FE316
SIDE SCAN

Diagram No. 1213-4

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

DESCRIPTIVE REPORT

Type of Survey ...... Side Scan Sonar

Field No. HE-10-1-88

Registery No. FE-316SS

LOCALITY

State ...... New York

General Locality ...... Long Island Sound

Sublocality ...... Vicinity of Stepping Stones

19 88

CHIEF OF PARTY
LCDR C.B. Lawrence

☆U.S. GOV. PRINTING OFFICE: 1985—566-054

FE316
SIDE SCAN

"G.P."
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12364 (E, F) pg 11
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NOAA FORM 77-28 (11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HYDROGRAPHIC TITLE SHEET

REGISTER NO.

FE-316-SS

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

HE-10-1-88

State NEW YORK

General locality ~~WESTERN~~ LONG ISLAND SOUND

Locality VICINITY OF STEPPING STONES

Scale 1:10,000 Date of survey JULY 22 - AUGUST 8, 1988

Instructions dated MAY 26, 1988 Project No. OPR-B660-RU/HE-88

Vessel NOAA SHIP HECK S-591, EDPN 9140

Chief of party CHRISTOPHER B. LAWRENCE, LCDR, NOAA, CMDG

Surveyed by LCDR LAWRENCE (C.B.), LT TUELL (G.H.), LT(jg) BEAVER (A.L.), ST MORRIS (W.R.)

Soundings taken by echo sounder, hand lead, pole DSF 6000N DUAL BEAM ECHOSOUNDER

Graphic record scaled by AUTOMATED HDAPS SYSTEM

Graphic record checked by LT TUELL, LT(jg) BEAVER, ST MORRIS

XYNETICS 1201 PLOTTER (AHC)

Protracted by _____ Automated plot by HDAPS (FIELD)

Verification by D.A. Bland (AHC)

Soundings in ~~fathoms~~ feet at ~~MLW~~ MLLW

REMARKS: Notes in red were made during office processing

AWOIS/SURF MSM 6/27/89

K.W.W. 3/8/94

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1978-665-010-1174

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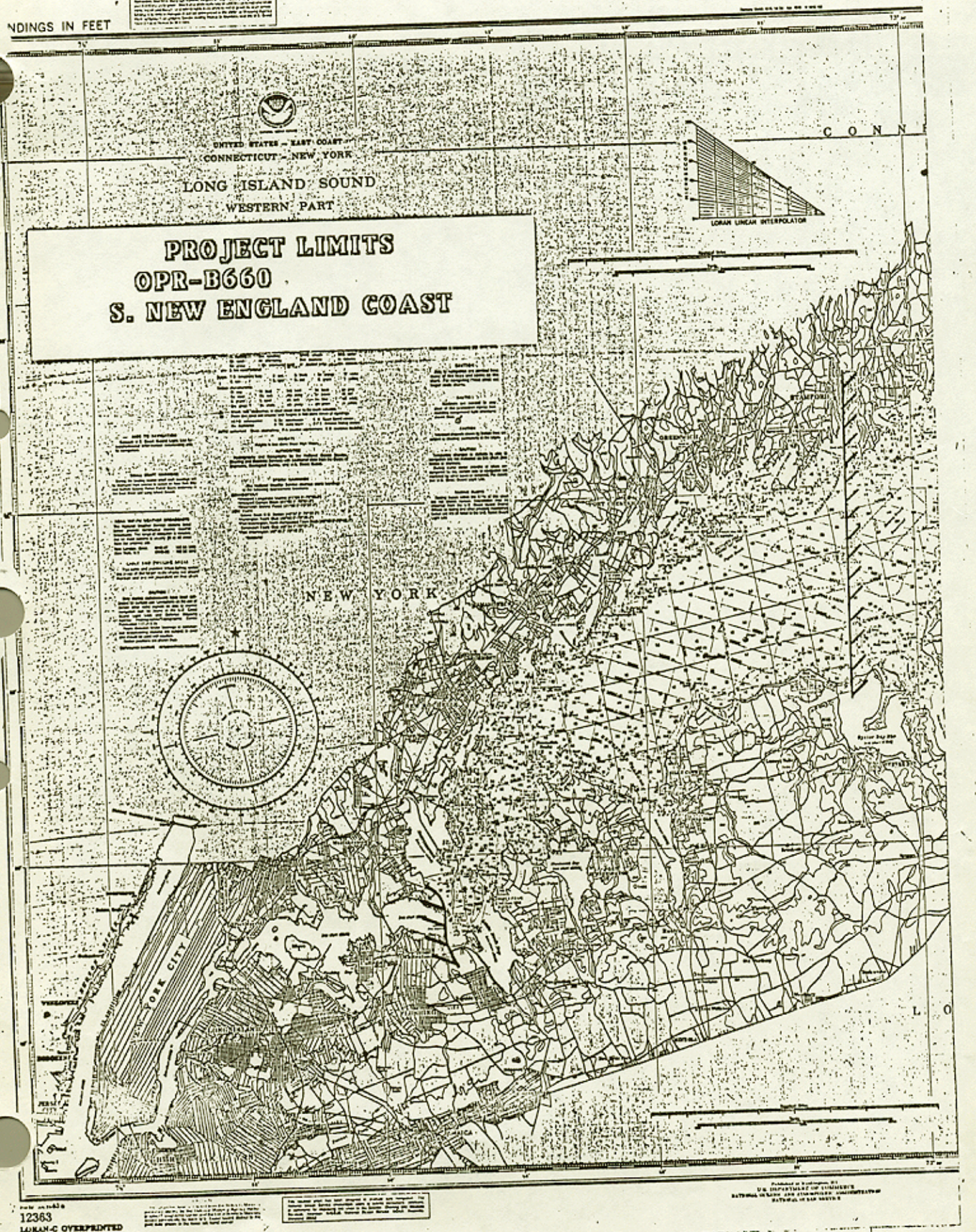

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APPENDICES

* Filed with the original field records.

DESCRIPTIVE REPORT TO ACCOMPANY
SURVEY FE-316-SS
FIELD NUMBER HE-10-1-88
SOUTHERN NEW ENGLAND COAST, CONNECTICUT AND NEW YORK
VICINITY OF STEPPING STONES
Scale 1:10,000
NOAA Ship HECK S-591
LCDR Christopher B. Lawrence, CMDG

A. PROJECT DESCRIPTION

A1. Project Authorization

This survey was conducted in accordance with Hydrographic Project Instructions OPR-B660-RU/HE-88, Southern New England Coast, Connecticut and New York, dated May 26, 1988 as amended by Change No. 1 dated July 6, 1988.

A2. Project Purpose

This project is in response to requests from the Northeast Marine Pilots Inc., of Newport, Rhode Island, to verify or disprove and determine least depths for certain wrecks and obstructions in western Long Island Sound. The data from this project will supplement a basic hydrographic survey (OPR-B285) which is scheduled for this area in 1989-91. The U.S. Navy, as well as state and local governments have requested updated bathymetric and hydrographic survey data for western Long Island Sound and vicinity to aid in proposed biological, chemical, environmental, and coastal zone management studies in this region.

B. PROJECT OVERVIEW

B1. General

Project Instructions for Project OPR-B660-RU/HE-88 assigned to the NOAA Ships HECK and RUDE a total of 57 AWOIS Items, all of which are submerged wrecks or obstructions. Field work for OPR-B660-RU/HE-88 began on July 13, 1988 (JD 195) and is scheduled for completion on November 30, 1988 (JD 335). This report addresses all field work accomplished in resolving AWOIS items 4382, 4386, 4389, 4416, and 6504. Recovery and installation of horizontal control stations began on July 19 (JD 201) with on-line operations for this sheet beginning on July 22 (JD 204). Operations for this sheet concluded on August 8 (JD 221).

Problems with the Falcon Mini-Ranger system developed the first day and continued throughout work on these items, resulting in 19 hours of lost production. Three separate Mini-Ranger RPU/RT installations were utilized. Dates of use for each combination are tabulated and discussed in Section H of this text.

The waters of Western Long Island Sound and surrounding waters have been severely polluted with hospital and raw sewage wastes throughout the summer of 1988. Due to the health and safety hazards associated with dive operations west of Execution Rocks, least depths on items in this area were determined hydrographically. A formula for determining the line spacing to achieve fathometer coverage was verbally conveyed to the ships by the Hydrographic Surveys Branch (N/CG2) on July 22, 1988 (JD 204). The following formulas were received :

$$\text{LINE SPACING} = 2 \times [D \times \text{TAN}(23.75^{\circ})]$$

or

$$\text{LINE SPACING} = 0.26823 \times D$$

D = DEPTH
INPUT UNITS = OUTPUT UNITS

The HECK took a conservative approach to this line spacing requirement and ran line spacings tighter than those required.

On August 12 (JD 225), after completion of survey operations on items covered with this sheet, CDR Alan Anderson from the NOAA Ship RUDE submitted to N/CG24 a memo rigorously defining line spacing requirements for the DSF6000N echosounder. The formulas derived by CDR Anderson differ slightly from those provided by N/CG24 due to inclusion of vessel draft. CDR Anderson also derived a formula defining line spacing as a function of measured allowable error. The formulas are as follows :

$$\text{LINE SPACING} = 0.86 [D - T]$$

or

$$\text{LINE SPACING} = 2 \times \text{SQRT}[2 \times (D - T) - 1.0]$$

T = TRANSDUCER DRAFT

A draft written specification for required line spacings for 100% echosounder coverage was received from N/CG2 on September 15, 1988 (JD 259) using the formulas derived by CDR Anderson. Refer to Appendix IB for a copy of the draft requirement. HECK personnel conducted an extensive review of all hydrographic development trackplots for all significant contacts using the new line spacing formulas. Line spacings were found to be adequate based on the written specifications.

Testing of the HECK's towfish after repairs made at AMC's Electronic Engineering Branch during the ship's July inport indicated a faulty starboard channel. On July 22 (JD 204) the HECK's towfish was sent to EG&G for further repairs while the ship continued operations using two towfish borrowed from the WHITING and the RUDE. The HECK's towfish was returned by EG&G and put back into service on August 4 (JD 217).

B2. Methodology

Survey work on this sheet was carried out using an EG&G Model 260 slant corrected Side Scan Sonar recorder and three Model 272 Side Scan towfish, one single beam 100 khz and two dual beam 100/500 khz models. Side Scan ensonification was supplemented by echosounder traces obtained utilizing the ship's Raytheon DSF-6000N echosounder.

Primary position control for survey operations was provided by a Motorola Mini-Ranger Falcon 484 system. Four lines of position (LOP's) were recorded for each fix. Upon recognition of targets deemed significant, hydrographic survey lines were run at tight line spacings to obtain 100% ensonification of the contact area. Least depths were determined from the DSF6000N echosounder trace and tidal, velocity, and draft correctors applied accordingly. Detached positions were determined from the sounding line on which the least depth was obtained. When the least depth fell between two selected soundings, the detached position was calculated using the two selected sounding positions.

Due to the pronounced tidal currents and the large volume of vessel traffic in the vicinity of Stepping Stones, the HECK found the steering of tight line spacing (ie. 10 meters) to be very challenging and time consuming. All least depths over sonar contacts were acquired while drifting or moving at dead slow speeds over the contact.

C. AREA SURVEYED

The position, survey requirements, and dates of field work for AWOIS Items 4382, 4386, 4389, 4416, and 6504 are as follows:

AWOIS NUMBER	POSITION (AWOIS)	SURVEY REQUIREMENTS	DATES SURVEYED (DOY)
4382	040° 49' 30.0" 073° 47' 10.0"	250 meter radius 200% SSS coverage	(209-218)
4386	040° 50' 00.0" 073° 46' 18.0"	75 meter radius 200% SSS coverage	(210-215)

4389	040° 50' 16.8" 073° 45' 49.8"	75 meter radius 200% SSS coverage	(211-221)
4416	040° 49' 01.5" 073° 46' 55.0"	75 meter radius 200% SSS coverage	(204-215)
6504	040° 50' 13.5" 073° 46' 45.5"	75 meter radius 200% SSS coverage	(211-214)

D. SURVEY VESSELS

The following survey vessels were used for data collection:

VESSEL	ELECTRONIC DATA PROCESSING NUMBER	PRIMARY FUNCTION
NOAA Ship HECK (S-591)	9140	SSS and Echosounder
HECK Boston Whaler (HE-1)	None	Mini-Ranger service

E. SURVEY SHEETS (Field)

All survey sheets were generated aboard the NOAA Ship HECK using HDAPS and the Brunning 824 CS Plotter (S/N 15237). Survey sheets were plotted on NAD 1983.

Several different scales were used for the smooth and field sheets plotted for this survey. All side scan sonar field work and smooth plots for the first and second 100% coverages were plotted on 1:10,000 scale sheets. Side scan sonar development and hydrographic development field sheets as well as smooth track plots of the hydrographic developments were plotted on 1:2,500 sheets. All sounding smooth plots were made on 1:1,000 scale sheets to better clarify individual soundings. *See Appendix V for plotter sheet parameters.

*filed with original field records.

Multiple field and smooth sheets were plotted in the following manner:

SHEET HE-10-1-88 : SIDE SCAN COVERAGE SHEET (1:10,000)

Track Plot - 1 Smooth

Swath Plots - 1 On-line and 2 Smooth

Depth Plot - 1 Smooth for Prior Survey and Chart Comparisons

Contact Plot - 1 Smooth Plot of MARTEK, Contacts, and Development Sheets

SHEET HE-2.5-1-88 : AWOIS 4416 DEVELOPMENT (1:2,500)

Track Plot - 1 Smooth Hydrographic Development

Swath Plot - 1 On-line Side Scan Development

Depth Plot - 1 On-line Hydrographic Development

SHEET HE-2.5-2-88 : AWOIS 4382 DEVELOPMENT (1:2,500)

Track Plot - 1 Smooth Hydrographic Development

Swath Plot - 1 On-line Side Scan Development

Depth Plot - 1 On-line Hydrographic Development

SHEET HE-2.5-3-88 : AWOIS 6504 DEVELOPMENT (1:2,500)

Track Plot - 1 Smooth Hydrographic Development

Swath Plot - 1 On-line Side Scan Development

Depth Plot - 1 On-line Hydrographic Development

SHEET HE-2.5-4-88 : AWOIS 4389 DEVELOPMENT (1:2,500)

Track Plot - 1 Smooth Hydrographic Development

Swath Plot - 1 On-line Side Scan Development

Depth Plot - 1 On-line Hydrographic Development

SHEET HE-2.5-5-88 : AWOIS 4386 DEVELOPMENT (1:2,500)

Swath Plot - 1 On-line Side Scan Development

SHEET HE-1-1-88 : AWOIS 4416 HYDROGRAPHIC DEVELOPMENT (1:1,000)

Depth Plot - 1 Smooth with Contact Detached Position

SHEET HE-1-2-88 : AWOIS 4382 HYDROGRAPHIC DEVELOPMENT (1:1,000)

Depth Plot - 1 Smooth with Contact Detached Position

SHEET HE-1-3-88 : AWOIS 4389 HYDROGRAPHIC DEVELOPMENT (1:1,000)

Depth Plot - 1 Smooth with Contact Detached Position

SHEET HE-1-4-88 : AWOIS 6504 HYDROGRAPHIC DEVELOPMENT (1:1,000)

Depth Plot - 1 Smooth with Contact Detached Position

F. SOUNDING EQUIPMENT

F1. Raytheon DSF 6000N Echosounder

Echosoundings were taken with a Raytheon DSF 6000N Dual Beam Echosounder (S/N A107). The DSF 6000N was calibrated daily with an Electronic Depth Simulator Instrument (EDSI) provided by AMC's Electronic Engineering Branch.

The DSF-6000N provided a good quality representation of the bottom. All least depths determined for this sheet utilized the high frequency soundings. Due to concentrations of fish in the water column and the interference caused by these fish, the high frequency beam was often operated in the manual gain setting. Operation in the manual gain mode did not effect the digital return from the bottom. The reverb blanking function was also used to block out interference in the water column. See Appendices IA and IB for dates of use and abstracts of daily tests.

F2. EG&G Model 260 Side Scan Sonar

The HECK is equipped with an EG&G model 260 Slant Corrected Side Scan Sonar recording unit (S/N 0011443) and a model 272, 100/500 khz towfish (S/N 0011591). The towfish is led through a fairlead block over the stern of the HECK and towed astern at speeds of from 2.5 to 5.5 knots. Fish height is controlled by a combination of vessel speed and cable out.

During normal SSS operation the 500 khz frequency was used. The 100 khz frequency was used on the first day of operations, July 22 (JD 204), and for some test passes conducted during normal operations. On July 7 (JD 211) the primary 80 meter side scan tow cable was damaged and subsequently replaced with the 50 meter backup cable. Following repair, the primary cable was put back into service on August 1 (JD 214).

On the first day of operations, July 21 (JD 203), the ship's towfish was tested before beginning work in the project area. Several passes made on a known contact indicated a faulty starboard channel on the towfish. That same day, the defective towfish was sent to EG&G for repair and the HECK installed a towfish borrowed from the NOAA Ship WHITING. No relevant data was collected on July 21 (JD 203).

Data was collected on July 22 (JD 204) using the WHITING's 100 khz towfish. The HECK traded towfish with the RUDE on July 25 (JD 207) to meet the N/CG24 verbal instructions for least depth determination using the 500 khz side scan sonar frequency. On August 3 (JD 216) the HECK received its repaired towfish from EG&G. Operations with the repaired towfish resumed on August 4 (JD 217) following satisfactory testing.

The EG&G system produced a good quality picture when running at both the 100 and 500 khz frequencies.

Daily printer and rub tests were performed. Confidence checks utilizing a 100 khz pinger transponder or a known contact were performed when necessary. Return from the outer edges of the side scan trace indicated throughout work on this sheet that the side scan unit was operating effectively. The results of these checks and tests are included as a part of the graphic record. * See Appendix IA for an abstract of side scan sonar tests and dates of use for each of the three towfish.

F3. Pneumofathometer

Least depths for all significant contacts identified during operations on this sheet were determined with 100% echosounder coverage. Consequently, no least depth measurements requiring use of the pneumofathometer were taken. Unable to dive West of "Execution Rocks" due to pollution of water.

G. CORRECTIONS TO SOUNDINGS

G1. Velocity Correctors

Velocity correction data for the Raytheon DSF 6000N echosounder were obtained by MARTEK casts conducted on July 21 (JD 203) and August 8 (JD 221). Positions for the casts are indicated on the 1:10,000 scale sheet showing control stations, development sheets, and velocity cast points.

The MARTEK data was reduced and velocity corrections calculated using program VELOCITY. The computed velocity correctors were applied by entering the VELOCITY output data into a HDAPS sound velocity table. * Refer to Appendix ID for MARTEK cast data.

One dual leadline comparison was performed on July 21 (JD 203). HECK personnel found that the application of speed of sound correctors calculated by program VELOCITY agreed within 0.4 foot of the leadline depths. *Refer to Appendix ID for leadline comparison data.

MARTEK units receive a pre and post deployment calibration by AMC. A copy of the pre deployment calibration is enclosed in this report. A copy of the post deployment calibration will be forwarded to the Hydrographic Surveys Branch for inclusion in this report following the end of the field season. * See Appendix ID for MARTEK calibration data.

* filed with the original field records

G2. Tidal Correctors

The tidal datum for this project is mean lower low water. The operating tide station at Willets Point, NY (851-6990) served as control for datum determination and as reference station for predicted tides. The operating tide station at Bridgeport, CT (846-7150) provided additional control for datum determination. No tide stations were established for work on this project.

Predicted tidal correctors were generated and applied by entering the 1988 NOS Tide Table values into the HDAPS system. Willets Point, NY was used for the reference station with time and height correctors applied for City Island, NY.* Hard copies of the applicable tables are included in Appendix IG, Tides Information.

A request for smooth tides was made to N/MOA12 on September 12, 1988.* See Appendix IG for a copy of the request.

G3. Settlement and Squat Correctors

Settlement and Squat corrections for the HECK were determined on March 22, 1988 (JD 82), at the Little Creek Naval Amphibious Base in Norfolk, VA.* See Appendix IF for Settlement and Squat Correction data.

Settlement and squat corrector values were applied to survey data using the Offset Table of HDAPS.* See Appendix IF for offset table parameters.

G4. Heave Correctors

Heave is measured by a Datawell B.V. (S/N 19110-C) heave, roll, and pitch sensor (HIPPY) located midships near the transducer. This sensor gathers on line heave data which is applied to soundings in near real time. To date, no HIPPY calibration requirements or procedures have been defined or used.* See Appendix IE for dates of use.

HDAPS software does not allow the acquisition of heave data while conducting side scan operations. Correction of this system deficiency is under consideration by the HDAPS support group at this time. The HIPPY was used during hydrographic development of the contacts found on each item. All correctors observed appear to properly reflect the sea conditions experienced during hydrographic work on this sheet.

*filed with original Field Data

G5. Vessel Draft Corrector

During a recent drydock period in Norfolk, VA, an exact measurement of 19.0 feet was taken from the DSF6000N transducers to a point established on each bridge wing of the HECK. While conducting leadline comparisons with the DSF6000N echosounder on May 13 (JD 134) and on May 16 (JD 137), measurements of the HECK's static draft were made. The HECK's static draft was determined to be 6.9 feet (2.10 meters).

This value was applied to survey data using the Offset Table of HDAPS.* See Appendix IF for offset table parameters.

H. HORIZONTAL POSITION CONTROL *See section 2. of the Evaluation Report*

H1. Electronic Positioning Systems

Positioning for this survey was provided by the Motorola Mini-Ranger Falcon 484 microwave positioning system. HDAPS allows use of up to four lines of position (LOP'S) for improved positioning accuracy. During work on this survey, four LOP'S were routinely acquired during on-line operations. A minimum acceptable signal strength (MASS) of 15 was used in the positioning algorithm. Any LOP with a signal strength below 15 was not used in the HDAPS computation of the vessel position.

On-line maximum residuals were consistently less than 5 meters (i.e. 0.5 mm at the scale of the survey), and error circle radius (ECR) values were consistently less than 15 meters (i.e. 1.5 mm at the scale of the survey). Based on observed maximum residuals and ECR values, position quality is deemed excellent.

Mini-Ranger baseline calibrations and systems checks were conducted in accordance with the project instructions. An initial baseline calibration was performed at Fentress Air Force Base in Norfolk, VA on July 6, 1988 (JD 188).

On July 25 (JD 207) Mini-Ranger RPU/RT combination D0004/F3409 malfunctioned and was replaced by the ship's second combination E0141/F3411. All systems checks indicated that data collected up to that point with the first RPU/RT combination were good. The new RPU/RT combination was calibrated that same day, but no data were collected. On July 26 (JD 208) the second RPU/RT combination malfunctioned. The problem was in the inability of the Mini-Ranger unit to communicate properly with the HDAPS system allowing the ship to dead reckon ahead of the LOP's. Although the Mini-Ranger unit was not malfunctioning in it's ability to acquire ranges, the system was experiencing a time lock between receiving the rates and communicating them to the HDAPS algorithm causing the LOP's to lag behind the ship's computed position. The HDAPS support group is currently working on the problem.

*Filed with original field data

The first RPU/RT combination, D0004/F3409, was put back into service on July 26 (JD 208) after maintenance performed by the ship's RET. The units worked adequately up to August 3 (JD 216) when they failed again. Since the RT from the second combination and the RPU from the first combination were faulty, the backup system from the NOAA Ship RUDE was installed and used for the remaining work done on this sheet. All systems checks and calibrations performed on the units which malfunctioned indicated that all data collected with the units were good. The following table summarizes the dates of use of the various RPU/RT combinations :

DATE INSTALLED	SERIAL NUMBERS	APPLICABLE FIXES
22 July (JD 204)	D0004/F3409	1 - 43
25 July (JD 207)	E0141/F3411	NONE
26 July (JD 208)	D0004/F3409	44 - 521
03 Aug. (JD 216)	H0375/G6346	522 - 732

On August 4 (JD 217), code 8 failed due to water in the antenna and was replaced with code 10 (A). A critical calibration was conducted that same day including the code 10 and the new RPU/RT combination.

Appendix IIA contains a listing of Mini-Ranger locations. * Appendix IIB contains all baseline corrector computations for the HECK's RPU/RT combinations and a listing of the baseline correctors for the RUDE's RPU/RT combination. * Dates of use for all shore stations are included in Appendix III.

H2. Geodetic Position Control

The horizontal datum for this project is the North American Datum of 1983 (NAD 83). The coordinates for each station were taken from either published NGS Geodetic control data listings or from listings provided by AMC Photogrammetry Branch personnel.

All horizontal control stations were recovered in accordance with the Hydrographic Manual and AMC OPORDER 82. Stations Kingspoint 1932 and Merchant PK were occupied and used to recover the other stations by way of theodolite cuts. Field observations were conducted by HECK personnel using the ship's equipment. All computations were done on the ship's IBM PC using the "ENHANCEMENTS" routines for the NGS MTEN software. Recovery notes, and supporting abstracts are included in Appendix II, Horizontal Position Control. Field data volumes are submitted along with other survey records for this report.

* filed with original field data

The electronic control stations were readily accessible by small boat or land. Every electronic control station was positioned directly over the mark where possible. The Mini-Ranger unit at Hart Island Light was rigidly attached to the light tower and positioned by a direct computation from station Kingspoint 1932 and an eccentric calculated.* This computation and supporting abstracts are also submitted in Appendix II.

*Filed with original field data

I. AUTOMATED DATA PROCESSING

Project OPR-B660-RU/HE-88, Southern New England Coast, Connecticut and New York, was conducted using the Hydrographic Data Acquisition and Processing System (HDAPS) which is still undergoing software modification and enhancement at the time of this survey. Some changes to the HDAPS software were made in Norfolk just prior to beginning operations on this project. These changes, along with remaining and newly discovered software bugs are described below as they relate to the data.

The HDAPS positioning algorithm contains a software bug which allows "flyers" to pass through the position filter. As a result, anomalous positions beyond the geographic limits of the field sheet are occasionally plotted causing the sheet to spool off of the plotter. When this occurs, the entire system requires rebooting to reinitialize the plotter. Review of the data in the vicinity of these flyers showed no apparent reason for this occurrence, yet these fliers were carried over to the smooth plot. Evidently, a data field which is not displayed in the post-processing mode is retaining the flyer. The HDAPS support group is currently working on the problem.

At the time of this report, HDAPS provided no straightforward method of plotting contacts on field or smooth sheets. To plot detached positions taken on contacts, it is necessary to generate a position in the control station table and plot the contacts as though they are control stations. For this report, reported positions of AWOIS items and detached positions are plotted in black with different cartographic codes for each type of position.

While conducting on line operations in the side scan sonar mode an occasional buffer lock was experienced in the recording of echosounder data to the magnetic tape. Since echosounder data is not routinely reduced during side scan operations, this problem does not effect the quality of this survey. If side scan and echosounder operations are conducted simultaneously in the future, this problem could become a major draw on post processing time. The buffer locks result in the recording of locked depths on both the high and low frequency sounding records for extended periods of time. To correct the problem,

the operator must edit the raw data by inserting the correct primary sounding and then recording the edited data to an edited data tape. This is a troublesome procedure because the raw data printout and echosounder trace give no indication of when this buffer lock occurs. The problem only seems to occur with any significant frequency during side scan operations and rarely during hydrographic operations. The HDAPS support group is currently working on the problem.

J. COMPARISONS WITH PRIOR SURVEYS AND RELEVANT CHARTS

See sections 6. and 7. of the Evaluation Report.

Comparisons with prior surveys were made to survey sheets H-5547 and H-5546. Due to the small area of coverage, 75 meters in most cases, meaningful comparisons were difficult to obtain.

The depth plot sheet drawn for comparisons was overlayed on the prior surveys and the soundings directly compared. Only soundings taken on fixes were plotted to avoid congestion. During on line operations in the side scan sonar mode, HIPPY data cannot be applied to soundings taken. Therefore, no HIPPY data were applied to the soundings plotted on the smooth depth plot sheet. Since sea heights experienced during data collection were minimal, no adjustment of recorded soundings was necessary. All depths are plotted on NAD 83 rather than NAD 27 which was used for the prior surveys.

Most depths agree within two feet to the prior survey. Sedimentation appears to be taking place in the area of AWOIS #4386 where depths to the northwest of the reported position are three to six feet shoaler than the prior survey.

* Lat: 40°50'00"N, Long: 73°46'18"W

The depths west of AWOIS #4382 indicate an outward movement of the Eastchester Bay shoal. Although the depths are not shoaling enough to warrant immediate attention, they should be further investigated during the next basic survey of the area.

* Lat: 40°49'35"N, Long: 73°49'10"W.

Due to the small survey areas covered, comparisons to charted depths were difficult. Chart 12366, Long Island Sound and East River, Hempstead Harbor to Tallman Island, 20th ED., November 1, 1986 was used for comparisons. The chart is deemed accurate with compared depths differing by less than two feet.

K. AWOIS ITEM INVESTIGATION REPORTS

See also sections 6. and 7. of the Evaluation Report.

Following are the individual AWOIS investigation reports on AWOIS items 4382, 4386, 4389, 4416, and 6504.

K1. Investigation Report for AWOIS Item No. 4382

Largest Scale Chart : 12366 Long Island Sound and East River, Hempstead Harbor to Tallman Island, 20th ED., November 1, 1986

Vessel: NOAA Ship HECK (S-591)

Personnel :

Officer in Charge - LCDR Christopher B. Lawrence CMDG
Operations Officer - LT Grady H. Tuell
Survey Officer - LT(jg) Andrew L. Beaver
Survey Technician - Walter R. Morris

Dates of Investigation : July 27 (209) - August 5 (218), 1988

AWOIS History : NM41/60--DANG SUBM WK REPORT SUNK IN 52FT OF WATER, COVERED 32FT, IN APPROX LAT 40-49-30N, LONG 73-47-10W. (ENTERED 3/86 RWD)

Survey Requirements : FULL--VERIFY OR DISPROVE THROUGH 200% SIDE SCAN SONAR SEARCH, 250 METER RADIUS. LD AND DP REQUIRED IF FOUND, SALVAGE DOCUMENTATION ACCEPTABLE AS DISPROVAL. SEARCH ONLY TO 18 FT CURVE OR LIMIT OF SAFE NAVIGATION.
ASSIGNED : OPR-B660-RU/HE-88

Method of Investigation : Side scan sonar supplemented by hydrographic development was used to resolve AWOIS Item 4382. The DSF6000N echosounder was used to obtain the least depth and detached position of the contact.

Results of Investigation : Eighteen side scan sonar main scheme coverage lines were run over the reported position using the 50 meter range and 500 khz frequency settings to obtain the 200% required coverage as depicted on sheet HE-10-1-88.

Ten additional side scan sonar development lines were run at various angles to the reported AWOIS position to further investigate contacts detected in the initial 200% coverage lines. These lines were run at the 50 meter side scan range and 500 khz frequency setting and plotted on sheet HE-2.5-2-88.

All hydrographic development lines were run on sheet HE-2.5-2-88 and smooth plotted on HE-1-2-88 so that individual depths could be easily distinguished.

Twenty eight targets were identified; of these, 15 were unique with 3 of these being considered significant. The following table abstracts important data relevant to each significant target :

TARGET #	DESCRIPTION	REQUIRED HYDRO LINE SPACING	ACHIEVED HYDRO LINE SPACING	SEE POSITIONS
5	geologic	26 meters	15 meters	546+4
7	geologic	26 meters	12 meters	611+5
14	wreckage	15 meters	12 meters	640+5

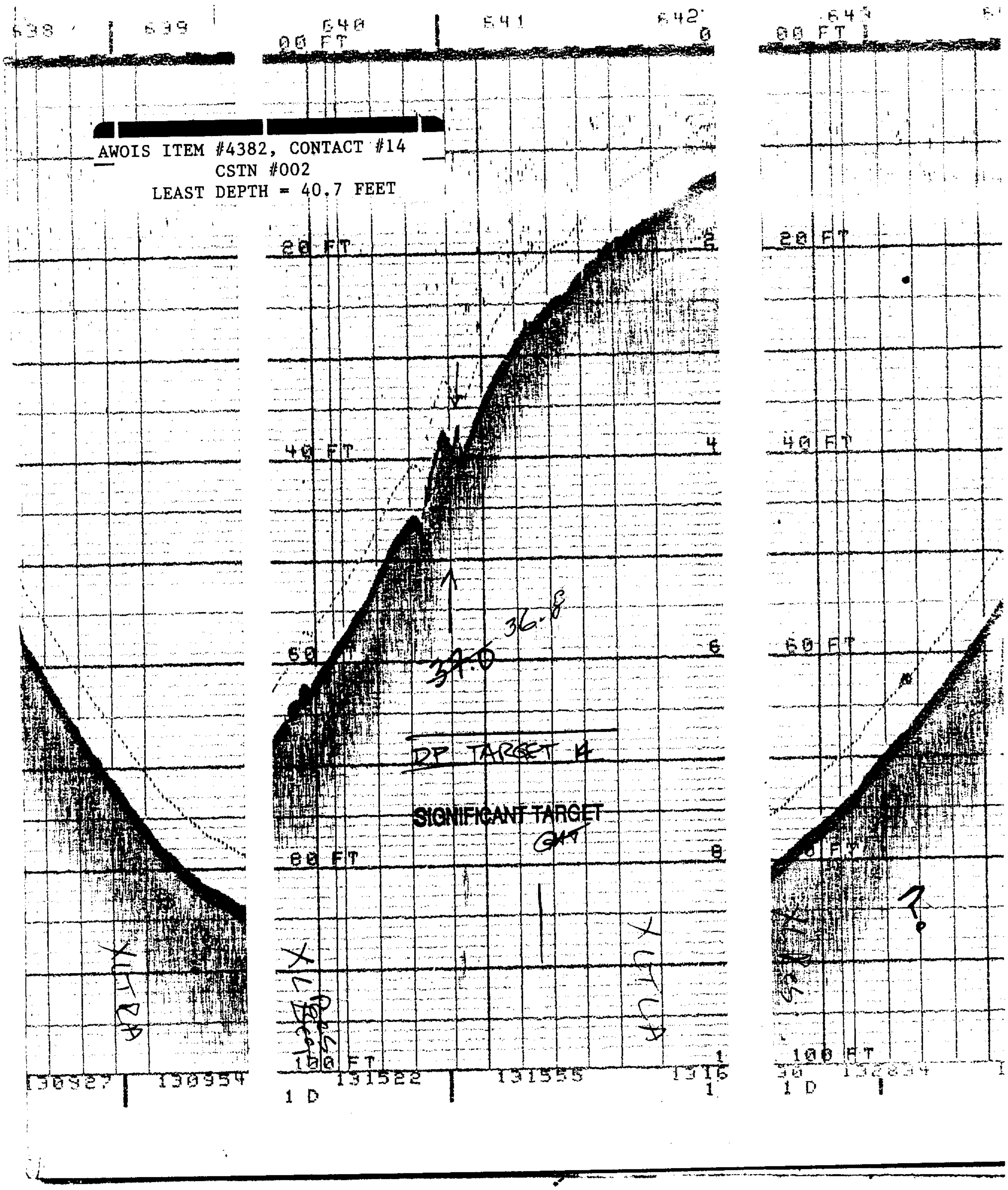
Hydrographic development of the contact areas disproved the significance of contact 5 and 7. Other pertinent data can be found on the target abstract on page 4.3 and 4.4 of Appendix IV. Concur. ~~Filed with original field data~~.

The side scan sonar records indicated that target #14 was the remains of a small vessel. This is also the only contact lying within the navigation channel shoaling to a least depth that could be considered a hazard to navigation. A corrected **least depth of ~~46.7~~ feet** following corrector application was obtained at position 640+5 on August 5 (JD 218).

Recommendation : The wreckage located with the side scan sonar is the only non-geologic contact found within the search radius of AWOIS item #4382. Because the wreck was located within 150 meters of the reported position and at approximately the reported depth, the hydrographer concludes that contact 14 is AWOIS item #4382. It is recommended that the item be ~~moved to~~ charted at the new location :

LAT : 040° 49' 25.390" N NORTHING : 8193.2
LONG : 073° 47' 08.365" W EASTING : 89962.3

and charted as a submerged wreck over which the depth is known, hazardous to surface navigation. See section 7.a.1) of the Evaluation Report.


AWOIS ITEM #4382, CONTACT #14
CSTN #002
LEAST DEPTH = 40.7 FEET
20 FT
40 FT
60
80 FT
100 FT
DP TARGET 14
SIGNIFICANT TARGET
36.8

K2. Investigation Report for AWOIS Item No. 4386

Largest Scale Chart : 12366 Long Island Sound and East River, Hempstead Harbor to Tallman Island, 20th ED., November 1, 1986

Vessel: NOAA Ship HECK (S-591)

Personnel :

Officer in Charge - LCDR Christopher B. Lawrence CMDG
Operations Officer - LT Grady H. Tuell
Survey Officer - LT(jg) Andrew L. Beaver
Survey Technician - Walter R. Morris

Dates of Investigation : July 28 (210) - August 2 (215), 1988

AWOIS History : FE174/60WD(FE 1;1960 WD)--SP 3-60; OBSTR, CLEARED BY 57FT, HUNG AT 58FT IN LAT 40-50-00.0N, LONG 73-46-18.0W. OBSTR NOT CONSIDERED A HAZARD TO NAV. (ENTERED 3/86 RWD)
FE293/86SS-- OPR-B660-RU/HE-86; INVESTIGATED WITH 200% SSS AND ECHO SOUNDER SEARCH WITH NO SIGNIFICANT CONTACTS; EVALUATOR RECOMMENDS RETAINING AS CHARTED UNTIL FULL 400% SSS IS ACCOMPLISHED. (ENTERED MSM 6/88)

Survey Requirements : FULL--VERIFY OR DISPROVE THROUGH 400% SIDE SCAN SONAR SEARCH, 75 METER RADIUS. LD AND DP REQUIRED IF FOUND. COMPLETE BY RUNNING ADDITIONAL 200% SSS SEARCH ASSIGNED : OPR-B660-RU/HE-88

Method of Investigation : Side scan sonar was used to resolve AWOIS Item 4386.

Results of Investigation : Six mainscheme and three development side scan sonar lines were run using the 50 meter range and the 500 khz frequency. No significant contacts were found over the area covered.

Recommendation : Since no contacts were found, the hydrographer recommends that the obstruction cleared to 57 feet be removed from the chart. *Do not concur. See section 6.b. of the Evaluation Report*

K3. Investigation Report for AWOIS Item No. 4389

Largest Scale Chart : 12366 Long Island Sound and East River, Hempstead Harbor to Tallman Island, 20th ED., November 1, 1986

Vessel: NOAA Ship HECK (S-591)

Personnel :

Officer in Charge - LCDR Christopher B. Lawrence CMDG
Operations Officer - LT Grady H. Tuell
Survey Officer - LT(jg) Andrew L. Beaver
Survey Technician - Walter R. Morris

Dates of Investigation : July 29 (211) - August 8 (221), 1988

AWOIS History : FE174/60WD (FE 2;1960 WD)--SP 3-60; OBSTR, CLEARED BY 54FT, HUNG AT 55FT IN LAT 40-50-16.8N, LONG 73-45-49.8W. OBST NOT CONSIDERED A HAZARD TO NAVIGATION (ENTERED 3/86 RWD)
FE293/86SS-- OPR-B660-RU/HE-86; 200% SSS AND ECHO SOUNDER SEARCH WITH NO CONTACTS; ADDITIONAL 200% SSS IS REQUIRED TO VERIFY OF DISPROVE ITEM. (ENTERED MSM 6/88)

Survey Requirements : FULL--VERIFY OR DISPROVE THROUGH 400% SIDE SCAN SONAR SEARCH, 75 METER RADIUS. LD AND DP REQUIRED IF FOUND. COMPLETE BY RUNNING AN ADDITIONAL 200% SSS.
ASSIGNED : OPR-B660-RU/HE-88

Method of Investigation : Side scan sonar supplemented by hydrographic development was used to resolve AWOIS Item 4389. The DSF6000N echosounder was used to obtain the least depth and detached position of the contact.

Results of Investigation : Six side scan sonar main scheme coverage lines were run over the reported position using the 50 meter range and 100 khz frequency setting to obtain the 200% required coverage. These lines are plotted on sheet HE-10-1-88.

Five additional side scan sonar development lines were run at various angles to the reported AWOIS position to further investigate contacts detected in the initial 200% coverage lines. Development lines were run at the 50 meter range with both the 100 and 500 khz frequency settings used. All side scan sonar development lines are plotted on sheet HE-2.5-4-88.

Hydrographic development lines were run on sheet HE-2.5-4-88 and smooth plotted on HE-1-3-88 so that individual depths could be easily distinguished.

Thirteen SSS targets were identified; of these, 2 were unique and considered significant. The following table abstracts important data relevant to each significant target :

TARGET #	DESCRIPTION	REQUIRED HYDRO LINE SPACING	ACHIEVED HYDRO LINE SPACING	SEE POSITIONS
1	geologic	16 meters	10 meters	729+2
2	geologic	16 meters	10 meters	723+5

Other pertinent data can be found on the target abstract on page 4.6 of Appendix IV.

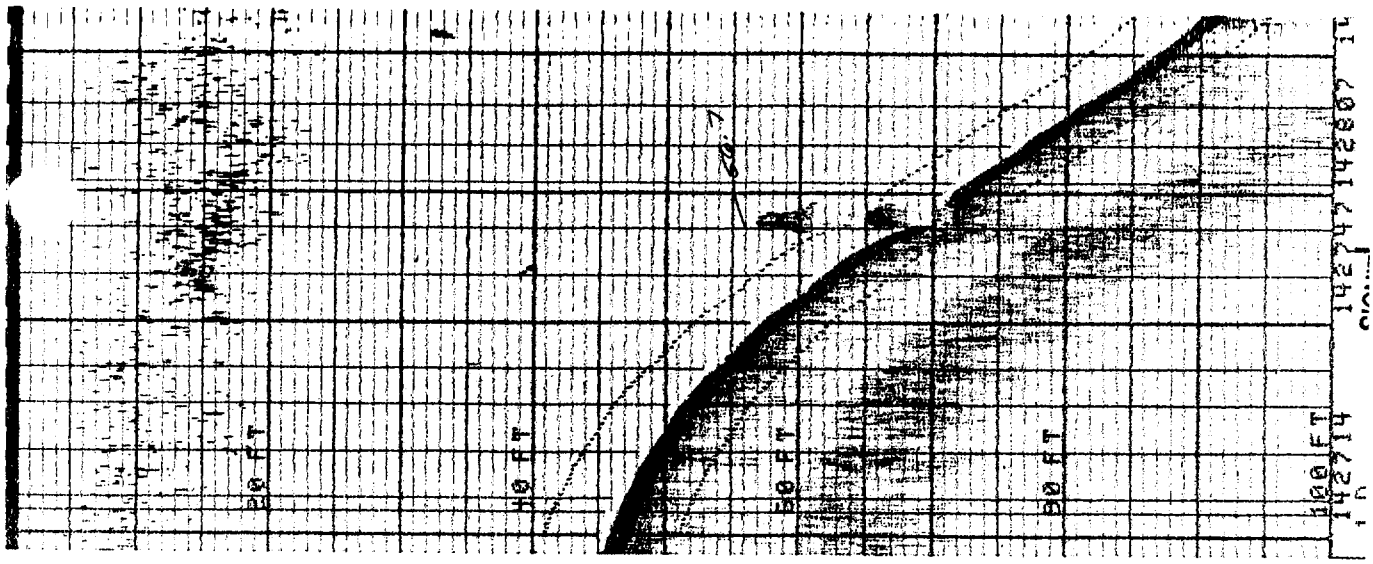
The two targets were only approximately 30 meters apart and were treated together as one item with the least depth and detached position of the shoalest item used as the controlling item. The side scan trace indicated that the objects are both rocks. A corrected **least depth of 58.1 feet** was obtained at position ~~729+2 on August 8 (JD 221)~~. 673+6 on August 6 (JD 218).

Recommendation : Both contacts were located very close to the reported AWOIS position and are therefore considered to be the item in question. Neither of the two objects present a danger to surface navigation. The hydrographer recommends that the symbol for an obstruction cleared to 54 feet be removed and Do not concur. ✓ replaced at :

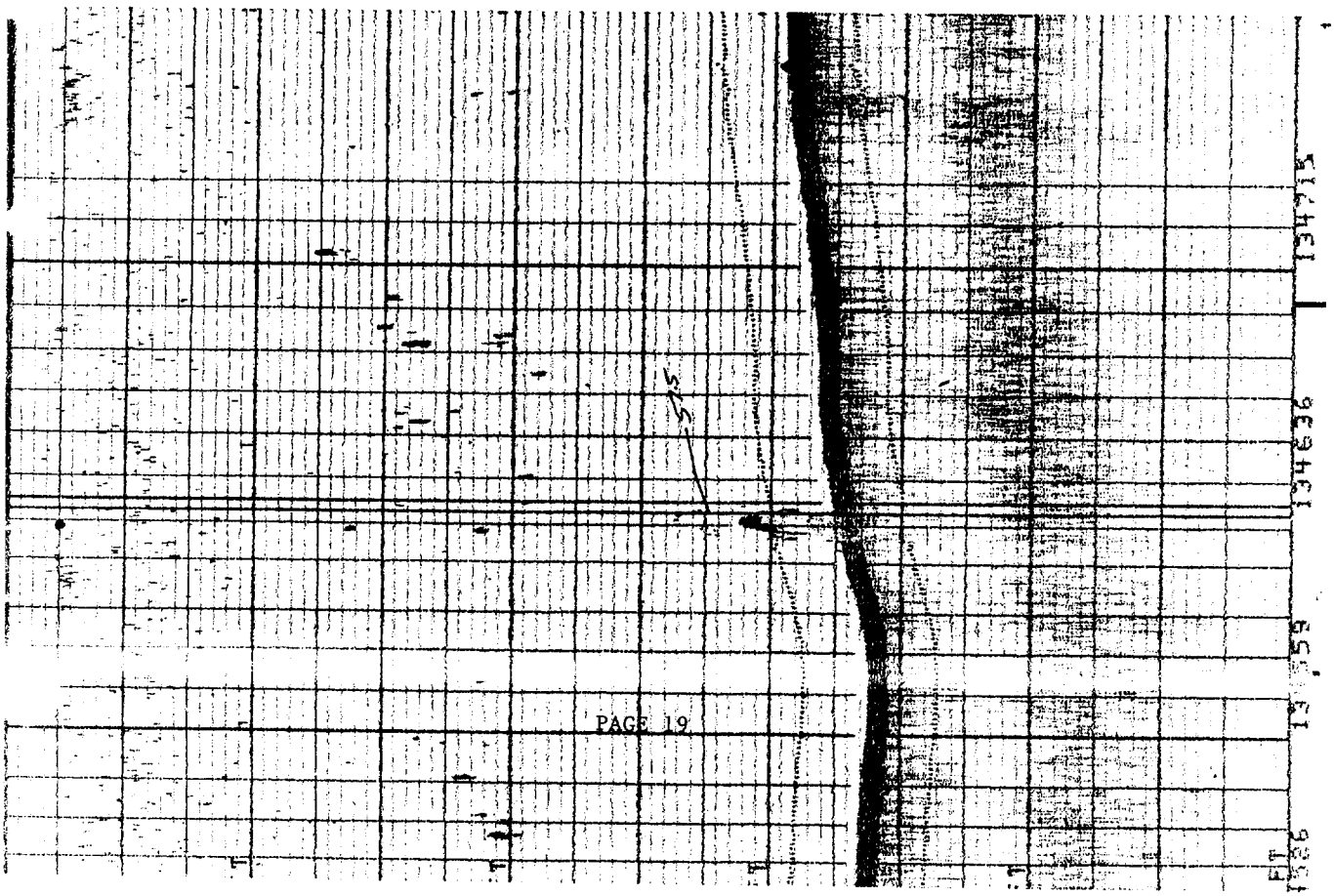
LAT : 040° 50' 16.~~771~~ 99" N NORTHING : 97~~75.8~~ 81.9
LONG : 073° 45' 47.~~317~~ 41" W EASTING : 9186~~3.2~~ 0.4

by the symbol for an obstruction over which the depth is known.

See section 6.b. of the Evaluation Report.



AWOIS #4389, CONTACTS #1 AND #2
CSTN #003 AND #004
LEAST DEPTH=58.1 FEET



K4. Investigation Report for AWOIS Item No. 4416

Largest Scale Chart : 12366 Long Island Sound and East River, Hempstead Harbor to Tallman Island, 20th ED., November 1, 1986

Vessel: NOAA Ship HECK (S-591)

Personnel :

Officer in Charge - LCDR Christopher B. Lawrence CMDG
Operations Officer - LT Grady H. Tuell
Survey Officer - LT(jg) Andrew L. Beaver
Survey Technician - Walter R. Morris

Dates of Investigation : July 22 (204) - August 2 (215), 1988

AWOIS History : H5078/30WD--PROJ. NO.64; BOULDERS 38FT (CHARTED AS RK CLEARED 35FT) SCALED IN LAT 40-49-01.5N, LONG 73-46-55W.
H5547/34--38FT DEVELOPED. 44FT FOUND WITHIN 30 METERS TO THE SW. 38FT CARRIED FORWARD. (ENTERED 3/86 RWD)
FE293/86SS--OPR-B660-RU/HE-86; 200% SSS AND ECHO SOUNDER SEARCH; INDISTINCT AND UNIDENTIFIABLE SSS CONTACT WAS FOUND IN LAT 40-49-01.23N, LONG 73-46-55.48W; ECHO SOUNDER COVERAGE DID NOT LOCATE THIS CONTACT; RISES 5-6 FT. ABOVE BOTTOM; 45 FT. SHOALEST ECHO SOUNDER DEPTH; HUNG CONTACT BY CONSTANT TENSION WIRE DRAG AT 43 FT.; CLEARED BY 41 FT.; CLEARANCE MAY NOT BE VALID IF SLOPING ROCKY SHOAL; INSUFFICIENT DATA TO ASSUME CONTACT IS A ROCK OR ROCKY SHOAL; EVALUATOR RECOMMENDED RETAINING AS CHARTED PENDING FURTHER INVESTIGATION. (ENTERED MSM 6/88)

Survey Requirements : FULL--VERIFY OR DISPROVE THROUGH 200% SIDE SCAN SONAR SEARCH, 75 METER RADIUS. LD AND DP REQUIRED IF FOUND. DETERMINE LD WITH 100% ECHOSOUNDER IF DIVE OPS NOT POSSIBLE.
ASSIGNED : OPR-B660-RU/HE-88

Method of Investigation : Side scan sonar supplemented by hydrographic development was used to resolve AWOIS Item 4416. The DSF6000N echosounder was used to obtain the least depth and detached position of the contact.

Results of Investigation : Six side scan sonar main scheme coverage lines were run over the reported position using the 50 meter range and 100 khz frequency settings to obtain the 200% required coverage. These lines consist of positions 2 through 25 and are plotted on sheet HE-10-1-88.

Six additional side scan sonar development lines were run at various angles to the reported AWOIS position to further investigate contacts detected in the initial 200% coverage lines. These lines were run at the 50 meter and 500 khz frequency settings. All side scan sonar development lines are plotted on sheet HE-2.5-1-88.

Thirteen SSS targets were identified; of these, 8 were unique with 5 of these being considered significant. The following table abstracts important data relevant to each significant target :

TARGET #	DESCRIPTION	REQUIRED HYDRO LINE SPACING	ACHIEVED HYDRO LINE SPACING	SEE POSITIONS
2	geologic	18 meters	18 meters	64+4
4	geologic	16 meters	16 meters	87+1
8	geologic	16 meters	16 meters	123+1
9	wreckage	17 meters	10 meters	127+3
13	wreckage	18 meters	10 meters	503+1

Hydrographic development indicated that of the 5 contacts deemed significant, contact #4 was the most significant. Since the significant contacts as determined by the sounding developments were within 30 meters of each other, the hydrographer decided to use the detached position of contact #4 for the position of contacts. Other pertinent data can be found on the target abstract on page 4.2 of Appendix IV.

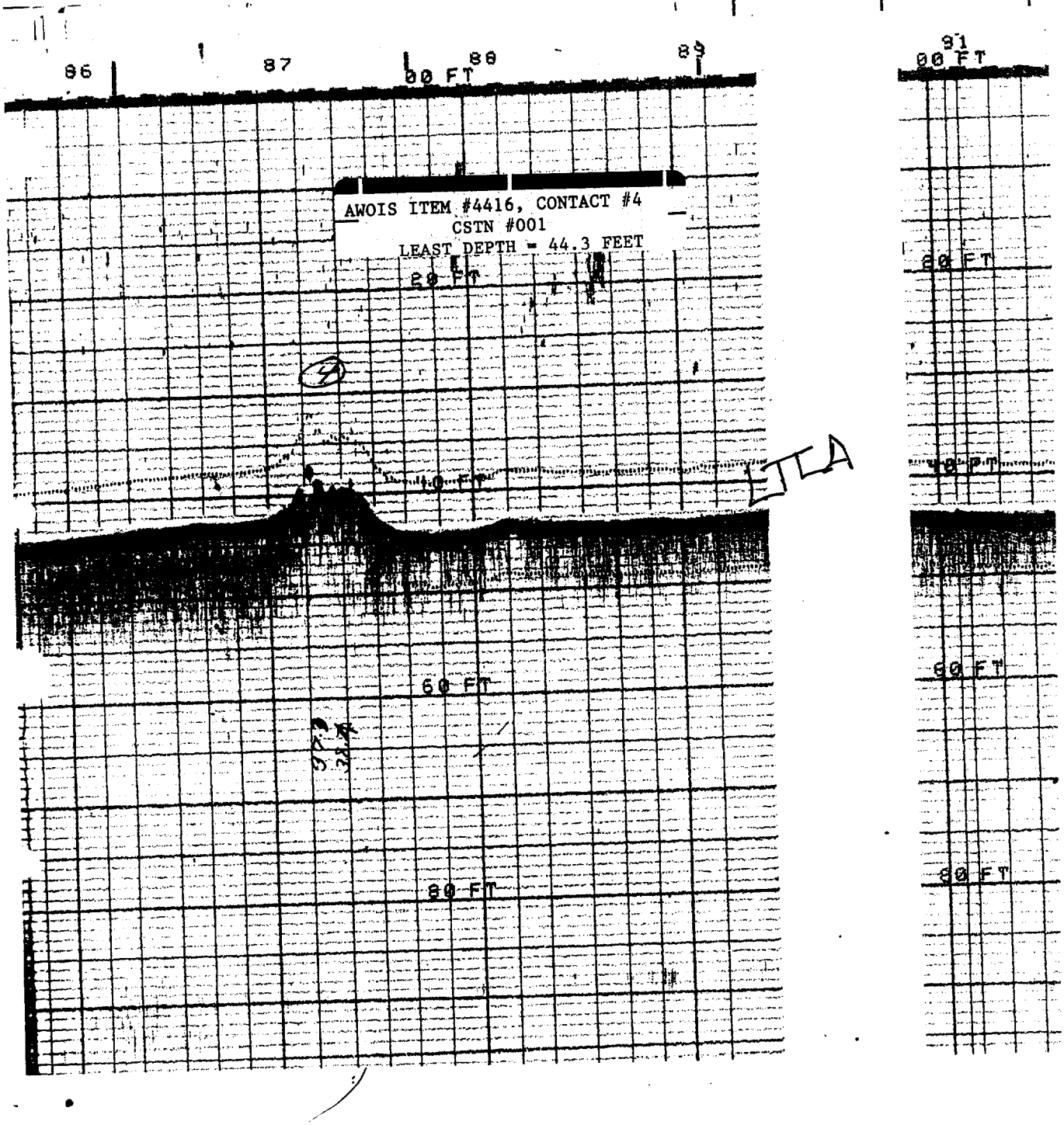
Target #4 was considered to be the most significant and shoalest contact in the search area. A hydrographic **least depth of ~~44.9~~ 45 feet** was obtained at position 87+1 on July 26 (JD 208).

Recommendation : The contact found was located very close to the AWOIS item's reported position and is therefore deemed to be the item in question. The least depth determined from the echosounder trace showed a depth nine feet deeper than the charted depth but very close to the depths found in earlier surveys. The object is not considered a hazard to surface navigation. It is therefore recommended that the obstruction be moved to the new location :

LAT : 040° 49' 01.6~~07~~4" N NORTHING : 7459.2
LONG : 073° 46' 54.~~492~~50" W EASTING : 90286.4

and the symbol changed to an obstruction over which the depth is known, not hazardous to surface navigation.

See section 6.6. of the Evaluation Report.


86
87
88
89
91
00 FT
AWOIS ITEM #4416, CONTACT #4
CSTN #001
LEAST DEPTH = 44.3 FEET
20 FT
60 FT
80 FT
60 FT
80 FT
60 FT
80 FT

K5. Investigation Report for AWOIS Item No. 6504

Largest Scale Chart : 12366 Long Island Sound and East River, Hempstead Harbor to Tallman Island, 20th ED., November 1, 1986

Vessel: NOAA Ship HECK (S-591)

Personnel :

Officer in Charge - LCDR Christopher B. Lawrence CMDG
Operations Officer - LT Grady H. Tuell
Survey Officer - LT(jg) Andrew L. Beaver
Survey Technician - Walter R. Morris

Dates of Investigation : July 29 (211) - August 1 (214), 1988

AWOIS History : FE293/86SS--OPR-B660-RU-86; SSS CONTACT HAVING THE APPEARANCE OF A SUNKEN WK FOUND IN PA LAT 40-50-13.5N, LONG 73-46-45.5W (+-50M) UNIDENTIFIED AND UNINVESTIGATED; SSS ACOUSTIC IMAGE IS GOOD BUT NOT CONSIDERED SUFFICIENT TO DETERMINE A RELIABLE TARGET HEIGHT; EVALUATOR RECOMMENDS CHARTING A SUBM DANG WK PA AT COMPUTED POSITION PENDING FURTHER INVESTIGATION TO DETERMINE LEAST DEPTH AND ACCURATE POSITION. (ENTERED MSM 4/88)

Survey Requirements : FULL--VERIFY OR DISPROVE THROUGH 200% SIDE SCAN SONAR SEARCH, 75 METER RADIUS. LD AND DP REQUIRED IF FOUND.
ASSIGNED : OPR-B660-RU/HE-88

Method of Investigation : Side scan sonar supplemented by hydrographic development was used to resolve AWOIS Item 6504. The DSF6000N echosounder was used to obtain the least depth and detached position of the contact.

Results of Investigation : Two side scan sonar main scheme coverage lines were run over the reported position using the 50 meter range and 100 khz frequency settings to obtain the coverage necessary to find the item as depicted on sheet HE-10-1-88.

Four additional side scan sonar development lines were run at the 100 and 500 khz frequency at the 50 meter range to further investigate the contact detected in the initial coverage. The development side scan lines were run on sheet HE-2.5-3-88.

The target is a rectangular shaped wreck, most likely a barge, found approximately 35 meters from the AWOIS items reported position. The sonargrams are of excellent quality and show no signs of a protrusion on the contact. Careful study of the sonargrams indicate that the wreck may be sitting on its keel.

TARGET #	DESCRIPTION	REQUIRED HYDRO LINE SPACING	ACHIEVED HYDRO LINE SPACING	SEE POSITIONS
1	wreckage	17 meters	9 meters	484+4

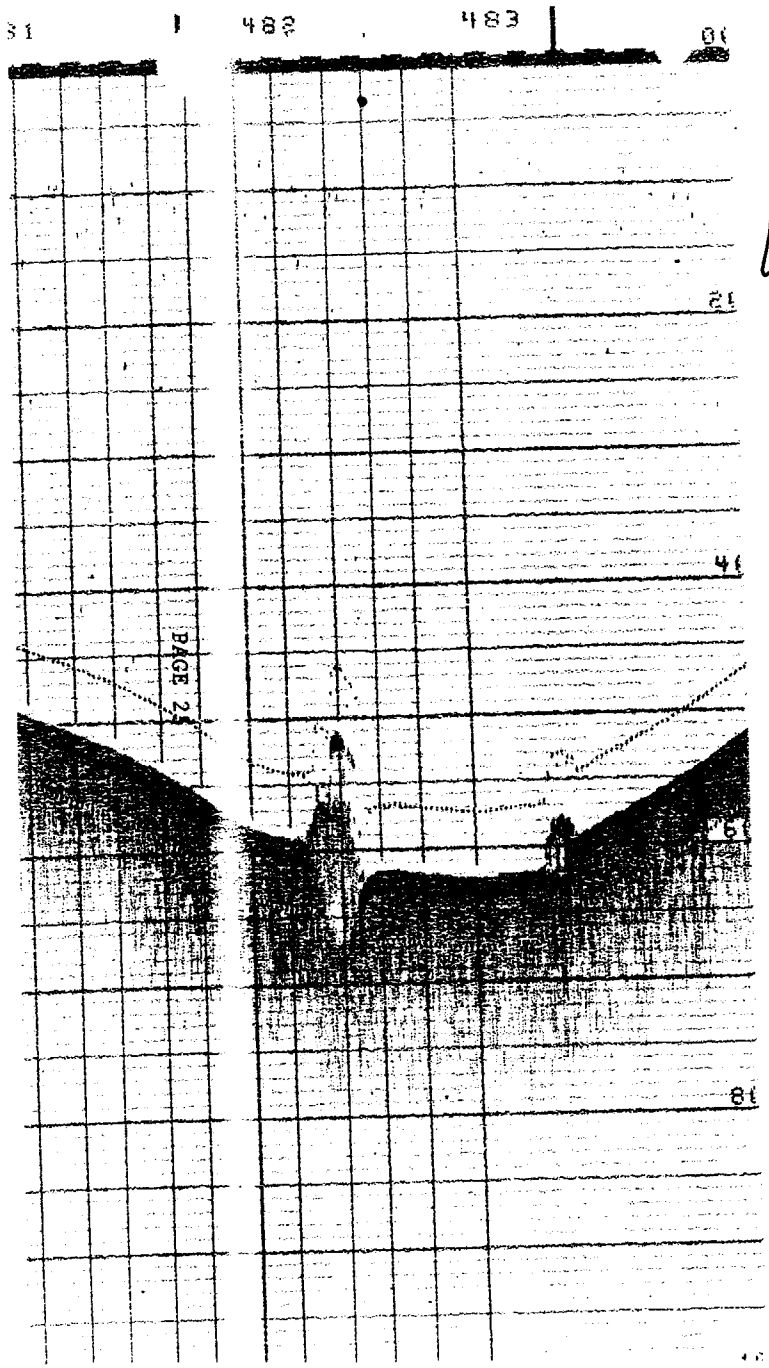
Other pertinent data can be found on the target abstract on page 4.7 of Appendix IV.

A hydrographic **least depth of 48.~~1~~ feet** was obtained at position ~~484+4~~ 386 on ~~August~~ July ~~1~~ 29 (JD 21~~4~~). ~~The least depth of this contact lies between two selected soundings. Positions for both soundings were taken and a position directly between computed to determine the detached position.~~

Recommendation : The contact found was located very close to the AWOIS item's reported position and is therefore deemed to be the item in question. The object is not considered a hazard to surface navigation. It is therefore recommended that the obstruction be charted at :

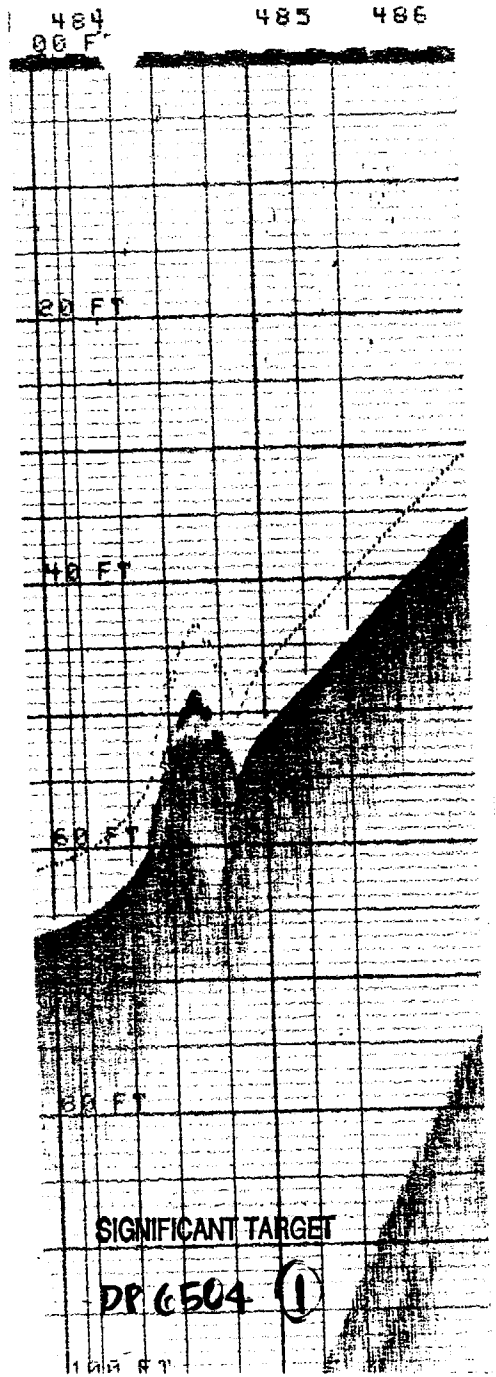
LAT : 040° 50' 13.~~796~~ 60" N NORTHING : 9685.6
LONG : 073° 46' ~~43.997~~ 44.20" W EASTING : 90535.2

and the symbol changed to a submerged wreck, not hazardous to surface navigation. See section 6.c. of the Evaluation Report.



LBRKS

LR
XL
180 BME



LTLS

LR
XL
180 BME

AWOIS #6504, CONTACT #1
CSTN #005
LEAST DEPTH=48.1 FEET

Respectfully Submitted,

Andrew L. Beaver, LT(jg), NOAA
Operations Officer
NOAA Ship HECK

Reviewed By,

Grady H. Tuell, LT, NOAA
Executive Officer
NOAA Ship HECK

L. LETTER OF APPROVAL

Field NO. HE 10-1-88

OPR-B660-RU/HE-88

Field operations contributing to the accomplishment of this survey were conducted under my direct supervision with frequent personal checks of progress and data quality. This report, the field sheets and the data records have been closely reviewed and are considered complete and adequate for charting.

Christopher B. Lawrence, LCDR, NOAA
Commanding Officer
NOAA Ship HECK

APPENDIX IIA

STATION INFORMATION

The following are the horizontal control and visual control stations used during work on this survey.

HDAS SIG	STATION NAME	LATITUDE LONGITUDE	EASTING NORTHING	USE	CARTO CODE
100	NEALE, 1986	040°47'47.951" 073°46'45.763"	90488.1 5186.8	PC	250
101	MERCHANT PK, 1986	040°48'48.658" 073°45'55.272"	91673.8 7058.0	PC	250
102	KINGSPOINT 1932	040°50'04.549" 073°45'24.635"	92394.2 9398.2	PC	250
103	HART ISL LT ECC	040°50'41.654" 073°46'00.214"	91561.9 10543.7	PC	254
200	HART ISL CHIMNEY	040°51'03.685" 073°46'09.151"	91353.4 11223.5	V	
201	STEPPING STONE LH, 1882	040°49'27.587" 073°46'29.259"	90878.7 8259.8	V	139
202	KINGS PT FLAGPOLE	040°48'43.547" 073°45'42.207"	91979.8 6900.0	V	
203	THROGS NECK MERCH TANK	040°48'31.455" 073°47'57.038"	88819.3 6531.1	V	
204	THROGS NECK LIGHT	040°48'16.539" 073°47'26.504"	89534.2 6070.0	V	
205	HART ISL LIGHT	040°50'41.668" 073°46'00.159"	91563.2 10544.1	V	

USE - PC - POSITION CONTROL
V - VISUAL CONTROL

APPENDIX IV

TARGET ABSTRACTS

SIDE SCAN S(TARGET AB RACT

NOAA SHIP HECK PROJECT NUMBER: OPR-B660-RU/ 88 AWOIS No. 4416 SHEET No. HE-10-1-88

	DOY	REF. LINE	PRECEEDING FIX No.	TIME	HT. OF TARGET	SURND DEPTH	POSTITION L/L OR (E/N)	REMARKS	CSTM NO.
1	204	0	14+2 S	145250	0	40'	90432.9 / 7556.2	INSIG / geologic	
(2)	"	+80	19+0 S	150315	2.6' (1/39)	52 ~~45'~~	90248.4 / 7411.0	SIG / geologic	
3	"	+160	23+0 S	151145	0	45'	90248.1 / 7416.9	SAME AS #2 / geologic	
(4)	207	0	28+2 P	172447	6.9'	49 ~~50'~~	90277.1 / 7454.1	SIG / geologic	001
5	"	+90	32+2 S	173652	5.6'	53'	90216.5 / 7421.3	SIG / wreckage / see 9	002
6	"	+90	32+3 P	173705	2.1'	53'	90240.0 / 7449.4	SEE 8 geologic	003
7	"	+90	30+~~8~~ P	173718	4.0'	51 ~~53'~~	90263.4 / 7435.9	INSIG SEE FATHO ?/ geologic	004
(8)	"	+20	36+5 P	182900	8.0'	50 ~~53'~~	90249.3 / 7447.3	SAME AS #6 / ? geologic	005
(9)	"	+20	37+0 P	182925	9.0'	53'	90227.0 / 7420.2	SAME AS #5 / wreckage?	006
10	"	+20	40+5 S	184817	0'	48'	90335.0 / 7412.0	INSIG / ? monmade	
11	"	+90	33+1 S	173801	0'	48'	90335.0 / 7412.0	SAME AS #10 INSIG	
12	"				0'	49'	90279.1 / 7453.0	SAME AS #4	
(13)	204	-80	1+2 S	135427	4.3'	50'	90345.0 / 7355.0	RECAN / linear monmade	
14							/		
15							/		

PAGE 4.2

REMARKS COLUMN LEGEND:

INS - INSIGNIFICANT, S - SAME AS (PAGE # & LINE), SIG - INVESTIGATE FURTHER
D - DOVE ON (DATE/DIVE #)

SIDE SCAN S TARGET AE RACT

NOAA SHIP HECK PROJECT NUMBER: OPR-B660-RU/...-88 AWOIS No. 4382 SHEET No. __ HE-10-1-88

PAGE 4.3

	DOY	REF. LINE	PRECEEDING FIX No.	TIME	HT. OF TARGET	SURND DEPTH	POSTITION L/L OR E/N	REMARKS	CHT NO.
	209	—	107	152710	—	—	89840.5 / 7903.4	OP RED "469" Im 49	
(1)	"	0	145+4.3 S	163037	1.5'	27'	89884.6 / 8269.9	geologic INSIG	007
(2)	"	0	146+2.0 P	163127	0	28'	89900.0 / 8172.5	geologic INSIG	
(3)	"	0	148+0.5 S	163355	1.8'	27'	89812.5 / 7980.0	geologic INSIG 2.5' IN 001' SEE (255-266)	
(4)	"	160	167+4.5 P	171911	2.6'	18'	89767.5 / 8452.5	INSIG geologic REFERENCE DSF 266+3	008
(5)	"	-160	193+0.5 S	182615	8.9 ?	77'	90167.5 / 8485.0	geologic INSIG AFTER HYDRO	009
(6)	"	-240	197+0.5 S	183929	3.9'	105'	90237.5 / 8475.0	INSIG	
(7)	"	-240	198+1.3 S	184103	8.5'	102'	90165.0 / 8380.0	geologic INSIG AFTER HYDRO	010
(8)	"	500	206+3.0 S	190056	2.0'	45'	89985.0 / 8070.0	INSIG (SEE 176-177)	
9	"	500	206+4.75 ~~211+3.8 S~~	190117	2.0'	40'	— / —	INSIG ?	
10	"	420	211+3.8 S	190958	0'	13'	89695.0 / 8220.0	geologic INSIG (SEE 245-246)	
11	"	420	212+4.2 P	191130	2.0'	17'	89825.0 / 8200.0	wreckage INSIG (SEE 229-230, 246-247)	011
12	"	420	214+0.2 S	191320	3.0'	57' ~~55'~~	89975.0 — / 8117.5	geologic 247-248 S INSIG (SEE ~~172-180~~)	
13	"	340	218+2.8 S	192249	3.9'	85'	— / —	INSIG (SEE 494+18) ? SEE (247-248 P)	012
14	210	340	252 P	162107	2.5'	37'	89952.5 / 8187.5	wreckage INSIG AFTER HYDRO	
15	210	420	246+3.5 S	—	1.0'	—	89827.5 / 8210.0	SAME AS #11	

REMARKS COLUMN LEGEND:

INS - INSIGNIFICANT, S - SAME AS (PAGE # & LINE), SIG - INVESTIGATE FURTHER
D - DOVE ON (DATE/DIVE #)

SIDE SCAN TARGET ABSTRACT

NOAA SHIP HECK PROJECT NUMBER: OPR-B660-RU/HE-88 AWOIS No. 4382 SHEET No. HE-10-1-88

PAGE 4.4

	DOY	REF. LINE	PRECEEDING FIX No.	TIME	HT. OF TARGET	SURND DEPTH	POSTITION L/L OR E/N	REMARKS
16	210	80	20915.6 P	—	0	—	— / —	SAME AS #11
17	210	420	24713.2 P SH	—	2.2'	—	— / —	geologic SAME AS #12, geologic
18	210	340	25214.2 S	—	0	—	— / —	SAME AS #1
19	210	20	27811.1 P	172533	3.3'	95'	— / —	INSIG
20	210	20	27813.4 S	—	3.9'	—	— / —	SAME AS #5
21	209	-80	17715 P	175137	1.9'	51'	89960 / 8800	SAME AS #14
22	214	-120 DEV	411+5 S	151342	0'	51'	— / —	SAME AS 14 wreckage
23	214	275 DEV	416+1 S	153858	3.7	50'	— / —	SAME AS 14 wreckage
24	217	-160	520+4 P	144045	8.0'	100'	90162.1 / 8463.2	SAME AS #5 geologic
25	217	-160	523+2 P	144125	6.6'	100'	90169.1 / 8411.5	SAME AS #7 geologic
26	217	-200	527+2 P	145604	7.3'	100'	90101.4 / 8338.3	INSIG geologic
27	217	-200	528+1 P	145720	8.0'	100'	90161.5 / 8462.5	SAME AS #5 geologic
28	217	-200	533+1 P	151835	9.9'	100'	90165.5 / 8400.4	SAME AS #7 geologic
13							/	
14							/	
15							/	

REMARKS COLUMN LEGEND:

INS - INSIGNIFICANT, S - SAME AS (PAGE # & LINE), SIG - INVESTIGATE FURTHER
D - DOVE ON (DATE/DIVE #)

SIDE SCAN S TARGET AI RACT

NOAA SHIP HECK PROJECT NUMBER: OPR-B660-RU-..-88 AWOIS No. 4386 SHEET No. ___ AUG-1-10-88

	DOY	REF. LINE	PRECEEDING FIX No.	TIME	HT. OF TARGET	SURND DEPTH	POSTITION L/L OR (E/N)	REMARKS
1	210	0	281 P	171552	1.3' 3.9'	60'	91140.0 / 8300.0	
1+2	210	0	281+4P	—	0.7'	60'	— / —	insignificant
2 3	210	80	285+5 S	—	0'	60'	— / —	insignificant
3 4	210	160	301+4 P	—	0'	60'	— / —	insignificant
4 5	215	0	505+5 S	190425	1.8'	60'	91174.9 / 8254.0	SIG SAME AS #1
5							/	
6							/	
7							/	
8							/	
9							/	
10							/	
11							/	
12							/	
13							/	
14							/	
15							/	

PAGE 4.5

REMARKS COLUMN LEGEND:

INS - INSIGNIFICANT, S - SAME AS (PAGE # & LINE), SIG - INVESTIGATE FURTHER
D - DOVE ON (DATE/DIVE #)

SIDE SCAN S TARGET AB RACT

NOAA SHIP HECK PROJECT NUMBER: OPR-B660-RU/...-88 AWOIS No. 4389 SHEET No. ___

	DOY	REF. LINE	PRECEEDING FIX No.	TIME	HT. OF TARGET	SURND DEPTH	POSTITION L/L OR E/N	REMARKS	CSTN NO
13	211	0	307+4	132816 E	4.0	—	91857.1 / 9786.1	RECON	10 KHz
1	212	0	551+0 S	171059	6.6'	85'	91860.5 / 9795.0	"	P16
2	217	-60	557 0.7 P	173415	10.5	62'	91867.5 / 9770.0	"	= 2 LD's P17
3	217	-60	557+2 P	173427	11.0'	62'	91875.0 / 9807.5	"	018
4	217	0	560+0 P	174210	5'	85'	91866.6 / 9786.2	SAME AS #1	019
5	217	0	568+0 S	175849	7.3'	85'	91867.5 / 9795.0	SAME AS #1	P20
6	217	0	578+1 P	182004	10.6'	75'	— / —	SAME AS #1	021
7	217	60	580+5 P	182740	15.5'	55'	91850.5 / 9773.2	SAME AS #2	022
8	217	0	588+3 S	193840	6.5'	65'	91857.7 / 9778.3	SAME AS #3	023
9	218	0	647+3.8 P	143304	6.9'	70'	91869.0 / 9771.8	SAME AS ABOVE	024
10	219	-60	658+4 S	160257	5.9'	50'	91863.8 / 9782.1	"	025
11	220	-60	659 S	160321	9.8'	55'	91851.1 / ~~9757.7~~ 9757.7	"	026
12	221	0	662+4 S	161652	15'	60'	91858.2 / 9777.5	"	
~~13~~							/		
14							/		
15							/		

REMARKS COLUMN LEGEND:

INS - INSIGNIFICANT, S - SAME AS (PAGE # & LINE), SIG - INVESTIGATE FURTHER
D - DOVE ON (DATE/DIVE #)

PAGE 4 OF ___

SIDE SCAN S TARGET AC RACT

NOAA SHIP HECK PROJECT NUMBER: OPR-B660-RU-88 AWOIS No. 6504 SHEET No. ____

	DOY	REF. LINE	PRECEEDING FIX No.	TIME	HT. OF TARGET	SURND DEPTH	POSTITION L/L OR E/N	REMARKS
(cont) 1	211	~~50~~ 0	321+2	150652	9 M.	~~60~~ 53 ft.	90528.5 / 9682.0	(OIS) RECON
(cont) 2	"	"	321+4	150729			90581.8 / 9734.3	(OIS) INSIG
(cont) 3	"	0	339+5	155941			90536.5 / 9696.5	Same as 1
(cont) 4	"	"	351+5	163355			90531.3 / 9685.5	Same as 1
(cont) 5							/	
5							/	
6							/	
7							/	
8							/	
9							/	
10							/	
11							/	
12							/	
13							/	
14							/	
15							/	

PAGE 4.7

REMARKS COLUMN LEGEND:

INS - INSIGNIFICANT, S - SAME AS (PAGE # & LINE), SIG - INVESTIGATE FURTHER
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U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMPOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: December 22, 1988

MARINE CENTER: Atlantic

OPR: B660

HYDROGRAPHIC SHEET: FE-316-SS (HE-10-1-88)

LOCALITY: Southern New England Coast, Connecticut and New York

TIME PERIOD: July 22 - August 8, 1988

TIDE STATION(S) USED: 851-6990 Willets Point, NY

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 5.00 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 7.4 ft.

REMARKS: RECOMMENDED ZONING

1. For AWOIS Items 4382, 4386, 4389, 4416, 6504, zone direct.

for Brian K. Cummings
Chief Tidal Datum
Quality Assurance Section

NOAA FORM 76-155
(11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

GEOGRAPHIC NAMES

SURVEY NUMBER

FE-316SS

Name on Survey	A ON CHART NO. 12366	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
Long Island Sound	X									1
New York	X									2
Stepping Stones	X									3
										4
										5
										6
										7
										8
										9
										10
										11
										12
										13
										14
										15
										16
										17
										18
										19
										20
										21
										22
										23
										24
										25

NOAA FORM 76-155 SUPERSEDES C&GS 197

05/04/89

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: FE-316

NUMBER OF CONTROL STATIONS	5
NUMBER OF POSITIONS	639
NUMBER OF SOUNDINGS	7

	TIME-HOURS	DATE COMPLETED
* PREPROCESSING EXAMINATION	35	11/18/88
VERIFICATION OF FIELD DATA	87	02/03/89
QUALITY CONTROL CHECKS	56	
EVALUATION AND ANALYSIS	103	05/03/89
FINAL INSPECTION	15	04/18/89
TOTAL TIME	261	

MARINE CENTER APPROVAL 05/04/89

* Preverification time is not considered as part of total survey time.

NOAA FORM 61-29
(12-71)

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

LETTER TRANSMITTING DATA

REFERENCE NO.
MOA23-56-89

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY *(Check)*:

☐ ORDINARY MAIL ☐ AIR MAIL
☐ REGISTERED MAIL ☐ EXPRESS
☐ GBL *(Give number)* _____

TO:

Chief,Data Control Branch, N/CG243
Room 151, WSC-2
National Ocean Service
Rockville, MD 20852

DATE FORWARDED
4 May 1989

NUMBER OF PACKAGES
two (2)

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

FE-316SS (HE-10-1-88)
OPR-B660 New York, Long Island Sound
Vicinity of Stepping Stones

Pkg #1 (box): ✓ Envelopes containing Sonargrams, Fathograms, and Printouts for the following days of the year (DOY):
AWOIS Item #4382 - 209, 210, 214, 217, 218
AWOIS Item #4386 - 210, 215
AWOIS Item #4389 - 211, 217, 218
AWOIS Item #4416 - 204, 207, 209, 214, 215
AWOIS Item #4416 - 208, 221 (Hydro only)
AWOIS Item #6504 - 211, 214
✓ Envelope annotated "Material Removed from Original Descriptive Report"
✓ Envelope annotated "FE-316SS Sounding Correctors"
✓ Cahier containing Final Position, Control, and Sounding Listings for AWOIS Items #4382, #4386, #4389, #4416, and #6504
✓ Envelope annotated "DR-NY1 ..."

Pkg #2 (envelope): ✓ Original Descriptive Report

FROM: *(Signature)*
Robert G. Roberson
Robert G. Roberson

RECEIVED THE ABOVE
(Name, Division, Date)
Dwayne S. Clark
May 16, 1989

Return receipted copy to:

Chief, Hydrographic Surveys Branch,
N/MOA23
Atlantic Marine Center
439 W. York Street
Norfolk, VA 23510-1114

NOAA FORM 61-29 SUPERSEDES FORM C&GS 413 WHICH MAY BE USED.

☆ U.S. G.P.O. 1981-564-008/1048

ATLANTIC MARINE CENTER
EVALUATION REPORT

SURVEY NO.: FE-316SS FIELD NO.: HE-10-1-88

New York, Long Island Sound, Vicinity of Stepping Stones

SURVEYED: 22 July through 8 August 1988

SCALE: 1:10,000 PROJECT NO.: OPR-B660-RU/HE-88

SOUNDINGS: RAYTHEON DSF-6000N Fathometer and EG&G Model 260 Side Scan Sonar

CONTROL: MOTOROLA Falcon 484 Mini-Ranger (Range/Range)

Chief of Party.....C. B. Lawrence

Surveyed by.....G. H. Tuell
.....A. L. Beaver

Automated Plot by.....XYNETICS 1201 Plotter (AMC)

1. INTRODUCTION

a. This is a side scan sonar survey. A RAYTHEON DSF-6000N fathometer was operated concurrently with the side scan sonar; however, the soundings are of reconnaissance value only. No wire drag was accomplished during this survey.

b. Four (4) 1:10,000 scale and one (1) 1:5,000 scale page size smooth sheets were generated during office processing, and are attached to this report. Sheets 1, 3, and 5 of 5 show only the items found by the field unit. Sheet 4 of 5 shows the item found by the field unit and one additional item that was identified during office processing in the search area for AWOIS item #4416. Sheet 2 of 5 shows an obstruction identified during office processing to be AWOIS item #4386. A discussion of AWOIS items #4386 and #4416 can be found in section 6.b. of this report. The final field sheets adequately delineate the lines run and the areas covered by this survey.

c. No unusual problems were encountered during office processing.

d. Notes in the Descriptive Report were made in red during office processing.

2. CONTROL AND SHORELINE

a. Control is adequately discussed in section H. of the Descriptive Report.

b. There is no shoreline within the limits of this survey.

c. Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83). Office processing of this survey is based on these values. The smooth sheet has been annotated with ticks showing the computed mean shift between the survey datum and the North American Datum of 1927 (NAD27).

To place the 1:10,000 scale plots, sheets 1, 3, 4, and 5 on the NAD27 datum, move the projection lines 0.364 seconds (11.2 meters or 1.12 mm at the scale of the survey) north in latitude, and 1.520 seconds (35.6 meters or 3.56 mm at the scale of the survey) east in longitude.

To place the 1:5,000 scale plot, sheet 2, on the NAD27 datum, move the projection lines 0.364 seconds (11.2 meters or 2.24 mm at the scale of the survey) north in latitude, and 1.520 seconds (35.6 meters or 7.12 mm at the scale of the survey) east in longitude.

3. HYDROGRAPHY

The hydrography collected on this survey during side scan sonar operations is of reconnaissance value only and was not verified. This does not pertain to the depths shown on the smooth plots included in this report.

4. CONDITION OF SURVEY

The smooth sheets and accompanying overlays, hydrographic records and reports are adequate and conform to the requirements of the HYDROGRAPHIC MANUAL and the SIDE SCAN SONAR MANUAL with the following exceptions:

a. The field unit did not obtain confidence checks each day of hydrography as required by section 1.2.6. of the SIDE SCAN SONAR MANUAL. As stated in the manual, 'A "confidence check" is a check to confirm that the side scan sonar system is in tune and functioning properly. ... As a minimum, at least two checks of each sonar channel shall be made daily."

b. Not all the prior surveys listed in section 7.8. of the Project Instructions were compared with as required. Prior surveys FE-174WD (1960) and H-5078WD (1930), which are source documents for 3 of the 5 items investigated, were not compared with the present survey by the hydrographer. See section 6.b. of this report for comparisons with these prior surveys.

5. JUNCTIONS

There are no contemporary junctional surveys. There are no junctional requirements in the Project Instructions.

6. COMPARISON WITH PRIOR SURVEYS

a. Hydrographic

H-5546 (1934) 1:10,000
H-5547 (1934) 1:10,000

The prior surveys listed above are common to the entire present survey. Comparisons between present and prior hydrography were not made since all present hydrography, except the detached soundings on items located, is considered reconnaissance hydrography. Adequate comparisons between the reconnaissance hydrography and the prior surveys have been made by the hydrographer in section J. of the Descriptive Report.

b. Wire Drag

H-5078WD (1930) 1:20,000
FE-174WD (1960) 1:10,000

Prior wire drag survey H-5078WD (1930) covers the entire present survey area. AWOIS item #4416 originates with the prior wire drag survey.

AWOIS item #4416 is a charted dangerous submerged rock with a wire drag clearance depth of 35 feet in Latitude 40°49'01.5"N, Longitude 73°46'55.0"W, originating with the prior survey as a hang at 40 feet, cleared by 35 feet, and is identified as boulders with a shoalest sounding of 38 feet. This item was investigated by a side scan sonar and fathometer search. A distinct contact was seen on the side scan sonargrams. A fathometer development located the contact which rises 5 to 6 feet above the bottom. A shoal depth of 45 feet was located by the fathometer in Latitude 40°49'01.64"N, Longitude 73°46'54.50"W. Line spacing for 100% ensonification of the contact was achieved. After close examination of the prior wire drag survey H-5078WD (1930) and its Descriptive Report, and H-5547 (1934) and its Descriptive Report, it is believed that the charted feature does not exist. H-5547 (1934) conducted an echo sounder development in the vicinity of the wire drag hang/grounding with a least depth of 44 feet in Latitude 40°49'00.864"N, Longitude 73°46'54.68"W. The AWOIS item position is 42 meters NE of the 44 foot sounding found by H-5547 (1934). The 44 foot sounding is 24 meters S of the 45 foot depth found by the present survey. Considering the 100% side scan sonar ensonification of the search area and the 100% fathometer ensonification of the area of the contact found by side scan sonar, it is recommended that the dangerous submerged rock with a wire drag clearance depth of 35 feet, AWOIS item #4416, be removed from the chart and a dangerous submerged rock with a least depth of 45 feet (45 Rk) be charted as shown on the present survey. See sheet 4 of 5.

Entered mbm 6/3/69

NAD 27 40°49'01.14" - 73°46'56.02"

AWOIS items #4386 and #4389 originate with the prior wire drag survey FE-174WD (1960).

AWOIS item #4386 is a charted dangerous submerged obstruction with a wire drag clearance depth of 57 feet in Latitude 40°50'00"N, Longitude 73°46'18"W, originating with the prior survey as an uninvestigated hang at 58 feet. The item was investigated by a side scan sonar and fathometer search. As stated by the hydrographer in the Investigation Report on page 16 of the Descriptive Report, no significant contacts or traces were found, and removal of the item is recommended. A side scan sonar contact with an estimated height of 5 feet above the bottom in depths of 62 feet was noted as insignificant by the hydrographer. This contact, which has a computed shoal depth of 57 feet, is approximately 17 meters SSE of the charted item in Latitude 40°49'59.82"N, Longitude 73°46'16.69"W. It is believed that this contact is AWOIS item #4386. The field unit did not perform a fathometer search of the area with line spacing that would have provided 100% ensonification of the bottom. This obstruction is not considered a hazard to surface navigation in this area. It is recommended that the presently charted dangerous submerged obstruction with a clearance depth of 57 feet be charted in the position determined from the data in the present survey as a non-dangerous submerged obstruction, with a least depth of 57 feet (57 obstr). Additional work on this item is not recommended. See sheet 2 of 5. NAD 27 40°49'59.46"N – 73°46'18.21"W

Entered mbm 6/26/89

(mbm 7/18/89)

AWOIS item #4389 is a charted dangerous submerged obstruction with a wire drag clearance depth of 54 feet in Latitude 40°50'16.8"N, Longitude 73°45'49.8"W, originating with the prior survey as an uninvestigated hang at 55 feet. This item was investigated by a side scan sonar and fathometer search. The entire area of the AWOIS item was not investigated. The position given for the AWOIS item was not ensonified with side scan sonar. Several lines of hydrography covered the AWOIS item; however, unless the vessel track went directly over the item it may not have been detected. Fathometer depths of 58 feet and 60 feet on rocks were located in Latitude 40°50'16.99"N, Longitude 73°45'47.41"W, and Latitude 40°50'16.12"N, Longitude 73°45'47.95"W, respectively. The fathometer trace and the depths found on these two rocks confirm the existence of obstructions in the area. The area developed by the field unit with reduced line spacing adequately ensonified the area (100%) to provide echo sounder least depths on the two rocks. These rocks are not considered hazards to surface navigation in the area. The 55 foot hang depth was brought forward from the prior survey to supplement the present survey. It is recommended that the dangerous submerged obstruction with a clearance depth of 54 feet, AWOIS item #4389, be retained as charted. Additional work on this item is not recommended. See sheet 3 of 5.

Entered mbm 6/26/89

NO CORR

c. Side Scan Sonar

FE-293SS (1986) 1:10,000

AWOIS item #6504 and is an uncharted dangerous sunken wreck in approximate Latitude 40°50'13.5"N, Longitude 73°46'45.5"W, originating with the prior survey. A sunken wreck was located by the hydrographer in Latitude 40°50'13.60"N, Longitude 73°46'44.20"W with a fathometer least depth of 48 feet. Since the wreck located by the hydrographer is within the search area of the assigned AWOIS item (approximately 31 meters east of the AWOIS position), it is considered to be AWOIS item #6504. It is recommended that this wreck be charted in the position determined by the present survey as a dangerous sunken wreck with a least depth of 48 feet (48 Wk). See sheet 5 of 5.

NAD 27 40°50'13.24"N - 73°46'45.72"W

7. COMPARISON WITH CHART 12366 (20th Ed., Nov. 1/86)

a. Hydrography

The charted hydrography originates with the previously discussed prior surveys and sources not readily ascertainable. The previously discussed prior surveys require no further consideration. Attention is directed to the following:

1) AWOIS item #4382 is a charted dangerous sunken wreck in Latitude 40°49'30.0"N, Longitude 73°47'10.0"W originating with Notice to Mariners No. 41 of 1960. A sunken wreck was located by the hydrographer in Latitude 40°49'25.38"N, Longitude 73°47'08.33"W with a fathometer least depth of 42 feet. Since the wreck located by the hydrographer is within the search area of the assigned AWOIS item (approximately 147 meters southeast of the charted position), it is considered to be AWOIS item #4382. It is recommended that this wreck be charted in the position determined by the present survey as a dangerous sunken wreck with a least depth of 42 feet (42 Wk). The presently charted dangerous sunken wreck should be deleted from the chart. See sheet 1 of 5.

NAD 27 40°49'25.02"N - 73°47'09.85"W

2) An unidentified contact was seen on the side scan sonargram during office processing. A fathometer depth of 49 feet was found on an the contact in Latitude 40°49'00.37"N, Longitude 73°46'57.18"W in prior survey (H-5547) depths of 52 to 54 feet. It is recommended that an obstruction with a depth of 49 feet (49 obstr) be charted in the position determined by the present survey. See sheet 4 of 5.

NAD 27 40°49'00.01"N - 73°46'58.70"W

b. Aids to Navigation

There are no fixed or floating aids to navigation within the limits of this survey.

8. COMPLIANCE WITH INSTRUCTIONS

This survey adequately complies with the Project Instructions except as noted in this report. This is a good side scan sonar survey for the AWOIS items resolved by this survey.

Deborah A. Bland
Deborah A. Bland
Cartographic Technician
Verification of Field Data

for Richard H. Whitfield
Cartographer
Evaluation and Analysis

Leroy G. Cram
Leroy G. Cram
Supervisory Cartographic
Technician
Verification Check

INSPECTION REPORT
FE-316SS

The data that make up this Side Scan Sonar survey have been inspected to gain insight into its overall completeness regarding survey coverage, presentation of survey results, and the verification or disproval of charted data. This survey, except as noted in the Evaluation Report, is considered complete and adequate to meet National Ocean Service standards. Processing is considered complete. The survey records comply with NOS requirements except as noted in the Evaluation Report.

Inspected

Robert G. Roberson
Chief, Evaluation and Analysis Group
Hydrographic Surveys Branch

William A. Wert, LCDR, NOAA
Chief Hydrographic Surveys Branch

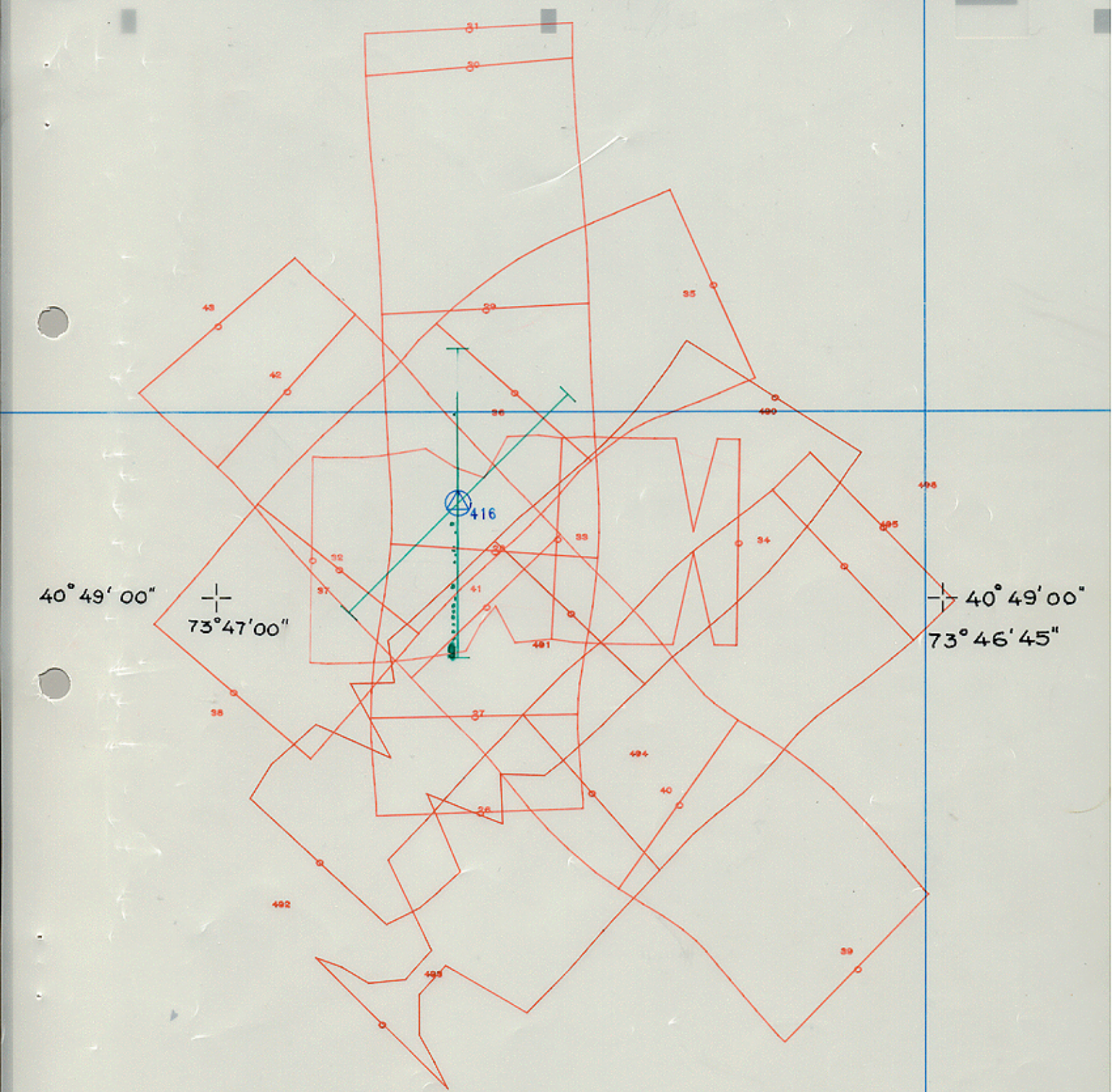
Approved: 4 May 1989

Ray E. Moses, RADM, NOAA
Director, Atlantic Marine Center

AWOIS Item # 4416

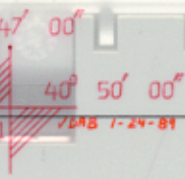
Swath Plot

Scale: 1:2,500



73° 47′ 30″ 73° 47′ 00″ 73° 46′ 30″

40° 50′ 00″



FE – 316 SS
NEW YORK
LONG ISLAND SOUND
VICINITY OF STEPPING STONES
27 JULY TO 5 AUGUST, 1988
SCALE: 1:10,000
HORIZONTAL DATUM: NAD 1983
SOUNDINGS IN FEET AT MLLW
SHEET 1 OF 5
ITEM 4382

40° 49′ 30″

42 Wk

40° 49′ 00″

73° 46′ 30″ 73° 46′ 15″

40° 50′ 15″ 40° 50′ 15″

FE-316-SS
NEW YORK
LONG ISLAND SOUND
VICINITY OF STEPPING STONES
28 JULY TO 2 AUG 1988
SCALE: 1:5,000
HORIZONTAL DATUM: NAD 1983
SOUNDINGS IN FEET AT MLLW
SHEET 2 OF 5
ITEM 4386

40° 50′ 00″ 40° 50′ 00″

57 obstr (A)

73° 46′ 30″

40° 49′ 45″ NAD 27 40° 49′ 45″ 40° 49′ 45″

XYNETICS 1201 DAB 1-24-89

(A) The depth on the obstruction was estimated by scaling heights off the bottom from side scan sonar records. The position was determined by computing the offset from the vessel's track.

73° 46′ 30″ 73° 46′ 15″

73° 46' 00"

73° 45' 30"

73° 45' 00"

73° 45' 30"

NAD 27

40° 51' 00"

XYNETICS 1201

YORK 1-24-89

40° 51' 00"

FE-316 SS
NEW YORK
LONG ISLAND SOUND
VICINITY OF STEPPING STONES
29 JULY TO 8 AUGUST, 1988
SCALE: 1:10,000
HORIZONTAL DATUM: NAD 1983
SOUNDINGS IN FEET AT MLLW
SHEET 3 OF 5
ITEM 4389

40° 50' 30"

Obstruction hung at 55 ft
Cleared by 54 ft
from FE-174 WD (1960)

obstr 55 58 *Rk*
60 *Rk*

40° 50' 00"

73° 47' 30"

73° 47' 00"

73° 46' 30"

FE – 316 SS
NEW YORK
LONG ISLAND SOUND
VICINITY OF STEPPING STONES
22 JULY TO 2 AUGUST, 1988
SCALE: 1:10,000
HORIZONTAL DATUM: NAD 1983
SOUNDINGS IN FEET AT MLLW
SHEET 4 OF 5
ITEM 4416

73° 46' 30"
NAD 27 40° 49' 30"
XYNETICS 1201
/DAB 1-24-89

40° 49' 30"

45 Rk
49 obstr

40° 49' 00"

40° 48' 30"

73° 47' 00"

73° 46' 30"

73° 46' 00"

FE- 316 SS
NEW YORK
LONG ISLAND SOUND
VICINITY OF STEPPING STONES
29 JULY TO 1 AUGUST, 1988
SCALE: 1: 10,000
HORIZONTAL DATUM: NAD 1983
SOUNDINGS IN FEET AT MLLW
SHEET 5 OF 5
ITEM 6504

73° 46' 30"

NAD 27 40° 50' 30"

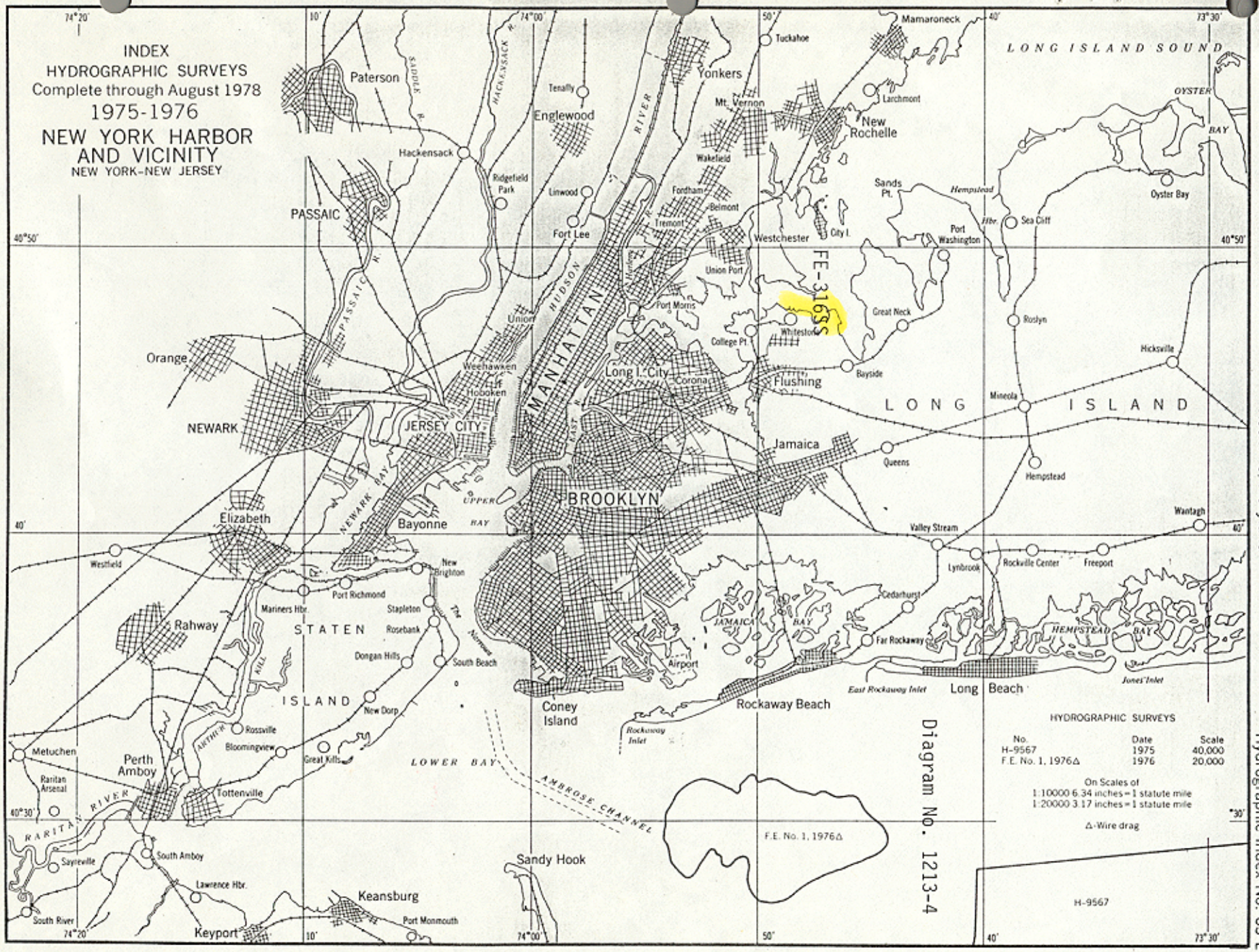
XYNETICS 1201
VDAB 1-25-89

40° 50' 30"

48 Wk

40° 50' 00"

40° 49' 30"



DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Survey
Rockville, Maryland

Hydrographic Index No. 65 L

NOAA FORM 75-96
(10-83)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. FE-316SS

EXAMINED FOR NM
GDBU
11-3-89 AP
Received in MCG 2212
For NM 3/6/90 AH

INSTRUCTIONS ✓AH

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
12366	11-2-89	AP Tom F.	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 40
12369 'E'	11-2-89	AP Tom F.	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 26
12369 'F'	11-2-89	AP Tom F.	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 26
12363	11-3-89	AP Tom F.	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 50
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.