

# FE 116

FE 116

Diagram No. 5530-5

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT (HYDROGRAPHIC)

Type of Survey ..... Field Examination  
Field No. ....  
Office No. .... FE-116

### LOCALITY

State ..... California  
General Locality .. San Francisco Bay  
Locality ..... North Pier Golden Gate Bridge

19 53

CHIEF OF PARTY  
E.B. Latham

### LIBRARY & ARCHIVES

DATE ..... August 31, 1953

☆ U.S. GOV. PRINTING OFFICE: 1976-669-441

NOTE: A new system for registering Field Examinations (FE's) was established in 1980. All FE's are now consecutively numbered as shown hereon. The date shown in the new format is the actual date of survey. This material was previously registered as; FE No.6 1953

# FENo. 6 1953

Diag. Cht. No. 5530-5

Form 504

U. S. COAST AND GEODETIC SURVEY  
DEPARTMENT OF COMMERCE

## DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC

Field No. .... Office No. F.E.No. 6, 1953

### LOCALITY

State CALIFORNIA

General locality SAN FRANCISCO BAY

Locality NORTH PIER GOLDEN GATE BRIDGE

194/53

CHIEF OF PARTY

E. B. Latham

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DATE AUGUST 31, 1953.

B-1870-1 (1)

FENo. 6  
1953

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

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

REGISTER No. NONE FE-6-53

Field No. NORTH PIER GOLDEN GATE BRIDGE

State CALIFORNIA

General locality SAN FRANCISCO BAY

Locality NORTH PIER GOLDEN GATE BRIDGE

Scale 1" = 25' Date of survey JULY - AUGUST 1953

Instructions dated \_\_\_\_\_

Vessel USC&GS Ship BOWIE (Skiff and Outboard)

Chief of party Ector B. Latham

Surveyed by E.B. Latham, D.G. Rushford, J.D. Walker

Soundings taken by fathometer, graphic recorder, hand lead, wire Hand lead and Pole sounding

Fathograms scaled by -

Fathograms checked by -

Protracted by J.D. Walker

Soundings penciled by J.D. Walker

Soundings in ~~fathoms~~ feet at ~~XXXXX~~ MLLW

REMARKS: Positions located by taut wire at 25 ft. intervals with respect to control stations A, B, and C.

211

*83*  
*83 roab.*  
*AMC*

*File*

22-roc  
 S-1-BOWIE

27 May 1953

To: Commanding Officer  
 USC&GS Ship BOWIE

Via: Supervisor, Western District

Subject: Special survey -- vicinity of north pier of Golden Gate Bridge

The Golden Gate Bridge and Highway District has requested a special survey to accurately determine water depths in the vicinity of the north pier of the Golden Gate Bridge. This survey is assigned to the Ship BOWIE. The survey shall be made during suitable weather conditions after consultation with the Supervisor, Western District, and other interested authorities, and at a time when it will least interfere with your other field operations.

The area in which soundings are required extends 150 feet east and west of the bridge center line, and south a minimum of 100 feet from the south face of the north pier. The northern part of this area is above the high-water line and this water line shall be determined. A print of an engineering drawing for the area is forwarded showing the area to be surveyed.

The request for this survey indicates a desire for closely spaced and accurately located soundings. Sounding lines normal to the face of the pier spaced at 20-foot intervals, will be satisfactory. Soundings along the lines shall have about a 10-foot spacing and be reduced to depths below lower low-water. A tag-line survey using ranges or a theodolite for alignment may be the best method to use in making this survey, but the actual details are left to your judgment after a conference with the Supervisor.

The engineering drawing of the area indicates that all soundings will be in water less than 40 feet deep. It is believed that current will not seriously affect leadline soundings in water of this depth, and all soundings shall be obtained with the leadline if practicable. Soundings shall be recorded and reducers entered to 0.2 foot.

The survey shall be plotted on a large scale -- 1 inch equals 25 feet or larger -- and checked to see that there are no discrepancies. All records shall be forwarded to Washington after the reducers have been entered so that the smooth-sheet plotting can be done in this office.

The receipt of this letter shall be acknowledged.

(Signed) R.F.A. Studds

Acting Director

cc: Supervisor, Western Dist.  
 Chart Division

DESCRIPTIVE REPORT

SPECIAL SURVEY \* VICINITY OF NORTH PIER OF GOLDEN GATE BRIDGE  
FIELD EXAMINATION NO. 6 (1953)

19 August 1953

A - INSTRUCTIONS:

Instructions dated 27 May 1953. No project number was assigned. No Field or Registry numbers of sheets have been assigned.

A-1- PURPOSE:

The purpose of this survey is to furnish soundings located with the greatest possible accuracy and by such method that the exact location of each sounding can be recovered at some future time. This survey is intended for comparison with future surveys to discover any erosion or changes in depth adjacent to the pier.

B - LIMITS:

Limits are area immediately adjacent to the South and West faces of the pier. It was agreed that any possible erosion would attack the South and/or West faces.

B-1- DATES:

Conferences were held and site inspected early in June. Method was agreed upon and special material for use in the project was ordered.

On 29 June Control points were located and high water line was run in. Soundings were attempted using oars on 6 July. On 20 July some soundings were taken using an obsolescent outboard motor but sounding was discontinued when the motor failed to operate satisfactorily during adverse weather and sea conditions. Sounding was completed on 4 August using a new outboard.

Work was carried on concurrently with the Current Survey of San Francisco Bay and approaches.

C - VESSEL AND EQUIPMENT:

Skiff and outboard motor was used. It was found that a modern type outboard with positive pump cooling and reverse gear was required.

A motor was purchased for use in this survey.

D - TIDE:

Tide reducers were obtained by direct reading of the tide staff at Fort Point. No corrections in time or height are indicated.

SPECIAL SURVEY REPORT - Vicinity of North pier of Golden Gate Bridge.

E - SMOOTH SHEET:

Scale 1" equals 25 ft. No projection. A three point fix to establish North line was observed. Shore line was plotted from transit and tape location. Transfer (plotting) of shore line was accomplished by Lieut. D.G. Rushford and verified by Comdr. E.B. Latham.

F - CONTROL STATIONS:

Control for this small special survey was accomplished by locating three expansion eye bolts located by transit and tape.

A three point fix on existing triangulation was observed for the purpose of establishing a North line only.

G - SHORE LINE AND TOPOGRAPHY:

Shore line was determined by transit and tape at the time control for the survey was established.

H - SOUNDINGS:

Soundings were taken by lead line and pole. Sounding vessel was held stationary by wire cables and several soundings taken at each position. Shoalest sounding obtained at each location is plotted on the sheet together with figures indicating ~~additional~~ depth of the deepest sounding. Bottom samples were taken at each position.

*in parenthesis*

I - CONTROL OF HYDROGRAPHY:

Soundings were controlled by a stainless steel cable attached to expansion eye bolts set in the face of the bridge pier and in the rock cliff Northwest of the pier. The bolts are stainless steel. Distances along wires are identified by zinc "buttons" sweated to the wire and stamped with figures indicating distance from each bolt. A tolerance of 1/2 inch was allowed in preparing the wires. Buttons were checked with tape and found to be located within 1/4 inch.

Bolts and wires were purchased by the Golden Gate Bridge and Highway District. The bolts will remain in place indefinitely and the wires remain the property of the Golden Gate Bridge and Highway District for use in future surveys.

J - ADEQUACY OF SURVEY:

Survey is complete in so far as is practicable. An open area just Southwest of the Southwest corner of the pier is foul area where it is extremely hazardous to maneuver a boat. Foulness consists of old steel sheet piling remaining from the construction of the pier.

Survey is adequate for the purpose intended. It would appear desirable to have an additional line of soundings off shore from those along the west face but such soundings could be obtained only through sacrifice of accuracy and would introduce uncertainty of recovery in future surveys.

SPECIAL SURVEY REPORT - Vicinity of North pier of Golden Gate Bridge.

J - ADEQUACY OF SURVEY (CONT'D):

It was unanimously agreed among the conferees that the optimum spacing along each line was 25 feet. A closer spacing would introduce possibility of error due to mis-reading buttons and would make uncertain the verification of position by the Chief of Party on shore, who directed the hooking on of the lines and verified each position by noting the time of each position for comparison with the record book.

Charting is not involved in this survey.

K - CROSSLINES:

No crosslines were run.

L - COMPARISON WITH PREVIOUS SURVEYS:

This project constitutes an entirely new approach to the problem of erosion near the pier. Comparison with previous surveys made by different methods and using different control is of no value.

M - COMPARISON WITH CHART:

No application.

N - DANGERS AND SHOALS:

The area lies not within waters used for navigation. However, dangers to a surveying boat consisting of old sheet piling do exist Southwest of the Southwest corner of the pier. See also paragraph "J".

O - COAST PILOT INFORMATION:

No application.

P - AIDS TO NAVIGATION:

The top of the Bridge tower which rests on the pier carries a light. No other aids exist within the area.

Q - LANDMARKS FOR CHARTS:

Bridge tower is a valuable landmark and is presently charted.

R - GEOGRAPHIC NAMES:

The north pier is generally called the Marin Pier.

## SPECIAL SURVEY REPORT - Vicinity of North Pier of Golden Gate Bridge.

S - SILTED AREAS:

See under "T".

T - BY PRODUCT INFORMATION:

It was noted during the progress of the survey that there is no westerly set along the south face of the pier. During ebb current there is a counter current caused by the main current sweeping around Lime Point. Inasmuch as the winds are generally Westerly there is no compensation of wind and current. This condition made it impossible to achieve satisfactory progress or accuracy using oars.

The strength of the flood current is near the South or San Francisco pier,—during ebb there is a counter current which sets Easterly.

Except for an area Northwest of the pier and near the cliffs where sand bottom was found, the bottom is either boulders or bedrock. Along the South face bottom at shoalest soundings were hard, with soft bottom at deeper sounding, indicating that some deposit of silt may be going on due to the eddy around Lime Point.

Appearances are that no erosion along the South face of the pier is to be anticipated during the lifetime of our Great Grandchildren. However, a severe storm may cause wave erosion of the talus North of the pier. A retaining wall, sheet piling or rubble fill seems to be <sup>needed</sup> indicated in that area.

U - MISCELLANEOUS: - ORGANIZATION:

The method is not easy and a proper organization is required in order to accomplish a similar survey in this area under even the best weather conditions usually encountered.

Four men in boat - viz, Leadsman, recorder, outboard motor operator and line manipulator. On pier five men. One in overall charge, two men to hook on lines and two men with ropes to keep survey lines from falling amongst boulders and becoming fouled.

Attachment of the lines is accomplished by means of stray lines leading through the ring bolts, hauling the lines tight against the ring.

When operating on ring in cliff three or four men are required on the beach and two men on pier to attach lines and keep them from fouling in boulders and old sheet piling. One man reading staff at Fort Point is also required.

Skiff was fitted with an upright around which the wire is passed 2½ feet above the water. Boat is maneuvered so that the wire is taught between each ring and this upright.



## SPECIAL SURVEY REPORT - Vicinity of North Pier of Golden Gate Bridge.

U - MISCELLANEOUS: - ORGANIZATION: (CONT'D)

Inas much as this survey was done concurrently with the current survey, assistance was requested of and furnished by the Golden Gate Bridge Maintainance crew. These men are excellent riggers, quick and intelligent. Their assistance was largely responsible for the successful accomplishment of the project. I wish to commend Msrs. J.T. Rickets, Art Pfeifer and S. Haymond.

There is no apparent slack water in the area of the survey, best time to work is at the lower high water and during the low velocity ebb current. Inas much as the area is exposed, sounding canbe accomplished only during periods of light winds. Winds generally increase during the afternoon--morning work is indicated.

Respectfully submitted:

*Ector B. Latham*

Ector B. Latham  
Hydrographer

APPROVED:

*Ector B. Latham*

Ector B. Latham  
Chief of Party

(6)

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TIDE NOTE

SPECIAL SURVEY GOLDEN GATE BRIDGE

Tide Staff at Fort Point - Latitude  $37^{\circ} 48.4'$  Longitude  $122^{\circ} 27.9'$

MLLW equals 2 feet on staff

Staff was read during sounding. No gage involved.

STATISTICS FOR SPECIAL SURVEY  
 SPECIAL SURVEY GOLDEN GATE BRIDGE  
 USC&GSS BOWIE

29 June 1953 CONTROL

Control points located — 3  
 Miles shoreline (HWL) — 185 feet.

6 July 1953	-	Prevented by weather
20 July 1953		Soundings 8 - pos. 6
4 August 1953		<u>Soundings 73 - pos. 31</u>
TOTAL		81 Pos. 37

RHC

## TIDE NOTE FOR HYDROGRAPHIC SHEET

~~DIVISION OF COASTAL SURVEYS:~~

29 September 1953

Division of Charts: R. H. Carstens

Plane of reference approved in  
1 volume~~s~~ of sounding records for

~~HYDROGRAPHIC SHEET~~ F. E. NO 6 1953

Locality San Francisco, California

Chief of Party: E. B. Latham in 1953  
Plane of reference is mean lower low water, reading  
2.0 ft. on tide staff at The Presidio  
13.4 ft. below B. M. 180 (1936)

Height of mean high water above plane of reference is 5.1 feet.

Condition of records satisfactory except as noted below:

*E. C. McKay*  
Section of Tides

Chief, Division of Tides and Currents.

Hydrographic Surveys (Chart Division)

HYDROGRAPHIC SURVEY NO. F.E. No. 6, 1953

Records accompanying survey:

Boat sheets .....; sounding vols. ....<sup>1</sup>...; wire drag vols. ....; bomb vols. ....; graphic recorder rolls .....; special reports, etc. <sup>1</sup> Smooth Sheet; <sup>1</sup> Sketchbook; <sup>1</sup> Observations of Horizontal Angles; <sup>1</sup> Location of Tide Staff; .....

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

Number of positions on sheet	.....	31
Number of positions checked	.....	31
Number of positions revised	.....	18
Number of soundings revised (refers to depth only)	.....	—
Number of soundings erroneously spaced	.....	—
Number of signals erroneously plotted or transferred	.....	1
Topographic details	Time	..... 3
Junctions	Time	..... —
Verification of soundings from graphic record	Time	..... —

Verification by..... *R.E. EIKINS* ..... Total time ..... *12 hr* Date ..... *10-13-53*

Reviewed by..... *R.E. EIKINS* ..... Time ..... *2 hr* Date ..... *10-13-53*

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Review of Field Examination No. 6, 1953

This field examination accomplished by special survey methods was made for the purpose of obtaining soundings to be used in comparison with future soundings for determining the amount of erosion, if any adjacent to the north pier (Marin Pier) of the Golden Gate Bridge.

A comparison between the present and prior surveys would serve no useful purpose because of the difference of scale and accuracy of the survey methods.

Because of the small inshore area covered, the present survey depths are not considered of value for charting.

The Descriptive Report covers all matters of importance pertaining to this survey. The sounding records are complete. One signal (B, eye bolt) and 18 position fixes were replotted in the Washington Office because signal B had been plotted .14" in error on the smooth sheet. The smooth sheet is now complete and adequate.

The sounding line spacing and survey limits do not exactly conform to those specified in the instructions; however, it appears from the Descriptive Report that spacing and limits together with the survey methods were agreed upon in the field with representatives of the Golden Gate Bridge and Highway District. The survey is considered adequate for the purpose intended.

Reviewed by: R.E. Elkins  
13 October 1953

Inspected by: R.H. Carstens

F.E. NO. 6, 1953  
 CALIFORNIA  
 Vicinity of North Pier (Marin Pier)  
 Golden Gate Bridge

Ship: Bowie—E.B. Latham, Com'd'g.

Surveyed: July—Aug., 1953

Scale: 1 inch = 25 feet

Soundings are in feet at MLLW

Maximum depth at same position shown in parenthesis  
 Distances given for position of sounding from signals



