

FE302

Diagram No. 5532-1

NOAA FORM 78-35A

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

DESCRIPTIVE REPORT

Type of Survey ... Field Examination.....
Field No. PHP-10-2-87.....
Registry No. FE-302.....

LOCALITY

State California.....
General Locality .. San Francisco Bay.....
Sublocality Richmond Inner Harbor to.....
Richmond Marina Bay.....

1987

CHIEF OF PARTY
LTJG J.A. Miller

LIBRARY & ARCHIVES

DATE December 23, 1987.....

FE302

☆U.S. GOV. PRINTING OFFICE: 1985-588-054

ref L-853(87)
L-6(88)

Area 3
CHT
18649
18653
18652 Brants

CARTOIS
SIGN OFF ON
FILE IN BRACE

HYDROGRAPHIC TITLE SHEET

FE-302

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.

PHP 10-2-87

State CaliforniaGeneral locality San Francisco BayLocality Richmond Inner Harbor to Richmond Marina BayScale 1:10,000 Date of survey May 13 to August 12, 1987Instructions dated February 10, 1987 Project No. OPR-L123-PHP-87Vessel Launch 1101 (EDP 0651)Chief of party LTJG John A. MillerSurveyed by LTJG Thomas K. PortaSoundings taken by ~~echo sounder, hand lead, pole~~ Fiberglass Survey TapeGraphic record scaled by N/AGraphic record checked by N/AVerification by L. Deodato, C.R. Davies Automated plot by PMC Xynetics PlotterEvaluation by C.R. DaviesSoundings in ~~fathoms~~ feet at MKW MLLWREMARKS: Marginal notes in black by evaluator. All times are in UTC.Separates are filed with the hydrographic data.Awards and SURF ✓ 8/88 TWD

DESCRIPTIVE REPORT TO ACCOMPANY HYDROGRAPHIC SURVEY
FE-302, FIELD NO. PHP-10-2-1987
Scale 1:10,000, Year 1987
Pacific Hydrographic Party
Chief of Party: LTJG John Miller

A. PROJECT. ✓

A field examination was performed in accordance with Project Instructions OPR-L123-PHP-87, dated February 10, 1987, and Change No. 1 dated March 20, 1987. These Project Instructions encompass all of San Francisco and San Pablo Bays.

For ease in managing data, both at the field party level and at the Marine Center level, the field examinations were conducted within the limits of the chart that covers the respective area. This field examination investigated unresolved items that remained from basic surveys that were used to update chart 18649. The items listed below, from the Office Review, dated October 25, 1984 (included with Project Instructions OPR-L123-PHP-87) have been completed.

<u>ITEM NUMBER</u>	<u>CHART NUMBER</u>
190	18649
191	18649
192	18649

B. AREA SURVEYED. ✓

The investigations were performed in San Francisco Bay, CA, from the Richmond Inner Harbor to Richmond Marina Bay, from May 13, 1987 (DN 133) to August 12, 1987 (DN 224). Limits of the investigations were:

37/55/00 N to 37/54/00 N
122/22/00 W 122/20/30 W.

The Point Potrero Reach and the Harbor Channel are used by tugboats and deep draft cargo vessels. These channels are maintained by the Army Corps of Engineers. Richmond Inner Harbor and Richmond Marina Bay is utilized by private small vessels. There are a few commercial vessels and large sailing ships (100 ft) moored in Richmond Marina Bay.

C. SOUNDING VESSEL. ✓

PHP's launch 1101 (EDP 0651), was used as the vessel for bottom drags, dive searches, and all investigations.

D. SOUNDING EQUIPMENT. ✓

A fiberglass surveying tape was used for least depth measurements. Final field sheet soundings were corrected for tape angle (where appropriate). Predicted tides were used to reduce the soundings to MLLW. No other corrections to the soundings were applied.

E. HYDROGRAPHIC SHEETS. ✓

Three 1:10,000 field sheets were constructed by PHP members with program RK 201 on a Modified Transverse Mercator projection.

Field records were forwarded to the Pacific Marine Center, Nautical Chart Branch, Seattle, Washington, for verification and smooth plotting.

F. CONTROL STATIONS. ✓

Control stations used on field examinations are:

NEW POSITION OR VERIFICATION OF OLD	STATION	LOCATION METHOD
Verified by PHP	Harbor Use 1929	Traverse
"	Brooks Island 2 1905	"
"	Trans America Building	Intersection
"	Mt Sutro TV Tower S Antenna	"
Positioned by PHP	Oakland Tribune Bldg Flag Ecc	Spur Traverse
"	Point Potrero Rch Rng F Lt 14	"

All stations were positioned to Third Order, Class I, or better accuracy. Geodetic computations were based on the 1927 North American Datum. See the Horizontal Control Report, San Francisco Bay and San Pablo Bay, CA., OPR-L123-PHP-8Z, which will be submitted at the completion of the project, for a complete discussion of horizontal control procedures, equipment, computations and observations. Copies of the geodetic abstracts and computations for the above stations are included for the verifier's benefit in Appendix XIII, Supplemental Information.

G. HYDROGRAPHIC POSITION CONTROL.

Electronic launch position control on these investigations were accomplished with a Motorola Mini-Ranger III ultra-high frequency transponder system in the range-range or range-azimuth configuration.

Electronic Control Equipment.

The following electronic positioning equipment were used on this survey:

Motorola Mini-Ranger III Mobile Station Launch 1101

Mini-Ranger Console S/N 701
Transceiver (RT Console) S/N C1419

Motorola Mini-Ranger III Reference Stations

Mini Ranger Transponder, Code B S/N 911059
Mini Ranger Transponder, Code C S/N E2712
Mini Ranger Transponder, Code 9 S/N 1628

Position Control Equipment Operation.

Baseline calibrations for data collected on this survey were performed April 27 (DN 107), and June 18 (DN 169) 1987 over a slope distance of 2189.2 meters at Haire Ranch Camp #6. The correctors from DN 107 were used for work performed on DN 133. The correctors from the calibration on DN 169 were used for field work performed on DN 173. It should be noted that there were only two days where position control equipment were used on these examinations.

Corrector/Minimum Signal Strength

	Code B	Code C	Code 9
Date of BLC			
April 27, 1987 (DN 107)	-1/9	+1/11	0/9
June 18, 1987 (DN 169)	0/8	+3/11	+1/9

PHP is adhering to a two month baseline calibration schedule. The next baseline calibration for this project, which is scheduled to end December 31, 1987, will be during the third week of August, 1987. Daily critical systems checks confirm that the Mini-Ranger correctors determined

from the June 18 baseline are valid for data collected after June 18, 1987.

There were no positioning equipment failures during these investigations.

Daily Calibrations.

Mini-Ranger critical system checks were performed once each day. Critical system checks were performed at a geodetic monument or compared to simultaneous EDM readings at a fixed point. All daily system checks on the Mini-Rangers and console/RT unit during this time period resulted in a variance of less than 3 meters. PHP considers these system checks a confirmation of the BLC and proper Mini-Ranger operation.

Fixed aids to navigation (located to Third Order Class I standards) used for calibration were:

Point Potrero Rch
Rng F Lt 14

The observed distances were corrected for antenna offset and were compared with the computed slope distance to yield the observed system corrector. The observed system corrector was then compared with the BLC and required to be within 0.5 millimeters at the scale of the item investigated. All hydrographic data meets this requirement.

The geometric configuration of the control stations and the signal strengths for all positions were good. Angles of intersection for all survey data were between 30 and 150 degrees. Signal strength was annotated on the raw data printout frequently during sounding acquisition. No data was submitted with less than minimum signal strength.

There were no unusual methods of electronic control operations, and no unusual atmospheric conditions on these item investigations.

RK 561 was used to calculate ANDIST on detached positions. The range-azimuth geodetic positions were converted to range-range distances from electronic control stations with good intersection using RK 300. These distances and the computed distances for the check fix were input to RK 561, along with the boats heading and the ANDIST to the feature. The output range-range distances derived from the range-azimuth positions were used for plotting. For further information see the letter to Lieutenant Marlene Mozgala, N/MOP21x2, dated 7 July 1987 in Appendix XIII Supplemental Information. *See attached letter*

The theodolites used for range-azimuth control and calibrations were Wild T-2, S/N 276812 and S/N 35797.

The EDM used for these investigations was a DM 102, SN 293684.

EQUIPMENT FAILURES

The signal strength cable caused the left channel of the meter to artificially add 40 to the signal strength of any code on the left. The signal strength on the raw data print-outs were accurate because the OIC would subtract 40 from the displayed rates. This procedure was used on data throughout the survey until the cable was replaced on June 22, 1987.

For further information on electronic calibrations see Appendix V, Abstracts of Corrections to Electronic Position Control.

A detached position listing is included in Appendix VIII, Carto Code Listing.

H. SHORELINE.

Shoreline information was taken from the sources listed below.

Source	Scale	Enlargement
18649 ^{2nd} 1st ed. ^{10/18/86} 1/19/85	1:40,000	1:10,000

Shoreline verification was conducted by the hydrographer for all shoreline within the search radii of the investigations. Shoreline details and features have been transferred to the field sheet. Changes to the shoreline are shown in red on the final field sheet. *Field sheet shoreline is shown in brown for reference purposes only.*

The following stations are seaward of the shoreline:

Station	#
Point Potrero Rch Rng F Lt 14	614

I. CROSSLINES. ✓

Not applicable.

J. JUNCTIONS. ✓

Not applicable.

K. PRIOR SURVEYS. See EOMC Report Section 6

Not applicable (according to Project Instructions). See Section L below.

L. COMPARISON WITH THE CHART. See EOMC Report Section 7

The items on this survey were compared to chart 18649 52nd ed. Oct 18, 1986.

DANGERS TO NAVIGATION

A Dangers to Navigation letter was written to the Commander, Eleventh Coast Guard District, concerning the ruins observed on this survey. A copy of this letter is included in Appendix XII, Dangers To Navigation. A copy of this letter was also sent to the Chart Information Section, N/CG222, and PMC (N/MOP 21). This letter is dated July 20, 1987. *See attached.*

CHART 18649

Description	Latitude	Longitude (NAD 1927)	Least Depth (MLLW)	POS
Submerged Obstruction	37/54/37.27 ⁸ N	122/20/45.92 ¹ W	13.0 ft	461
Submerged Obstruction	37/54/38.86 ⁷ N	122/20/46.03 W	12.5 ft	462

ITEM INVESTIGATIONS

All depths reported in this section have been corrected for predicted tides and were acquired using a fiberglass surveying tape. Elevations and depths may change when smooth tides are applied. Nevertheless all charting recommendations are based on MLLW from predicted tides measured in feet (ft).

All times are Universal Coordinated Time (UTC).

Inverse distances were calculated from the listed AWDIS or item position to the center of the survey search or observed position of the feature. Inverse positions are also calculated from the detached position to its check position. These distances are in meters (m).

CHART: 18649 52nd ed. Oct. 18, 1986 ITEM: 190

ITEM DESCRIPTION: Ruins

SOURCE: H-9810/79

REFERENCES:

Mr. Norman Chan, Harbor Engineer, City of Richmond, states that the pier ruins have been removed in a letter dated 7 April 1987 (see Appendix XIII Supplemental Information).

See Attached Letters

CHARTING RECOMMENDATION:

Delete pier ruins charted at 37/54/48 N and 122/21/09 W. *concur*

CHART: 18649 52nd ed. Oct. 18, 1986 ITEM: 191

ITEM DESCRIPTION: Ruins

SOURCE: H-9810/79

INVESTIGATION DATE: 173

TIME: 1649-1939 UTC

VESSEL: 0651

OIC: LTJG Porta

REFERENCES:

Position No: 460, 461, 463, 464. See also letter from Mr. Norman Chan, Harbor Engineer, and Michael Hanlon, City of Richmond, regarding the removal of piles and ruins charted in the vicinity of 37/54/40 N, 122/20/48 W (see Appendix XIII Supplemental Information).

GEODETTIC POSITION	Latitude N	Longitude W	POS
Project Inst.:	37/54/40	122/20/48	
Observed:	37/54/37.27 ⁹	122/20/45.92	461
	37/54/38.86	122/20/46.03	464

Inverse Distances:

Project Instructions to Object

Pos	Dist.
461	98 m
464	60 m

Search to Scaled Position

Pos.	Dist.
460	4.9 m
463	2.4 m

Object to scaled position

Pos.	Dist.
461	35.4 m
464	76.2 m

POSITION DETERMINED BY:

Motorola Mini-Ranger, Wild T-2. The method of positioning the feature was range-azimuth checked by a range-range position to 3.7 m for both positions 461 and 464, 4.8 m for position 460, 0.2 m for 463. This is adequate for a 1:10,000 scale survey. The range-azimuth positions, corrected for ANDIST (in RK 561), are considered the strongest positions, and are the ones listed here.

METHOD OF INVESTIGATION:

Two 100 m radius bottom drags were conducted around the item locations scaled from a 1:20000 copy of the smooth sheet. The sites for the search were selected so the entire navigable area not covered by the new piers were swept by PHP. Two obstructions were found.

The position of the ruins from the project instructions was centered over a group of three different pier ruins. The sites of the northern two pier ruins are now covered by new

piers. It was not possible to conduct bottom drags in this area. The area of PHP searches were over the southern pier ruins, therefore there is a large inverse distance between the searches and the project instruction locations.

The search radii were increased from 20 to 100 m to cover the entire ruins with the least amount of circle searches.

The following method was used at both search locations. A 25 pound weight with a float was attached to a 100 m 5/8 inch nylon line. A 25 pound weight was attached to the other end of the nylon line. A 25 m tow line was attached to the 25 pound weight. Two circles were made in one direction, then the launch was pulled to the center weight to check for hangs near the center and to verify the location of the center of the search. Then one circle was driven in the opposite direction and the launch was again pulled to the center weight to check for hangs. The launch speed was adjusted to ensure the weight was on the bottom. If a hang was observed during the drag a diver would investigate.

Two hangs were observed during the search around position 460. The hangs were approximately 10 m apart and were composed of metal debris and a 4 inch diameter metal pipe. The least depth was 13 ft. One hang was observed during the search around position 463. The hang was on a piece of angle iron and metal debris. The least depth was 12.5 ft.

CHARTING RECOMMENDATION:

Chart obstruction, submerged 13.0 ft at 37/54/37.2⁸ N, 122/20/45.92¹ W, and obstruction, submerged 12.5 ft at 37/54/38.86⁷ N, 122/20/46.03 W.

LNM 36/87

CONCUR

Delete piles charted in the vicinity of 37/54/40 N, 122/20/48 W. The pier ruins on the smooth sheet for H-9810 have been disproved.

CONCUR

Position	Cartographic Code
461	287
464	287

CHART: 18649 52nd ed. Oct. 18, 1986 ITEM: 192

ITEM DESCRIPTION: Submerged Piles

SOURCE: H-9810/79 and H-7623/47 and Verifier's Report, section 6.

INVESTIGATION DATE: 5/13/87 (DN 133) TIME: 1752-2303

VESSEL: 0651 OIC: LTJG Porta

REFERENCES:

Position No: 388-459

GEODETTIC POSITION	Latitude N	Longitude W	Inv D. m
Scaled from H-9810:	37/54/29.20	122/21/27.70	
Pos 388	37/54/29.50	122/21/27.59	9.6
Scaled from H-9810:	37/54/23.50	122/21/25.00	
Pos 418	37/54/22.98	122/21/26.28	35.8
Scaled from H-9810:	37/54/26.20	122/21/26.50	
Pos 439	37/54/26.07	122/21/26.53	4.1

POSITION DETERMINED BY:

Motorola Mini-Ranger, Wild T-2. The method of positioning the feature was range-azimuth checked by a second range azimuth position to 6.5 m, 6.2 m, 2.5 m, for 388, 418, 439 respectively. Although the inverse distance between the positions of the center of the searches were greater than 5 meters for positions 388 and 418 the length of the radius of the drag was 55 m longer than required, therefore the entire area was swept.

METHOD OF INVESTIGATION:

Three 75 m radius bottom drags were conducted around the item locations scaled from a 1:20000 copy of the smooth sheet. No significant obstructions were observed.

There was a discrepancy in position of the items from the verifier's report and the Office Review section of the project instructions. The positions of the searches were scaled from the smooth sheet as instructed by N/CG241 (R. DerKazarian). The positions of three submerged objects were scaled from an approximately 1:20000 scale paper reproduction of the smooth sheet.

The search radii were increased from 20 m to 75 m to compensate for scaling errors.

The large inverse distance between position 419 and the scaled position of the object resulted from a blunder in converting the scaled position into range-azimuth positions. Due to the length of the drag and the overlap from the other bottom drags, the entire required area was swept.

A 50 pound weight with a float was attached to a 75 m 5/8 inch nylon line. A 25 pound weight was attached to the other end of the nylon line. A 25 m tow line was attached to the 25 pound weight. Two circles were made in one direction, then the launch was pulled to the center weight to check for hangs. Then one circle was driven in the opposite direction and the launch was again pulled to the center weight to check for hangs. The launch speed was adjusted to ensure the weight was on the bottom.

The above procedure was followed at all three locations.

One hang was investigated by a diver. A small rock 0.5 ft off the bottom and one ft in diameter was observed. The rock was laying on the muddy bottom and was not part of a rocky feature. The hydrographer determined it was too insignificant to chart.

CHARTING RECOMMENDATION:

Delete the following charted items: submerged pile in the vicinity of 37/54/29.2 N, 122/21/27.7 W; submerged pile in the vicinity of 37/54/23.5 N, 122/21/25.0 W; submerged stake in the vicinity of 37/54/26.2 N, 122/21/26.5 W.

*See EML
Report Section 7*

M. ADEQUACY OF SURVEY. See EAC Report Section 9

These investigations are complete and adequate to supersede all prior charted and item information.

PHP felt that diving on AWOIS 50736, because of lack of visibility, hazardous currents, depth, and the fact that the item (wreck) had been swept by the Corps of Engineers in the past, was not warranted. PHP has requested a side scan sonar. The Chief of Party believes this is the only safe and efficient way to determine if the wreck still exists.

N. AIDS TO NAVIGATION. ✓ See EAC Report Section 7

There were no aids to navigation within the areas of these investigations. However for calibration purposes, the Pt Potrero Rch Rng F Lt 14 was positioned to third order, class I accuracy. A comparison between this new position and the LIGHT LIST VOL VI, 1987 follows:

Source	Latitude	Longitude	Inv. D (m)
PHP	37/54/08.97802	122/21/35.71807	
LIGHT LIST	37/54.2	122/21.6	93.4

O. STATISTICS. ✓

Vessel: Launch 1101, EDP 0651
Number of Positions: 76
N. miles of Sounding Lines: 0
Square nm of Hydrography: 0
Detached positions: 7
N. miles of Bottom Drag: 0.8
Square nm of Bottom Drag: 0.1
Number of bottom samples: 0
Number of tide gages: 2 (POG gages: 2. See Field Tide Note.)
Number of current stations: 0
Number of velocity casts: 0
Number of magnetic stations: 0
Days of production: 4

P. MISCELLANEOUS. ✓

There were no anomalous currents, tides, or submarine features in the areas of investigation.

No bottom samples were acquired or sent to the Smithsonian Institute.

Q. RECOMMENDATIONS. ✓

Richmond Marina Bay will be filled with moorage facilities. Construction and dredging in the area covered by item 191 is scheduled to begin in late 1987 or early 1988. Plans for the marina are included in the cahier.

The areas of the item investigations were not utilized a great deal by commercial vessels. The soundings from the investigations agreed with the charted soundings or were at most 1 foot shoaler. Although there has been construction along the shoreline and additional construction planned in Richmond Marina Bay resurvey of this area should not be given high priority.

cancel

R. AUTOMATED DATA PROCESSING. ✓

DEC PDP 8/e Computer

<u>Number</u>	<u>Name</u>	<u>Version Date</u>
RK201	Grid, Signal, and Lattice Plot	4/18/75
RK211	Range-Range Non-Real Time Plot	2/13/84
RK226	Range-Azimuth Non-Real Time Plot	7/25/86
RK300	Utility Computations	10/21/80
RK330	Reformat and Data Check	5/04/76
RK360	Electronic Corrector Abstract	2/02/76
RK362	Reformat and Data Check and Elinore-Line Oriented Generator	8/20/84
AM500	Predicted Tide Generator	11/10/72
RK561	H/R Geodetic Calibration	12/01/82

Hewlett Packard 9815A Calculator.

<u>Number</u>	<u>Name</u>	<u>Version Date</u>
811101	Geodetic Package	Feb. 1985

Hewlett Packard 97 Calculator.

<u>Number</u>	<u>Name</u>	<u>Version Date</u>
	Geodetic Inverse	

IBM PC

<u>Number</u>	<u>Name</u>	<u>Version Date</u>
MTEN	Micro - Terminal Entry Command	Nov. 1984

S. REFERRAL TO REPORTS. ✓

Other reports covering this survey area are:

- 1) Horizontal Control Report, PHP, San Francisco Bay to San Pablo Bay, DPR-L123-PHP-87 (since geodetic work for the project continues, the report will be sent in the near future). *Horizontal Control Report has yet to be submitted*

Submitted by,

Thomas K. Porta

LT(JG) Thomas K. Porta, NOAA
Asst. Chief, PHP

FIELD TIDE NOTE

OPR-L123-PHP-87

San Francisco Bay, California (Items)

Reductions

Soundings on the field sheet were reduced on the basis of predicted tides for San Francisco, Golden Gate, Presidio, Fort Point, Calif., station number 941-4290. Tide correctors were generated at 0.2 ft intervals using the PDF-8e computer system and program AM 500 "Predicted Tide Generator".

Stations

Three permanent tide stations bracket the survey area. These three stations are operated by NOAA, Pacific Operations Group, N/OMA 1214. The gage at San Francisco, Fort Point 941-4290 is to the southwest of the survey area, Alameda (Alameda NAS) 941-4750 is to the south, and Port Chicago (Concord, Ca.) 951-5144 is to the east. Frequent checks with POG confirmed that there were no significant breaks in the data from these stations.

Tide Zone Correctors

Predicted tides from the San Francisco, Fort Point tide gage were adjusted by the application of correctors supplied by NOAA, Office of Oceanography and Marine Assistance, Sea and Lake Levels Branch, Rockville, Md (N/OMA 121). These correctors accompany project instructions OPR-L123-PHP-87, dated 10 Feb. 1987, and Change No. 1 dated 20 March 1987.

The correctors used for this Field Exam Survey are as follows:

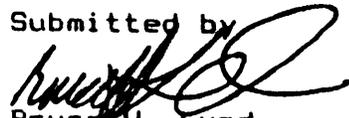
CHART 18649

ITEMS No. 190, 191, and 192

+ 0 hr. 25 min. High Water
+ 0 hr. 36 min. Low Water
X 1.03 Height Ratio

No survey data was acquired without the required tide support. Pacific Standard Time (120 W.) was used at the permanent stations operated by POG N/OMA 1214.

Submitted by


Bruce H. Lund
Eng. Tech.

Approved by


Lt(jg) Tom K. Porta, NOAA
for Chief, PHP (N/MOP223)

SIGNAL TAPE LISTING
PHP-10-2-87
RICHMOND INNER HARBOR TO RICHMOND MARINA BAY, CA
FIELD EXAMINATIONS

~~402 0 37 45 18578 122 27 05923 139 0000 000000 MT SUTRO TV TOWER S ANTENNA~~
~~412 0 37 47 42026 122 24 06079 139 0264 000000 TRANS AMERICA BUILDING~~
604 0 37 53 47366 122 21 16177 250 0048 000000 BROOKS ISLAND 2 1905
605 0 37 54 34400 122 21 34121 250 0002 000000 HARBOR USE 1929
~~607 0 37 48 11576 122 16 11226 139 0109 000000 OAKLAND TRIBUNE BLDG FLAGPOLE~~
612 0 37 48 11495 122 16 11238 250 0109 000000 OAKLAND TRIBUNE BLDG FLAG ECC
614 0 37 54 08978 122 21 35718 250 0006 000000 POINT POTRERO RCH RNG F LT 14

RESPONSIBLE PERSONNEL		
TYPE OF ACTION	NAME	ORIGINATOR
OBJECTS INSPECTED FROM SEAWARD	Thomas K. Porta, Lt.(jg), NOAA	<input type="checkbox"/> PHOTO FIELD PARTY <input checked="" type="checkbox"/> HYDROGRAPHIC PARTY <input type="checkbox"/> GEODETIC PARTY <input type="checkbox"/> OTHER (Specify)
POSITIONS DETERMINED AND/OR VERIFIED	Felipe L. Rosario	FIELD ACTIVITY REPRESENTATIVE
		OFFICE ACTIVITY REPRESENTATIVE
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES		<input type="checkbox"/> REVIEWER <input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE
INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION' <i>(Consult Photogrammetric Instructions No. 64.</i>		
OFFICE I. OFFICE IDENTIFIED AND LOCATED OBJECTS Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object. EXAMPLE: 75E(C)6042 8-12-75 FIELD I. NEW POSITION DETERMINED OR VERIFIED Enter the applicable data by symbols as follows: F - Field P - Photogrammetric L - Located Vis - Visually V - Verified 1 - Triangulation 5 - Field identified 2 - Traverse 6 - Theodolite 3 - Intersection 7 - Planetable 4 - Resection 8 - Sextant A. Field positions* require entry of method of location and date of field work. EXAMPLE: F-2-6-L 8-12-75 *FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.		FIELD (Cont'd) B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object. EXAMPLE: P-8-V 8-12-75 74L(C)2982 II. TRIANGULATION STATION RECOVERED When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery. EXAMPLE: Triang. Rec. 8-12-75 III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH Enter 'V-Vis.' and date. EXAMPLE: V-Vis. 8-12-75 **PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Pacific Hydrographic Party
614 A East Fifth St.
Benicia, CA 94510

20 July 1987

Commander (oan)
Eleventh Coast Guard District
400 Oceangate Blvd.
Union Bank Building
Long Beach, CA 90822

Sir:

The following features were observed by the Pacific Hydrographic Party, NOS, NOAA, during a field examination of Richmond Marina Bay. This field examination is entitled San Francisco Bay, CA, Richmond Inner Harbor to Richmond Marina Bay, May 13, 1987 to June 22, 1987. This information, which is field data and is subject to verification, will be used to update future editions of nautical chart 18649. It is, however, considered important enough to warrant immediate publication.

OBSTRUCTIONS

The following uncharted obstructions and hazards were found during the item investigations. The surveyed depths have been corrected to the chart datum, which is mean lower low water (MLLW), by applying predicted tides. The surveyed depths are field data and are subject to change. The geodetic positions are based on the North American Datum 1927 (NAD 1927).

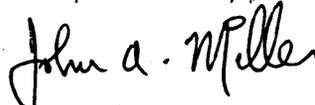
CHART 18649

Description	Latitude	Longitude	Least Depth
	(NAD 1927)	(NAD 1927)	(MLLW)
Submerged Obstruction	37/54/37.2 ⁸ N	122/20/45.9 ¹ W	13.0 ft
Submerged Obstruction	37/54/38.8 ⁷ N	122/20/46.03 W	12.5 ft



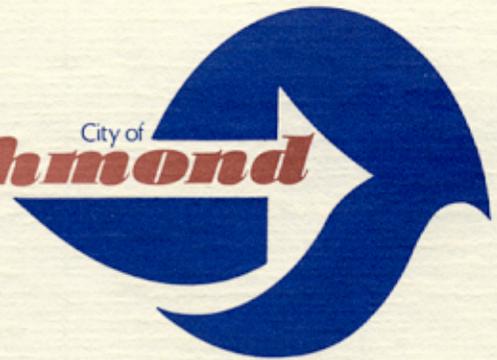
For further information concerning the above mentioned obstructions contact the Chief of Party, Pacific Hydrographic Party-NOAA, 614 A East 5th St. Benicia, 94510. The Chief of Party may be reached locally in Benicia at the following phone number: 707-746-8189.

Respectfully,

A handwritten signature in cursive script that reads "John A. Miller".

John A. Miller
LT(JG) NOAA
Chief of Party

cc: Chart Information Section, N/CG222
Nautical Charts Branch, N/MOP21



April 7, 1987

Lt. Tom Porta
Pacific Hydrographic Party
P.O. Box 10001
Sonoma, CA 95476-10001

Dear Lt. Porta:

As discussed in our telephone conversation this morning, the following is the information you have requested.

<u>Description</u>	<u>Location</u>	<u>Status</u>
Pier Ruins <i>B 190</i>	Lat 37°54'48" Long 122° 21'09"	Have been removed.
Piles <i>B 191</i>	Lat 37°54'40" Long 122° 20'48"	Have been removed or cut off at mud line.
Piles <i>#192</i>	Lat 37°54'25" Long 122° 21'28"	No information

I hope this will be helpful to you in updating Chart 18649. When you complete your task, I would appreciate it if you would send me a copy of the chart or any information change regarding the Richmond Harbor.

Thank you.

Sincerely yours,

Norman K. Chan
Harbor Engineer

NKC:mj

Richmond Redevelopment Agency

August 10, 1987

Lt. J. G. Thomas Porta
Pacific Hydrographic Party
614-A East 5th Street
Benicia, California 94510

Dear Mr. Porta:

In response to our telephone conversation the morning of August 10th, dredging of Marina Bay occurred in 1979.

<u>Item #</u>	<u>Latitude (North)</u>	<u>Longitude (West)</u>
191	37 ⁰ 54' 40"	122 ⁰ 20' 48"

The disposition of the item referenced in the letter to Mike Hanlon is that....the northern two pier ruins were removed by dredging in 1979.

If you need additional information or if questions should arise please feel free to call Marshall Walker, III at 620-6546 or myself.

Very truly yours,

Michael E. Hanlon

Michael E. Hanlon
Chief, Redevelopment Projects

MEH:ec

Attachment



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

PACIFIC HYDROGRAPHIC PARTY
P.O. BOX 1001
SONOMA, CA. 95476-1001

July 7, 1987

TO: Lieutenant Marlene Mozgala, N/MOP21x2
FROM: Lieutenant (jg) John A. Miller, N/MOP223
SUBJECT: Detached Position Computations.

PHP recently had a phone call from one of the verifiers at FMC requesting information on our methods for computing and plotting range-azimuth detached positions. I hope this memo will clear-up any problems.

A common method that PHP uses to position piles, obstructions, etc., is a range-azimuth position from some known station, checked by a range-range position from two or more known stations. Should there be an acceptable inverse distance check between the two positions, PHP will hold the range-azimuth position as the best one. The range-azimuth position will be the position used in plotting and in the report of the item.

One problem that PHP faces in using the range-azimuth position, however, is how to easily apply the offset corrector to the position, to compensate for the Mini-Ranger RT unit's offset from the item (in almost all cases the RT unit is wrapped in orange signal cloth, which is the target for the person on the theodolite).

The following is the method PHP uses to apply offset correctors to range-azimuth positions:

1. The boat is driven as close to the item as possible, and held there.
2. A fix is taken. The OIC records the angle and all Mini-Ranger distances.
3. The OIC notes the offset from the antenna to the item, and the magnetic bearing.
4. In the office, the range-azimuth observation is computed into a lat. and long. position, using RK 300.
5. The lat. and long. is then converted to rates from two stations with good geometry (usually the same stations as those used for the checks). This is also done in RK 300.



6. Program RK 561 is used to perform the inverse distance checks between the range-azimuth generated rates and the range-range check rates. However, the correct ANDIST and compass bearing (converted to True) are put into the RK 561 computations. If the inverse distance check is acceptable, the range-range rates generated from the range-azimuth position, which now have the offset correctors applied, are used for plotting and report writing.

As you can see, there is the possibility for some confusion when checking our work. I hope this memo has cleared-up any problems.

I'd like to add here that the ANDIST as applied to RK 561 is not the same ANDIST applied to parameter tapes. For PHP's Launch 1101 (EDP 0651) the RT unit is over the transducer, which means there is no ANDIST. For RK 561, the ANDIST entry refers to the noted-in-the-field offset corrector from the antenna (or RT unit) to the item being positioned. A compass bearing must be noted also to make this offset correction valid.

If this memo is clear to you, would you please pass it on to the verifiers who are working on FE 299 and H-10223. Hopefully this will make their job smoother. Thanks.

Approval Sheet

OPR-L123-PHF-87

Field Examination
Richmond Inner Harbor to Richmond Marina Bay

The Chief of Party has inspected all field sheets and field data on a weekly basis. All field sheets, reports and records are complete. This survey is adequate for charting purposes and no additional field work is necessary.

Approved by:

A handwritten signature in cursive script that reads "John A. Miller". The signature is written in dark ink and is positioned above the typed name and title.

Lt(jg) John A. Miller, NOAA
Chief of Party
Pacific Hydrographic Party
NOS

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

DATE: October 15, 1987

Marine Center: Pacific

OPR: L123

Hydrographic Sheet: FE-302

Locality: San Francisco Bay, CA

Time Period: May 13 - June 22, 1987

Tide Station Used: 941-4290 San Francisco, CA

Plane of Reference (Mean Lower Low Water): 5.77 ft.

Height of Mean High Water Above Plane of Reference: 5.2 ft.

Remarks: Recommended Zoning:

1. For AWOIS Items# 190, 191, 192 apply a + 0hr 30 minute time correction and a X1.03 range ratio to all heights.


Chief, Tidal Datum Quality
Assurance Section

GEOGRAPHIC NAMES

(TITLE)
Name on Survey
CALIFORNIA, SAN FRANCISCO
BAY, RICHMOND INNER HARBOR
TO RICHMOND MARINA

A ON CHART NO. 18649
B ON PREVIOUS SURVEY
C ON U.S. QUADRANGLE MAPS
D FROM LOCAL INFORMATION
E ON LOCAL MAPS
F P.O. GUIDE OR MAP
G RAND MCNALLY ATLAS
H U.S. LIGHT LIST
K

(TITLE)	A	B	C	D	E	F	G	H	K
CALIFORNIA (TITLE)	X								1
BROOKS ISLAND	X								2
									3
RICHMOND INNER HARBOR	X								4
RICHMOND MARINA BAY	X								5
									6
									7
									8
									9
									10
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20
									21
									22
									23
									24
									25

Approved:
Charles E. Harrington
Chief Geographer - N/CG 2x5
OCT 14 1987



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102-3767

FILE COPY

SEP 14 1987

N/MOP21x2/MM

TO: PHP Chief of Party - John A. Miller

Robert L. Sandquist

FROM: N/MOP - Robert L. Sandquist

SUBJECT: Preprocessing Examination of FE-302, California
San Francisco Bay, Richmond Inner Harbor to Richmond
Marina Bay

Hydrographic survey FE-302 has been reviewed in accordance with Hydrographic Survey Guideline No. 15, and the Preprocessing Examination Critique for this survey is attached. Survey FE-302 is accepted for Pacific Marine Center processing.

The Preprocessing Examination Critique is designed to provide information which will be useful to the Command for maintaining the quality of future hydrographic surveys. I encourage you to use this information constructively. Your comments on specific critique items are welcome.

Attachment

cc: N/MOP2x1
N/MOP21x2
N/MOP211
N/CG2





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Pacific Marine Center
Nautical Chart Branch
7600 Sand Point Way NE
Seattle, Washington 98115-0070

September 10, 1987 N/MOP21x2/MM

TO: N/MOP - Robert L. Sandquist
FROM: N/MOP 21 - Thomas W. Richards
FOR *Dennis Hill*
SUBJECT: Preprocessing Examination for FE-302

I. SURVEY INFORMATION

A. Field No.	PHP-10-2-87	Registry No.	FE-302
B. State:		California	
General Locality:		San Francisco Bay	
Sublocality:		Richmond Inner Harbor to Richmond Marina Bay	
C. Project Instructions:		OPR-L123-PHP-87	
Original dated:		February 10, 1987	
Change No. 1 dated:		March 20, 1987	
D. Dates:			
Field Work Commenced:		May 13, 1987	
Field Work Completed:		August 12, 1987	
plus 6 weeks:		September 23, 1987	
Data received at Marine Center:		August 25, 1987	
plus 1 month:		September 25, 1987	
Examination critique transmitted to field		<u>September 14, 1987</u>	
Target for completion of Marine Center processing		<u>March 14, 1988</u>	



II. PREPROCESSING EXAMINATION CRITIQUE

Hydrographic survey FE-302 was performed by personnel of the Pacific Hydrographic Party, LTJG John A. Miller, Officer-In-Charge. The following personnel supervised portions of the data acquisition: LTJG Miller and LTJG Porta.

In accordance with the Preprocessing Examination System set forth in Hydrographic Survey Guideline (HSG) No. 15, Section III, the following items are brought to your attention:

A. Danger to Navigation Report:

The Pacific Hydrographic Party (PHP) reported two dangers to navigation within the limits of the survey.

No additional dangers were found during the preprocessing examination.

B. Compliance with Instructions:

Survey FE-302 generally complies with the Project Instructions.

The hydrographer investigated three of the five items within the limits of Chart 18649. AWOIS #50736 was not investigated as a side-scan sonar unit was not available. Item 189 was not investigated because of the low priority assigned to it in the Project Instructions. The hydrographer stated in a telephone conversation on 4 September 1987 that PHP was only investigating high-priority items (priority numbers 1 and 2) in order to complete field work on this project by January 1988 [per Project Instructions Change No. 1].

C. Final Field Sheets:

The charted piers shown within Richmond Inner Harbor were not transferred to the final field sheets.

D. Descriptive Report:

The hydrographer states in Section G (Hydrographic Position Control) that the baseline calibration data performed on DN173 for Mini-Ranger unit (Code 9) was used for survey data acquired on DN173. The corrector tape for DN173 shows the results from the baseline calibration performed on DN107 to have been applied to this day's data. The difference between the two is only one meter and is not considered significant.

In Section H (Shoreline), the hydrographer recommends deleting ruins charted at 37°54'48"N, 122°21'09"W. The ruins appear on the Presurvey Review copy of the chart (49th edition) but do not appear on the latest edition of the chart.

F. Sounding Volumes and/or Raw Data Printouts:

No major discrepancies were found in the raw data printouts.

K. Special and/or Ancillary Reports:

Information regarding sounding corrections and hydrographic position control were included in the survey package. The Horizontal Control Report has not yet been received.

L. Automated Data Check:

Inconsistencies exist in the designation of "Not to be Smooth Plotted" (NSP) data. Corrector tapes contain no codes for NSP designation; the Abstract of Positions states 74 of the 76 positions in the survey are NSP. The final field sheets were examined to determine which position numbers should have an NSP designation.

M. General Comments:

Discrepancies of NSP notation between the Abstract of Positions, data tapes and final field sheets has led to confusion in processing survey data. The designation of NSP data should be consistently and accurately noted in Abstract of Positions, data tapes and final field sheets [PMC OORDER Section 3.5.1.a.2].

N. Survey Acceptance:

The preprocessing examination for FE-302 was conducted under the time constraints of HSG 15. All comments contained herein are based on a spot check of the data, and it is possible that some problem areas have not been addressed.

Except for the items noted in the critique, survey FE-302 is in compliance with the Project Instructions. I recommend that FE-302 be accepted for Nautical Chart Branch processing.

Prepared by:

Marlene Mozgala
Marlene Mozgala

HYDROGRAPHIC SURVEY STATISTICS

FE-302

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		1	SMOOTH OVERLAYS: POS., ARC, EXCESS		1
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS		5
DESCRIP- TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR- GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS
ACCORDION FILES	1				
ENVELOPES					
VOLUMES					
CAHIERS					
BOXES					

SHORELINE DATA

SHORELINE MAPS (List):

PHOTOBATHYMETRIC MAPS (List):

NOTES TO THE HYDROGRAPHER (List):

SPECIAL REPORTS (List):

NAUTICAL CHARTS (List):

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	EVALUATION	TOTALS
POSITIONS ON SHEET			7
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS	19		19
VERIFICATION OF SOUNDINGS			
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	20		5
COMPARISON WITH PRIOR SURVEYS AND CHARTS		4	4
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		27	17
GEOGRAPHIC NAMES			
OTHER: Digitizing			
*USE OTHER SIDE OF FORM FOR REMARKS	TOTALS		
	39	31	

Pre-processing Examination by M. Mozgala	Beginning Date	Ending Date 9/14/87
Verification of Field Data by L. Deodato, C.R. Davies	Time (Hours) 39	Ending Date 12/2/87
Verification Check by J. Green, B. Olmstead	Time (Hours) 9	Ending Date 12/3/87
Evaluation and Analysis by C.R. Davies	Time (Hours) 31	Ending Date 12/3/87
Inspection by D. Hill	Time (Hours) 4	Ending Date 12/7/87

PACIFIC MARINE CENTER
EVALUATION REPORT
FE-302

1. INTRODUCTION

FE-302 is a field examination accomplished by the Pacific Hydrographic Party under the following project instructions.

OPR-L123-PHP-87, dated February 10, 1987
Change Number 1, dated March 20, 1987

This field examination was accomplished in San Francisco Bay, California, from Richmond Marina Bay south to Richmond Inner Harbor. The field examination consists of the investigation of three unresolved items from basic survey H-9810 (1979) that fall within the limits of chart 18649.

Field processing used predicted tides for Fort Point, San Francisco, California. Office processing used approved hourly heights zoned from the San Francisco gage (941-4290).

The field sheet parameters were revised to center the hydrography on the smooth sheet and to change the projection to polyconic. The electronic control correctors are adequate. An accompanying computer printout contains the revised data.

A digital file, generated for this survey, includes categories of information required to comply with N/CG2 Hydrographic Survey Guideline No. 23, Completion of Digital Hydrographic Surveys, September 7, 1983. Certain descriptive information, however, may not be included in the digital record due to the restrictions of the presently available cartographic codes. The user should refer to the smooth sheet for complete information.

2. CONTROL AND SHORELINE

Sections F and G of the hydrographer's report contain adequate discussions of horizontal control and hydrographic positioning.

Positions of horizontal control stations used during hydrography are either published or 1987 field values based on the NAD 27. The computation of positions accomplished during office processing used these same values. The smooth sheet and accompanying overlay are annotated with NAD 83 adjustment ticks based on values determined by N/CG121. Geographic positions based on the NAD 83 may be plotted on the smooth sheet utilizing the NAD 27 projection by applying the following corrections:

Latitude: 0.260 seconds (8.0 meters).
Longitude: - 3.898 seconds (-95.3 meters).

The year of establishment of control stations shown on the smooth sheet originates with the hydrographer's signal list and is in the case of the 1987 station subject to change pending certification of the data by NGS.

There are no shoreline manuscripts for this field examination. Shoreline is shown in brown for orientation only from chart 18649, 52nd Edition, October 18, 1986.

3. HYDROGRAPHY

Hydrography consists of bottom drag and diver investigations to verify or disprove individual features from a prior survey. Except for least depths on two features no soundings were acquired. The limited amount of data available is adequate for the intended purpose.

4. CONDITION OF SURVEY

The hydrographic records and reports are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, and the PMC OPOORDER, except as noted in the Preprocessing Examination Report, dated September 10, 1987 (copy attached).

5. JUNCTIONS

Not applicable to this field examination.

6. COMPARISON WITH PRIOR SURVEYS

H-9810 (1979) 1:10,000

Items 190, 191 and 192 originate from survey H-7623 (1947) and were carried forward to survey H-9810 as ruins and submerged piles. The hydrographer adequately discusses the investigation of these items in section 7 of the hydrographer's report.

Survey FE-302 is adequate to disprove the ruins and submerged piles shown on Survey H-9810 that are identified as Items 190, 191, and 192.

7. COMPARISON WITH CHART

Chart 18649, 52nd Edition, dated Oct 18, 1986; scale 1:40,000

a. Hydrography The charted information addressed by this survey originates from the prior survey H-9810. For more details see section L of the hydrographer's report.

Item 192, submerged piles, is charted as submerged poles. The positions of these submerged poles are the same positions as the submerged piles carried forward on survey H-9810. The reason for the change in terminology from pile to pole is not known. These features are considered disproven and removal of the charted submerged poles at the following positions is recommended.

	Latitude (N)	Longitude (W)
Submerged pole	37°54'29"	122°21'28"
Submerged pole	37°54'27"	122°21'27"
Submerged pole	37°54'24"	122°21'25"

The ruins located at latitude 37°54'48"N, longitude 122°21'09"W and latitude 37°54'40"N, longitude 122°20'48"W, Items 190 and 191, have been removed from the 52nd edition of chart 18649. Two attached letters from the Harbor Engineer and Chief, Redevelopment Projects of the City of Richmond, disprove the existence of these ruins. The hydrographer also confirms the disproof of Item 191 by bottom drag.

b. AWOIS AWOIS item 50736, submerged wreck, charted at latitude 37°57'32"N, longitude 122°26'28"W, was not investigated and should remain as charted.

c. Controlling Depths There are no charted channels with controlling depths within the limits of this survey.

d. Aids to Navigation There are two fixed and two floating aids within the limits of this survey. Their charted positions and descriptions were not verified with the exception of Point Potrero Reach Range Front Passing Light 14, Light List No. 5740. It was positioned to third order accuracy and found to be displaced 93.4 meters from the Light List position. The position of the light is latitude 37°54'08.978"N, longitude 122°21'35.718"W. A NOAA Form 76-40 is attached.

e. Geographic Names Names appearing on the smooth sheet and in the survey title have been approved by the Chief Geographer.

f. Dangers to Navigation The hydrographer submitted one danger to navigation report to the 11th Coast Guard District on July 20, 1987 (copy attached). No additional dangers were identified during office processing.

8. COMPLIANCE WITH INSTRUCTIONS

FE-302 adequately complies with the project instructions mentioned in section 1 of this report.

9. ADDITIONAL FIELD WORK

This is an excellent field examination. Additional field work to resolve AWOIS item 50736 is recommended when the field party has access to side-scan sonar.

Charles R. Davies

C.R. Davies
Cartographer

This survey has been examined and it meets Charting and Geodetic Services' standards and requirements for use in nautical charting. This survey is recommended for approval.

Dennis Hill

Dennis Hill
Chief, Hydrographic Section

ATTACHMENT TO DESCRIPTIVE REPORT FOR FE-302

I have reviewed the smooth plots, accompanying data, and reports of this hydrographic survey. The hydrographic survey meets or exceeds Charting and Geodetic Services (C&GS) standards, complies with instructions, and is accurately and completely represented by the smooth plots and digital data file for use in nautical charting.

Thomas W. Richards 12-9-87
Chief, Nautical Chart Branch (Date)

CLEARANCE:

N/MOP2:LWMordock

SIGNATURE AND DATE:

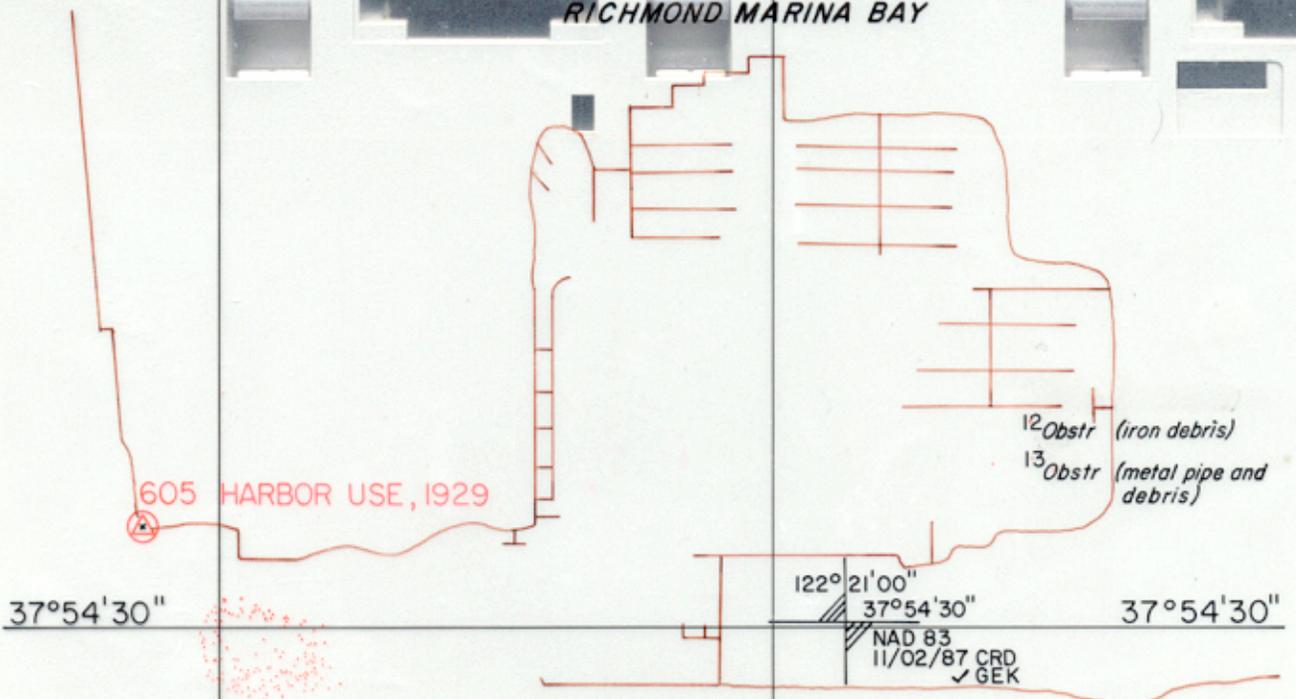
Raymond W. Mordock 12-9-87

After review of the smooth plots and accompanying reports, I hereby certify this survey is accurate, complete, and meets appropriate standards with only the exceptions as noted above. The above recommendations are forwarded with my concurrence.

Robert L. Saupit 12-9-87
Director, Pacific Marine Center (Date)

122°21'30" 122°21'00" 37°55'00" 37°55'00"

RICHMOND MARINA BAY



122°21'00"
37°54'30"
NAD 83
11/02/87 CRD
✓ GEK

RICHMOND INNER HARBOR

⊕ 614 POINT POTRERO RCH RNG F LT 14, 1987
(Point Potrero Reach Range Front Passing Light 14)
(Field position)
(pile)

Shoreline in brown from chart 18649 52nd edition for orientation purposes only

37°54'00" 37°54'00"

BROOKS ISLAND

FE-302
CALIFORNIA, SAN FRANCISCO BAY
RICHMOND INNER HARBOR TO
RICHMOND MARINA BAY
DATE OF SURVEY: MAY-JUN 1987
SCALE - 1:10,000
SOUNDINGS IN FEET AT MLLW

604 BROOKS ISLAND 2, 1905

⊕ SHEET 1 of 2
ITEMS 190, 191, 192

122°21'30" 122°21'00"

37°55'00" 122°21'30" 122°21'00" 37°55'00"

605 HARBOR USE, 1929 

464
463 461 460

37°54'30" 122°21'00" 37°54'30" 37°54'30"

NAD 83
11/02/87 CRD
GEK

388
439
418

614 POINT POTRERO RCH RNG F LT 14, 1987 

37°54'00" 37°54'00"

FE-302
POSITION OVERLAY
SCALE-1:10,000
SHEET 2 of 2

Note: "Not to Be Smooth Plotted" type positions are not displayed.

604 BROOKS ISLAND 2, 1905 

122°21'30" 122°21'00"

PROGRESS SKETCH TO ACCOMPANY ANNUAL FIELD OPERATIONS REPORT

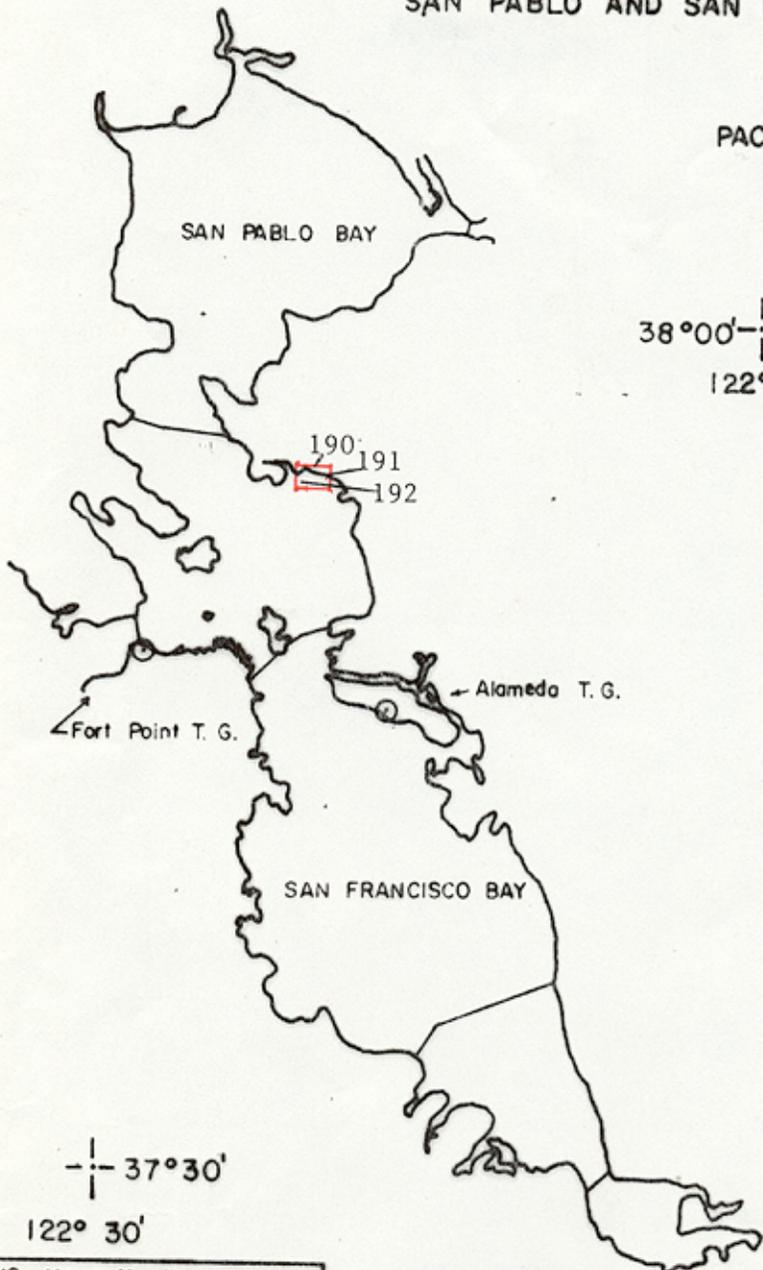
OPR-L123-PHP-87

SAN PABLO AND SAN FRANCISCO BAY, CALIFORNIA

PACIFIC HYDROGRAPHIC PARTY

Chief of Party:

John A. Miller, Lt(jg), NOAA



(Shoreline from Chart 18652)

AWOIS Item Numbers		Month	Year
STATUS OF INVESTIGATION		MAY - AUG	1987
DISPROVED	190, 192		
VERIFIED	191		
IN PROGRESS			
RESOLUTION NOT FEASIBLE			

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

Hydrographic Index No. 96M

