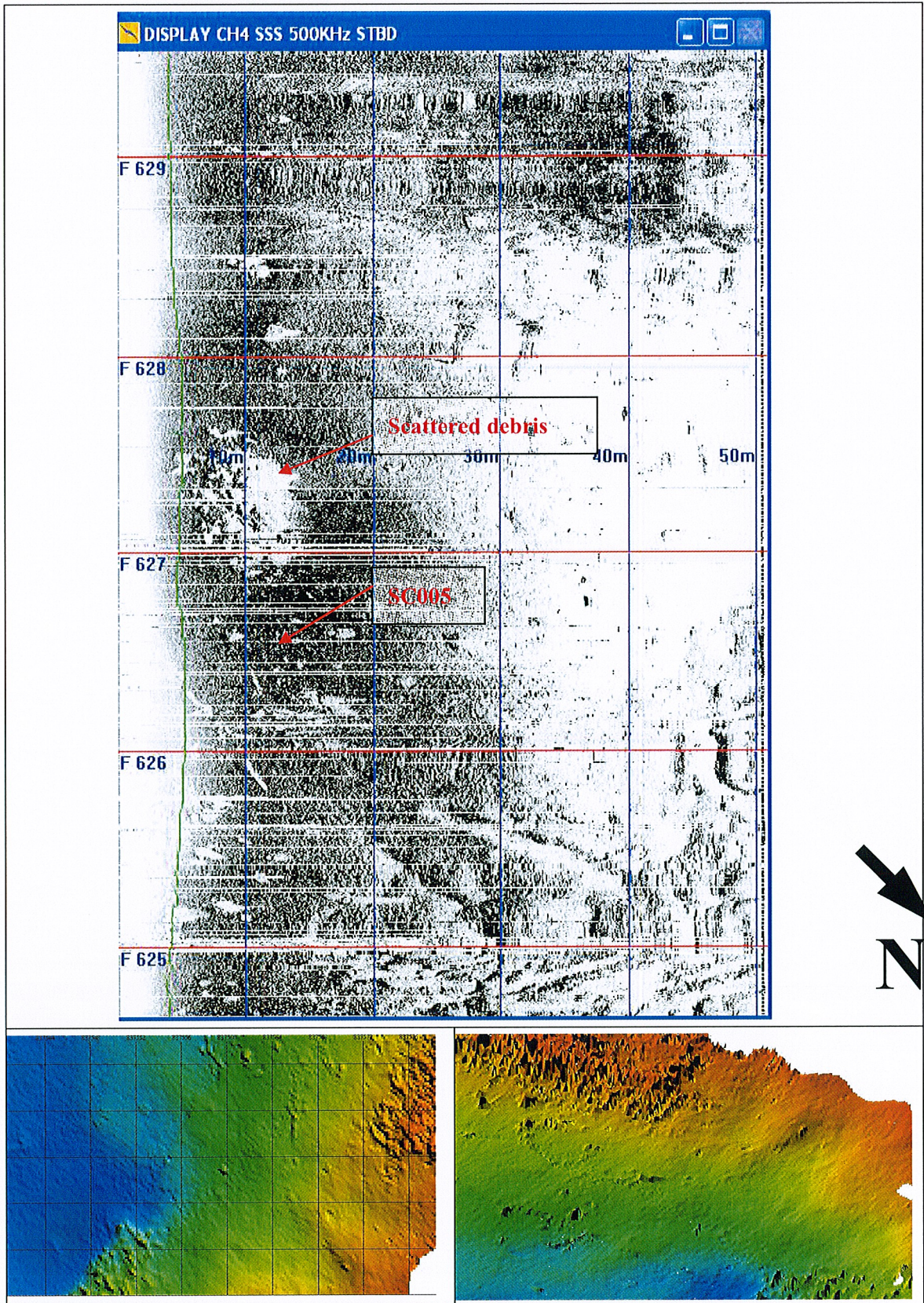


Appendix C, SC004

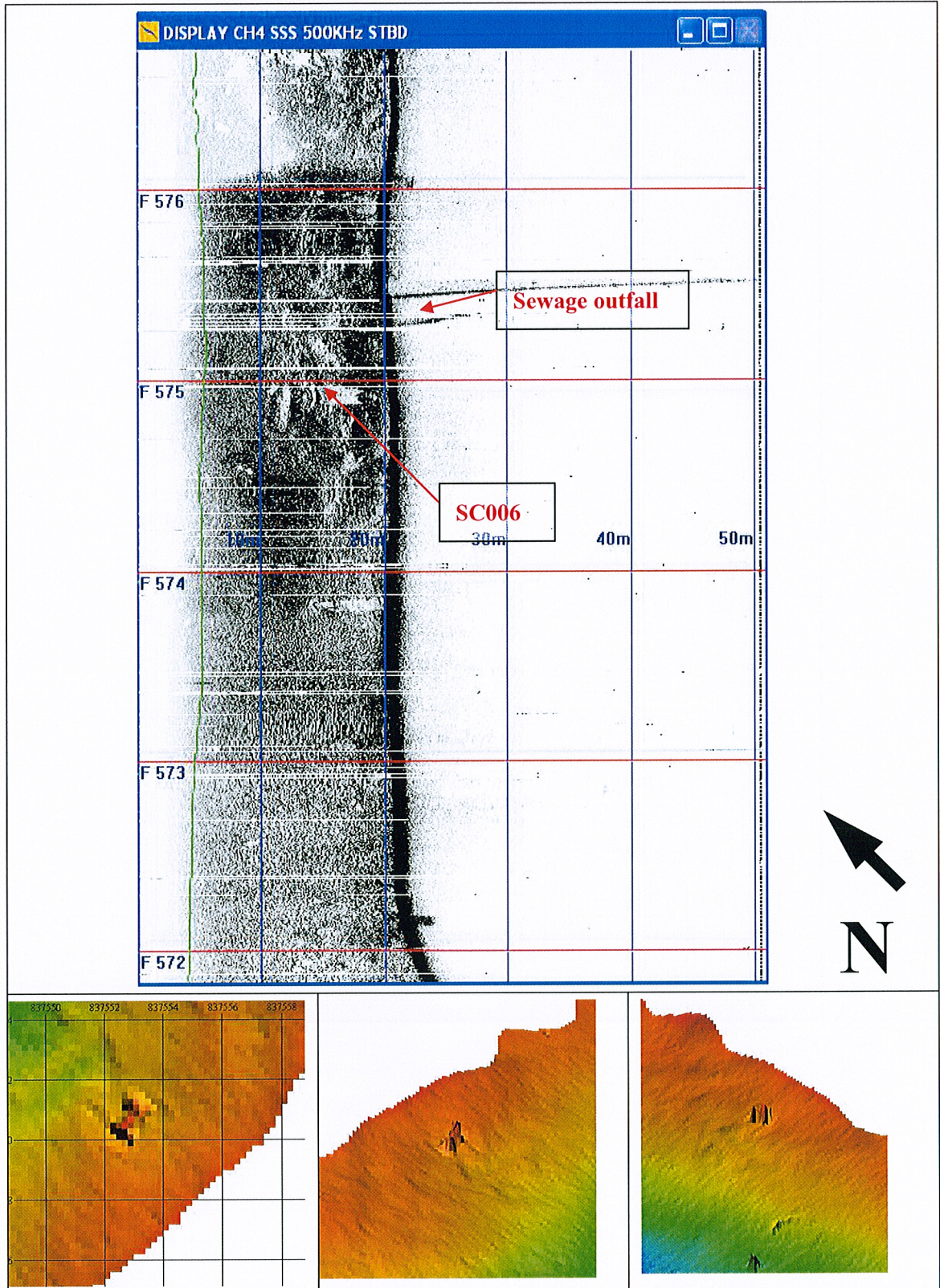


There are no swath data for SC04 due to its proximity to the seawall, as shown above.

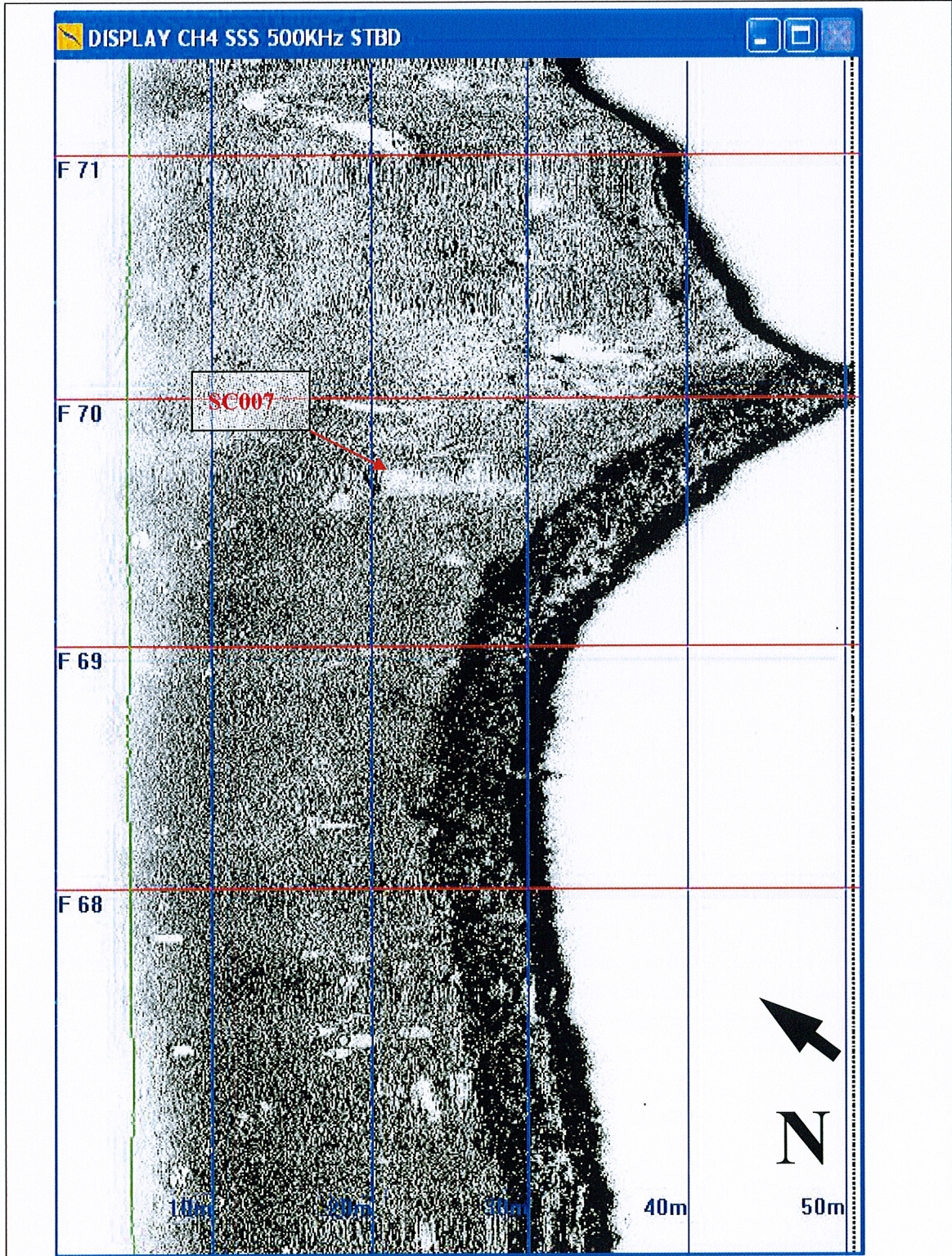
Appendix D, SC005



Appendix E, SC006

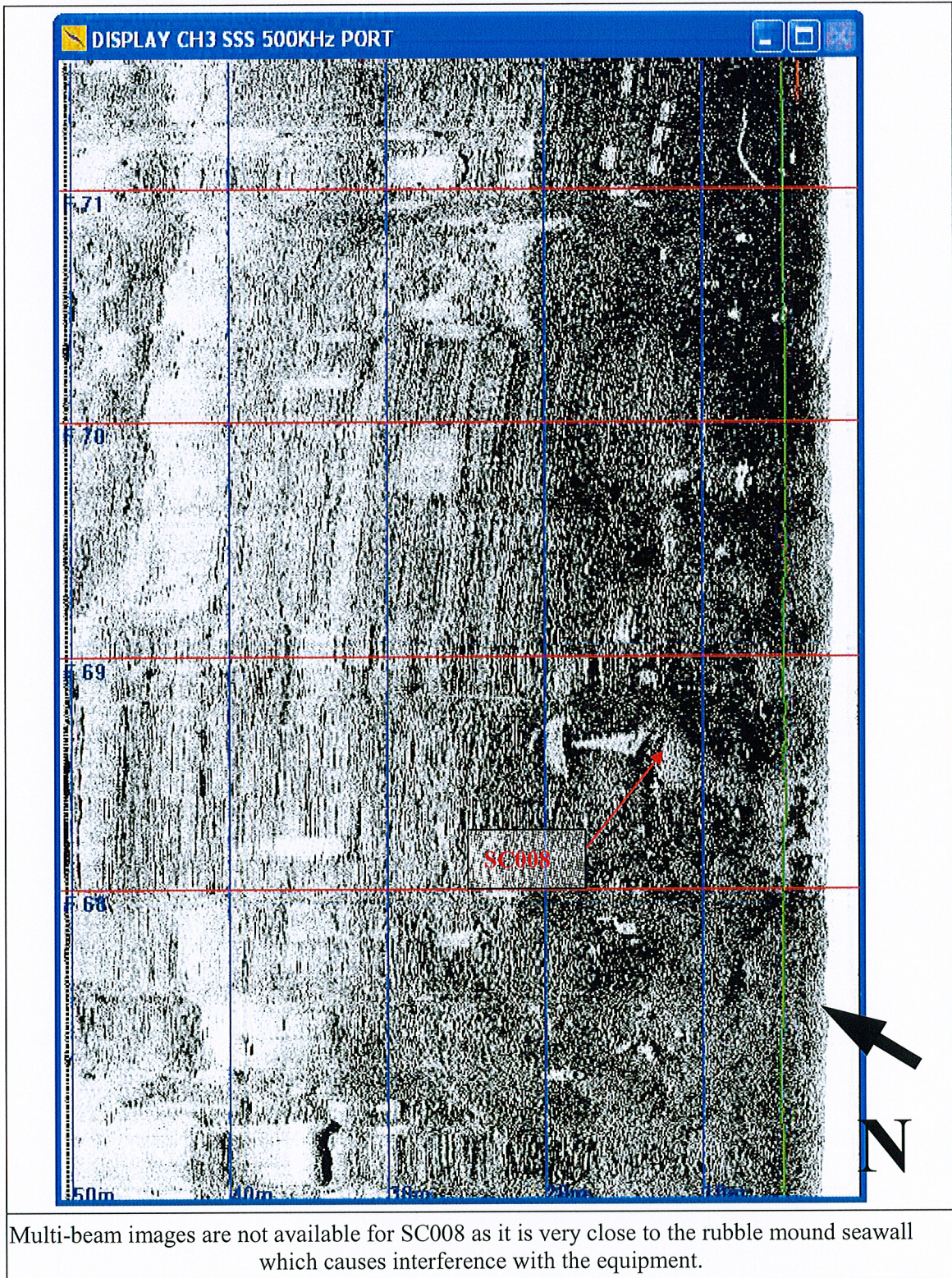


Appendix F, SC007

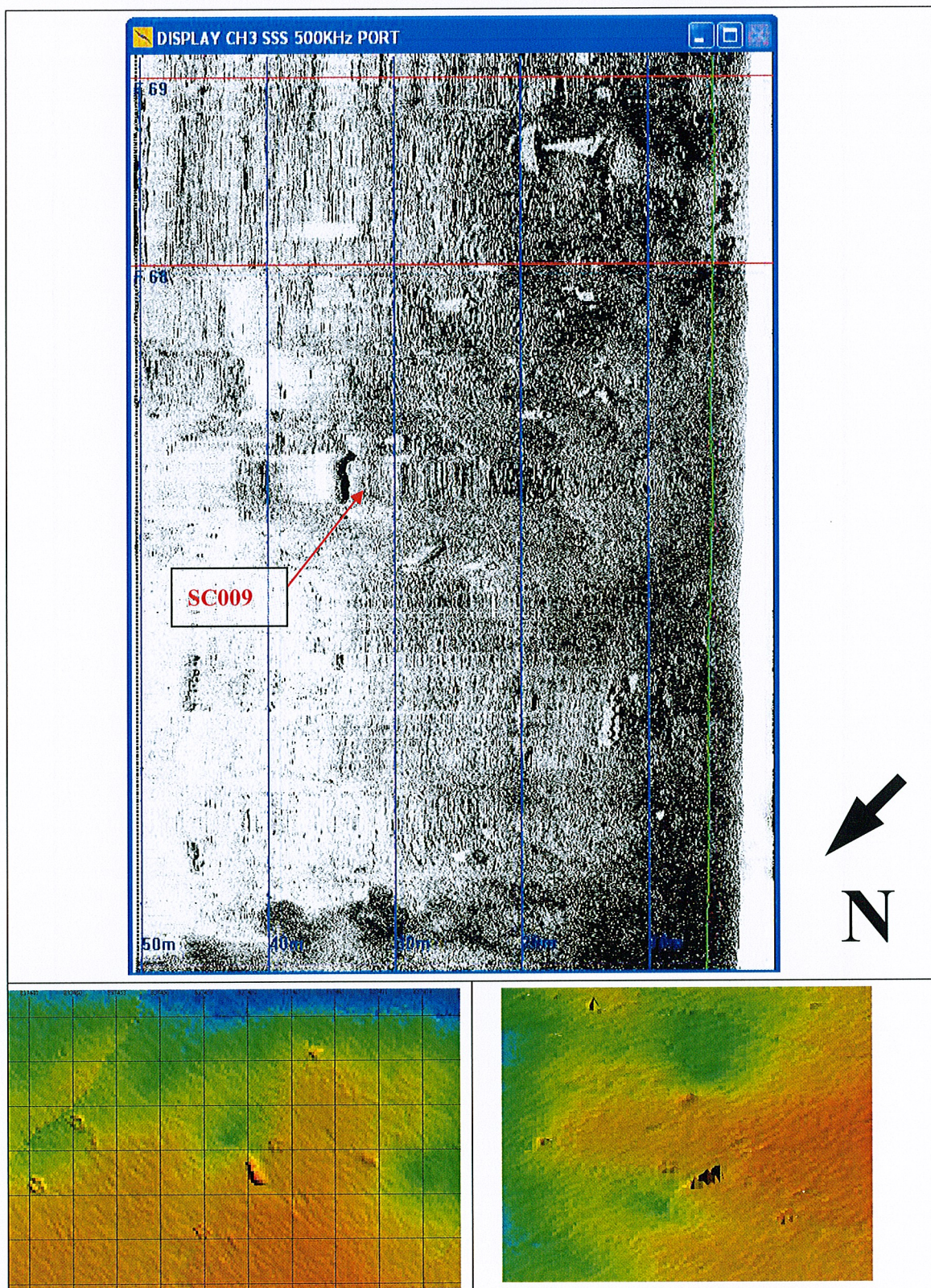


Multi-beam images are not available for SC007 as it is very close to the rubble mound seawall which causes interference with the equipment.

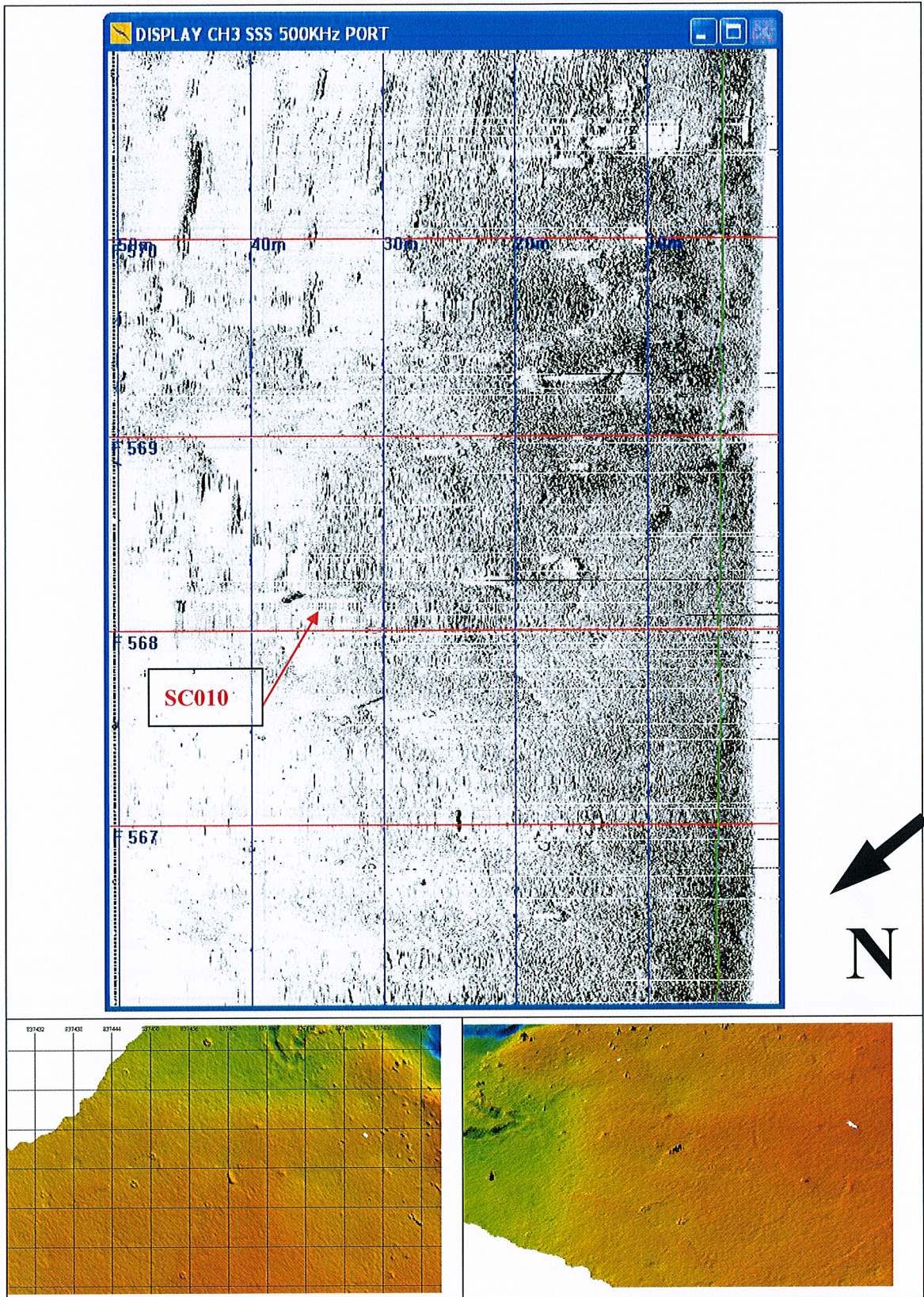
Appendix G, SC008



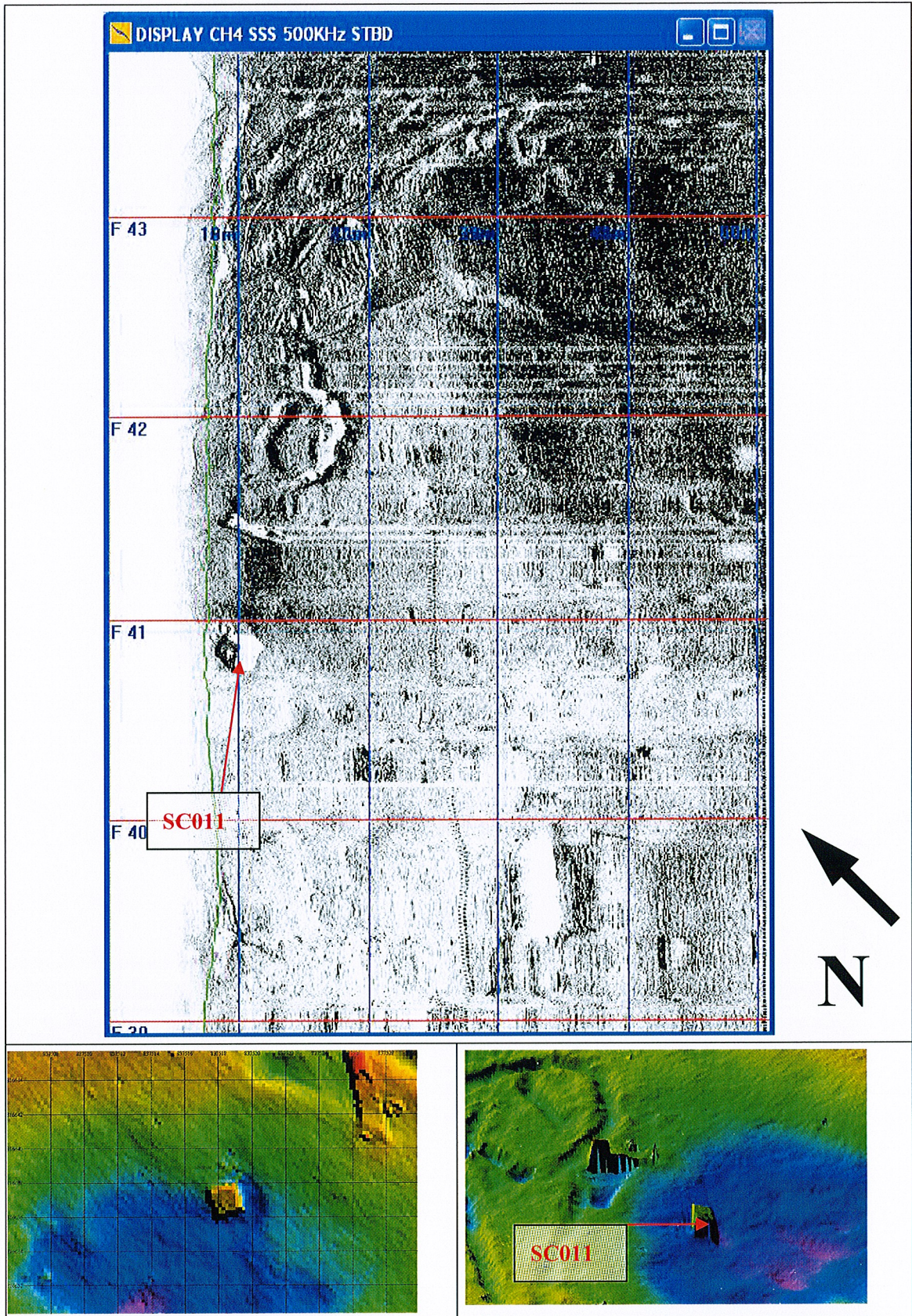
Appendix H, SC009



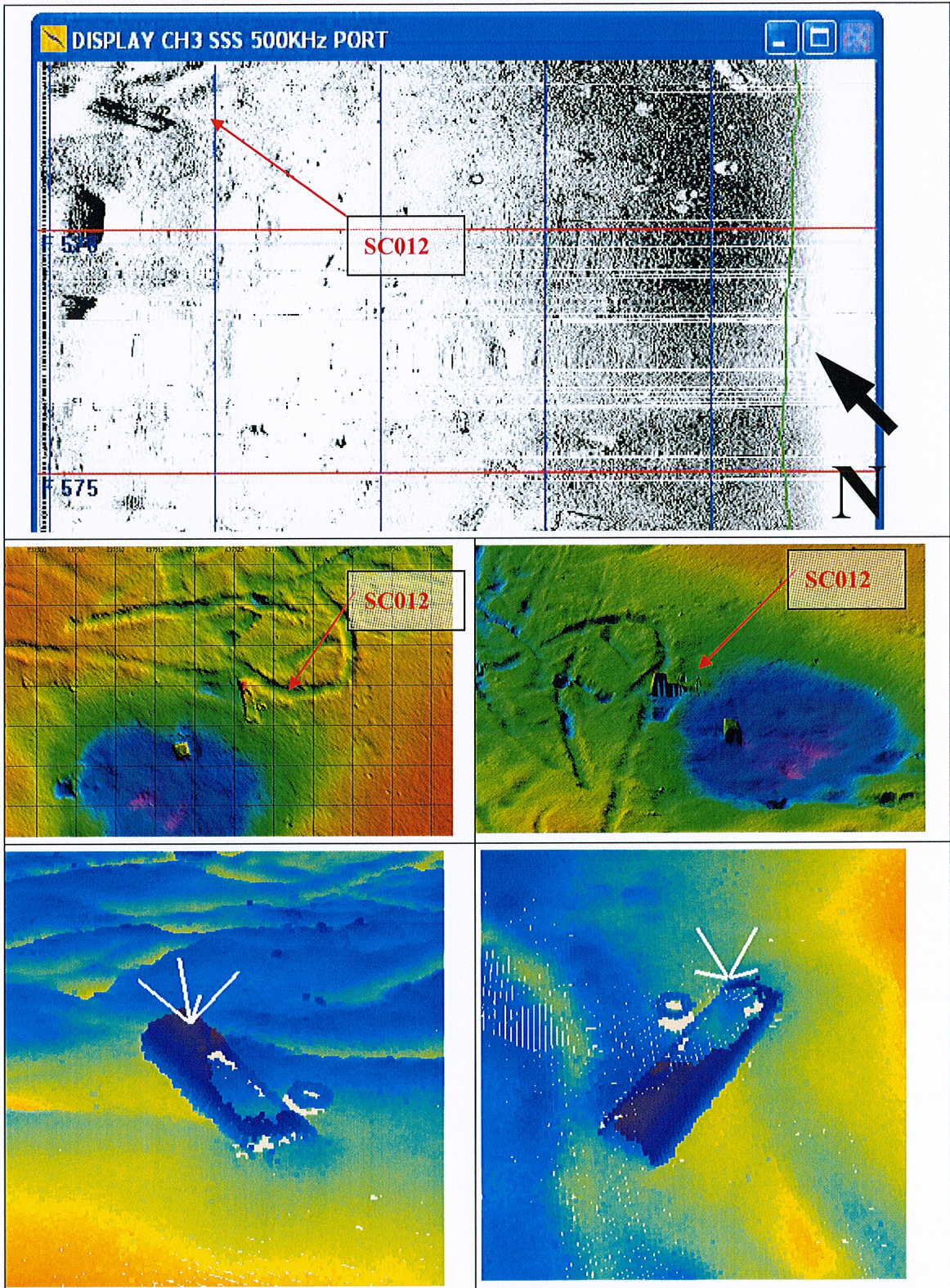
Appendix I, SC010



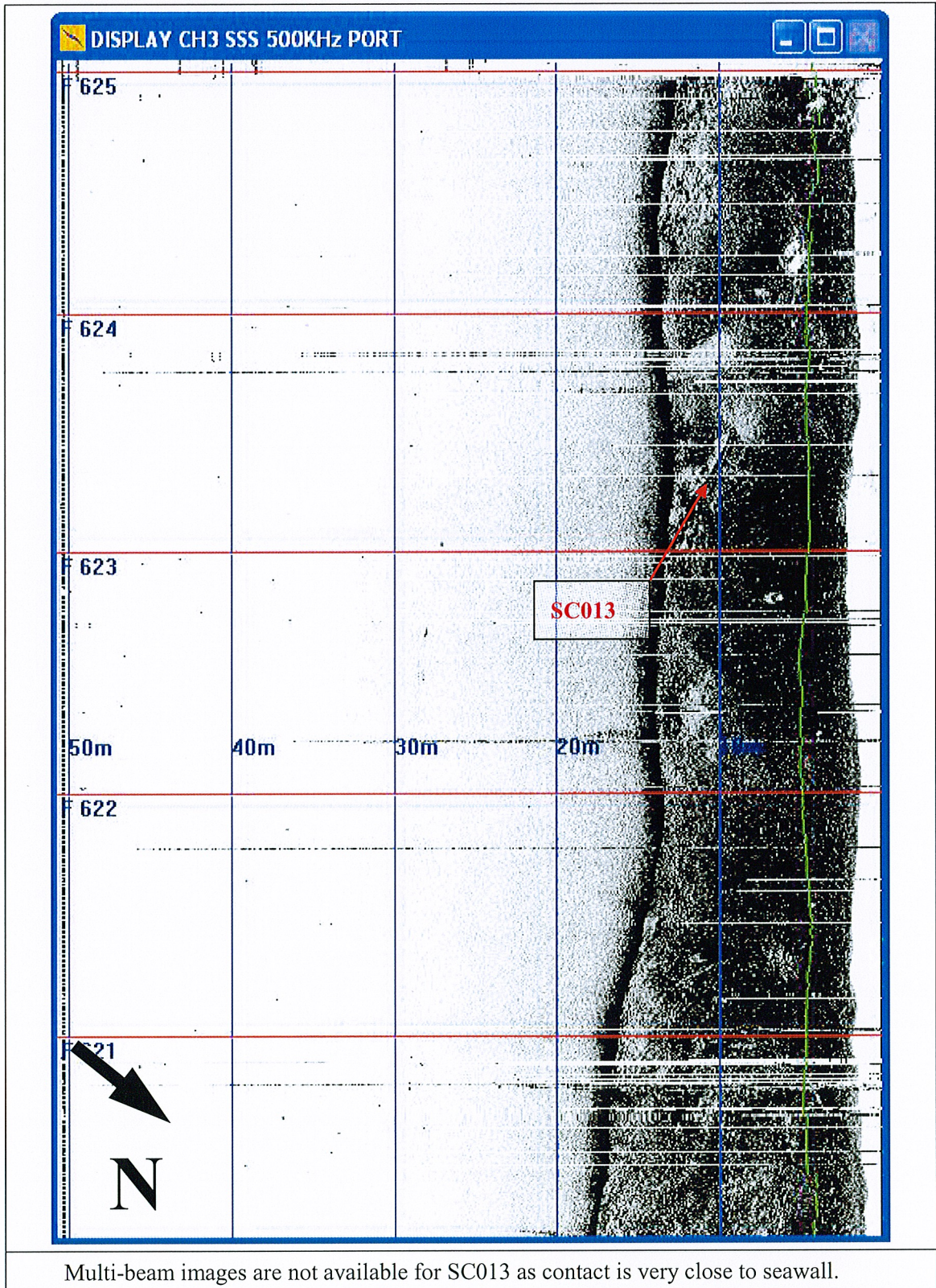
Appendix J, SC011



Appendix K, SC012



Appendix L, SC013



Multi-beam images are not available for SC013 as contact is very close to seawall.

