

10480

NOAA FORM 76-35A

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

# DESCRIPTIVE REPORT

Type of Survey ..... Hydrographic  
Field No. .... PHP-10-3-93  
Registry No. .... H-10480

## LOCALITY

State ..... California  
General Locality ..... San Francisco Bay  
Sublocality ..... Southampton Shoal to  
..... San Pablo Strait

19 93

CHIEF OF PARTY  
LT Guy Noll, NOAA

## LIBRARY & ARCHIVES

DATE ..... MAR 6 1995

**HYDROGRAPHIC TITLE SHEET**

H-10480

**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-10-3-93

State California

General locality San Francisco Bay

Locality Southampton Shoal to San Pablo Strait

Scale 1:10,000 Date of survey June 8 to July 16, 1993

Instructions dated December 29, 1992 Project No. OPR-L344-PHP

Vessel NOAA Launch 1101 (EDP No. 0651)

Chief of party LT Guy Noll, NOAA

Surveyed by LT G.Noll, LT R.Fletcher, ST R.Adams, ST L.K. Simmons

Soundings taken by echo sounder, ~~hand lead, pole~~ Innerspace Model 448

Graphic record scaled by PHP Personnel

Graphic record checked by PHP Personnel

Verification by: L. Deodato, I. Almacen Automated plot by PHS Xynetics Plotter

~~Entered by~~ I. Almacen

Evaluation by: I. Almacen

~~Verification by~~ I. Almacen

Soundings in ~~fathoms~~ meters and decimeters ~~feet~~ at ~~MLW~~ MLLW

REMARKS: Time in UTC. Revisions and marginal notes in black were generated during office processing. Some separates are filed with the hydrographic data, as a result page numbering may be interrupted or non-sequential.

*AWOIS and SURF v PWD 3/95*

# H-10080

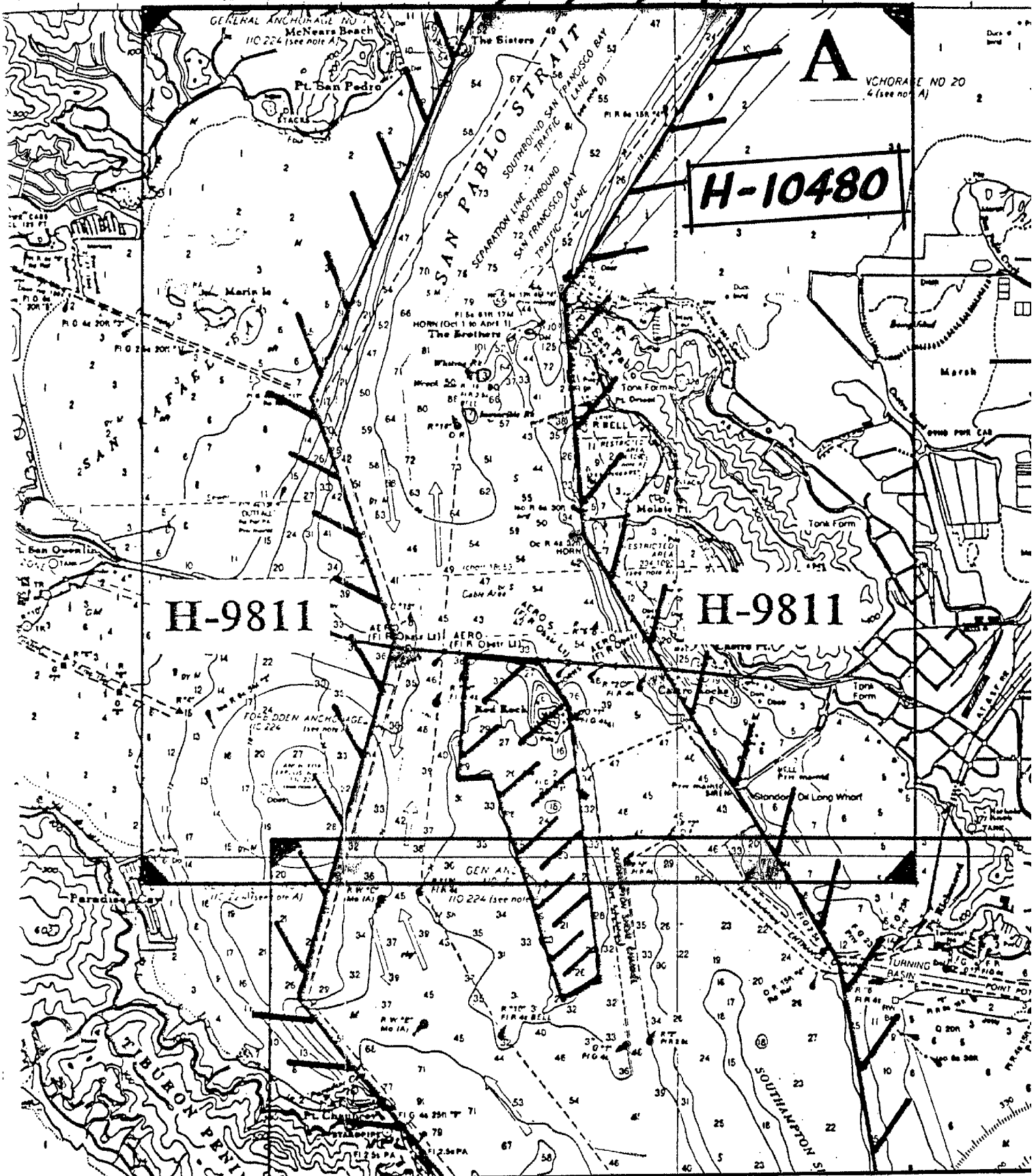
FILE

Formerly CAGS 5537 1st Ed. Jan. 1903

1:430 000

28° 45' 30' 15' 27' 50'

25' 10000 CHART 18654



**Descriptive Report to Accompany Navigable Area Survey H-10480**

Field Number PHP-10-3-93  
Scale 1:10,000  
1993

Pacific Hydrographic Party  
Chief of Party: LT Guy T. Noll

**A. PROJECT**

This survey was conducted in accordance with Hydrographic Project Instructions OPR-L344-PHP, San Francisco Bay, California, dated December 29, 1992. ✓

Hydrographic survey H-10480 was conducted to obtain data to update coverage of the designated traffic lanes in San Francisco Bay which are frequently transited by deep-draft vessels and to obtain data for the maintenance of existing nautical charts. This project responds to the concerns of the Harbor Safety Committee of the San Francisco Bay Region, the San Francisco Bar Pilots, the State of California Department of Fish and Game, Office of Oil Spill Prevention and Response, and the U.S. Coast Guard Marine Safety Office (USCG MSO). This part of San Francisco Bay was last surveyed by the National Ocean Service (NOS) in the late 1970's, with Field Investigations conducted in the early 1980's. The U.S. Army Corps of Engineers (COE) maintains a dredged area in the vicinity of the Richmond Long Wharf (Chevron private wharf) and Southampton and Richmond channels. ✓

This survey's sheet letter is "A", as specified by the project instructions. Sheet A is the third survey for Project OPR-L344. ✓

**B. AREA SURVEYED (See EVAL RPT., Sec. 1)**

The area surveyed for H-10480 extends from approximately latitude 37°54'50"N north to latitude 37°59'30"N and from longitude 122°27'30"W eastward to longitude 122°24'20"W. The HDAPS plotter sheet number 24 was skewed to 90° and measures 58.5 cm by 87.0 cm. Hydrographic limits for H-10480 are within those required by the Hydrographic Manual (Section 1.2.4, p. 1-6). ✓

Data acquisition was conducted from June 8, 1993 (DN 159) to July 16, 1993 (DN 197). ✓

**C. SOUNDING VESSELS**

NOAA Launch 1101 (EDP No. 0651), a 29-foot Jensen was used for all hydrography, detached positions and sound velocity casts. No shoreline verification or bottom drags were required. No changes to the standard vessel sounding configuration were necessary.

**D. AUTOMATED DATA ACQUISITION AND PROCESSING**

The standard HDAPS software suite was used throughout this survey. Program names and versions are listed in the appendix. \*

The following non-HDAPS computer programs were used:

<u>Program Name</u>	<u>Program Version</u>	<u>Version Date</u>
VELOCITY	2.00	1992
NADCON	1.01	1989
MTEN 4	20	1991
GEOID93	2.00	1993

The PC-DAS SURVEY Program, version 4.03 (GPS implementation), was used for all data acquisition.

**E. SONAR EQUIPMENT**

Not applicable.

**F. SOUNDING EQUIPMENT**

During this survey, the following Innerspace Model 448 (IN-448) echosounders, modified with custom EPROMS for HDAPS, were used:

<u>Echosounder Type</u>	<u>Vessel EDP No.</u>	<u>Serial No.</u>	<u>DN Used</u>
IN-448	0651	236	159-173
IN-448	0651	239	175-197

Soundings were recorded in meters, with an assumed speed-of-sound through water of 1500 m/sec. Depths encountered in the survey area ranged from 1.2 meters to 40.5 meters based on predicted tides.

The digitized soundings displayed on-line were compared in real time with the analog trace to ensure reasonable agreement. No on-line calibration adjustments are required for the IN-448. Occasional breaks in the continuity of the fathogram occurred when rapid changes in range scale were required; these were

\* Filed with the hydrographic data.

primarily due to operator inattention. These breaks are not considered significant by the hydrographer unless greater than 6mm at survey scale or if they occurred over a shoaling trend (potential missed peak), in which cases the section or line was resurveyed. ✓

Metric leadlines were made by PHP in accordance with HSG 69. Each leadline is 7/16-inch double-braided dacron line. Markings are at one-meter intervals from 0 to 19, and are shrink-tubing secured with epoxy glue. This deviation from HSG 69 makes for a more rugged leadline. Markings were calibrated during fabrication with a steel surveyor's tape while the line was under six pounds of constant tension. The throwing end is a standard six-pound lead shackled to a stainless steel thimble bent to the bitter end. Leadlines were used for depth comparisons with the echosounders. Leadline calibration forms are included in Separate IV\*(Sounding Equipment Calibration and Corrections). ✓

#### G. CORRECTIONS TO SOUNDINGS

##### Velocity of Sound

Corrections for the speed of sound through the water column were computed from data obtained with an Applied Microsystems Laboratories (AML) Velocity of Sound Profiler (S/N 03004). The VELOCITY Program was used to determine the speed of sound correctors. The following casts were used to determine the velocity correctors. ✓

Cast	Extrapolated DN				Cast Position	
	DN	Depth	Range	HDAPS Tables	Latitude	Longitude
1	152	47.3	159-161	9	37°57'40"N	122°25'51"W
2	166	39.8	167-173	10	37°57'40"N	122°25'51"W
3	183	46.2	175-181	11	37°57'40"N	122°25'51"W
4	195	49.9	195-197	12	37°57'40"N	122°25'51"W

 ✓

Copies of all velocity cast data and HDAPS Velocity Corrector Tables are included in Separate IV.\*

The AML instrument was calibrated by Northwest Regional Calibration Center on March 17, 1993. A copy of this calibration report was included with H-10456. ✓

##### Leadline Comparisons

Leadline comparisons were taken periodically to ensure digitization of the echosounder depth matched the fathogram; these are annotated on the fathograms. No systematic drift or error was observed. It should be noted that the Innerspace 484 echosounder is not prone to mis-digitization. ✓

\* Filed with the hydrographic data.

### Static Draft

A static draft for VN 0651 was determined on January 19, 1993, in two steps. The first step determined the depth of the transducer face from a reference mark on the hull. The second step involved measuring the depth from this reference mark to the launch's waterline with the launch in water (fuel tanks half full and two crew aboard). A static draft of 0.5 meter was determined. ✓

### Dynamic Draft

Settlement and squat measurements for VN 0651 were conducted on March 17, 1993, in San Francisco Bay at the Tiburon Fisheries Laboratory in Tiburon, CA.

Settlement and squat correctors are applied online based on the vessel's speed over ground (SMG), a practical approximation to the speed through the water upon which these correctors are applied in theory. Settlement and squat correctors are re-applied based on the SMG computed between data records during field processing using the REAPPLY program in HDAPS. Field records are included in Separate IV. \* ✓

### Tide Correctors

HDAPS Segment line 4 divides the survey into two field-determined tidal corrector zones at Latitude 37°57'17.9"N. The northern zone's correctors were computed from time and height corrections for Point San Pedro, adding 59 minutes and 0.1 feet to high tide and 1 hour and 1 minute to low tide at the reference station at Fort Point. The southern correctors were based on the time and height corrections for the Chevron Oil Company Pier (aka Richmond Long Wharf), adding 29 minutes to high tide and 36 minutes to low tide. The hydrographer believes that the predicted tide zoning of this survey produces adequate correctors for the areas of primary concern. ✓

## H. CONTROL STATIONS (*See EVAL RPT., Sec. 2*)

### Horizontal Datum

The horizontal control datum for this project is North American Datum of 1983 (NAD 83). A copy of the HDAPS Control Station Table is included in ~~Appendix III~~ <sup>*this report*</sup> (List of Horizontal Control Stations). A separate Horizontal Control Report OPR-L344, San Francisco Bay, was submitted with H-10456. An addendum describing the conventional horizontal control work performed in positioning Lime Point Light accompanies this Descriptive Report.

*\* Filed with the hydrographic data.*

## I. HYDROGRAPHIC POSITION CONTROL (See EVAL RPT., Sec. 2)

### Position Control

Differential GPS (DGPS) was used for position control throughout this survey. The DGPS reference station, TIBU DGPS, 1993, was installed as described in the Horizontal Control Report in accordance with FPM Section 3.4.6. Per FPM Section 3.4.6.3, the reference site was confirmed using the program MONITOR. A copy of the scatter plot and the outlier.sum file are included in Separate III\*(Horizontal Position Control and Corrections to Position Data). ✓

GPS signals were partially blocked and/or reflected in the vicinity of the San Rafael-Richmond Bridge. In most cases the interference was sufficiently intermittent that it was possible to continue surveying, smoothing (dead reckoning) any aberrant positions during processing. In cases where inadequate position control would necessitate smoothing in excess of 4 continuous centimeters at the scale of the survey, or where accurate positioning was not recoverable, the data were rejected and the lines, or sections of lines, were re-surveyed. ✓

There was a zone of VHF radio multi-pathing at the north end of the survey area which caused loss of GPS corrector information from the reference station. This caused several episodes of "Lost Lock" during data acquisition. If these zones were large enough, the internal positioning algorithm of the PC-DAS and GPS receiver were affected and positions had to be smoothed based on dead reckoning. Crossline and contour checks indicate that no data were noticeably mis-positioned by this method of analysis. Survey lines were not re-run due to the likelihood of repeated problems with multi-pathing in this area. ✓

### DGPS Performance Checks

DGPS performance checks were obtained periodically at a dolphin near Point Chauncey whose center was positioned to Third Order, Class I standards (see Horizontal Control Report). All DGPS performance checks were successful; forms are included with the data files. ✓

### Positioning Equipment

The following GPS equipment was used:

\* Filed with the hydrographic data.



<u>Equipment Location</u>	<u>Type of Receiver/Antenna</u>	<u>Receiver Serial No.</u>	<u>Antenna Serial No.</u>
TIBU 1993 (DGPS Ref. Sta.)	Trimble 4000SST	2952A00459	2951A00123
Spare (used for geodetic work)	Trimble 4000SST	2952A00461	2951A00008 ✓
VN 0651	Ashtech Firmware 1E08D	700417B1139 (DN 096-111)	700378A0272

The printout accompanying the data includes the serial number of electronic equipment used.

**J. SHORELINE** (*See EVAL RPT., Sec 2*)

Not applicable to this Navigable Area Survey. ✓

**K. CROSSLINES**

A total of 19.6 nautical miles of crosslines were run, representing 14.1% of the hydrography on H-10480. Crossline soundings are within 0.5 meter of the mainscheme values when using predicted tidal correctors. ✓

**L. JUNCTIONS** (*See EVAL RPT., Sec. 5*)

This survey joins H-10471 at Latitude 37°55'00"N.

**M. COMPARISON WITH PRIOR SURVEYS** (*See EVAL RPT., Sec. 6*)

**N. COMPARISON WITH THE CHART** (*See EVAL RPT., Sec. 7*)

This survey was field-excessed and plotted in feet at 1:20,000 scale to compare with chart 18653, 3rd edition, published on September 28, 1991. Manually field-plotted depth contours and selected sounding comparisons were nearly identical to the chart, with the exception of the contours offshore of the Marin Islands, where shoaler depths appear to have encroached on the shipping channel. This change in the contours along a steep slope may be due to slumping of the soft sediment which accretes off San Rafael.

Item Investigation Reports for the following features are included in ~~Separate VI:~~  
*This Report.*

<u>Feature</u>	<u>Item Number</u>	<u>Description/Area</u>
50736	N1	Sunken Oil Barge
Invincible Rock	N2	7 foot sounding
Whiting Rock	N3	13 foot sounding
Mooring Buoys	N4	Point San Pedro
Small boat pier	N5	East Brother Island
Obstruction	N6	Anchorage No. 13
6-foot sounding	N7	Near Sisters Islands

Dangers to Navigation

No dangers to navigation were identified within the limits of this survey. ✓

**O. ADEQUACY OF SURVEY** (*See EVAL RPT Sec. 4 & 5*)

This survey is complete and adequate to supercede prior surveys in their common areas.

**P. AIDS TO NAVIGATION** (*See EVAL RPT., Sec. 7 d*)

Detached Positions were taken on all buoys and sea-level lights within the survey area. Hydrographic positions confirmed the charted position of these aids to navigation. Buoys appear to move up to 15 meters with directional change in tidal currents. ✓

A Third-Order, Class I position of Lime Point Light was determined using conventional methods. The unadjusted field position is Latitude 37°49'31.61016"N, Longitude 122°28'41.77917"W with a MHW elevation of 6.5 meters. This checks with the traverse position from JPLM to 1:29,673. See the addendum to the OPR-L344 Horizontal Control Report for further information and MTEN printouts\* *Lime Point Light is located outside of the survey area.*

**Q. STATISTICS**

<u>Description</u>	<u>Quantities</u>
Total Positions, VN 0651	1216
Total Detached Positions:	57
Total Nautical Miles of Hydrography	174.7
Sq. Nautical Miles of Hydrography	8.0
Velocity Casts	4
Days of Production	9

\* Filed with the hydrographic data.

**R. MISCELLANEOUS** (*See EVAL RPT., Sec 6*)

Tidal currents, especially on ebb, can reach velocities of 7 knots in the vicinity of East Brother Island and near the San Rafael-Richmond Bridge piers. These are strong enough to create eddies flowing in the opposite direction in the nearby shoaler water, especially along the eastern piers. ✓

**S. RECOMMENDATIONS** (*See EVAL RPT., Sec. 7e*)

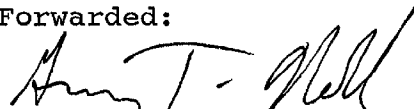
The hydrographer recommends that the name of the long, Chevron Oil Company (no longer the Standard Oil Company) pier near Richmond be charted as the "Richmond Long Wharf" to conform to the local usage and to common USCG Vessel Traffic Service vernacular.

**T. REFERRAL TO REPORTS**

<u>TITLE</u>	<u>DATE</u>
1993 Horizontal Control Report, OPR-L344-PHP	March 1993
Addendum - Lime Point Light	August 1993
Addendum - San Leandro Marina Light	August 1993
1993 Coast Pilot Report, OPR-L344-PHP	August 1993

 ✓

Forwarded:



Guy T. Noll  
Lieutenant, NOAA  
Chief of Party

ITEM INVESTIGATION - N1

ITEM # AWOIS 50736 DN: 173,189,195,197
CHART # 18649, 18652, 18653 VN: 0651

DESCRIPTION: Oil barge sunk in 85 feet (25.9 meters) of water. Corps of Engineers swept area in 1953 to 50 feet, with nothing found. Wreck was not investigated in prior surveys (H-9811, FE302), and Side Scan Sonar was recommended by PHP in 1987. No size of barge is available.

SOURCE: LNM 4/52, 15/53, CL346/53

\*\*\*\*\*

GEOGRAPHIC POSITION

LATITUDE LONGITUDE POSITION #
CHARTED: 37°57'32.0"N 122°26'31.5"W
OBSERVED: 37°57'28.81"N / 122°26'28.647"W 2162 +4 (DN 197) (22.6 m) \*
(least depth on shoal) 37°57'28.88"N, } 2162 +9 (DN 197) (22.5)
POSITIONED BY: DGPS 122°26'28.27"W

\*EXERCISED

METHOD OF INVESTIGATION: Echosounder, 12 meter spacing east-west, additional 10-meter spacing north south over least depth inside 250-meter search radius.

FINDINGS: No sidescan sonar was available for this item. No indication of a wreck was noted in the echosounder data. Several small pinnacles come up off the bottom about 4 meters in 26 meters of water, northwest of Invincible Rock. Intensive echosounding development on these shoaler areas revealed no barge-like shape, and no depth less than 22.8 meters (75 feet) at the above position.

\*\*\*\*\*

DIVING INVESTIGATION

None. This item is located in deep, low-visibility water, in a heavily-traveled area swept by currents up to 5 knots in velocity.

\*\*\*\*\*

CHARTING RECOMMENDATIONS

The hydrographer recommends removing the 50-foot wire drag depth from the charted wreck. Furthermore, the hydrographer recommends that the wreck be charted as "PD", and that soundings from this survey supercede the prior survey data in this area. Do not concur. Retain charted wire drag depth of 50 feet over the wreck.

..... COMPILATION USE ONLY

CHART

APPLIED

ITEM INVESTIGATION - N2

ITEM Invincible Rock DN: 173,181,195,197

CHART # 18649, 18652, 18653 VN: 0651

DESCRIPTION: Charted rock covered 7 feet.

SOURCE: PHP investigation of least depth on feature

\*\*\*\*\*

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	37°57'22.4"N	122°26'23.1"W	
OBSERVED:	37°57'22.4 <sup>80</sup> <del>74</del> "N	122°26'23.48 <sup>90</sup> <del>4</del> "W	2217 (DN 197) (2.4 m.)
	37°57'22.06 <sup>80</sup> <del>5</del> "N	122°26'23.27 <sup>90</sup> <del>1</del> "W	2077 +3 (DN 195) (2.6 m.)

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: Echosounder, drift search

FINDINGS: The charted depth could not be verified. It is possible that there has been erosion of this feature, given the high current velocities in this area. Least depth from development was 2.76 meters at position 2077+3 (see above). Least depth from drift search was 2.84 meters at fix 2217. (7.8 feet)

\*\*\*\*\*

DIVING INVESTIGATION

None.

\*\*\*\*\*

CHARTING RECOMMENDATIONS

The hydrographer recommends that the feature remain as charted. *concur.*

. . . . . COMPILATION USE ONLY

CHART

APPLIED

ITEM INVESTIGATION - N3

ITEM Whiting Rock DN: 173,181,195,197

CHART # 18649, 18652, 18653 VN: 0651

DESCRIPTION: Charted rock covers 13 feet.

SOURCE: PHP investigation of least depth on feature

\*\*\*\*\*

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	37°57'33.9"N	122°26'17.6"W	
OBSERVED:	37°57'33.42 <sup>40</sup> "N	122°26'17.72 <sup>30</sup> "W	2222 (DN 197) (4.9 m.)

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: Echosounder, drift search

FINDINGS: The charted depth could not be verified. It is possible that there has been erosion of this feature, given the high current velocities in this area. Least depth of 8.1 meters (16 ft) acquired during drift search at position number 2222 (above).

\*\*\*\*\*

DIVING INVESTIGATION

None.

\*\*\*\*\*

CHARTING RECOMMENDATIONS

The hydrographer recommends that the feature remain as charted. *Concur.*

. . . . . COMPILATION USE ONLY

CHART

APPLIED

ITEM INVESTIGATION - N4

ITEM: Mooring buoys DN: 181
CHART # 18649, 18652, 18653 VN: 0651

DESCRIPTION: Private mooring buoys used by onshore gravel pit at Point San Pedro are scattered south of the Sisters Islands. They are located just outside the downbound ship channel in approximately 4.5 meters of water, and are not charted. They are used for mooring of gravel barges.

SOURCE: PHP

\*\*\*\*\*

GEOGRAPHIC POSITION

Table with 4 columns: LATITUDE, LONGITUDE, POSITION #, and CHARTED/OBSERVED. Contains 5 rows of observed data for positions 1861-1882.

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: Visual, Detached Positions

FINDINGS: All visible mooring buoys were positioned. See pictures attached.\*

\* Filed with hydrographic data.

\*\*\*\*\*

DIVING INVESTIGATION

None.

\*\*\*\*\*

CHARTING RECOMMENDATIONS

The hydrographer recommends that the private mooring buoys be charted at the above positions. Furthermore, a note should be placed on chart SC18642 warning small craft of the probable presence of large barges moored to these buoys. Concur.

..... COMPILATION USE ONLY

CHART

APPLIED

ITEM INVESTIGATION - N5

ITEM: Small Boat Pier DN: 195  
CHART # 18649, 18652, 18653 VN: 0651

DESCRIPTION: An uncharted small boat pier with lifting davit exists on the east shore of the eastern Brother Island. A dolphin is charted at the position shown below.

SOURCE: PHP

\*\*\*\*\*

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	37°57'47.5"N	122°25'57.3"W	(Dolphin)
OBSERVED:	37°57'48. <sup>710</sup> <sub>195</sub> "N	122°25'57. <sup>10</sup> <sub>600</sub> "W	2085 (NE corner)
	37°57'47. <sup>887"N</sup>	122°25'57. <sup>49</sup> <sub>641</sub> "W	2086 (SE corner)

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: Visual search

FINDINGS: The charted dolphin does not exist. Currents in excess of 7 knots occur in the vicinity of the pier. The small boat used by the Bed & Breakfast located in the old lighthouse on the island to ferry guests to the mainland is hoisted on a davit when not in use. See pictures attached.

\*\*\*\*\*

DIVING INVESTIGATION

None.

\*\*\*\*\*

CHARTING RECOMMENDATIONS

The hydrographer recommends that the charted dolphin be removed, and that the small pier be charted between the above positions. *Concur.*

..... COMPILATION USE ONLY

CHART

APPLIED



ITEM INVESTIGATION - N6

ITEM # Charted Obstruction DN: 197  
CHART # 18649, 18652, 18653 VN: 0651

DESCRIPTION: Charted Obstruction originating with destroyed, uncharted private aid to navigation. Obstruction is charted just southwest of Explosives Anchorage No. 13.

SOURCE: LNM 37/85

\*\*\*\*\*

GEOGRAPHIC POSITION

LATITUDE LONGITUDE POSITION #  
CHARTED: 37°55'21.0"N 122°27'41.0"W  
OBSERVED: No obstruction observed  
POSITIONED BY: DGPS  
METHOD OF INVESTIGATION: Echosounder, 10 meter line spacing

FINDINGS: Echosounder development was performed in the area on DN 197 (Positions 2229 to 2256). No indication of an obstruction exists at the charted position. Mr. Eric Robinson, Division Manager of the Golden Gate Ferry system ((415) 457-8800, Larkspur to San Francisco, near charted obstruction, with a draft of 6 feet) was contacted on DN 202. He and his pilots recall no knowledge of an obstruction in this area. It should be noted that private aids in this area are generally small (0.5 meter diameter) round buoys.

\*\*\*\*\*

DIVING INVESTIGATION

None.

\*\*\*\*\*

CHARTING RECOMMENDATIONS

The hydrographer recommends that the obstruction charted at the above position be removed from the affected charts. *Do not concur. The obstruction area was not fully investigated. Retain obstruction as charted.*

. . . . . COMPILATION USE ONLY

CHART

APPLIED

ITEM INVESTIGATION - N7

ITEM: 6-foot sounding at Sisters DN: 197  
CHART # 18649, 18652, 18653 VN: 0651

DESCRIPTION: A shoal covering 6 feet is charted east of the Sisters Islands, off Point San Pedro near the main channel.

SOURCE: Chart, PHP

\*\*\*\*\*

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	37°59'16"N	122°26'26.2"W	
OBSERVED:	37°59'16.5 <sup>40</sup> <sub>25</sub> "N	122°26'26.770"W	2209 +4 (DN 197) (1.8 m.)
POSITIONED BY:	DGPS		

METHOD OF INVESTIGATION: Echosounder, 10 meter spacing in both east-west and north-south development.

FINDINGS: A least depth of <sup>1.8 (6.0)</sup>~~2.0~~ meters was found at the above position. Development suggests that the feature is an offshore extension of the eastern Sister Island, which is entirely bedrock. This area is swept by strong currents, which also indicates that the feature is a rocky outcrop.

\*\*\*\*\*

DIVING INVESTIGATION

None.

\*\*\*\*\*

CHARTING RECOMMENDATIONS

The hydrographer recommends that the sounding remain as charted.  
*Do not concur. Chart the 1.8 meters (6 feet) depth based on the present survey.*

..... COMPILATION USE ONLY

CHART

APPLIED

APPROVAL SHEET

for

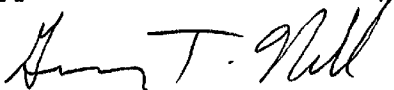
SURVEY H-10480

Standard field surveying and processing procedures were followed in producing this survey, in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Survey Guidelines; and the Field Procedures Manual, as updated for 1993. The data were reviewed daily during acquisition and processing.

Following initial field processing, data were forwarded to Pacific Hydrographic Section, N/CG245, in two batches for verification. The first data submittal included mainscheme and crossline data, the second included splits, crosslines, developments on item investigations, and detached positions. No unverifiable data have been reported to this date.

The field sheets and supporting data have been reviewed by me, are considered complete and adequate for charting purposes, and are approved.

Approved and Forwarded,



Guy T. Noll  
Lieutenant, NOAA  
Chief, Pacific Hydrographic Party

August 3, 1993

DATE

CONTROL STATIONS as of 15 Jul 1993

No	Type	Latitude	Longitude	H	Cart	Freq	Vel	Code	MM/DD/YY	Station Name
001	G	037:48:19.064	122:27:18.198	4	139	0.0	0.0	0.0	02/17/93	PRESIDIO JPL 13 7252
002	G	037:50:06.223	122:28:21.045	4	139	0.0	0.0	0.0	02/17/93	RANGE RESET
100	G	037:49:34.480	122:25:19.687	36	250	0.0	0.0	0.0	03/01/92	ALCATRAZ DGPS STATION
200	G	037:51:21.232	122:28:07.244	0	200	0.0	0.0	0.0	03/23/93	SAUSALITO CHANNEL LIGHT 2
102	G	037:51:41.184	122:28:43.534	-26	139	0.0	0.0	0.0	03/23/93	SAUSALITO CHANNEL LIGHT 4
103	G	037:53:28.906	122:26:49.453	-14	139	0.0	0.0	0.0	03/23/93	TIBU DGPS STATION BLDG 54
<del>104</del>	<del>G</del>	<del>037:53:36.193</del>	<del>122:26:52.957</del>	<del>-27</del>	<del>139</del>	<del>0.0</del>	<del>0.0</del>	<del>0.0</del>	<del>03/23/93</del>	<del>PILE AT PT. CHAUNCEY</del>
201	T	037:48:24.000	122:27:54.000	0	244	0.0	0.0	0.0	05/13/93	941-4290
202	T	037:46:18.000	122:17:54.000	0	244	0.0	0.0	0.0	05/13/93	941-4750
203	T	037:48:36.000	122:21:36.000	0	244	0.0	0.0	0.0	05/13/93	941-4782
204	T	037:53:30.000	122:26:48.000	0	244	0.0	0.0	0.0	05/13/93	941-4837
205	T	037:57:21.277	122:25:37.056	0	244	0.0	0.0	0.0	05/13/93	941-4881

00 # = PUBLISHED / COMPUTED GPS STATIONS (RECOVERABLE)  
 10 # = COMPUTED GPS STATIONS (NOT RECOVERABLE)  
 20 # = INTERESTING DP'S



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Office of Ocean and Earth Sciences  
Silver Spring, Maryland 20910

ORIGINAL

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: October 7, 1993

MARINE CENTER: Pacific

HYDROGRAPHIC PROJECT: OPR-L344-PHP

HYDROGRAPHIC SHEET: H-10480

LOCALITY: California, San Francisco Bay, Southampton Shoal to San Pablo Strait

TIME PERIOD: June 8 - July 16, 1993

TIDE STATION USED: 941-4881 Point Orient, S.F. Bay, Ca.  
Lat.  $37^{\circ} 57.5'N$  Lon.  $122^{\circ} 25.5'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 3.84 ft.  
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 5.5 ft.

REMARKS: RECOMMENDED ZONING

Zone times and heights direct on Point Orient, Ca. (941-4881).

Note: Times are tabulated in Pacific Standard Time.

  
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ACTING CHIEF, DATUMS SECTION



NOAA FORM 76-155 (11-72)		U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION							SURVEY NUMBER H-10480	
GEOGRAPHIC NAMES										
Name on Survey	<div style="display: flex; justify-content: space-between;"> <span>A ON CHART NO. 18653</span> <span>B ON PREVIOUS SURVEY NO.</span> <span>C ON U.S. QUADRANGLE MAPS</span> <span>D FROM LOCAL INFORMATION</span> <span>E ON LOCAL MAPS</span> <span>F P.O. GUIDE OR MAP</span> <span>G RAND McNALLY ATLAS</span> <span>H U.S. LIGHT LIST</span> <span>K</span> </div>									
	BROTHERS, THE	X								
CALIFORNIA (title)	X									2
CASTRO POINT	X									3
CASTRO ROCKS	X									4
INVINCIBLE ROCK	X									5
MOLATE POINT	X									6
* RED ROCK	X									7
SAN PABLO BAY	X									8
SAN PABLO, POINT	X									9
SAN PABLO STRAIT	X									10
SAN PEDRO, POINT	X									11
SAN FRANCISCO BAY (title)	X									12
SISTERS, THE	X									13
SOUTHAMPTON SHOAL (title)	X									14
WHITING ROCK	X									15
										16
* ORIENT, POINT										17
										18
										19
										20
										21
										22
										23
										24
										25

Approved:

*Charles E. Hammett*  
 Chief Geographer - N/OG 2x5

APR 12 1994

FILE COPY



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Coast and Geodetic Survey  
Seattle, Washington 98115-0070

September 10, 1993

MEMORANDUM FOR: Charles E. Harrington  
Chief Geographer, Nautical Charting Division  
FROM: *Douglas G. Hennick*  
Commander Douglas G. Hennick, NOAA  
Chief, Pacific Hydrographic Section  
SUBJECT: Recommendation submitted with survey H-10480

The attached recommendation, Section S of the Descriptive Report, was submitted with survey H-10480 by Pacific Hydrographic Party. The pier is located at 37°55'25"N and 122°24'30"W in San Francisco Bay, California.



**HYDROGRAPHIC SURVEY STATISTICS**

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION			AMOUNT
SMOOTH SHEET		1	SMOOTH OVERLAYS: POS., ARC, EXCESS			
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS			
DESCRIP-TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS	
ACCORDION FILES	2					
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			1216	
POSITIONS REVISED				
SOUNDINGS REVISED				
CONTROL STATIONS REVISED				
	TIME-HOURS			
	VERIFICATION	EVALUATION	TOTALS	
PRE-PROCESSING EXAMINATION				
VERIFICATION OF CONTROL				
VERIFICATION OF POSITIONS	42.5		42.5	
VERIFICATION OF SOUNDINGS	88.0		88.0	
VERIFICATION OF JUNCTIONS				
APPLICATION OF PHOTOBATHYMETRY				
SHORELINE APPLICATION/VERIFICATION				
COMPILATION OF SMOOTH SHEET	34.0		34.0	
COMPARISON WITH PRIOR SURVEYS AND CHARTS		14.0	14.0	
EVALUATION OF SIDE SCAN SONAR RECORDS				
EVALUATION OF WIRE DRAGS AND SWEEPS				
EVALUATION REPORT		23.0	23.0	
GEOGRAPHIC NAMES				
OTHER*				
*USE OTHER SIDE OF FORM FOR REMARKS	<b>TOTALS</b>	164.5	37.0	201.5

Pre-processing Examination by <b>LT D. Haines</b>	Beginning Date 8/2/93	Ending Date 9/10/93
Verification of Field Data by <b>L. Deodato, I. Almacen</b>	Time (Hours) 164.5	Ending Date 9/12/94
Verification Check by <b>E. Domingo</b>	Time (Hours) 2.0	Ending Date 9/9/94
Evaluation and Analysis by <b>I. Almacen</b>	Time (Hours) 37.0	Ending Date 11/4/94
Inspection by <b>Russ Davies</b>	Time (Hours) 8	Ending Date 1/23/95



## EVALUATION REPORT H-10480

### 1. INTRODUCTION

Survey H-10480 is a navigable area survey accomplished by the Pacific Hydrographic Party under the following Project Instructions.

OPR-L344-PHP, dated December 29, 1992

This survey was conducted in San Francisco Bay, California, to update coverage of the designated traffic lanes within the bay area which are frequently transited by deep-draft vessels. It was also undertaken in response to the request of the Harbor Safety Committee of the San Francisco Bay Region, the San Francisco Bar Pilots, the State of California Department of Fish and Game, Office of Oil Spill Prevention and Response and the U.S. Coast Guard. This survey extends from the vicinity of Southampton Shoal Channel at latitude 37/54/55N to the vicinity of San Pedro Point at latitude 37/59/30N. It stretches from longitude 122/24/15W to longitude 122/27/28W, covering the area of San Pedro Strait. The bottom generally consists of sand and mud. Depths range from 1.0 to 39.0 meters.

The tide correctors for Point San Pedro and Chevron Oil Company pier were used in the reduction of soundings in the field based on the predicted tides for Fort Point, California, gage 941-4290. Approved hourly heights zoned from Point Orient, California, gage 941-4881, were used during office processing.

The field sheet parameters have been revised to center the hydrography on the smooth sheet and to change the projection to polyconic. NAD 83 is used as the horizontal datum for plotting and position computation. The offset table and sound velocity correctors are adequate. An accompanying computer printout contains the parameters and the correctors.

A digital file has been generated for this survey as required by the specifications contained in Hydrographic Survey Guideline No. 52, Standard Digital Data Exchange Format, April 15, 1986. Certain descriptive information, however, may not be in the digital record due to the restrictions of the presently available cartographic codes. The user should refer to the smooth sheet for a complete depiction of the survey data.

### 2. CONTROL AND SHORELINE

Sections H and I of the hydrographer's report and the 1993 Horizontal Control Reports for OPR-L344-PHP, contain adequate discussions of horizontal control and hydrographic positioning.

Differential GPS(DGPS) was used to control this survey. GPS station TIBU DGPS,1993, was established to Third-Order accuracy and served as DGPS reference station. Pt. Chauncey (Pile),1993, was used as a calibration point during this survey.

Positions of horizontal control stations used during this survey are based on NAD 83. The smooth sheet is annotated with NAD 27 adjustment ticks based on values determined with the NGS program, NADCON. Geographic positions based on NAD 27 may be

plotted on the smooth sheet utilizing the NAD 83 projection by applying the following corrections.

Latitude: -0.274 seconds (-8.445 meters)  
Longitude: 3.902 seconds (95.266 meters)

The year of establishment of control stations shown on the smooth sheet originates with the previously referenced horizontal control reports.

There are (32) fixes during this survey where the maximum allowable horizontal dilution of precision (HDOP) limits of 3.75 have been exceeded. These positions are isolated and occur randomly throughout the survey area. A review of the data, however, shows that the positioning of the features located by these fixes were consistent with the surrounding information and considered acceptable. None of these fixes are used to position dangers to navigation. Daily DGPS performance checks were conducted in the field and found adequate.

There are no shoreline maps required for this survey. The shoreline depicted in brown on the smooth sheet originates from chart 18653 (3rd Edition) and is shown for orientation purposes only.

### 3. HYDROGRAPHY

Except for the specific items mentioned elsewhere in this report, hydrography is adequate to:

- a. delineate the bottom configuration, determine least depths, and draw the standard depth curves;
- b. reveal there are no significant discrepancies or anomalies requiring further investigation; and
- c. show the survey was properly controlled and soundings are correctly plotted.

### 4. CONDITION OF SURVEY

With the exception of some of the features mentioned in this report that were not adequately investigated or not investigated at all during this survey, the hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, and the Field Procedures Manual, March 1993 Edition.

### 5. JUNCTIONS

Survey H-10480 junctions with the following surveys.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10471	1993	1:10,000	South

The junctions with surveys H-10471 is complete. Comparison is considered good. Surveys H-9811 and H-10080 adjoins with this survey and the comparisons with these prior surveys are discussed in the succeeding section of this report.

## 6. COMPARISON WITH PRIOR SURVEYS

H-9811(1979), 1:10,000  
H-10080(1983), 1:10,000

Surveys H-9811 and H-10080, provides the basic coverage of the entire area of this survey. Comparison with this 1979 and 1983 surveys is considered satisfactory. The present soundings are generally within 0.3 to 0.6 meter (1 to 2 feet) compared with the prior surveys except around the areas where strong tidal current prevails. Some changes were also noted along the western edge of San Pablo Strait and the eastern section of San Rafael Bay. The gradual slipping of the soft sediment along the steep edges of the strait towards the shipping lane has changed the configuration of the bottom in the area.

The following charted soundings originating from survey H-9811 were not adequately disproved by the present survey and therefore were carried forward on the smooth sheet.

<u>Depth (ft./m.)</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>
7/2.1	37/57/22.4	122/26/23.1
13/3.9	37/57/33.9	122/26/17.6
59/18.0	37/57/56.0	122/26/12.5
83/25.3	37/57/38.0	122/26/23.5

The five (5) charted rocks around Red Rock island were not investigated during this survey. These rocks originated from survey H-9811 and were carried forward on the smooth sheet. The charted submerged rock located north of the island at latitude 37/55/48.2N, longitude 122/25/54.0W, was shown as a rock awash on survey H-9811, however, it was revised to a submerged rock during the prior compilation of the chart.

With the transfer of the items mentioned above, Survey H-10480 is adequate to supersede the prior surveys for the area of common coverage.

## 7. COMPARISON WITH CHART

Chart 18649, 57th edition, dated Jan. 22, 1994; scale 1:40,000  
Chart 18653, 4th edition, dated July 10, 1993; scale 1:20,000

The earlier editions of the above listed charts were used in the field for comparison. The latest editions were used for comparison during office processing.

### a. Hydrography

The charted hydrography originates with prior surveys mentioned in the preceding section of this report and the rest from miscellaneous sources. No significant changes were noted concerning the bottom configuration of the bay, other than those previously mentioned in this report and the hydrographer's report.

The 18 and 58<sup>\*</sup>-foot shoal soundings at latitude 37/55/15.0N, longitude 122/25/52.0W and latitude 37/56/50.0N, longitude 122/26/39.0W, respectively, originating from miscellaneous source were not verified or disproved by the present survey. These depths should be retained as charted.

\* 58 FT From NOAA PHF Recon Survey; CL141(90) BP139713

The charted obstruction at latitude 37/55/21.0N, longitude 122/27/41.0W, in the vicinity of the area of anchorage for explosives No.13 was not adequately investigated during this survey and therefore should be retained as charted.

With the exception of the items mentioned elsewhere in this report, survey H-10480 is adequate to supersede charted hydrography within the common area.

b. AWOIS

AWOIS item 50736 was investigated during this survey. This item originate with miscellaneous source. Discussion and disposition of this feature is included in the hydrographer's report.

Additional item investigations (N2 to N7) were conducted within the area of this survey. Discussion and disposition of these items is included in the hydrographer's report.

c. Controlling Depths

The depths found during this survey are consistent with or deeper than the presently charted controlling depths along the section of Southampton Shoal channel covered on this survey.

d. Aids to Navigation

There are sixteen (16) aids to navigation located during this survey. The detached positions taken on each of the following aids using DGPS positioning system confirms its presently charted locations. They were found in good condition and adequately serve their intended purpose.

<u>Name of aid</u>	<u>Lt.List #</u>	<u>Latitude(N)</u>	<u>Longitude(W)</u>
(San Francisco Bay)			
North Channel Lighted Buoy 14	5515	37/55/48.48	122/26/36.84
North Channel Buoy 15	5635	37/56/13.49	122/26/47.35
(Southampton Shoal Ch.)			
Lighted Buoy 4	5655	37/54/57.70	122/25/20.17
Lighted Buoy 5	5660	37/55/18.70	122/25/37.42
(Richmond Hbr. Ch.)			
Lighted Buoy 2	5665	37/55/06.33	122/25/01.34
(Richmond-San Rafael Bridge East Channel)			
Lighted Buoy 1	5770	37/55/46.17	122/25/42.05
Castro Rocks Lighted Buoy 2CR	5775	37/55/52.71	122/25/14.83
Buoy 6	5785	37/56/10.80	122/25/31.93
San Rafael Outfall Lt.	5810	37/56/52.87	122/27/40.59
(San Francisco Bay, North Channel)			
Lighted Buoy 16	5815	37/57/18.19	122/26/29.14

Lighted Bell Buoy 18	5820	37/57/35.18	122/26/25.87
Light 17	5825	37/57/26.48	122/27/25.80
(San Pablo Bay)			
E. Brother I. Light	5865	37/57/46.58	122/26/00.59
Pt.San Pablo Terminal			
Light 4	5870	37/57/53.08	122/25/46.14
Lighted Buoy 2	5875	37/58/02.99	122/25/45.27
Lighted Buoy 4	5880	37/58/52.39	122/25/03.77

Five (5) privately maintained mooring buoys located off Pt.San Pedro were positioned during this survey and are recommended for charting. Additional information concerning these items is included in the hydrographer's report.

A privately maintained buoy at latitude 37/51/33.0N, longitude 122/24/58.0W, located south of the Chevron Oil Company Wharf(formerly Standard Oil Long Wharf), was positioned during this survey and is recommended for charting.

Some privately maintained aids (LL# 5630,5760,5765, 5790 & 5800) and a U.S Navy maintained aid (LL# 5805) were not located during this survey and therefore should be retained as charted.

The charted Aero obstruction lights located along Richmond-San Rafael bridge were not verified during this survey. These aids should be retained as charted.

See section P of the hydrographer's report for further information concerning aids to navigation located during this survey.

#### e. Geographic Names

Names appearing on the smooth sheet and in the survey title have been approved by the Chief Geographer, with the exception of "Point Orient" which was inadvertently omitted in the list of approved geographic names received from N/CG2x5. This geographic name has been previously approved and compiled on the chart of the area and was included in the compilation of the smooth sheet.

I concur with the hydrographer's recommendation that the name "Standard Oil Long Wharf" (now operated by Chevron Oil Company) located in Richmond be charted as "Richmond Long Wharf" to conform to the common USCG and local usage. A request for approval of this change in the geographic name was forwarded to the Chief Geographer (N/CG2x5) on September 10, 1993. A copy of this request is attached to this report.

#### f. Dangers to Navigation

No dangers to navigation were reported during this survey and during office processing.

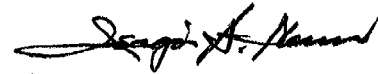
The cable area in the vicinity of Richmond-San Rafael bridge was not investigated during this survey and therefore it should be retained as charted.

**8. COMPLIANCE WITH INSTRUCTIONS**

Survey H-10480 adequately complies with the Project Instructions.

**9. ADDITIONAL FIELD WORK**

This is an adequate hydrographic survey; however, additional field work on low priority basis is required to adequately investigate the features previously mentioned in this report.




Isagani A. Almacén  
Cartographer

APPROVAL SHEET  
H-10480


Initial Approvals:

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

  
\_\_\_\_\_  
Dennis J. Hill *for*  
Chief, Hydrographic Processing Unit  
Pacific Hydrographic Section

Date: 1/23/95

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.


  
\_\_\_\_\_  
Commander Kathryn Timmons, NOAA  
Chief, Pacific Hydrographic Section

Date: 1/26/95

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Final Approval

Approved:

  
\_\_\_\_\_  
*for* J. Austin Yeager  
Rear Admiral, NOAA  
Director, Coast and Geodetic Survey

Date: 2/8/95

MARINE CHART BRANCH  
**RECORD OF APPLICATION TO CHARTS**

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10480

**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
18022	7/17/93	Mr. Isagani Almazen	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. Examined, no corrections and soundings applied.
530	7/17/93	Bruce A. Olmstead	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. Examined, no corrections and soundings applied.
18007	7/17/93	Bruce A. Olmstead	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. Examined, no corrections and soundings applied.
18020	7/17/93	Bruce A. Olmstead	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. Examined, no corrections and soundings applied.
18680	1/26/95	Bruce A. Olmstead	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. Examined, no corrections and soundings applied.
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