

9361 a & b

Diag. Cht. No. 4115

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT  
(HYDROGRAPHIC)

Type of Survey ..... HYDROGRAPHIC  
Field No. .... FA-5-2-73 & FA-5-1-73  
Office No..... H-9361 a & b

LOCALITY

State ..... HAWAII  
General Locality ..... WEST COAST OF HAWAII  
Locality ..... OKOE BAY & HONAUNAU BAY

1973

CHIEF OF PARTY  
C.A. Burroughs

LIBRARY & ARCHIVES

DATE ..... December 2, 1974

9361 a & b

Check  
1937  
1937  
1937

DESCRIPTIVE REPORT  
to accompany  
Hydrographic Survey H-9361a (FA 5-2-73)  
NOAA Ship FAIRWEATHER  
CDR Charles A. Burroughs, Cmdg.

A. PROJECT

This survey is a continuation of the survey of the west coast of the Island of Hawaii. The survey was accomplished in accordance with project instructions dated 15 December 1972 and with the Pacific Marine Center OORDER.

B. AREA SURVEYED

This is a survey of Okoe Bay, located on the southwest coast of the Island of Hawaii. It extends westward from the shoreline to 155° 55' 30" W. The north and south limits are 19° 09' 30" N and 19° 08' 15" N respectively. Visual control for the survey was established on 21 March and hydrography run between 27 March and 11 April 1973.

C. SOUNDING VESSELS

FAIRWEATHER launches FA-4 and FA-5 were used to obtain soundings for this survey. No color differentiation is made in plotting as all data was plotted by Hydroplot system. Position numbers used are as follows:

Launch FA-4 (Hull #1225)	Positions 2620 - 2661
" FA-5 (Hull #1233)	" 2000 - 2603

D. SOUNDING EQUIPMENT

Launch FA-5 is equipped with the Hydrolog system and a Ross 5000 Fineline fathometer, S/N 1046. Launch FA-4 has a Ross 400A Fineline fathometer, No S/N. Due to the inability of the Ross fathometers to record depths in feet on any scale other than the 0 - 100 foot scale, the Hydrolog system of FA-5 was set up to log in feet while the analog trace recorded fathoms. Fathograms from FA-4 were converted from fathoms to feet in scanning. Depths recorded in the survey area ranged from 0 to 672 feet.

TRA corrections were determined by daily bar checks. A MARTEK temperature-depth-conductivity cast was made to 45 meters in Okoe Bay and an offshore Nansen cast to 3500 meters to determine sound velocity corrections to soundings. An abstract of TRA, initial, and velocity corrections is appended to this report.

E. SMOOTH SHEET

All data was plotted by onboard Hydroplot system, discrepancies rectified, and the data replotted. All data has been logged and converted to Hydrolog/plot master tape format with GPs for smooth plotting at PMC. ✓

F. CONTROL

In order to avoid any problem in establishing control signals for the 1:5,000 scale boatsheet for Okoe Bay (FA-5-2-73), signals 200 thru 209 were established by means of a T-2 Theodolite supplemented by sextant. ✓

A position was established by resection method using the points 301, 302, and 303 (H.G.S. triangulation stations) for control. From this position, a ray to all visible signals in the bay was observed. ✓

Rays to the signals were also measured by setting the theodolite over signals 302 and 303 (triangulation stations OHEPUUPUU H.G.S. 1890 and NIUOU 1948 respectively). ✓

Sextant cuts were also observed from the Fairweather to supplement the theodolite, if three rays to a signal could not be observed. ✓

These rays were then intersected graphically and that position was used for hydro control. ✓

A review of the bay showed that more signals were needed. Signals 202, 204, and 206 were then built and located using sextant cuts to the signals that had already been established. ✓

G. SHORELINE

The source of shoreline was manuscript T-13312. The transfer of shoreline was made and verified prior to hydrography. Manuscript T-13312 was field edited during the project. The low water line was not defined by the soundings because of a very irregular bottom and shoreline, and a small tide range. There are certain areas along the shoreline that are dangerous because of large foreshore breakers. These areas are marked on the boatsheet for Okoe Bay. (Refer to Field Edit Report) ✓

H. CROSSLINES

Crosslines constituted approximately 9.69% of the sounding lines. Due to the highly irregular nature of the bottom configuration, crossline soundings often disagreed with regular survey line soundings by as much as 5%. ✓

I. JUNCTIONS

The survey is junctioned on the north & west by H-9357 (FA-10-2-73) at 19°09'30"N. A comparison of soundings was made with the following results: ✓

Largest difference	4.3% of the depth
Smallest difference	0% of the depth
Average difference	1.9% of the depth

The differences in depths would most likely be caused by the highly irregular bottom and the fact that the soundings did not overlap exactly and had to be interpolated. The soundings on FA-5-2-73 were both higher and lower than the soundings on FA-10-2-73 with no apparent pattern of disagreement. ✓

J. COMPARISON WITH PRIOR SURVEY

No prior surveys of this area were provided for comparison. No presurvey review items were included. ✓

L. ADEQUACY OF SURVEY

This survey is considered complete and adequate for charting. ✓

M. AIDS TO NAVIGATION

There are no aids to navigation within the area surveyed. ✓

N. STATISTICS

	Launch FA-4	Launch FA-5	Total
Positions	41	604	645 ✓
Sounding Lines	1.75 n.m.	46.7 n.m.	48.4 n.m.
Total area surveyed	.01 sq.n.m.	.69 sq.n.m.	.70 sq.n.m.
Bottom Samples			13

O. MISCELLANEOUS

A zero fathom curve could not be interpolated from the soundings because of the irregular bottom and shoreline characteristics. The tide range was also very small. It is very difficult and sometimes very dangerous to get near the shoreline in some areas of the bay because of heavy surge and large foreshore breakers. These areas are marked <sup>on</sup> the boatsheet for Okoe Bay. ✓

P. RECOMMENDATIONS

None

Q. REFERENCE TO REPORTS

Fathometer and Velocity Correction Report  
OPR 419, NOAA Ship FAIRWEATHER 1973 ✓

Field Edit Report  
OPR 419, NOAA Ship FAIRWEATHER 1973

Respectfully submitted,

*Alan D. Anderson*

Alan D. Anderson  
ENS. NOAA

TIDE NOTE

OPR-419

Reference tide gage for this project was at Honolulu, Oahu, Hawaii. Field tide reducers, generated by PDP8/e computer using program AM 500, were based on predicted tides at Napoopoo, Island of Hawaii.

Four Bristol Bubbler tide gages were installed in the project area. Locations and periods of operation are as follow:

Napoopoo	Lat. 19°28.6'N Long. 155°55.3'W	22 Feb - 12 Apr 1973
Honaunau Bay	Lat. 19°25.7'N Long. 155°55.0'W	06 Mar - 21 Mar 1973
Milolii	Lat. 19°11.3'N Long. 155°54.6'W	23 Feb - 12 Mar 1973
Okoe Bay	Lat. 19°09.2'N Long. 155°54.8'W	23 Mar - 12 Apr 1973

Honaunau Bay and Okoe Bay gages operated on 135° W time for the entire period of observations. The Milolii gage operated on 150° W time up to 1540, 29 March at which time it was changed to 135° W time zone.

Napoopoo - Gage S/N 63A17969

This gage was provided and installed by Pacific Tides Party prior to arrival of FAIRWEATHER. The gage frequently failed to maintain an accurate time base on the marigram. The sprocket holes in the marigram paper failed to remain engaged with the gage drive sprocket. During the periods in which the paper was not tracking properly it was being advanced at a rate well in excess of that required to properly maintain time. The error was complicated by the fact that occasionally, after the paper had disengaged the drive sprocket it would re-engage at a later but erroneous time. The result was excessive and non-uniform time errors of a magnitude approaching as much as 30 minutes in 6 hours.

Since adequate tidal reduction data was obtained from other gages it was concluded that data records from this gage be rejected.

Honaunau Bay - Gage S/N 63A2925

This was a previously unoccupied site, the gage being placed in operation to provide tidal support for hydrography on FA 5-1-73. The staff and gage were installed and the gage placed in operation on 06 March 1973. Five new bench marks were established and levels run on 06 March. The gage was set to record 0.5 feet higher than the staff. The only irregularity in the marigram resulted from an

attempt to compensate for the effect of swell by adjusting the damping valve. The valve was closed as far as possible and yet allow the gage to track. This resulted in a short interval step type trace rather than a smooth curve trace. The gage was removed and levels rerun on 21 March 1973. Since this gage operated for less than 30 days, it is recommended that the data be correlated to that of the Milolii gage.

Milolii -Gage S/N 67A10287

This gage was provided and installed by Pacific Tides Party prior to arrival of FAIRWEATHER. This was a previously unoccupied site, the gage placed in operation to provide tidal support for hydrography on sheets FA 5-2-73, FA 10-1-73, and FA 10-2-73. The staff and gage were installed and the gage began operation on 23 February 1973. Three new bench marks were established and levels run on 23 Feb. The gage and staff readings were set to correspond directly. Between 26 and 27 March the staff and orifice hose were destroyed by high surf conditions. A new staff and hose were installed and levels run on 28 March. At this time the gage was set to read 1.6 feet higher than the staff. Excepting the storm damage, this gage performed well throughout its installation with only minor time corrections required for abstracting. The gage was removed and levels run on 12 April 1973.

Okoe Bay - Gage S/N 63A2925

This was a previously unoccupied site and five new bench marks were placed. The gage failed to track any level above about one half the tide range. Information obtained was therefore useless and as such has been rejected. The gage was intended to support hydrography on sheet FA 5-2-73. Since the Milolii gage was less than 3 miles from Okoe Bay it is recommended that this gage be used to support the Okoe Bay hydrography.

Recommendation

It appears that the damping valve in the 0-10 ft. bubbler tide gage is not adequate to reduce, to a readable state, the trace when a relatively large swell or surge exists. The increase or decrease of pressure due to this swell action caused the trace to exceed, in many instances, 25% of the scale of the marigram, thus making it extremely difficult to abstract the tide curve. This situation can be corrected by housing the orifice in a 4 inch diameter plastic pipe. This pipe must extend below the lowest anticipated water level and above the surface at all times. It must be open to the air at the top and have several small holes near the bottom to allow water to enter the pipe. The scheme is similar to that used in the installation of an ADR tide gage except that instead of having the pipe house a float it would house the bubbler gage's orifice. This would greatly dampen the oscillations caused by swell.

COMPUTER BOATSHEET LAYOUT

OPR-419-FA-73

● Tide Gage Sites

ISLAND OF  
HAWAII

20° 30' N

Napoopoo  
● Honaunau Bay  
FA 5-1-73  
H-9362

Miloli

FA 10-1-73  
H-9356

Okoe Bay  
FA 5-2-73  
H-9361

FA 10-2-73  
H-9357

19° 00' N

FA 80-1A-73  
H-9355

FA 80-1B-73  
H-9355

156° 00' W



GEOGRAPHIC NAMES

Survey No.

H-9361

Name on Survey

Name on Survey	Source of Name										
	A	B	C	D	E	F	G	H	K		
HANAMALO POINT	✓										1
HAWAII <del>ISLAND</del>	✓										2
KAPUA BAY	✓										3
KAUPO BAY											4
LAE O AHOLE	✓										5
LAE O HUMUHUMU	✓										6
OE A BAY	✓										7
<del>OKOE</del>											8
OKOE BAY	✓										9
PACIFIC OCEAN	✓										10
PUU HINAHINA BAY	✓										11
KAKIO POINT	✓										12
KALAPILI	✓										13
											14
											15
											16
											17
											18
											19
											20
											21
											22
											23
											24
											25
											26

Approved  
 Chas. E. Hamilton  
 Staff Geographer  
 12 Feb. 1975

SOUND VELOCITY CORRECTOR ABSTRACT

The following sound velocity correctors are to be applied to soundings on sheets FA 5-1-73 and FA 5-2-73:

<u>DEPTHS (ft)</u>	<u>CORRECTOR (ft)</u>	<u>DEPTHS</u>	<u>CORRECTOR</u>
0.0- 4.8	0.0	201.0-222.0	+10.0
5.0- 8.8	+0.2	223.0-243.0	+11.0
9.0- 13.2	+0.4	244.0-264.0	+12.0
13.4- 17.0	+0.6	265.0-285.0	+13.0
17.2- 22.0	+0.8	286.0-306.0	+14.0
22.2- 26.0	+1.0	307.0-327.0	+15.0
26.2- 29.0	+1.2	328.0-348.0	+16.0
29.2- 34.0	+1.4	349.0-368.0	+17.0
34.2- 38.0	+1.6	369.0-389.0	+18.0
38.2- 42.0	+1.8	390.0-411.0	+19.0
42.2- 46.0	+2.0	412.0-432.0	+20.0
46.2- 50.8	+2.2	433.0-453.0	+21.0
51.0- 55.0	+2.4	454.0-473.0	+22.0
55.2- 59.0	+2.6	474.0-494.0	+23.0
59.2- 63.0	+2.8	495.0-514.0	+24.0
63.2- 67.0	+3.0	515.0-535.0	+25.0
67.2- 71.0	+3.2	536.0-556.0-	+26.0
71.2- 76.0	+3.4	557.0-577.0	+27.0
76.2- 96.0	+4.0	578.0-599.0	+28.0
97.0-117.0	+5.0	600.0-620.0	+29.0
118.0-138.0	+6.0	621.0-641.0	+30.0
139.0-160.0	+7.0	642.0-662.0	+31.0
161.0-180.0	+8.0	663.0-683.0	+32.0
181.0-200.0	+9.0		

Transmittal Sheet

The field work was examined daily under the supervision of this command. The boat sheet was inspected daily for completeness and no additional work is considered necessary.

*C. A. Burroughs*  
C. A. Burroughs  
CDR, NOAA  
Cmdg, Ship FAIRWEATHER

S I G N A L P L O T T E R C A R D S

H-NO.

LATITUDE LONGITUDE X Y

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09361	301	73	19093325	155550481	04573	07441	301
09361	302	73	19081560	155545243	05312	02428	302
09361	303	73	19074916	155550899	04296	00720	303
09361	200	73	19092498	155550681	04430	06907	200
09361	201	73	19091955	155545889	04916	06556	201
09361	202	73	19091912	155545181	05350	06528	202
09361	203	73	19091080	155544637	05684	05991	203
09361	204	73	19090325	155544736	05623	05504	204
09361	205	73	19085809	155545102	05399	05171	205
09361	206	73	19084953	155544808	05579	04618	206
09361	207	73	19084300	155545068	05420	04196	207
09361	208	73	19083229	155550124	04772	03505	208
09361	209	73	19081516	155551259	04075	02399	209
09361	300	73	19112527	155543627	06303	14673	300

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7/22/74

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Pacific Marine Center:

Hourly heights are approved for Form 362

Tide Station Used (NOAA Form 77-12): Milolii

Period: February 23 - April 12, 1973

HYDROGRAPHIC SHEET: H-9356, H9361, H9357

OPR: 419

Locality: Southwest Coast of Hawaii Island

Plane of reference (mean lower low water): 3.3 ft.  
1.8 ft. from 1400 hrs.

Height of Mean High Water above Plane of Reference is 1.7 ft.  
April 5-12

Remarks: Zone direct on Milolii.

*James R. Hubbard*  
for Chief, Tides Branch

HYDROGRAPHIC SURVEY STATISTICS  
HYDROGRAPHIC SURVEY NO. H-9361A  
(H-9361)

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET & PNO Combined		1	BOAT SHEETS		1	
DESCRIPTIVE REPORT		1	OVERLAYS		4 <del>XXXX</del>	
DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
ENVELOPES						
CAHIERS	1 & Misc, P/O.					
VOLUMES	1					
BOXES						
T-SHEET PRINTS (List)						
<del>XXXXXXXXXXXXXXXXXXXX</del>						
SPECIAL REPORTS (List)						

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS			
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS
POSITIONS ON SHEET				45 636
POSITIONS CHECKED		45 636		
POSITIONS REVISED		6		
DEPTH SOUNDINGS REVISED		146		
DEPTH SOUNDINGS ERRONEOUSLY SPACED		0		
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED		0		
	TIME (MANHOURS)			
Verification of Control		1	9	
Verification of Positions		10	1	
Verification of Soundings		61		
Smooth Sheet Compilation		32		
ALL OTHER WORK		7	21	
TOTALS		111	59	45 hrs
PRE-VERIFICATION BY <i>Nicholas Lestenko</i> Nicholas Lestenko, Cartographic Tech.	BEGINNING DATE 4 January 1974	ENDING DATE 4 Jan 74		
VERIFICATION BY <i>Karol M. Hoops</i> Karol M. Hoops, Cartographic Tech.	BEGINNING DATE 14 Feb. 74	ENDING DATE 12 Nov. 74		
REVIEW BY <i>L. Gorlaton</i> L. Gorlaton	BEGINNING DATE 16 Mar 76	ENDING DATE 15 Apr 76		

*Cartographer 71-5/10/75*

Reg. No. H-9361A

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey, the following shall be completed:

CARDS CORRECTED

DATE \_\_\_\_\_ TIME REQ'D \_\_\_\_\_ INITIALS \_\_\_\_\_

REMARKS:

H-9361A

Information for Future Presurvey Reviews

None

<u>Position Index</u>		<u>Bottom Change Index</u>	<u>Use Index</u>	<u>Resurvey Cycle</u>
<u>Lat.</u>	<u>Long.</u>			
190	1560	0	1	50 years



OFFICE OF MARINE SURVEYS AND MAPS

MARINE SURVEYS DIVISION

MODIFIED HYDROGRAPHIC SURVEY REVIEW

REGISTRY NO. H-9361A

FIELD NO. FA-5-2-73

Hawaii, West Coast of Hawaii, Okoe Bay

SURVEYED: March 27 - April 11, 1973

SCALE: 1:5,000

PROJECT NO.: OPR-419

SOUNDINGS: Ross 5000 Depth Recorder

CONTROL: Sextant Fixes on  
Shore Signals

Chief of Party .....	C. A. Burroughs
Surveyed by .....	F. L. Jeffries
.....	D. E. Nortrup
.....	F. P. Rossi
.....	T. E. DeFoor
.....	W. A. Wert
.....	A. D. Anderson
Automated Plot by .....	Gerber Digital Plotter
Verified by .....	K. Hoops
Reviewed by .....	L. Quinlan
	Date: April 8, 1976
Cursory inspection made--survey	K. W. Wellman
processing considered complete .....	October 14, 1977

1. Control and Shoreline

The origin of the control is given in part F of the Descriptive Report.

The shoreline originates with Class I photogrammetric manuscript T-13312 (1963/73). The datum of numerous rocks annotated as "awash" on T-13312 is not definitively specified thereon. The elevations of such rocks were therefore referenced to MLLW on the present survey.

The mean high water line as shown on the smooth sheet is for guidance only; its true position is shown on the topographic survey previously mentioned.

2. Hydrography

- a. Depths at crossings are in good agreement.
- b. The usual depth curves are adequately delineated.

c. The development of the bottom configuration and the investigation of least depths are considered adequate with the exception of the near-shore area where detailed development was precluded by ". . . heavy surge and large foreshore breakers."

### 3. Condition of Survey

The field work, survey records, automated plotting, and the Descriptive Report are adequate and conform to the requirements of the Hydrographic Manual supplemented by the Instruction Manual - Automated Hydrographic Surveys, with the following exceptions:

- a. The bottom characteristics were not fully represented as observed.
- b. The limits of foul areas were not transferred from T-13312 during verification thus necessitating appropriate delineation of such features during review.
- c. Section K of the Descriptive Report (Comparison with the Chart) was omitted.

### 4. Junctions

Junctional survey H-9357 (1973) on the north and west is unverified and thus not available for junctioning with the present survey. Its junction with the present survey will be considered at the time of its review.

### 5. Comparison with Prior Surveys

There are no prior surveys within the common area of the present survey.

### 6. Comparison with Chart 4115, 10th Edition, Latest Print Date 10/13/73

#### a. Hydrography

The sparse charted hydrography and the extreme scale difference between the chart (scale 1:250,000) and the present survey precludes a realistic comparison. The present survey is adequate to supersede the charted hydrography within the common area.

#### b. Aids to Navigation

There are no aids to navigation within the area of the present survey.

### 7. Compliance with Instructions

This survey adequately complies with the project instructions.

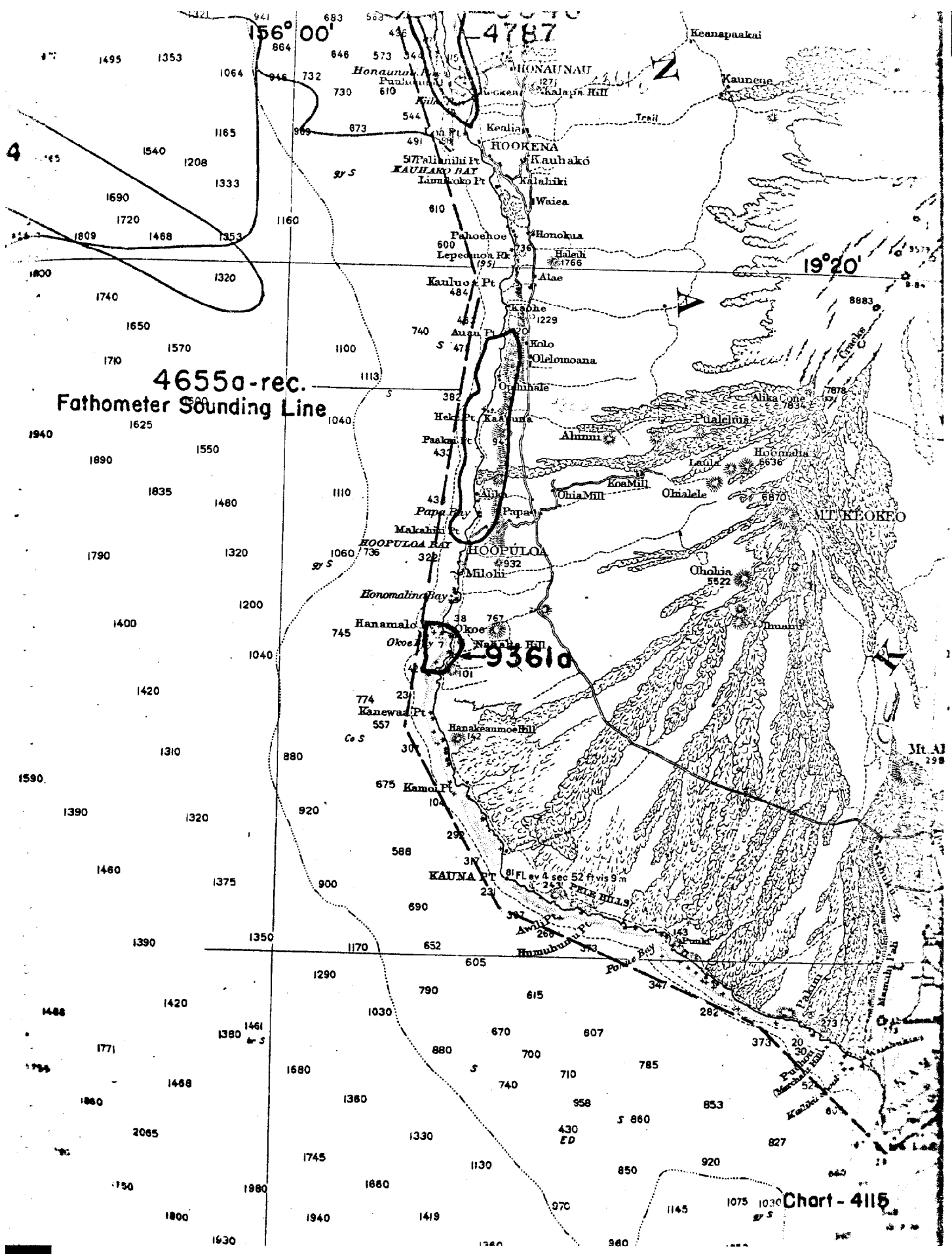
8. Additional Field Work

This survey is considered to be a good basic survey and no additional field work is recommended.

Examined and Approved:

*for R.H. Carstens*  
\_\_\_\_\_  
Chief  
Marine Surveys Division

*R.H. Houston*  
\_\_\_\_\_  
Associate Director  
Office of Marine Surveys  
and Maps



4655a-rec.  
Fathometer Sounding Line

4787  
9361a

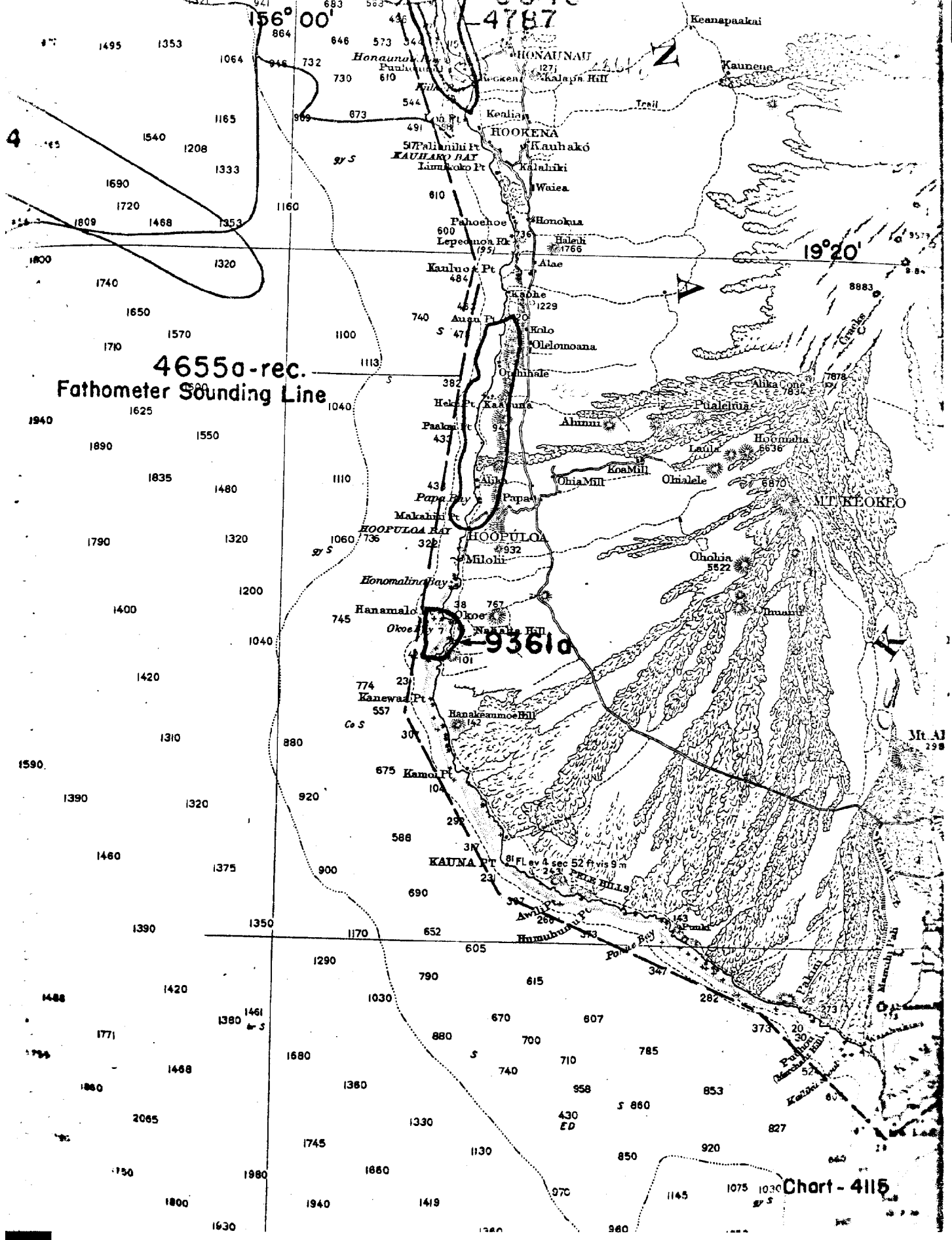
Chart - 4115

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N

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Mt. A  
298



# RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. **H-9361a**

## 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
4115	1/23/75	E. Mantof	Full Part <del>Before</del> After Verification Review Inspection Signed Via Drawing No. Examined for Notice to Mariners. <i>None required.</i>
4179	9/12/75	HAUSMAN	Full Part <del>Before</del> After Verification Review Inspection Signed Via Drawing No. Exam. <sup>direct from smooth sheet</sup> thro 4115 No Corr.
<del>4123</del>	<del>10/29/76</del>	<del>Stuart</del>	Full Part <del>Before</del> After Verification Review Inspection Signed Via Drawing No. <del>CRITICAL CORRECTIONS ONLY</del>
4115	1/27/77	KRANIS	Full Part <del>Before</del> After Verification Review Inspection Signed Via Drawing No. Examined for critical corr. <i>only - no corr.</i>
4115	2/8/75	M. J. Fruse	Full Part <del>Before</del> After Verification Review Inspection Signed Via Drawing No. A1 #14 Consider hydro fully appd at this scale.
19010	11/12/81	R. S. House	Full Part <del>Before</del> After Verification Review Inspection Signed Via Drawing No. Appd Dwg #15, C.Ht 19320
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
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COMPUTER BOATSHEET LAYOUT

OPR-419-FA-73

ISLAND OF  
HAWAII

20° 30' N

Honaunau Bay  
FA 5-1-73  
H-9362-1b

FA 10-1-73  
H-9356

Okoe Bay  
FA 5-2-73  
H-9361c

FA 10-2-73  
H-9357

19° 00' N

FA 80-1A-73  
H-9355

FA 80-1B-73  
H-9355

156° 00' W

**HYDROGRAPHIC TITLE SHEET**

H-9361  
(H-9361A)

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.

FA 5-2-73

State HAWAII

General locality WEST COAST ISLAND OF HAWAII

Locality OKOE BAY

Scale 1:5000

Date of survey 27/03 - 11/04/73

Instructions dated 15 December 1972

Project No. OPR-419-FA-73

Vessel NOAA Ship FAIRWEATHER Launches FA-4 & FA-5

Chief of party CDR Charles A. Burroughs, Cmdg.

CDR F. L. Jeffries, LCDR D. E. Nortrup, LCDR F. P. Rossi, ENS T. E. DeFoor,

Surveyed by ENS W. A. Wert, ENS A. D. Anderson

Soundings taken by echo sounder, hand lead, pole Echo sounder

Graphic record scaled by Hydrolog

Graphic record checked by Ship's personnel

Protracted by Hydroplot

Automated plot by Gerber Digital Plotter  
Hydroplot

Soundings penciled by \_\_\_\_\_

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

REMARKS: Misc items were removed from the DR and are filed in the cahier.

revised to stas 1/16/75