

FE373

SIDE SCAN

Diagram No. 1210-4

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. RU-20-4-92
Registry No. FE-373SS

LOCALITY

State Rhode Island
General Locality ... Rhode Island Sound
Sublocality 1.8NM SSE of Sakonnet Point

1992

CHIEF OF PARTY

ICDR N.E. Perugini

LIBRARY & ARCHIVES

DATE June 16, 1993

FE373

AIG
PRODUCTS

13221

13218

12300

CP2

13006-NJ

HYDROGRAPHIC TITLE SHEET

FE-373SS

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.

RU-20-4-92

State Rhode Island

General locality Rhode Island Sound

Locality 1.8NM SSE of Sakonnet Point

Scale 1:20,000 Date of survey April 30 to June 24, 1992

Instructions dated February 12, 1992 Project No. OPR-B66⁰-RU-92

Vessel NOAA Ship RUDE (9040)

Chief of party LCDR Nicholas E. Perugini

Surveyed by N.E. Perugini, P.L. Schattgen, M.J. Oberlies, J.A. Illg

Soundings taken by echo sounder, hand lead, pole pneumatic depth gage *+ SIDE SCAN SONAR*

Graphic record scaled by NEP, PLS, MJO, JAI, RTB, DEW

Graphic record checked by NEP, PLS, MJO, JAI, RTB, DEW

Protracted by NA Automated plot by NA *SYNETICS 1201 PLOTTER (AHS)*

Verification by NA ATLANTIC HYDROGRAPHIC SECTION PERSONNEL

Soundings in meters at MLLW

REMARKS: All times are Coordinated Universal Time (UTC)

AWOIS Item 1906 is addressed in this report

NOTES IN RED WERE MADE DURING OFFICE PROCESSING

AWOIS/SURF 8/6/93 MCR

MMX 7/19/94

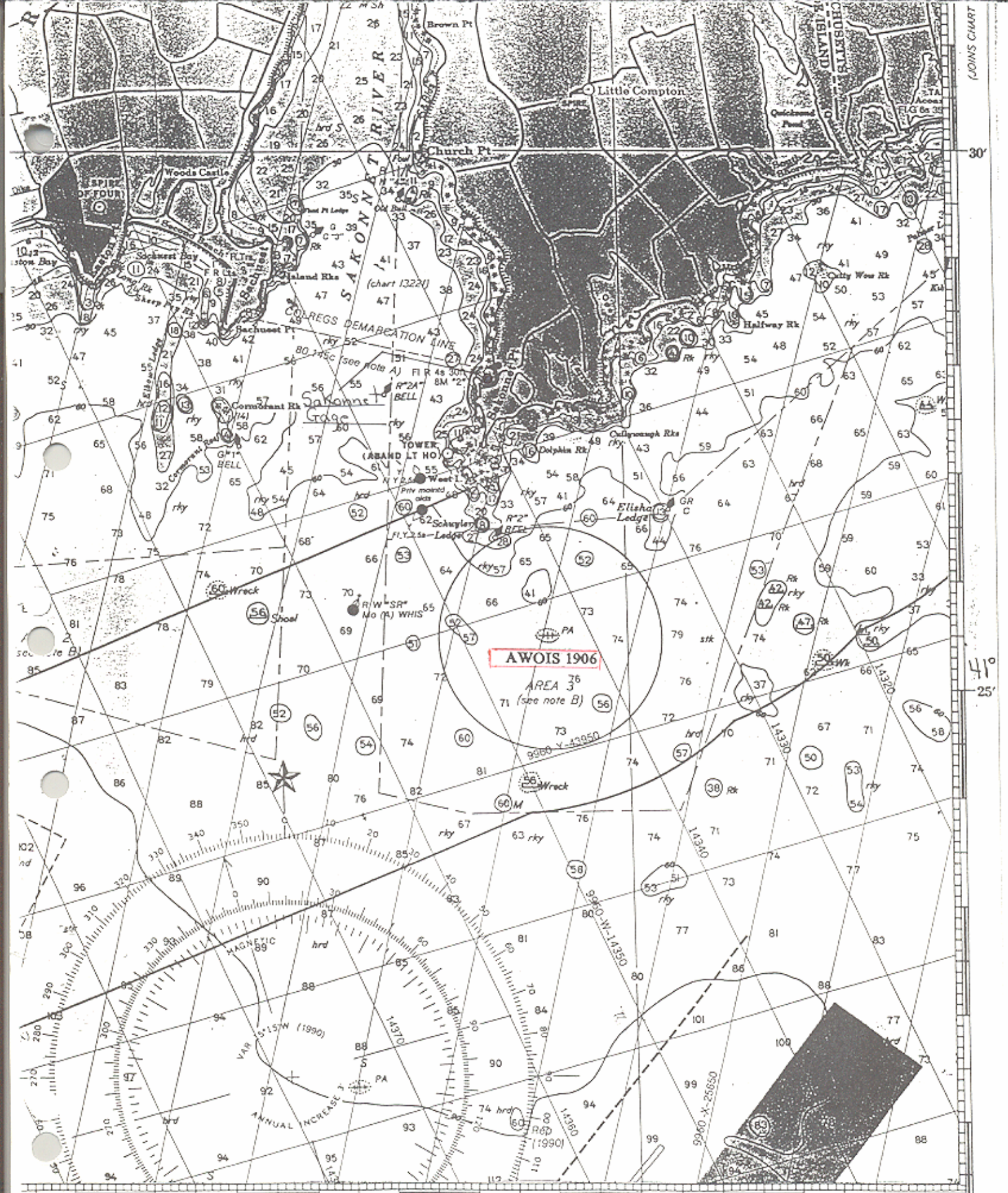


Chart 13218 15' 1:80,000

71° 10' 31st ed. Jan 11, 1992

TABLE OF CONTENTS

A. <u>PROJECT</u>	Page:2
B. <u>AREA SURVEYED</u>	Page:3
C. <u>SURVEY VESSELS</u>	Page:3
D. <u>AUTOMATED DATA ACQUISITION AND PROCESSING</u>	Page:4
E. <u>SONAR EQUIPMENT</u>	Page:5
F. <u>SOUNDING EQUIPMENT</u>	Page:7
G. <u>CORRECTIONS TO SOUNDINGS</u>	Page:8
H. <u>CONTROL STATIONS</u>	Page:11
I. <u>HYDROGRAPHIC POSITION CONTROL</u>	Page:12
J. <u>SHORELINE</u>	Page:16
K. <u>CROSSLINES</u>	Page:16
M. <u>COMPARISON WITH PRIOR SURVEYS</u>	Page:16
N. <u>COMPARISON WITH THE CHART</u>	Page:17
O. <u>ADEQUACY OF SURVEY</u>	Page:21
P. <u>AIDS TO NAVIGATION</u>	Page:21
Q. <u>STATISTICS</u>	Page:22
R. <u>MISCELLANEOUS</u>	Page:23
S. <u>RECOMMENDATIONS</u>	Page:23
T. <u>REFERRAL TO REPORTS</u>	Page:23

A. PROJECT

A.1 This survey was conducted in accordance with Hydrographic Project Instructions OPR-B660-RU, Southern New England Coast, Connecticut and New York.

A.2 The original date of the instructions is February 12, 1992.

A.3 The following changes are relevant to this project:

Change No. 1, dated April 2, 1992, authorized the implementation of the Pilot Partnership Processing Project.

Change No. 2, dated April 14, 1992, states that all AWOIS item surveys shall be at the scale of 1:20,000 when the largest scale chart of the area is smaller than 1:20,000. When the largest scale chart of the area is 1:20,000 or larger, the scale of the survey shall be 1:10,000.

A.4 A sheet letter was not specified in the project instructions.

A.5 Project OPR-B660-RU responds to requests from the Northeast Marine Pilots, Inc., of Newport, Rhode Island, to verify or disprove certain wrecks and obstructions in Long Island, Block Island, and Rhode Island Sounds. The U.S. Navy, as well as state and local governments, have also requested updated bathymetric and hydrographic survey data of the area.

B. AREA SURVEYED

B.1 This survey consists of AWOIS item 1906 located approximately 1.8 nautical miles SSE of Sakonnet Point, Rhode Island. The search radius is 2000 meters. This item is identified on the chartlet preceding the table of contents of this descriptive report.

In the extreme northwest corner of the search area, near Schuyler's Ledge and buoy "2", the area is authorized for the use of fish traps. Several fish traps are in place there and seem to consist of a long line of netting suspended somewhere in the water column. The ends of these traps are not clearly marked. These fish traps and their indefinite dimensions made it impossible to survey within their vicinity. Only a relatively very small area of the search radius was therefore not investigated.

In addition to the AWOIS item, a 51 foot depth presently charted on charts 13218 and 13221, was investigated. This shoal lies just outside of the search radius for AWOIS 1906 in position: 41° 25.24' N
71° 12.42' W

B.2 The approximate limits of this survey are within a one mile radius of 41° 25' 30" N and 071° 10' 58" W.

B.3 Data acquisition began on April 30, 1992 (DN 121) and concluded on June 24, 1992 (DN 176).

C. SURVEY VESSELS

C.1 The following vessels were used during this project:

<u>VESSELS</u>	<u>ELECTRONIC DATA PROCESSING NUMBER</u>	<u>PRIMARY FUNCTION</u>
NOAA Ship RUDE (S590)	9040	Hydrography/ Side Scan Operations
RUDE Launch (RU3)	1290	Diving Operations

C.2 No unusual vessel configurations or problems were encountered.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

D.1 Survey data acquisition and processing were accomplished using the HDAPS system with the following software versions:

Program	Version	Dates Used
SURVEY	6.10	DN 121 - 176
DAS_SURV	6.20	DN 121 - 169
	6.23	DN 170 - 176
POSTSUR	5.20	DN 121 - 176

D.2 Other software includes VELOCITY 1.11 dated March 9, 1990 used to generate sound velocity corrector tables, and MTEN (dated between 1985 and 1986) for horizontal control verification and establishment.

D.3 On DN 125 the day's starting fix number was incorrectly input as 468 rather than the correct 4068. This was not discovered until the processing of this data at the conclusion of the day's survey activities. To rectify this, the Active File Block Edit program was used to correct the fix numbers on all digital data. All analog records were corrected by hand. Other than this, there were no nonstandard automated acquisition or processing methods used.

E. SONAR EQUIPMENT

E.1 Side scan sonar operations were conducted using an EG&G Model 260 slant range corrected side scan sonar recorder and a Model 272-TD (dual frequency) towfish. All side scan operations were conducted from the RUDE (vessel # 9040). The following list shows equipment serial numbers and corresponding dates used:

Equipment Type	Serial Number	Dates Used
Recorder	0012104	DN 121
	0011443	DN 122 - DN 176
Towfish	10823 (Dual Freq)	Entire Survey

E.2 The side scan sonar towfish was configured with a 20° beam depression, which is the normal setting and which yields the best beam correction.

E.3 The 100 Khz frequency was used throughout this survey.

E.4 a) The 100 meter range scale was used to investigate the search radius for this item. Given the depth of water in the search area, this range scale was used to provide optimum contact resolution.

The current specification in the Field Procedures Manual for Hydrographic Surveying (FPM) was used to determine maximum line spacing when **conventional positioning systems** are used:

$$LS_{max} = 2RS - 2ECR_{max}$$

where RS = range scale (100m)
and ECR = error circle radius

Predicted ECR values were generated using the HDAPS function "Predict ECR" for control station configurations used in this survey. No predicted ECR value was greater than 9 meters for the entire survey area. Thus the maximum line spacing computed by the above equation was 182 meters. RUDE used a 170 meter line spacing which yielded an effective swath overlap of 30 meters. Printouts of "Predict ECR" values supporting the above calculation are included in Separate V.*

** Filed with the original field records*

The current FPM specification was used to determine maximum line spacing when **Differential GPS positioning** is used:

$$LS_{max} = 2RS - 2EPE_{max}$$

where RS = range scale (100m)
and EPE = expected positional error

The FPM mandates that the maximum allowable EPE not exceed 1.5mm at the scale of the survey. Therefore, the maximum EPE for this 1:20,000 scale survey is 30. However, survey operations were not conducted when the EPE exceeded 15 meters. This figure was used because the real limitation for survey operations is a HDOP that does not exceed 3.35. Only HDOP values exceeding 3.35, outside survey limitations, could cause the EPE to ever exceed 15 meters.

Using the above equation and an EPE value of 15 meters, it was determined the maximum allowable line spacing for side scan sonar operations with the use of DGPS positioning is 170 meters. This was the line spacing used for side scan sonar operations during this survey.

b) Confidence checks were obtained by noting recognizable bottom characteristics at the edges of the sonar range scale in use. They were obtained whenever possible so their timing is irregular.

c) Two hundred percent side scan sonar coverage was completed for this item.

d) No other factors affected side scan sonar operations or the quality of the sonar records.

e) The towfish was deployed from the stern during the entire survey.

E.5 Significant contacts were investigated by echosounder development. Section 7.2.2. of the FPM provides two equations to be used to determine the line spacing for echosounder investigations of significant features of limited extent. The lesser of the two values from these equations is to be used for line spacing. The results of these two equations were a line spacing value of either 7.4 meters using one formula or 19.6 meters using the other formula.

For development of significant contacts of limited extent, line spacing of 5 meters was used. For development of extensive bottom features such as ridges, line spacing of 25 meters was used.

There was one diver investigation conducted during this survey.

Refer to section N.5 for a more detailed discussion of contact development procedures.

E.6 Overlap was checked on-line using the real-time plot and the edited swath plot was used to identify holidays.

F. SOUNDING EQUIPMENT

F.1 All hydrographic soundings were acquired using a Raytheon 6000N Digital Survey Fathometer (DSF). One DSF 6000N was used during the entire survey: S/N B050N.

F.2 One diver investigation was conducted during this survey. Divers determined a least depth on development 36. The least depth was measured with a 3-D Instruments, Inc. precision direct drive depth gauge:

0- 70 fsw (feet salt water)

S/N 201637

Calibration and check documentation for this equipment can be found in Separate IV.

F.3 There were no faults in soundings equipment that affected the accuracy or quality of the data.

F.4 Both the high (100 kHz) and low (24 kHz) frequency sounding data were recorded during data acquisition. Only high frequency soundings were plotted.

G. CORRECTIONS TO SOUNDINGS

G.1 a) The velocity of sound through water was determined using a Digibar Sound Velocity Probe (S/N 169), made by Odom. A Data Quality Assurance Test was conducted before the velocity cast to ensure the meter was within tolerance.

All data were processed using Velocity 1.11 software. The computed velocity correctors were entered into the HDAPS sound velocity table and applied on-line to both high and low frequency soundings. The sound velocity correctors applied to this survey are based on the cast recorded on the following date:

Cast Number	DN	Latitude	Longitude	HDAPS Table #	Applied to Days
03	120	41° 20.0' N	71° 12.7' W	03	120-140
04	140	41° 25.7' N	71° 14.0' W	04	141-146
05	148	41° 25.1' N	71° 09.2' W	05	147-153
06	155	41° 24.9' N	71° 06.9' W	06	154-173
09	176	41° 26.5' N	71° 11.1' W	09	174-176

b) There was no variation in the DSF-6000N instrument initial.

c) No instrument correctors to the DSF-6000N were required.

d) A dual lead line comparison with the DSF-6000N was made in the project area.

DN ¹¹²~~097~~ at 41° 26.0' N 71° 15.0' W (75 ft depths)

The greatest variation between leadline and DSF soundings was 0.2⁴ meters. Considering the ship's motion and the wire angle in the leadline from current (approximately 5°), this is excellent agreement and provides an adequate check that the echosounder was functioning properly. Data from these comparisons are found in Separate IV.

Both of the leadlines used in the leadline to DSF 6000 comparison were calibrated by steel tape prior to the above comparison. An average leadline correction of -0.3 feet was applied in comparisons between the DSF-6000 and the ship's leadlines.

e) All sounding correctors were applied to both the narrow (100 kHz) and wide (24 kHz) DSF 6000N beams.

f) During the winter 1988 dry dock period, an exact vertical measurement was taken from the DSF transducer to a fixed point on the bridge wing. After the ship was re-floated, the height above the waterline was determined for this point. The ship's static draft was thereby calculated to be exactly 2.26 meters (7.4 feet). This draft value was applied to the sounding data via the HDAPS offset table.

g) Settlement and squat correctors for the RUDE were determined on the Elizabeth River, Norfolk, Virginia on March 13, 1991. An observer, stationed with a level on a pier, measured changes in relative height by sighting to a staff held at the longitudinal position of the ship's transducer. The ship steamed directly toward and then away from the observer. The toward and away runs were averaged and applied to soundings through the HDAPS offset table.

h) Heave data were acquired by a Datawell heave, roll and pitch sensor (S/N 19128-C), and were applied to soundings in real time. Only the heave corrections were applied to the plotted soundings.

See Separate IV for data records.

G.2 There were no unusual or unique methods or instruments used for correcting echo soundings.

G.3 The sound velocity correctors resulting from velocity casts 3, 4, 5, 6, and 9 were reapplied to the data at the end of survey activities. Section G.1 a) gives the periods that each velocity cast correctors were used for.

G.4 The ship's shallow water (0-70 fsw) pneumatic depth gauge was calibrated on January 16, 1992. This gauge was bought new prior to the start of the 1992 field season and calibrated by the manufacturer. Corrector data from the calibration was not applied to pneumatic depths because it was less than 0.1 meters.

G.5 Generally, sea conditions greater than one meter affected ^{DEEPS} the sounding record, creating a trace of constant peaks and dips. Application of heave correctors to raw echo soundings appeared to accurately represent true depths.

G.6 a) The tidal datum for this project is Mean Lower Low Water. The operating tide station at Newport, Rhode Island (845-2660) served as direct control for datum determination. This station also served as the reference station for predicted tides. Data for predicted tides were provided on floppy magnetic disk before the start of the project.

b) Tidal data used during data acquisition were obtained from Table 2 of the East Coast of North and South America Tide Predictions, and applied to the digital tide data using the HDAPS software. The subordinate station for predicted tides was:

NO.	PLACE	TIME		HEIGHT	
		High water	Low water	High water	Low water
1149	Sakonnet	-0 13	-0 01	*0.88	*0.86
	41°28' N				
	71°12' W				

Tidal correctors were applied on-line using the HDAPS predicted tide table numbers 4,5, and 6.

c) Zoning for this project is consistent with the project instructions.

A request for smooth tides was mailed on July 5, 1992.

H. CONTROL STATIONS *SEE ALSO SECTION 3.2. OF THE EVALUATION REPORT*

H.1 The horizontal datum for this project is the North American Datum of 1983 (NAD 83).

H.2 The list of Horizontal Control Stations is ^{APPENDED TO} ~~located in~~ Appendix III. *THIS REPORT*

H.3 No horizontal control stations were established for this survey. Existing NGS stations were used. All horizontal control stations used during this survey are third-order with the exception of Beavertail Lighthouse Offset.

H.4 All horizontal control stations are within NGS Quadrants N0410703, N0410711 and N0410712. All are referenced to the NAD 83 Horizontal Datum.

H.5 Copies of all horizontal control documentation relevant to this survey are on file with the Atlantic Hydrographic Section.

H.6 There are no photogrammetric problems, positioning problems or unconventional survey methods pertinent to this survey.

I. HYDROGRAPHIC POSITION CONTROL *See Also section 3. a. of the Evaluation REPORT.*

I.1 This survey was conducted entirely with the use of the Falcon Mini-Ranger system with the exception of DN 176, the final day of the survey, when DGPS was used as well as Falcon Mini-Ranger.

I.2 Accuracy requirements were met with the use of both the Falcon Mini-Ranger and DGPS positioning system as specified by the FPM. For an explanation of the critical system checks conducted for both positioning systems refer to section I.4.

I.3 Control Equipment:

Mini-Ranger:

Falcon 484 by Motorola Inc.

Baseline Calibration 1, C-O Table 1
DN 121 - 143

RPU F-0246
R/T F-3409
R/S: F-3222 (code 4)
F-3296 (code 5)
D-2123 (code 7)
F-3241 (code 8)

Baseline Calibration 3, C-O Table 3
DN 144 - 152

RPU F-0246
R/T F-3409
R/S: F-3296 (code 5)
E-2909 (code 6)
D-2123 (code 7)
F-3217 (code 9)

Baseline Calibration 3, C-O Table 4
DN 153 - 155

RPU F0244
R/T F-3409
R/S: E-2915 (code 2)
F-3296 (code 5)
E-2909 (code 6)
D-2123 (code 7)
F-3217 (code 9)

No survey activities conducted from DN 155 - 173.

Baseline Calibration 4, C-0 Table 5
DN 174-176

RPU E0138
R/T F3411
R/S: E-2915 (code 2)
E-3296 (code 5)
E-2969 (code 6)
D-2123 (code 7)

DGPS

Ashtech GPS Sensor

S/N CD0000458769

Receiver Version: TD08

Firmware Version: 1E03

Magnavox MX50R DGPS Receiver

S/N 036

Correctors received from Montauk, New York radiobeacon.

I.4 Calibration and system check procedures for the positioning systems are as follows:

Falcon:

As stated in section 3.1.3.3 of the FPM a continuous critical system check is obtained "when data are acquired with three or more LOP's and ECR and maximum residual criteria are being met as required in section 3.1.3.1" (of the same manual). RUDE routinely conducted survey operations using at least three LOP's, and all other positioning criteria were met as required (see section I.2).

Raw data printouts are scanned during each day's data processing for occasions when the ECR exceeds 1.0 mm at the scale of the survey (20 meters) or the maximum residual exceeds 0.5 mm at the scale of the survey (10 meters). These are the standards specified in the FPM. On such occasions the digital data are accessed and examined for position busts. If a position bust is determined to have occurred, it is either smoothed or rejected as appropriate.

A pre-project baseline calibration of the Mini-Ranger system was conducted in Norfolk, Virginia on DN 071. Baseline calibrations #3 and #4 were conducted in New Bedford, Mass. on DN 143 and DN 171 respectively. The results of these baseline calibrations are on file with the Atlantic Hydrographic Section.

DGPS:

As specified in section 3.4 of the FPM, never during survey activities did the expected positional error (EPE) exceed 13.4 meters. This is within the authorized maximum of 1.5 mm at the scale of the survey or 30 meters for this survey. The HDOP never exceeded 3.3 while the authorized maximum is 3.7 as derived by the formula in the FPM. At all times at least four satellites were used for positioning.

A DGPS system performance check was conducted on DN 162. This procedure was completed very near the search radius for this survey in an area with an established Falcon Mini-Ranger network. By using HDAPS' Position Data and Quality Figures program within the Survey environment, three consecutive DGPS performance checks were obtained. All three recorded DGPS/Falcon positions compared to each other within the maximum allowable inverse distance (ΔP_{\max}) between the two as computed by HDAPS. This performance check is included in Separate III. *Filed with the original field records.*

I.5 The Falcon system required calibration data to be applied to raw ranges. The range corrector and minimum acceptable signal strength (MASS) for each Mini-Ranger Reference Station was entered into the HDAPS system using the Pre-Survey C-0 Table. This table provided the mechanism by which HDAPS automatically applies the proper range corrector and removes from the position computation those LOP's with signal strengths below MASS. Overall, calibration data applied to the raw Mini-Ranger ranges was adequate and effective.

I.6 a) There were no unusual methods used to calibrate or operate the electronic positioning equipment.

b) There were isolated occurrences of equipment malfunctions. However, these occurrences, usually Mini-Ranger reference station failures, were detected immediately. Often the solution was replacing the failed station with another reference station either from spares on hand, or in one case, by replacing the reference station with that taken from a less critical horizontal control station. Rarely were survey operations conducted with less than three fully operable reference stations. However, the FPM specifies in section 3.1.3.1. that "while three or more LOP's are desirable, they are not a necessity. When using two LOP's, only the ECR needs to be monitored for meeting acceptable limits. The residual values should be disregarded."

On DN 153 RPU F0246 failed. This did not affect data acquisition since it occurred prior to the start of that day's survey activities. It was replaced with RPU F0244 and C-0 table 4 was created to reflect the equipment change.

c) There were no occurrences of unusual atmospheric conditions that may have affected data quality.

d) On DN 176 survey operations were conducted for part of the day with only two Mini-Ranger reference stations. These two stations, Warren Reset and Cuttyhunk Lighthouse, did however yield an acceptable position given the geometry of the stations. They are separated by an angle of approximately 100 degrees.

e) No systematic errors were detected that required adjustments.

f) Antenna positions were corrected for offset and layback, and referenced to the position of the DSF 6000N transducer. These correctors were located in the HDAPS Offset table, and applied on-line to the positioning algorithm. Refer to Separate III for a copy of offset table 1.

g) Offset and layback distances for the A-frame (tow point) were located in the HDAPS Offset table and applied on-line. These offsets, along with the cable length, towfish height, and depth of water, were used by the HDAPS system to compute the position of the towfish. Refer to Separate III* for a copy of offset table 1. ** Filed with the ORIGINAL field records*

J. SHORELINE *See section 2.6. of the Evaluation Report*
No field sheets encompassed any shoreline.

K. CROSSLINES *See also section 3. a. of the Evaluation Report*
Approximately 2/3 of all soundings are from mainscheme investigations with the balance resulting from crossline investigations.

A comparison between mainscheme (north-south) and crossline (east-west) soundings was completed to assess agreement between the two. A mylar excessed depth plot of all mainscheme and crossline soundings was overlaid on a paper unexcessed depth plot of only crossline soundings. The agreement between the two is within 0.5 meters within a field sheet radius of 5 mm.

L. JUNCTIONS *See also section 5. of the Evaluation Report.*
This survey does not junction with any current surveys.

M. COMPARISON WITH PRIOR SURVEYS *See also section 6. of the Evaluation Report*
The comparison between soundings from this survey and prior surveys is to be addressed by the Atlantic Hydrographic Section.

N. COMPARISON WITH THE CHART *See Also Section 7. of the Evaluation Report*

AWOIS 1906

N.1 The object of this investigation is a 38 foot steel hulled motor vessel that was reported sunk in 1978.

N.2 Item Location

Geographic position provided was: 41° 25' 30.37" N
71° 14' 58.15" W

N.3 Source of Item

Notice to Mariners 52/78.

N.4 Largest Scale Chart Affected

Chart 13221, scale 1:40,000, edition 47 dated March 23, 1991.

The search radius for this item went beyond the confines of this chart.

Chart 13218, scale 1:80,000, edition 31 dated January 11, 1992.

The search radius for this item fit entirely within the confines of this chart.

N.5 Investigation Procedures

Survey requirements called for 200% side scan sonar coverage in conjunction with echosounder development in a 2000 meter search radius. A diver investigation was also required, if appropriate.

Two hundred percent side scan coverage was completed on this item. The line spacing used for both the mainscheme (North-South) and crossline (East-West) side scan sonar coverage was 170 meters. Holidays were identified by use of a edited swath plot and then reconciled by further side scan sonar coverage.

After the completion of the above investigation, further efforts entailed hydrographic development with the sole use of the DSF-6000 echosounder. This was conducted in a mainscheme orientation and such that these lines of echosounder investigation split evenly the mainscheme lines of side scan sonar coverage. Again, 170 meter spacing was used for this coverage.

At the extreme edge of the search radius in the northwest portion of the search area there are several fish traps. These traps prevented survey operations there. This particular area is less than 3% of the entire search area. Given the distance of this area to the charted position of the wreck (PA), it is extremely

unlikely the wreck lies within the unsurveyed portion of the search radius.

The next step in the investigation involved identifying areas that warranted further investigation. These "developments" consisted of two types. The first were contacts that were deemed significant requiring further investigation. The second were soundings that were unreconcilable with presently charted depths. These developments were chosen by use of both a contact plot and a comparison of the excess depth plot with charted depths. Over 40 such contacts and chart discrepancies were selected for further investigation by echosounder.

These "developments" were each dealt with individually. Bottom features were investigated by echosounder to delineate the extent and least depth of the feature. The objective of investigating the inconsistencies between soundings from this survey and charted depths was to determine the actual depth. In four cases, questionable fathometer spikes identified in contact development were designated as "sub-developments". These were designated 20A, 20B, 41A, and 41B. These sub-developments were investigated by the same means as the developments.

To investigate these developments tightly spaced echosounder lines were run over the computed position of the contact or questionable sounding. These investigations were rather intensive with line spacing most often at 5 meters and never exceeding 25 meters. Such lines were run by the item of interest until a least depth was determined and the definite boundaries of the item had been determined.

On DN 168 RUDE received a request from the Atlantic Hydrographic Section for additional investigation activities for this survey. This request was under the auspices of the Pilot Partnership Processing Program. The request was for additional investigation of selected presently charted depths and for development of several significant contact groups. This work was completed on DN 174-176 as developments 50 through 57.

N.6 Investigation Results

While many contacts were found and investigated, nothing that resembled a 38 foot vessel was found within the search radius. The results of all developments are abstracted on the following pages. The bottom in this area is so cluttered with natural features that a 38 foot wreck would be a minor feature among all the sizeable boulders found during this survey. It is recommended that this item be considered disproved. *CONCOR*

N.7 Explanation for Position Difference

This is not applicable.

N.8 Least Depth Information

This is not applicable for AWOIS 1906. Least depth information for the contacts are abstracted on the pages following this section.

N.9 Charting Recommendation

Delete the presently charted dangerous wreck symbol PA (depth unknown). ✓

N.10 Danger to Navigation Report

Submitted July 7, 1992 and included with this report. ~~in Appendix I.~~ This report was submitted because of the significant discrepancies found between presently charted depths and soundings from this survey.

N.11 Although this item is technically of limited extent, it was conducted as a basic survey due to it being disproved after 200% side scan sonar coverage and extensive contact developments. See section N.12 for a comparison of soundings from this survey with depths presently charted.

N.12 Soundings from this survey were compared with the presently charted depths on the largest scale charts of the area:

13218, edition 31	scale 1:80,000	dated March 23, 1991
13221, edition 47	scale 1:40,000	dated January 11, 1992

This was done by scaling off the position of all the depths from the above charts that fell within the search radius of AWOIS 1906. These depths were entered into a HDAPS cartographic table and plotted at the scale of each of the above charts. These mylar plots were overlaid on their respective charts and the position of the plotted depths was compared to the actual charted depths. Where necessary, adjustments were made so that the position of the depths on the plot conformed as close as possible to the actual charted depths they corresponded to. Any position changes were entered into the carto table and depths were changed from feet to meters to conform with the units of this survey.

The next step involved plotting the depths in carto table 1 at the scale of the field sheet, 1:10,000. This plot was then overlaid on the field sheet to facilitate a direct comparison of soundings resulting from this survey to presently charted depths.

The results of this comparison show numerous soundings from this survey to be shoaler than presently charted depths. Some discrepancies are on the order of 10 -20 feet. Four of these discrepancies were of a magnitude to justify the issuance of a Danger to Navigation report. This report is included ~~in Appendix I.~~ ^{with this report} It discusses in detail these four particular soundings and includes a chartlet illustrating all sounding/depth discrepancies. ~~In Appendix VI,~~ Supplemental Correspondence, a

copy of a letter to the Chief, Atlantic Hydrographic Section is included. It discusses the discrepancies between soundings and depths and requests guidance on the necessity to issue a Danger to Navigation report. Plot #3 of that letter shows where discrepancies between soundings and depths exist.

DEVELOPMENTS: FE-373SS

Dev	Side Scan Contact Numbers	Hydro Dev Posns	Least Depth (m)	LD Pos	Geographic Position	Remarks
1	4249.31S <i>4106.51P</i>	4818-4825	20.78	4822.2	41°24'30.4 ⁵ 33" 71°11'09.748" ⁵	
2	4249.06P, 4249.10P <i>4007.03P</i>	4802-4817	18.78	4812.2	41°24'28.2 ³⁰ 86" 71°10'54.175" ⁸	
3	4040.20P	4661-4670	20.1	4663.1	41°24'34.293" 71°10'23.526"	
4	4024.46S, 4237.16S	4671-4678	21.47 <i>*21.2</i>	4671.1	41°24'41.27 ¹ 8" 71°10'34.779" <i>5.06</i>	* SHOALER DEPTH SHOWN FROM DEV #41
5	4040.55P, 4233.20P	4679-4686	17.24	4683.1	41°24'46.676" 71°10'22.711" <i>23.72</i>	
6	4066.00P, 4234.12S	4649-4660	20.68	4651.1	41°24'44.127" 71°10'00.345" ⁴	
7	4051.27S, 4051.29S 4220.15S	4629-4648	19.23	4633.1	41°24'56.977" 71°10'16.650" ⁵	
8	4025.41S, 4211.33P	4687-4694	19.9 <i>20.5</i>	4687.1	41°25'00.450" 71°10'33.818" ²	
9	4219.01S	4695-4706	20.9 <i>21.2</i>	4697.1	41°24'55.783" 71°10'53.853" ⁸⁰	
10	4051.02P, 4051.03P 4051.06S, 4055.36P 4207.05S, 4210.59S	4609-4628	20.12	4625.1	41°25'04.507" 71°10'16.657" ⁶	

DEVELOPMENTS: FE-373SS

Dev	Side Scan Contact Numbers	Hydro Dev Posns	Least Depth(m)	LD Pos	Geographic Position	Remarks
11	4042.15S	4577-4590	20.8 21.1	4579.2	41°25'16.3 ⁷ 56" 71°10'19.4 ⁷ 14"	
12	4035.37P, 4042.21P 4050.29P, 4190.55S 4191.13S, 4195.38S 4190.55S, 4191.55S +	4591-4608	19.2 ³	4591.1	41°25'16.8 ⁷ 55" 71°10'16.9 ⁷ 71"	
13	4180.27P	4565-4576	21.0	4571.1	41°25'23.8 ⁷ 50" 71°10'16.8 ⁷ 76"	
14	4081.29S, 4177.05P	4499-4512	20.9 21.0	4505.4	41°25'29.9 ^{30.02} 98" 71°09'36.7 ² 18"	
15	4295.04P	4513-4518	18.8 ⁹	4517.1	41°25'57.8 ⁵ 29" 71°09'42.640"	
16	4061.28P	4545-4554	16.9	4549.2	41°26'13.0 ⁴ 19" 71°09'56.3 ⁷ 62"	
17	4058.20P	4555-4564	18.8 ⁶	456 ⁵⁹ 1.2	41°26'08.4 ⁹ 53" 71°10'08.4 ⁷⁰ 52"	
18	4028.49S, 4307.39S 4307.50P	5335-5352	17.1	5339.1	41°26'05.5 ⁶¹ 92" 71°10'34.7 ⁸⁰ 94"	
19	4029.07S	5353-5376	16.5 *15.7	5359.1	41°26'07.8 ^{08.38} 39" 71°10'44.6 ^{41.34} 44"	* SHORLEST DEPTH FROM DEV. 56
20	4010.46P, 4021.50P 4021.52S, 4025.11S 4025.16P, 4037.00S 4224.25P, 4224.32P +	4707-4742	17.5 18.2	4708.1 ⁴ 2	41°24'48.0 ⁴ 22" 71°10'26.7 ⁵ 48"	+4224.39P, .48S 4225.03S

DEVELOPMENTS: FE-373SS

Dev	Side Scan Contact Numbers	Hydro Dev Posns	Least Depth (m)	LD Pos	Geographic Position	Remarks
20A	Based on Dev 20 Hydro dev	5471-5480	18.8 ²	5473.1	41°24'47.501" 71°10'27.115"	
20B	Based on Dev 20 Hydro dev	5481-5490	18.8	5487.1	41°24'50.645" 71°10'36.680"	
21	4096.35P, 4096.43P 4096.49P, 4326.08P 4333.15P	5443-5460	13.5 12.6	5447.4	41°26'32.706" 71°11'05.280"	
22	4099.51S, 4319.09P	5409-5418	16.3 ²	5413.1	41°26'20.490" 71°11'14.001"	
23	4116.03P, 4314.21S	5315-5324	13.4 11.9	5324.0 5319.3	41°26'18.108" 71°11'24.801"	
24	4002.04S, 4002.01P 4095.01P, 4095.06P 4095.12S, 4095.18S 4284.52S, 4285.02S +	5255-5314	15.1 ⁰	5289.2	41°25'55.664" 71°11'02.005"	
25	Dev. based on depth	5227-5254	11.1 ⁰	5239.1	41°25'52.673" 71°11'12.698"	
26	4275.51S	5215-5226	16.2 ³ 16.0 19.1	5215.2 4335.6 5223.2	41°25'50.529" 71°11'16.635"	
27	4002.57S	5077-5088	20.1 ⁰	5083.1	41°25'42.392" 71°11'00.493"	
28	4012.55S	5089-5108	15.6 ⁵	5091.1	41°25'36.823" 71°10'48.038"	

DEVELOPMENTS: FE-373SS

Dev	Side Scan Contact Numbers	Hydro Dev Posns	Least Depth (m)	LD Pos	Geographic Position	Remarks
29	4027.37P	5325-5334	Insignificant			Flat Bottom
30	4189.29S	5039-5048	22.3 ₂	5045.1	41°25'18.805" 71°11'09.337" ²	
31	4112.42S, 4112.42S 4126.43S, 4267.20P 4267.26P, 4269.07P+	5147-5162	18.2 ₁	5149.4	41°25'39.880" 71°11'34.058" ⁴	
32	4146.38P, 4146.41P 4146.41P, 4151.22P 4274.07S, 4274.10S	5049-5076	15.9	5051.2	41°25'44.358" 71°11'57.586" ⁶	
33	4171.36S	5017-5038	14.6	5033.1	41°25'31.249" 71°11'54.465" ⁹	
34	4152.28S, 4157.50S	5001-5012	19.7 Ex1 19.4	5003.3 4358.0	41°25'24.085" 71°12'13.420" ^{6 53} 07.59	
35	4166.55P, 4187.04P	4933-4946	19.7 ₅	4939.2	41°25'19.817" 71°12'26.494" ³	
36	418 ₅ 2.28S	4947-4962 5013-5016	12.9 ₈	5014 DIVE D.P.	41°25'25.302" 71°12'38.262" ²	
37	4203.13S	4917-4932	19.7 ₆	4919.1	41°25'08.104" 71°11'53.845" ²	
38	4153.48P	4836-4845	19.4 ¹	4842.2	41°24'56.494" 71°12'02.477" ⁵	

DEVELOPMENTS: FE-373SS

Dev	Side Scan Contact Numbers	Hydro Dev Posns	Least Depth (m)	LD Pos	Geographic Position	Remarks
39	4229.26S	4826-4835	20.3 ⁵	4830.1	41°24'41.9 ⁹ 68" 71°12'02.30 ¹ 99"	
40	4131.30P, 4140.33P 4140.35P, 4213.50P 4217.15P	4846-4884	19.0 ²	4856.1	41°25'00.2 ³⁰ 79" 71°11'48.1 ²⁰ 99"	
41	4021.30P, 4025.11S 4024.46S, 4025.16P 4036.46P, 4037.00S+	4743-4801	17.8 18.0	4761.2	41°24'52.4 ⁸ 58" 71°10'20.9 ^{1.00} 97"	Based on depth
41A	Based on Dev 41	5461-5470	17.7 ⁸	546 ⁷ 8.1	41°24'54.5 ⁶³ 37" 71°10'19.7 ⁴² 13"	
41B	Based on Dev 41	5491-5502	19.5 ⁴	5497.2	41°24'38.1 ²¹ 90" 71°10'21.7 ⁰⁴ 04"	
42	4029.07S, 4307.39S 4307.50P	5377-5408	16.3 ^{EX2} 15.7	5401.1 5526.7 ←	41°26'08.5 ³⁸ 29" 71°10'42.0 ^{6.34} 84"	Based on depth
43	Based on Depth	5419-5442	13.4	5431.1	41°26'31.6 ² 01" 71°10'33.7 ⁶ 58"	
44	4002.04S, 4002.01P 4095.01P, 4095.06P 4095.12S, 4095.18S+	5163-5214 Based on	11.1 ⁰ depth	5239.1	41°25'52.6 ⁹ 73" 71°11'12.6 ⁷⁰ 98"	Least Depth Same as Dev 25
45	4145.49P, 4146.05P 4146.19P, 4152.09P 4171.23S, 4171.36S+	5109-5146	15.1 14.9	5135.3	41°25'34.1 ⁹ 75" 71°11'59.7 ⁸⁰ 98"	Based on depth
46	Based on depth	488 ⁷ 5-4916	16.6	4913.2	41°25'17.6 ⁷⁰ 86" 71°11'59.2 ³⁰ 95"	

DEVELOPMENTS: FE-373SS

Dev	Side Scan Contact Numbers	Hydro Dev Posns	Least Depth (m)	LD Pos	Geographic Position	Remarks
47	4166.55P, 4167.19P 4185.28S, 4187.04P	4963-5000 Based on	12.2 ⁸ Depth <i>DIVE D.P</i>	5014	41°25'25.30 ² " 71°12'38.26 ² "	Least Depth Same as Dev 36
48	Based on Depth	4519-4544	15.3 ⁴	4519.1	41°26'13.39 ⁴ " 71°09'48.31 ² "	Based on depth
49	No Development 49	-----	-----	-----	-----	-----
50	4317.22P, 4317.24P	5684-5699	14.7 ⁶	5694.2	41°26'08.13 ⁵ " 71°11'43.29 ³ "	
51	4300.31P	5546-5561	16.2 ⁸	5552.2	41°26'02.22 ⁴ " 71°11'25.24 ⁰ "	
52	Based on Depth	5582-5623	11.1 ⁰	5604.3	41°26'31.05 ⁷ " 71°11'09.73 ⁴ "	<i>SIGNAL</i>
53	4000.21S, 4000.23P 4329.02P	5634-5677	16.1 ⁰	5662.1	41°26'31.29 ³ " 71°10'59.27 ⁸ "	
54	4319.53P, 4325.45P	5624-5633	18.1	5624.1	41°26'20.36 ⁶ " 71°10'53.75 ⁸ "	same as 25
55	4325.05S	5678-5683	17.8 ⁷	5678.1	41°26'27.01 ³ " 71°10'33.27 ³ "	
56	Based on Depth	5518-5545	15.2 ⁷	5526.7	41°26'08.36 ⁸ " 71°10'41.33 ⁹ "	
57	Based on Depth	5562-5581	10.3	5580.5	41°26'16.40 ² " 71°11'34.16 ⁰ "	<i>SIGNAL</i>

O. ADEQUACY OF SURVEY

O.1 All items investigated during this survey have been addressed.

O.2 Except for the area that was not surveyed in the extreme northwest portion of the search area, there are no parts of the survey that are considered incomplete or substandard.

P. AIDS TO NAVIGATION See Also section 7.6. of the Evaluation Report

P.1 The RUDE conducted no correspondence with the U.S. Coast Guard regarding floating aids to navigation.

P.2 A detached position was obtained for ^{Bell R} buoy "2". It lies in the extreme northwest corner of the search area. The U.S. Coast Guard Light List identifies this buoy as #16125, Schuyler Ledge Bell Buoy "2". This description is consistent with the actual buoy. The position for this buoy was scaled off of chart 13221. That position compares within 0.2 seconds in both latitude and longitude with the detached position. The detached position was adjusted for the ship's actual position in relation to the buoy at the time of the detached position.

P.3 No aids not already listed in the Light List were located during this survey.

P.4 No bridges, overhead cables or overhead pipelines are located within the survey area.

P.5 No submarine cables, pipelines or ferry routes are located within the survey area.

P.6 No ferry terminals are located within the survey area.

Q. STATISTICS

Q.1	a) Number of positions	1699
	b) Lineal nautical miles of sounding lines	
	-nautical miles of survey with the use of the side scan sonar	90.98
	-nautical miles of survey without the use of the side scan sonar	156.59
Q.2	a) square nautical miles of hydrography	3.8
	b) days of production	16
	c) detached positions	74
	-1 for diver investigation	
	-13 for bottom samples	
	-1 for buoy "R2"	
	-59 for developments and sub-developments	
	d) bottom samples	13
	e) tide stations	1
	f) current stations	0
	g) velocity casts	4
	h) magnetic stations	0
	i) XBT drops	0

R. MISCELLANEOUS

R.1 a) No evidence of silting was found during this survey.

b) No evidence of unusual submarine features was found during this survey.

c) No evidence of anomalous tidal conditions was found during this survey.

d) The tidal current tables for the area predict currents to be generally one half knot. Observations by divers concur with this.

e) No evidence of magnetic anomalies was found during this survey.

R.2 Bottom sampling was conducted for this project. The project instructions do not require samples be forwarded to the Smithsonian Institution. The results of the bottom samples are summarized in NOAA Form 75-44 included in Separate II. ** Filed with the original field records*

S. RECOMMENDATIONS

S.1 No survey inadequacies have been noted.

S.2 The RUDE is aware of no construction or dredging that will affect results of this survey.

S.3 No further investigation of the survey area is recommended.

T. REFERRAL TO REPORTS

No other reports have been submitted in conjunction with this survey.

APPENDIX VII. APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. FE-373SS

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

Nicholas E. Perugini

Nicholas E. Perugini, LCDR NOAA
Commanding Officer
NOAA Ship RUDE

CONTROL STATIONS as of 14 Aug 1992

No	Type	Latitude	Longitude	H	Cart	Freq	Vel	Code	MM/DD/YY	Station Name
121	F	041:26:57.711	071:23:57.797	20	254	0.0	0.0	04/01/92		BEAVERTAIL LIGHT OFFSET, 1991
130	F	041:28:37.723	071:14:27.579	15	250	0.0	0.0	04/02/92		SACHUEST, 1940
131	F	041:27:40.811	071:10:19.818	7	250	0.0	0.0	5 04/02/92		WARREN RESET, 1940
132	F	041:24:52.193	070:56:58.452	19	250	0.0	0.0	6 06/17/92		CUTTYHUNK LIGHTHOUSE, 1904
133	F	041:30:26.413	071:05:17.106	9	250	0.0	0.0	7 05/25/92		WESTPORT LIGHT, 1934

DEVELOPMENT 36
FE-373SS AWOIS ITEM 1907
DIVE INVESTIGATION REPORT

DATE: 27 MAY 92 DOY: 148 TIME: 1715Z

PERSONNEL:

DIVEMASTER\TENDER- LTJG OBERLIES DIVERS- LT SCHATTGEN

COXSWAIN\TENDER- J. BRAWLEY - ENS ILLG

VISIBILITY: 30 FEET CURRENT: 1 KNOT

MAXIMUM DEPTH: 21.6 METERS BOTTOM TIME: 20 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 5014

EASTING: 160257.2 NORTHING: 269125.9

LATITUDE: 41-25-25.30 N LONGITUDE: 71-12-38.26 W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 13.4 METERS

TIME OF READING: 1715Z

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

PREDICTED TIDAL ZONE CORRECTOR: -0.5

LEAST DEPTH DETERMINED @MLLW 12.8⁸ METERS ✓

NARRATIVE REPORT: The object of this investigation was a tremendous boulder. It was steep sided with a well defined top and host to an abundance of marine growth. There was a much smaller rock in close proximity to it. The bottom in the area was otherwise flat and composed of coarse sand. A least depth was determined by three consecutive readings with a pneumatic depth gauge. This least depth was determined to be 13.4 (44.3 feet) meters at the time of the survey. Diver's depth gauges found this same point to be 44 feet (13.4 meters). *Concur.*

The rock originates with H-4006 WD (1917) as a long charted as a 51-ft sounding (15.5m) in Lat: 41°25'27.1"N, Long: 71°12'38.5"W. Chart as a 12.8m Rk as shown on the present survey.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
Atlantic Marine Center
439 W. York Street
Norfolk, VA 23510-1114

July 7, 1992

MEMORANDUM FOR: Rear Admiral Freddie L. Jeffries, NOAA
Director, Atlantic Marine Center

FROM: *Nicholas E. Perugini*
Lieutenant Commander Nicholas E. Perugini, NOAA
Commanding Officer, NOAA Ship RUDE

SUBJECT: Dangers to Navigation Report, OPR-B660-RU-92

Attached is a letter to the Commander, First Coast Guard District concerning significant charting discrepancies discovered by RUDE in Rhode Island Sound. Copies are being forwarded to the appropriate offices.

Attachment

cc: N/CG241 - Wilder
N/CG244 - Lawrence
N/CG221 - Romesburg
DMAHTC





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
Atlantic Marine Center
439 W. York Street
Norfolk, VA 23510-1114

July 7, 1992

Commander, First Coast Guard District
Aids to Navigation Office
408 Atlantic Ave.
Boston, Mass. 02110-3350

Dear Sir,

The NOAA Ship RUDE has discovered major charting discrepancies while conducting hydrographic surveys in Rhode Island Sound. Survey depths which are 5 to 20 feet shoaler than currently charted depths have been located one to three miles south southeast of Sakonnet Point. It is requested that information concerning these discrepancies be published in the Local Notice to Mariners. Charts affected by this report are NOS Chart 13221 and 13218.

Detailed information concerning the discrepancies is presented below. All data submitted in this report should be considered preliminary information subject to office review. All geographic coordinates are referenced to the North American Datum of 1983 (NAD 83). Depths are in feet and have been reduced to Mean Lower Low Water (MLLW) by the application of predicted tide corrections.

Hydrographic Survey Registry Number: FE-373SS

State: Rhode Island

General Locality: Rhode Island Sound

Sublocality: 1.8 NM SSE of Sakonnet Point

Description: Numerous submerged boulders rising 5 to 20 feet off the bottom were discovered by side scan sonar while the NOAA Ship RUDE was conducting survey operations within a 1.2 NM radius of the charted dangerous wreck located at position:

41° 25' 30.4" N
071° 10' 58.1" W

The enclosed chartlet (13221, 47th ED., Mar 23/91, 1:40,000) shows the survey area with new shoal depths being circled.



While the new survey shows shoaler depths throughout the area, the most critical discrepancies are listed in the following table.

Critical Discrepancies: Chart 13221 and 13218

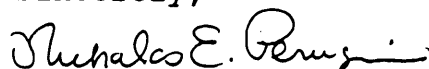
Charted Depth (Feet)	Survey Depth (Feet)	Survey Position (NAD 83)
51	42 (supercedes 51)	41° 25' 25.30 N 071° 12' 38.26 W
60-61	44 (add to chart)	41° 26' 31.60 N 071° 10' 33.76 W
71-72	51 (add to chart)	41° 25' 36.82 N 071° 10' 48.04 W
41	36 (supercedes 41)	41° 25' 52.67 N 071° 11' 12.70 W

NOAA Charts Affected by Changes			
Chart Number	Edition	Date	Scale
13221	47th	Mar 23, 1991	1:40,000
13218	31st	Jan 11, 1992	1:80,000

Questions regarding this report or any charting discrepancy in the Rhode Island Sound-Buzzards Bay area should be directed to the following address.

Commanding Officer
NOAA Ship RUDE
16 Scotcut Nk, #244
Fairhaven, Mass 02719
401-524-2498

Sincerely,



Nicholas E. Perugini, LCDR, NOAA
Commanding Officer, NOAA Ship RUDE



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
Atlantic Marine Center
439 W. York Street
Norfolk, VA 23510-1114

June 15, 1992

MEMORANDUM FOR: Lieutenant Commander John Wilder
Chief, Operations Section
Hydrographic Surveys Branch

FROM: Lieutenant Commander Nicholas E. Perugini, NOAA
Commanding Officer, NOAA Ship RUDE

SUBJECT: Failure of Tide Gauge at Sakonnet Point
Tide Station Number 845-0768

Recently, RUDE personnel discovered that the ADR tide gauge failed at Sakonnet Point (Station 845-0768). It appears that the gauge was down from June 4 to June 9. Unfortunately, the contract observer who tends the gauge daily was unable to detect the problem.

Survey data were acquired on four of the days that the gauge was down. In particular, a good deal of work was done on AWOIS 1893 and AWOIS 1899. AWOIS 1893 was a side scan sonar disapproval, while a hydro development was run over the shoal defined by AWOIS 1899. On June 10, when the gauge was again operational, a dive was made to determine the least depth on that shoal.

It is requested that you contact the Tides Branch and determine if the data acquired during that period is acceptable. Assuming the control gauge at Newport was operational, I would hope they could salvage the data.

Please contact me as soon as possible concerning this matter.

LCDR WILDER RESPONDED BY TELEPHONE ON JUNE 16, 1992, after this was fax'd to his office. He talked to tides branch and said there would be no problem since Newport gauge was running during this period.

Nicholas E. Perugini

8-16-92

1 of 2





U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

June 30, 1992

MEMORANDUM FOR: Commander Christopher B. Lawrence, NOAA
Chief, Atlantic Hydrographic Section

FROM: Lieutenant Commander *Nicholas E. Perugini*, NOAA
Commanding Officer, NOAA Ship RUDE

SUBJECT: Assistance in Identifying Dangers to Navigation
FE-373SS, AWOIS 1906

Your assistance is requested in evaluating potential "Dangers to Navigation" for survey FE-373SS. Survey soundings are generally three to ten feet shoaler than depths which are currently charted. The discrepancies have been found in depths of 37 to 75 feet. Most of the survey records for FE-373SS have already been forwarded to AHS for processing under the auspices of the pilot program. I expect to forward the final descriptive report and field sheets next week.

While these discrepancies are significant from a hydrographic standpoint, I do not believe that they qualify as "Dangers to Navigation." I have discussed the situation several times with Rudy Sanocki and I think he agrees with my analysis. However, LCDR Wilder and Mark Frieze have indicated to me that a report may be warranted.

I have enclosed three mylar field sheets which we have used to construct a preliminary analysis of the discrepancies. All page size plots are to be overlaid on Chart 13221, 1:40,000.

Plot 1 - (Green depths, slant) - These depths correspond to currently charted depths.

Plot 2 - (Black depths) - These are development least depths taken from survey data. When overlaid on the chart, a comparison between charted depths and survey soundings can be made.

Plot 3 - (Green and black depths) - Charted depths and survey soundings. I have circled lightly in pencil where major discrepancies exist.

It is requested that you examine these plots and advise me of what course of action, if any, should be taken.





TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: August 5, 1992

MARINE CENTER: Atlantic

OPR: B660-RU-92

HYDROGRAPHIC SHEET: FE-373SS

LOCALITY: Rhode Island, Rhode Island Sound, One Point Eight
Nautical Miles South Southeast of Sakonnet Point

TIME PERIOD: May 1 - June 25, 1992

TIDE STATION USED: 845-0768 Sakonnet Yacht Club, Rhode Island
Lat. $41^{\circ} 27.9'N$ Lon. $71^{\circ} 11.6'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 8.13 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.3 ft.

TIDE STATION USED: 845-2660 Newport, Rhode Island
Lat. $41^{\circ} 30.3'N$ Lon. $71^{\circ} 19.6'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 1.67 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.7 ft.

REMARKS: RECOMMENDED ZONING

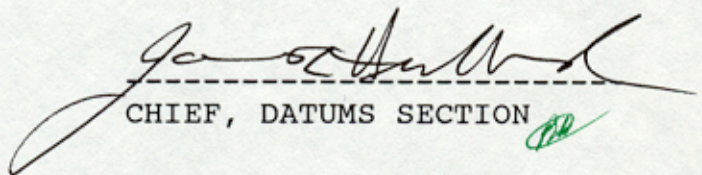

East of $71^{\circ} 23.0'W$ Longitude, west of $71^{\circ} 0.0'W$ Longitude, south of $41^{\circ} 30.0'N$ Latitude and north of $41^{\circ} 18.0'N$ Latitude, times are direct and apply a x0.92 range ratio to Sakonnet Yacht Club, Rhode Island (845-0768).



HYDROGRAPHIC SHEET: FE-373SS

When data for Sakonnet Yacht Club, Rhode Island are not available, apply a -6 minute time correction and a x0.85 range ratio to Newport, Rhode Island (845-2660).

Note: Times are tabulated in Eastern Standard Time.


CHIEF, DATUMS SECTION 

GEOGRAPHIC NAMES

FE-373 SS

Name on Survey	Source of Name											
	A	B	C	D	E	F	G	H	K			
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	GRAND McNALLY ATLAS	U.S. LIGHT LIST				
RHODE ISLAND (title)												1
RHODE ISLAND SOUND (title)												2
SAKONNET POINT (title)												3
SCHUYLER LEDGE												4
												5
												6
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Approved

Charles E. Harrington
Chief Geographer - N/C4285

DEC 14 1992

05/07/93

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: FE-373SS

NUMBER OF CONTROL STATIONS		6
NUMBER OF POSITIONS		891
NUMBER OF SOUNDINGS		3753
	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	199	08/27/92
VERIFICATION OF FIELD DATA	244	03/05/93
ELECTRONIC DATA PROCESSING	53	
QUALITY CONTROL CHECKS	60	
EVALUATION AND ANALYSIS	76	04/16/93
FINAL INSPECTION	36	04/30/93
TOTAL TIME	668	
ATLANTIC HYROGRAPHIC SECTION APPROVAL		05/03/93

N/CG244-65-93

LETTER TRANSMITTING DATA

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

- ORDINARY MAIL AIR MAIL
- REGISTERED MAIL EXPRESS
- GBL (Give number) _____

TO:

Data Control Section,
 N/CG243, Stn 6813, SSMC3
 NOAA/Hydrographic Surveys Branch
 1315 East-West Highway
 Silver Spring, MD 20910

DATE FORWARDED

7 June 1993

NUMBER OF PACKAGES
1 box

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-373SS

Rhode Island, Rhode Island Sound, 1.8 NM SSE of Sakonnet Point

1 Box containing:

- ~~1~~ Original Descriptive Report with smooth sheet appended for FE-373SS
- ~~1~~ Original containing: 3 smooth position overlays
3 sounding excess levels
- ~~1~~ Envelope containing Appendices and Separates removed from the original Descriptive Report
- ~~1~~ Cahier with Final Sounding Printout, Position Printout, Control File and Line File
- ~~1~~ Accordion file with: - fathograms, side scan sonargrams and field printouts
for 1992 JD's: 121, 125, 126, 127, 128, 141, 142,
143, 147, 148, 149, 150, 154, 155,
174, 175, and 176
-HDAPS to Harris Printout
-Data Abstracts
-Hippy Printouts
- ~~1~~ Envelope containing misc. data removed from the Printouts

FROM: (Signature)

Richard H. Whitfield
Richard H. Whitfield

RECEIVED THE ABOVE
(Name, Division, Date)

D. S. Clark

JUN 16 1993

Return receipted copy to:

Atlantic Hydrographic Section, N/CG244
 439 W. York Street
 Norfolk, VA 23510-1114

**COAST AND GEODETIC SURVEY
ATLANTIC HYDROGRAPHIC SECTION
EVALUATION REPORT**

SURVEY NO.: FE-373SS

FIELD NO.: RU-20-4-92

Rhode Island, Rhode Island Sound, 1.8 NM SSE of Sakonnet Point

SURVEYED: April 30 through June 24, 1992

SCALE: 1:20,000

PROJECT NO.: OPR-B660-RU-92

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

CONTROL: MOTOROLA Falcon 484 Mini-Ranger (Range-Range), and ASHTECH and MAGNAVOX Differential Global Positioning Systems,

Chief of Party.....N. E. Perugini

Surveyed by.....P. L. Schattgen
.....M. J. Oberlies
.....J. A. Illg
.....R. T. Brennan
.....D. E. Williams

Automated Plots by.....XYNETICS 1201 Plotter (AHS)

1. INTRODUCTION

a. This is primarily a side scan sonar survey. A RAYTHEON DSF-6000N fathometer was operated concurrently with the side scan sonar. Fathometer developments were conducted to search for several features found on the sonargrams. The fathometer was used in positioning and obtaining depths of these features. In cases where the side scan sonar was used to determine the estimated depth of a feature, the item is shown on the present survey with the upper case letter 'A' in parenthesis. Depths on these items were estimated by scaling heights off the bottom from side scan sonar records. Positions were determined by computing offsets from the vessel's track. This note is shown on the present survey in proximity to the title. See also the memorandum titled "Showing Estimated Side Scan Sonar Depths on Smooth Sheets," dated 23 February 1989, for an explanation of the note shown on the survey smooth sheet.

b. One 1:20,000 scale page size plot and accompanying overlays were generated during office processing. This plot is considered the smooth plot for this survey.

c. Corrections and notes made by the evaluator in the

Descriptive Report are in red ink.

2. CONTROL AND SHORELINE

a. Control is adequately discussed in Section H. and I. of the Descriptive Report.

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). 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 North American Datum of 1983 (NAD 83) and the North American Datum of 1927 (NAD 27).

To place the smooth plot on the NAD 27 move the projection lines 0.376 seconds (11.59 meters or 0.58 mm at the scale of the survey) north in latitude and 1.840 seconds (42.72 meters or 2.14 mm at the scale of the survey) east in longitude.

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

3. HYDROGRAPHY

a. Where crossings occur there is adequate agreement.

b. The standard depth curves are drawn in their entirety on the smooth sheet.

c. The development of bottom configuration and the investigation of features and least depths is considered adequate with the following exception of two side scan sonar contacts noted during office processing. See section 7.a.1) of this report.

4. CONDITION OF SURVEY

The smooth plot and accompanying overlays, survey records, and reports adequately conform to the requirements of the HYDROGRAPHIC MANUAL, SIDE SCAN SONAR MANUAL, and the FIELD PROCEDURES MANUAL.

5. JUNCTIONS

There are no junctional requirements for this survey. Present survey depths are in harmony with the charted hydrography and the contemporary hydrography shown on FE-374 (1993).

6. COMPARISON WITH PRIOR SURVEYS

a. Hydrographic Surveys

H-5553 (1934-35)	1:10,000
H-6444 (1939)	1:40,000
H-6445 (1939)	1:40,000
<u>H-8366 (1957)</u>	<u>1:10,000</u>

1) Prior survey H-5553 (1934-35) covers approximately 20% of the present survey to the north. Only the common area of this prior survey which has not been superseded by prior survey H-8366 (1957) was considered in this comparison. The prior survey shows indications of a few shoal features common to the present survey. Several critical features found by the present survey are not seen on the prior survey. Because of the paucity of soundings on the present survey in the vicinity of Schuyler Ledge, an uncharted 41-ft (12⁵ m) sounding, in Latitude 41°26'25.38"N, Longitude 71°11'23.61"W, has been brought forward from the prior survey to supplement the present survey. The prior survey soundings are generally 0³-0⁹ meters (1-3 ft) deeper than the present hydrography within the common area. These differences may be attributed to a more accurate and detailed present survey and naturally occurring changes that could occur in a shoal area near the mouth of a river.

2) Prior surveys H-6444 (1939) and H-6445 (1939) are surveys that junction with one another and cover approximately 85% of the present survey to the south. These prior surveys show indications of shoal features that are more defined on the present survey. Where the present and prior survey soundings are congruent, the prior soundings are generally 0³-0⁶ meters (1-2 ft) shoaler than present hydrography. These differences may be attributed to improved surveying methods by the present survey and/or naturally occurring changes that could occur in an area near the mouth of a river.

3) Prior survey H-8366 (1957) covers approximately 10% of the present survey to the northwest. Prior survey soundings are generally 0⁶ to 1² meters (2 to 4 ft) shoaler than present hydrography. These differences may be attributed to naturally occurring changes that could occur in an area near the mouth of a river and/or improved surveying methods of the present survey. The prior survey has good sounding density and shows good definition of features. In the vicinity of Schuyler Ledge, there is a paucity of soundings on the present survey. A charted 32 foot (9⁷ m) sounding in Latitude 41°26'14.94"N, Longitude 71°11'40.81"W and an

uncharted 37 foot (11³ m) sounding in Latitude 41°26'15.19"N, Longitude 71°11'37.22"W, have been brought forward from the prior survey to supplement the present survey.

The present survey is adequate to supersede the prior surveys within the common area except in the area of Schuyler Ledge. In this area the present survey is adequate to supplement the prior surveys. Additional field work is recommended in the area of Schuyler Ledge.

b. Wire Drag Surveys

H-3668aWD (1914-17) 1:30,000
 H-4006WD (1917) 1:20,000
FE-194 (1963) 1:20,000, 1:40,000, and 1:80,000

1) Prior survey H-3668aWD (1914-17) covers a very small portion of the present survey to the south. No hangs or groundings are within the common area. No conflicts exist between the present hydrography and the prior survey effective depths.

2) Prior survey H-4006WD (1917) is common to approximately 99% of the present survey. Comparison with the prior survey shows one hang that falls within the common area of the present survey. The sounding is considered resolved by the present survey. A discussion and charting recommendation can be found in the Dive Investigation Report appended to the Descriptive Report. The following should be noted:

a) The following charted soundings originate with the prior survey:

<u>PRIOR</u> <u>SNDG (FT/M)</u>	<u>PRIOR SOUNDING G.P.</u>		<u>PRESENT</u> <u>SNDG (M/FT)</u>
	<u>LATITUDE (N)</u>	<u>LONGITUDE (W)</u>	
52/15 ⁸	41°25'39.1"	71°12'08.4"	16 ⁵ /54
57/17 ⁴	41°25'29.0"	71°11'55.3"	14 ⁶ Rk/48Rk

The present survey is adequate to supersede the charted prior survey soundings.

b) The following charted soundings originating with the prior survey are not considered disproved by the present survey and have been brought forward from the prior survey to supplement the present survey:

<u>PRIOR</u> <u>SOUNDING (FT/M)</u>	<u>LATITUDE (N)</u>	<u>LONGITUDE (W)</u>
27/8 ²	41°26'24.6"	71°11'56.0"

<u>PRIOR</u> <u>SOUNDING (FT/M)</u>	<u>LATITUDE (N)</u>	<u>LONGITUDE (W)</u>
31/9 ⁴	41°26'21.1"	71°11'57.0"

It is recommended that the soundings listed above be retained as charted.

c) The following conflicts were noted between the present survey and the prior wire drag survey effective clearance depths:

<u>PRESENT</u> <u>DEPTH (M/FT)</u>	<u>LATITUDE (N)</u>	<u>LONGITUDE (N)</u>	<u>CLEARANCE</u> <u>DEPTH (M/FT)</u>
11 ⁰ Rk/36	41°25'52.69"	71°11'12.70"	12 ² /40
11 ⁰ Rk/36	41°26'31.07"	71°11'09.74"	12 ² /40
12 ⁶ Rk/41	41°26'27.79"	71°11'05.85"	15 ² /50
12 ⁸ Rk/42	41°25'25.32"	71°12'38.27"	15 ⁵ /51
14 ⁶ Rk/48	41°25'31.27"	71°11'54.47"	15 ⁵ /51
14 ⁹ Rk/49	41°25'34.19"	71°11'55.80"	15 ⁵ /51
15 ⁰ Rk/49	41°25'55.68"	71°11'02.01"	15 ² /50

These differences may be attributed to the irregular bottom with numerous large individual rocks and several rocky areas or outcrops. Some rocks tend to be rounded and a ground wire can easily ride over these features without hanging. No other conflicts exist between the present survey and the prior survey effective depths. The present survey is adequate to supersede the prior clearance depths where shoaler depths were obtained by the present survey.

3) Prior survey FE-194 (1963) covers approximately 20% of the present survey to the south. No hangs or groundings are within the common area. No conflicts exist between the present hydrography and the prior survey effective depths.

7. COMPARISON WITH CHARTS 13221 (48th Edition, May 30, 1992)
13218 (31st Edition, Jan 11, 1992)

a. Hydrography

The charted hydrography originates with the previously discussed prior surveys and from other sources not readily available and requires no further consideration. A charted 73 foot depth (22³ m), in Latitude 41°25'35.5"N, Longitude 71°09'47.0"W, originates with an unknown source. The sounding is in present survey depths of 22⁶ to 22⁸ meters (74 to 75 ft). Charting recommendations for AWOIS Item #1906 are adequately discussed in section N. of the Hydrographer's Report. The

following should be noted:

1) Two significant side scan sonar contacts were noted during office processing. The positions and heights of the contacts were scaled from the side scan sonargrams and are listed below:

<u>CONTACT (M/FT)</u>	<u>LATITUDE (N)</u>	<u>LONGITUDE (W)</u>
19 ⁰ Rk(A)/62	41°25'15.6"	71°12'12.9"
19 ⁸ Rk(A)/65	41°25'36.3"	71°09'54.3"

It is recommended that these rocks with estimated depths be charted in accordance with Cartographic Order 004/89, dated 3 July 1989 provided the chart scale will permit. It is also recommended these estimated depths be resolved by conventional methods at an opportune time.

2) Limit lines delineating rocky areas were added to the smooth plot from side scan analysis to define bottom characteristics and features not readily apparent. It is recommended that the limit lines be charted as shown on the present survey.

The present survey is adequate to supersede the charted hydrography within the common area except as noted in section 6. of this report.

b. Aids to Navigation

No fixed aids to navigation are common to the investigations of this field examination. Two fixed aids to navigation were used as station sites for the electronic position control of this survey. One floating aid to navigation is common to this investigation. This floating aid to navigation, *Schuyler Ledge Bell Buoy "2"*, was found on station and appears to serve its intended purpose.

c. Dangers to Navigation

A Danger to Navigation report was submitted by the hydrographer to the Commander (oan), First Coast Guard District, Boston, Massachusetts 02110-3350 and to N/CG222, Chart Information Section. A copy of the report is appended to the Descriptive Report. No additional dangers to navigation were noted during office processing.

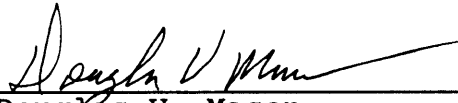
8. COMPLIANCE WITH INSTRUCTIONS

This survey adequately complies with the Project

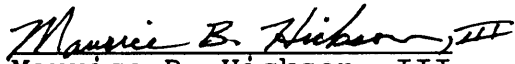
Instructions.

9. ADDITIONAL FIELD WORK

This is an adequate side scan sonar survey. Additional field work is recommended in sections 6.a. and 7.a. of this report.



Douglas V. Mason
Cartographic Technician
Verification of Field Data



Maurice B. Hickson, III
Cartographer
Evaluation and Analysis

APPROVAL SHEET
FE-373SS

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet during survey processing have been entered in the magnetic tape record for this survey. Final control, position, and sounding printouts of the survey have been made. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Richard H. Whitfield Date: 3 May 1993
Richard H. Whitfield
Cartographer, Evaluation and Analysis Team
Atlantic Hydrographic Section

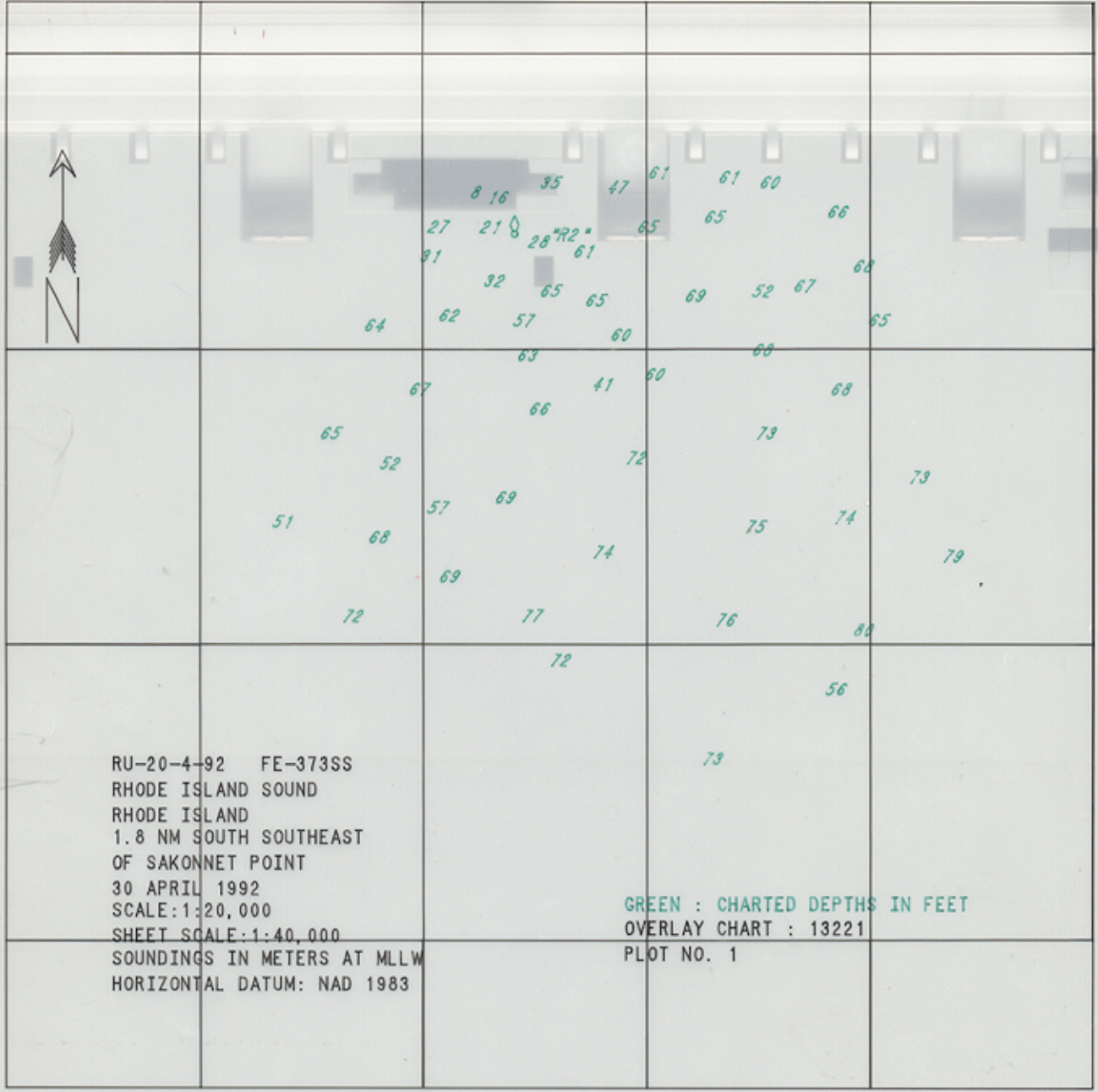
I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Christopher B. Lawrence Date: 3 May 1993
Christopher B. Lawrence, CDR, NOAA
Chief, Atlantic Hydrographic Section

Final Approval:

Approved: J. Austin Yeager Date: 7/18/94
J. Austin Yeager
Rear Admiral, NOAA
Director, Coast and Geodetic Survey

LAT 41:24:00 LAT 41:25:00 LAT 41:26:00 LAT 41:27



LON 71:13:00

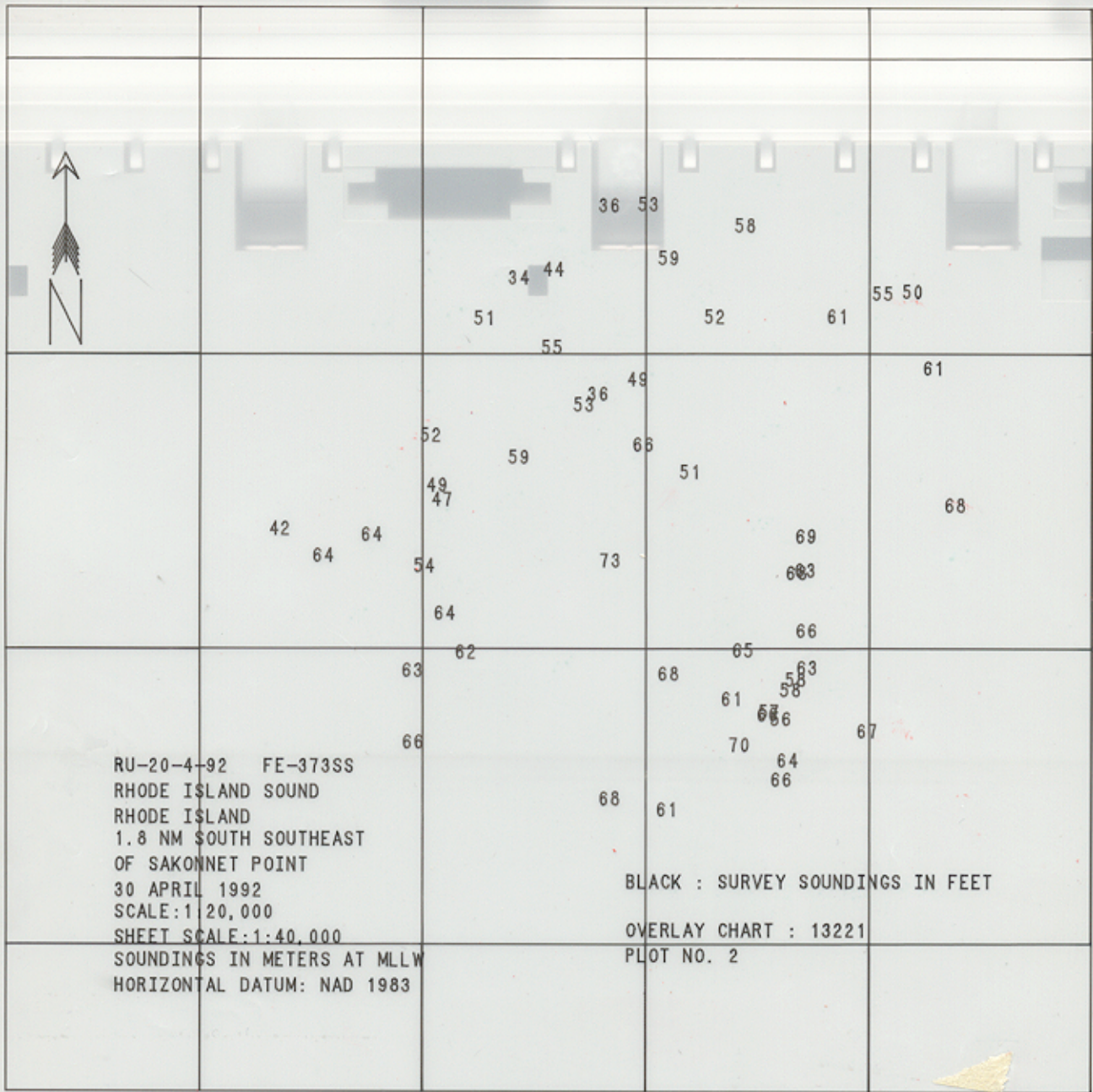
LON 71:12:00

LON 71:11:00

LON 71:10:00

OVERLAY 1906

LAT 41:27
LAT 41:26:00
LAT 41:25:00
LAT 41:24:00



LON 71:13:00

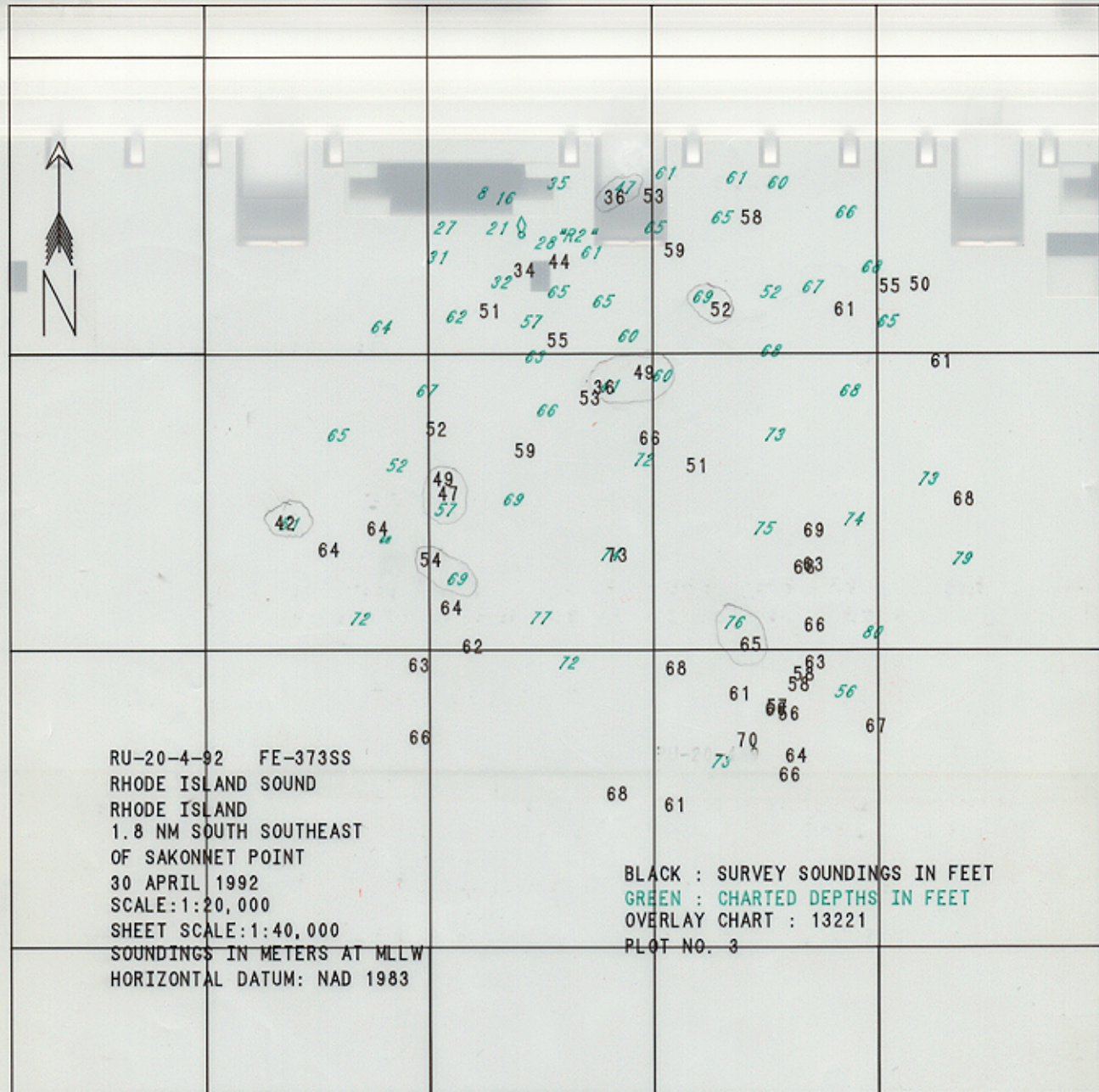
LON 71:12:00

LON 71:11:00

LON 71:10:00

OVERLAY 1906

LAT 41:24:00 LAT 41:25:00 LAT 41:26:00 LAT 41:27



LON 71:13:00

LON 71:12:00

LON 71:11:00

LON 71:10:00

OVERLAY 1906

71° 13'

71° 12'

71° 11'

71° 10'

71° 09'

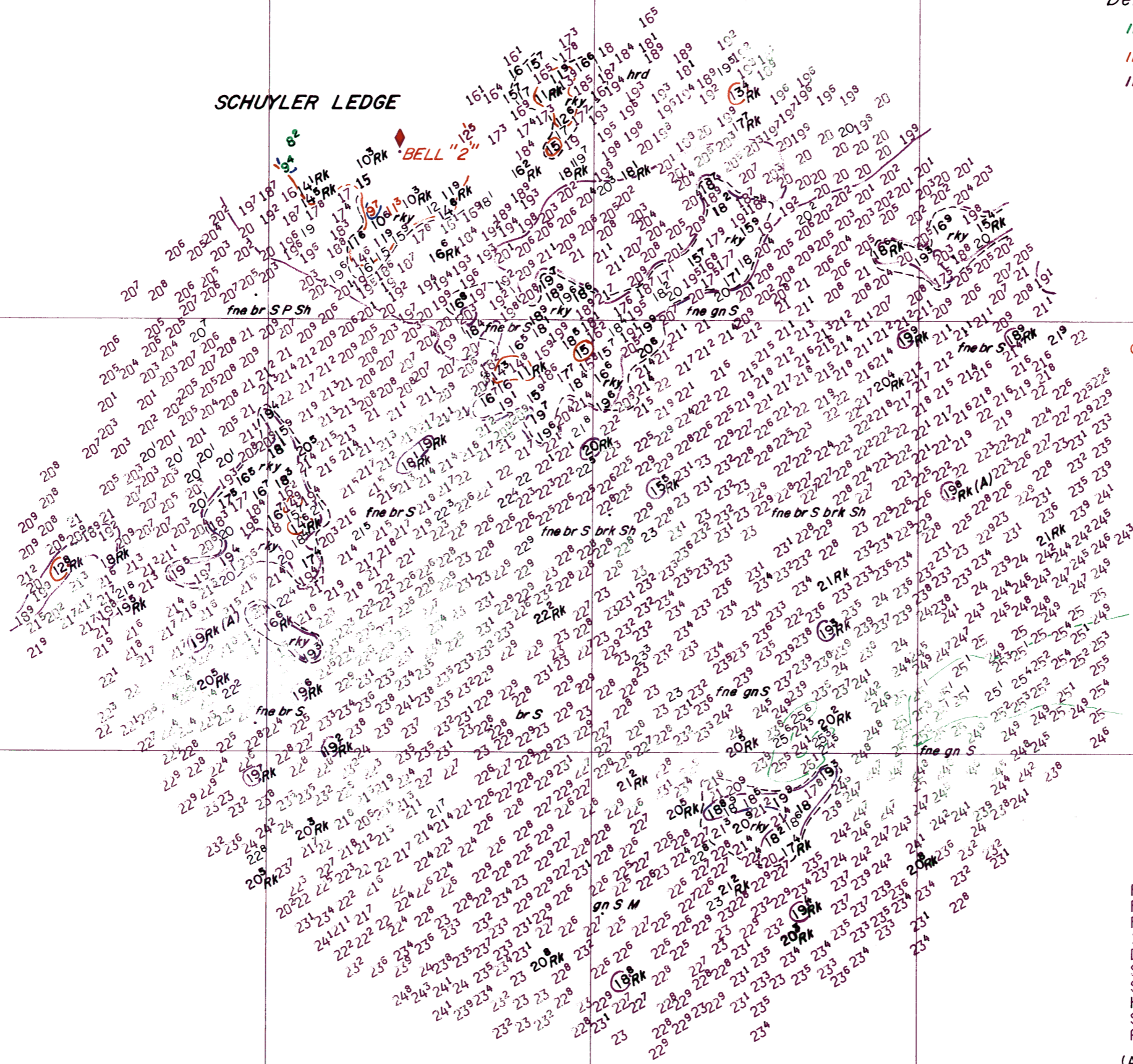
Detached soundings

in green from H-4006WD (1917)

in red from H-8366 (1957)

in brown from H-5553 (1934-35)

SCHUYLER LEDGE



71° 09' 00"

NAD 27
XYNETICS 1201
02-22-93 D.V.M.

41° 26' 00"

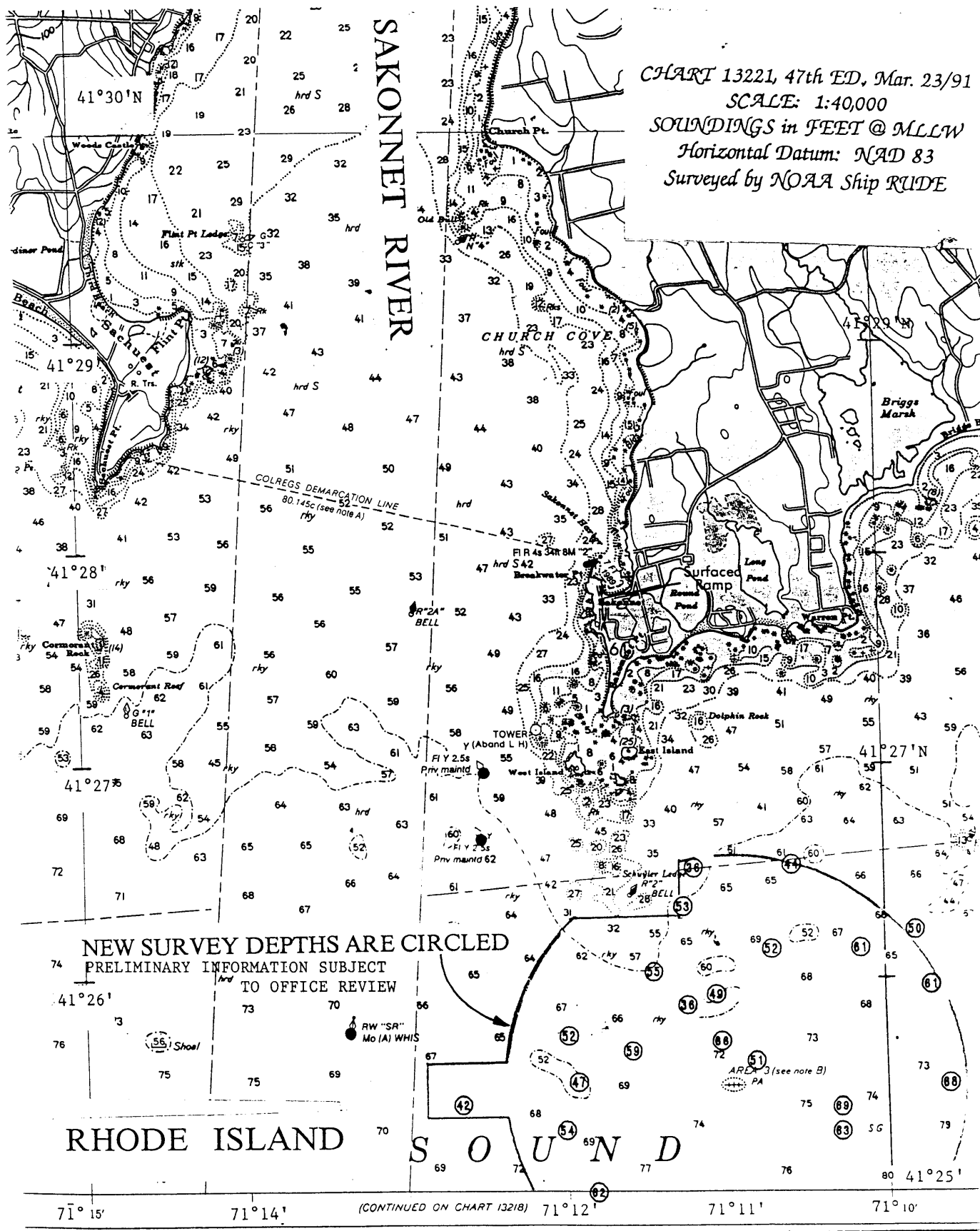
41° 26'

41° 25'

FE-373SS
 RHODE ISLAND SOUND
 1.8 NM SSE OF SAKONNET POINT
 DATE OF SURVEY: 30 APR 1992 TO 24 JUN 1992
 SCALE: 1:20000
 SOUNDINGS IN METERS AT MLLW
 HORIZONTAL DATUM: NAD 1983
 SHEET 1 OF 1
 AWOIS ITEM NUMBER 1906

(A) Depths on these obstructions were estimated by scaling heights off the bottom from side scan sonar records. Positions were determined by computing offsets from the vessel's track

CHART 13221, 47th ED, Mar. 23/91
 SCALE: 1:40,000
 SOUNDINGS in FEET @ MLLW
 Horizontal Datum: NAD 83
 Surveyed by NOAA Ship RUDE



NEW SURVEY DEPTHS ARE CIRCLED
 PRELIMINARY INFORMATION SUBJECT
 TO OFFICE REVIEW

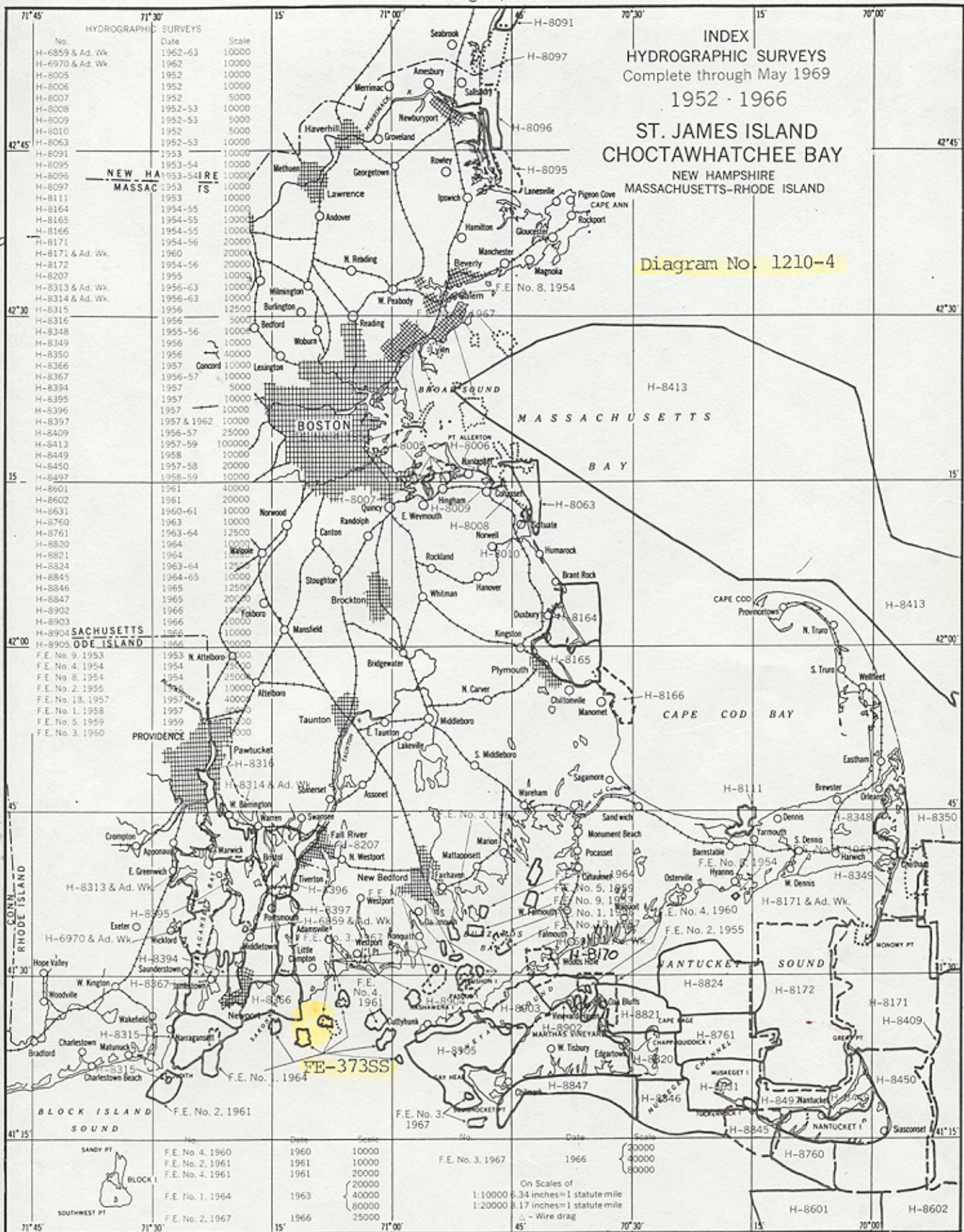
RHODE ISLAND

S O U N D

(CONTINUED ON CHART 13218)

DEPARTMENT OF COMMERCE
Environmental Science Services Administration
U.S. Coast and Geodetic Survey
Washington, D.C.

Hydrographic Index No. 62 C



MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. FE-373SS

INSTRUCTIONS			
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
13221	12/16/93	Don Black	Full Part Before After Marine Center Approval Signed Via
13221	1/6/94	Paul France	Drawing No. 62 CRIT. APPLIC.
13218	12/10/93 1/10/94	Don Black	Full Part Before After Marine Center Approval Signed Via Drawing No. 70 CRIT. APPLIC. thru 13221
12300	12/17/93	Don Black	Full Part Before After Marine Center Approval Signed Via
12300	12/17/93 1/10/94	Don Black	Drawing No. 57 CRIT. APPLIC. thru 13218
13221 (extension)	2/14/95	John Barber	Full Part Before After Marine Center Approval Signed Via Drawing No. 62 App'd in full to extension
			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
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