

# 9411

Diag. Cht. No. 6460-2

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT (HYDROGRAPHIC)

Type of Survey ..... HYDROGRAPHIC  
Field No. .... DA-5-2-74  
Office No. .... H-9411

### LOCALITY

State ..... WASHINGTON  
General Locality .. PUGET SOUND  
Locality ..... N.E. PORTION OF COMMENCEMENT BAY

1974

CHIEF OF PARTY  
Michael H. Fleming

### LIBRARY & ARCHIVES

DATE ..... June 23, 1977

# 9411

*Area 5*

*Charts*

6401 (18440) 15,000 ✓  
6407 (18453) 15,000 ✓  
6460 (18448) 50,000 ✓  
1855C (18445) 50,000

HYDROGRAPHIC TITLE SHEET

H-9411

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.

DA-5-2-74

State Washington

General locality Puget Sound

*N.E. Portion of*

Locality Commencement Bay and Tacoma Harbor

Scale 1:5,000

Date of survey 2 April - 25 April, 1974

Instructions dated 1 March 1974

Project No. OPR-412

Vessel NOAA Ship DAVIDSON, CSS-31 & Launches DA-1, DA-2 & WZ-3042

Chief of party CDR Michael H. Fleming, NOAA Corps

Surveyed by ENS J.J. Kapler, LT(JG) R.K. West, ENS J. Sarb, ENS R.W. Mercer

Soundings taken by echo sounder, ~~XXXXXX~~ pole Ross Fineline Fathometer 544, Raytheon DE-723 Fathometer

Graphic record scaled by Ship's Personnel

Graphic record checked by Ship's Officers

Positions verified by

~~XXXXXX~~ by F.L. Rosario Automated plot by PMC Kynetics Plotter

Soundings

Verification by F. L. Rosario

Soundings in ~~XXXXXX~~ feet at ~~XXXXXX~~ MLLW

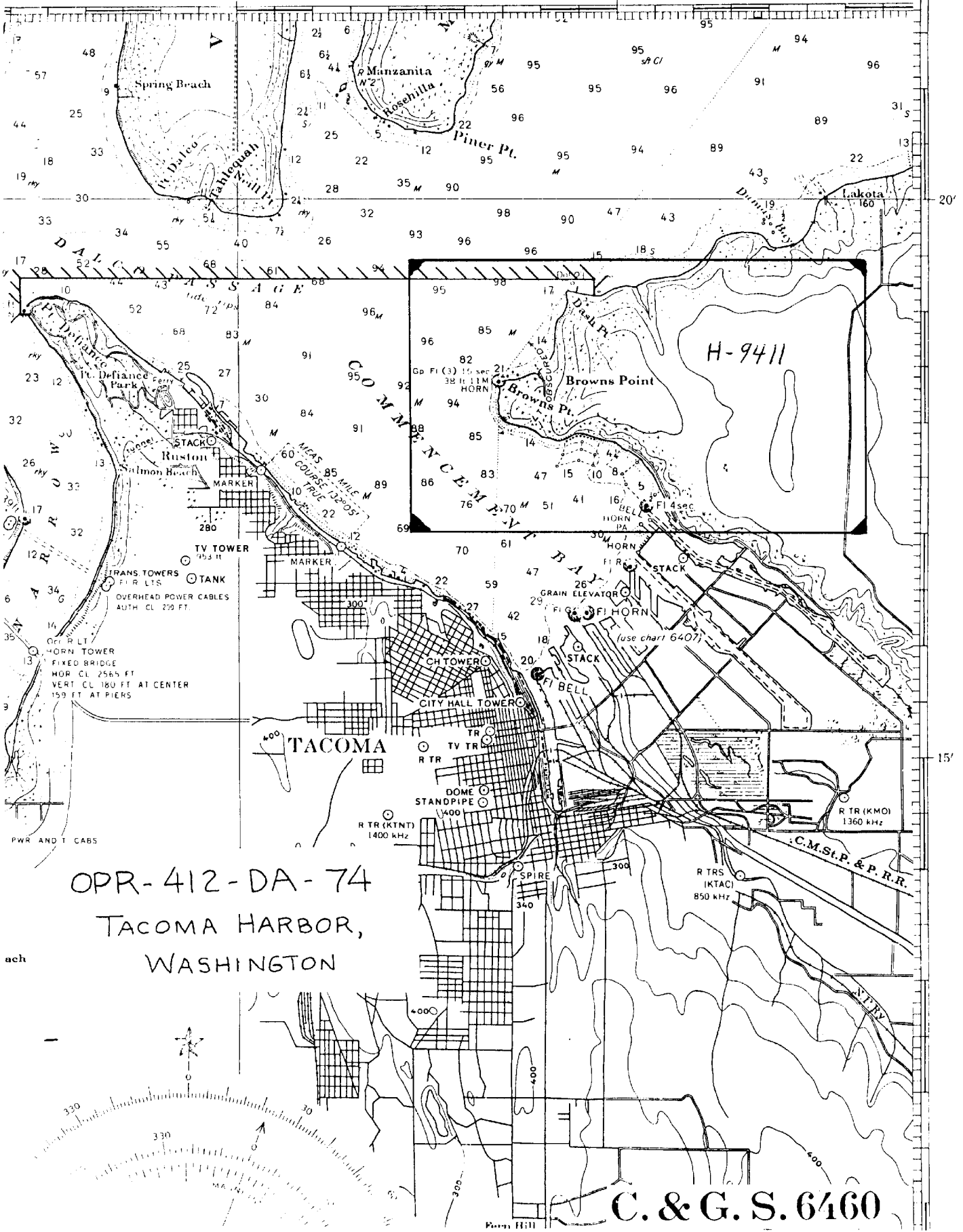
REMARKS: All times used for data logging are in GMT. The Mean Longitude of the survey area is 122°26'30"W.

*Applied to steds 4/21/78*  
*[Signature]*

122° 30'

(JOINS CHART 6450)

25'



OPR-412-DA-74  
 TACOMA HARBOR,  
 WASHINGTON

C. & G. S. 6460

DESCRIPTIVE REPORT

H-9411

DA-5-2-74

COMMENCEMENT BAY

A. PROJECT

This survey was accomplished in accordance with Project Instructions OPR-412-DA-74, Tacoma Harbor, Washington, dated 1 March 1974, change #1 dated 1 March 1974, change #3 dated 20 March 1974, and supplement dated 1 April 1974. No change #2 could be found in our correspondence files.

B. AREA SURVEYED

The area surveyed is that portion of Commencement Bay south of N. Latitude 47° 17' 15.0", north of N. Latitude 47° 16' 15.0", east of W. Longitude 122° 27' 30.0" and bounded by the shoreline on the east everywhere except for the most northerly part of the sheet which is bounded by W. Longitude 122° 25' 00.0". The survey was carried out between 2 April 1974 and 25 April 1974.

C. SOUNDING VESSELS

The following vessels were used to obtain sounding and bottom sample data for this survey. The color of ink used for each vessel's position data is listed on the right below.

<u>VESSEL</u>	<u>INK COLOR</u>
Launch DA-1 (3039)	Orange
Launch DA-2 (3040)	Blue
DAVIDSON	Brown
WZ3042	Black (DP's)

(See Appendix for positions abstracted as per vessel.)

D. SOUNDING EQUIPMENT

Launch DA-1 used a Ross Finline 5000 fathometer (SN-1048) for all of its soundings on this survey. Launch DA-2 used a Ross Finline 5000 fathometer (SN-1053) for all of its soundings on this sheet. Both

fathometers had a digital sounding output which was not subject to fine arc, initial, or phase error. Digitized soundings were accepted as true and correct unless they were suspected of being reflections from mid-water objects on the basis of scanning the analog record. The analog record initial was set at zero for all soundings. A phase check was made twice daily of the analog record and is available on the fathograms. The transducer depths for DA-1 and DA-2 are appended to this report as TRA TC/TI tape printouts. All soundings are in feet and tenths and are reduced for predicted tides to MLLW. Soundings on the sheet have not been reduced for transducer draft. All times logged for soundings are GMT.

The Ross 5000 system uses a narrow beam-type transducer which appears to be on the whole, an improvement over the wide beam transducers which were subject to deceptive side echoes. However, the narrow beam width sounding depends greatly on which direction the transducer is pointed. For example, it was calculated that with a 5° nose up running attitude, a launch running normal to a 45° bottom slope would experience a 14% difference between depths obtained while running up-slope and those obtained while running down-slope. This theory was substantiated by comparing soundings from adjacent lines running in towards the shore and away from the shore. (See Appended Diagram)

No corrections for this type of error were practical; but, with the steep bottom slopes in Commencement Bay, it is not unrealistic to expect significant sounding errors due to beam width-bottom slope effect.

#### E. SOUNDING SHEET

A sounding sheet was produced in accordance with Project Instructions. The smooth sheet will be constructed and plotted by the Processing Division, Pacific Marine Center.

#### F. CONTROL

Both visual and electronic (Mini-Ranger III) control was used for this survey. Mini-Ranger was used for offshore areas where reflection from cliffs and buildings was not a problem and visual control (sex-tant fixes) was employed for inshore work.

Control was located either photogrammetrically or by standard geodetic field methods (See Appendix for List of Signals and Geodetic Computations). Photo-picked control was taken from the Cronopaque Manuscripts which precluded the need for "raying in" from photographs. Any signal sites that could not be positively located on the Manuscript were located by geodetic field methods.

Stations used for Mini-Ranger sites were DAV, SON, Brown Point Light, Hylebos and Station ID. Stations used per day are available in the appended Daily Electronic Control Calibrations.

Signal #504 was used for "computation only" fixes; its location is N 47° 18' 30.00", 122° 25' 30.00" W.

#### G. CONTROL

Mini-Ranger III was used for position control and launch navigation. Calibration checks were made twice daily, once before daily operations were begun and once after daily operations were completed. At the outset of the survey, an effort was initiated to obtain a thorough evaluation of the Mini-Ranger system; but, due to the time limits in which the survey was to be completed, such an evaluation was not possible. Problems falling into categories of phase cancellation, reflection from vertical faces were encountered, but no time was available for a systematic treatment of these problems. When obviously incorrect fix ranges were recorded, the plotter would immediately shift the fix number to the preceding or following sounding and use the fix data for that sounding.

Visual signal number 203 was removed or destroyed several times during the survey. It was rebuilt each time, but some work was done off Dash Pt. when #203 was missing. A mini-Ranger tripod which stood very near the location of #203 (2 to 3 feet) was used at times when the signal was missing. This tripod was later found to have been moved also; consequently, there are some bad fixes where #203 was used (See Section I, CROSSLINES). Data using #203 for control has not been rejected; the decision to reject can best be made after all soundings have been plotted by computer and compared with DAVIDSON hand-plotted data.

#### H. SHORELINE

The shoreline was drawn using photogrammetric manuscripts TP-00729, TP-00732, and TP-00733 and confirmed by "Field Edit." Shoreline features not delineated or incorrectly labeled on the photo-manuscripts were depicted on the hydrographic sheets with red ink. Field Edit confirmed shoreline features have been drawn with black ink on the hydrographic sheets. Portions of the boat sheet that were not field-edited are depicted with blue ink. Signal #506 was seaward of MHW: it consisted of a two-pile dolphin extending about ten feet above MHW.

*Field edit was completed in late 1974 & early 1975,  
R.S.*

## I. CROSSLINES

There were 3.7 percent crosslines to sounding lines. Agreement between crosslines and sounding lines in deep water was good with no difference greater than two feet. There were some areas where sounding lines intersected allowing for a comparison of soundings.

One such area of sounding line intersection was located at approximately N 47° 19' 11", 122° 25' 50" W near Dash Point. These soundings did not agree very well; depth differences of up to twenty-three feet occurred where the deeper soundings were inshore of the shoaler soundings. These differences can probably be attributed to problems experienced with signal #203 as described under Section F (Control).

Sounding line intersection also occurred just north of Brown Point and near the log booming area at N 47° 17' 45", 122° 26' 00" W; the majority of soundings agreed within six feet in both of these areas.

## J. JUNCTIONS

H-9411 junctioned with contemporary surveys H-9410 and H-9412. Sounding junction with H-9410 was excellent with the maximum difference being only three feet. Junction with H-9412 was generally very good with differences of only three to five feet, except for two small areas. One area is at N 47° 17' 16", 122° 25' 58" W - this is due to a single H-9412 sounding that seems to be a very sharp pinnacle. The fathograms of this area depict an extremely rugged bottom with steep slopes and side echoes. The other poor junction area is at N 47° 17' 16", 122° 25' 23" W; here H-9412 soundings were shoaler by as much as fifty feet. H-9411 sounding lines were normal to the bottom contours here, whereas, H-9412 sounding lines were approximately parallel to bottom contours. Slight lateral displacement of H-9412 lines over this steeply sloping bottom could easily account for apparent sounding discrepancies between H-9411 and H-9412.

## K. COMPARISON WITH PRIOR SURVEYS

The area covered by H-9411 was surveyed in 1935-36 as parts of sheets H-5932 (1935) and H-6200 (1936). Soundings from H-9411 differ less than 5 feet from H-6200 for over 95% of the sheet; H-9411 soundings range from 0-26 feet shoaler than those on H-6200. H-5932 soundings average about 2-5 feet deeper than H-9411 with a maximum difference of about 10 feet. Nearly all of the H-9411 soundings are shoaler than those of H-5932 or H-6200.

## Reported Chart Deficiencies

1. The shoal reported 400 yards NW of Dash Point was not located *See QC,* and, according to our survey data, does not exist. There is a very shallow spit tending west from Dash Point that is probably the one that was reported; but, it doesn't extend out to 400 yards from the beach (MHW) as reported. Since this is a sand spit and not a rocky shoal, there was no reason to suspect the existence of any pinnacles and, consequently, no extensive development of this shoal was undertaken. *extends approx 150 meters to 11' depth*
2. Piles reported about <sup>150</sup>200m south of Brown Pt. Lt. could not be located. Some pier ruins were found about <sup>50</sup>50 meters SE of the reported piles. These ruins were well up on the beach and extended only about 1 foot above MHW and 10-15 feet seaward of MHW; these are plotted in red on the boat sheet as transferred from TP-00729.
3. The dolphin in question, about 300m south of Brown Pt. Lt., was used as signal #506 and its position is listed in the appended List of Signals. *(TWO PILE DOL. BARES ABOUT 10 FT. at M.H.W.)*
4. The ramp and dolphin reported at approximately N 47° 18' 17.98" 122° 26' 45" W were investigated and only the ramp was found to exist. The "ramp" is composed of marine railway ruins.
5. The barge moorages at N 47° 17.7', 122° 25.7' W and N 47° 17.6', 122° 25.3' W were confirmed. These moorages move almost 100 meters depending on wind and tide. Hydrography was run as close as possible to these moored barges; and considering the scope of the moorage, the position of the moorage points can be defined accurately enough relative to the limits of hydrography.
6. A single vessel was found at the reported barge moorage at N 47° 17' 23", 122° 25' 13" W. Its position is defined by limits of adjacent hydrography and is plotted on the boat sheet.
7. Existence of the marine railway at N 47° 17.7', 122° 24.9' W is confirmed by Field Edit. This railway is large enough to handle large fishing vessels up to sixty feet in length.

## L. COMPARISON WITH THE CHART

C&GS Number 6407 is the largest scale chart of the survey area. H-9411 compared generally well with the chart. Nearly all soundings agreed within three feet with a maximum disagreement of 10 feet for a very few soundings. The 10 foot discrepancies are in deep water over steeply sloping bottom and are considered acceptable. Most of the soundings for H-9411 were shoaler than those on the chart,



indicating a general shoaling of the entire area. This is understandable considering that the Puyallup River empties into Commencement Bay and contributes a sizable quantity of sediment to the system.

A small creek delta at approximately N 47° 18' 34", 122° 25' 49" W showed some evidence of growth since the last survey. New depth curves for this delta are depicted on the boat sheet.

M. ADEQUACY OF SURVEY

This survey is not complete as per NOS requirements for a 1:5,000 basic hydrographic survey. Insufficient crosslines were run; and, consequently, there is not a good verification of control quality. The bathymetry under the log booming areas in the SE portion of the survey area is not adequately defined due to lack of access to this area. The booms were constantly shifting and any lines that were run in to the booming area were on a catch as catch can basis. The area between the booming area and the east shore was very foul and little work was accomplished there.

All fathograms of this survey were scanned as a check for peaks and deeps missed by the digitized sounding record; changes to the original records were made wherever appropriate.

Although this survey does not meet all 1:5,000 scale survey requirements, it should be adequate for recreational boating throughout the area and for commercial vessels approaching and departing deep draft docks and anchorages.

N. AIDS TO NAVIGATION

There are no floating aids to navigation and only two fixed aids within the survey area. The two fixed aids to navigation, Brown's Point Lt. and Hylebos Waterway Lt., are included on NOAA Form 76-40 in the appendix. Chart C&GS 6407, 27 Jan. 1973 edition, compares well with the Light List for this area.

O. STATISTICS

The daily number of positions for each vessel are abstracted and available in the appendix of this report. Launch DA-1 ran a total of 88 miles of hydrography. Launch DA-2 ran a total of 32 miles of hydrography. The total area surveyed was approximately 2.87 square miles.

P. MISCELLANEOUS

No unusual bathymetric features were disclosed by this survey. Many deadheads are to be found floating freely in the survey area and constitute a hazard to small craft navigation, especially at night.

A correction to Echo Sounders Report by Ens. R.W. Mercer and a mini-ranger report by Cdr. M.H. Fleming have been prepared for OPR-412. Field Edit Reports for Manuscripts TP-00728 through TP-00736 were completed by Ens. Mercer and Lt.(jg) Kapler.

No List of Geographic Names for investigation was received in the project instructions as per Photogrammetry Instruction No. 63, hence no investigation was conducted. ✓

Q. RECOMMENDATIONS

Information from this survey indicates rugged submarine features underlying the booming area in the SE corner of the sheet; these log booms should be removed temporarily to allow access for a survey of this area. The area just south and the area east of the log booms should be surveyed more completely, using lead lines where necessary. *see Q. 1.*

Although the spit off Dash Pt. does not extend 400 yards offshore, it does extend further than might be expected from shoreline topography. The Dash Pt. spit should be marked with a floating navigational aid. *conclude  
FPS-  
✓*

R. REFERENCES TO REPORTS

Reports for this survey include Descriptive Reports for H-9410 and H-9412, the three reports listed under Section P of this report, and the Horizontal Control records as prepared by Ens. J.L. Oswald. None of these records have been forwarded to PMC at this time of writing. ✓

S. DATA PROCESSING PROCEDURES

No automated processing systems were used for preparation of data from this survey. Data acquisition was by methods and equipment previously described in this report. ✓

Submitted by,

*R. W. Mercer*

R.W. Mercer  
ENS, NOAA

Approved by,

*Melvin U. Mohr*

FOR

M.H. Fleming  
CDR, NOAA  
Commanding Officer  
NOAA SHIP DAVIDSON

<u>STA</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>CRT</u>	<u>ELEV</u>	<u>F. KHZ</u>	<u>TYPE/NAME</u>	<u>SOURCE</u>
001	47° 17' 0994	122° 29' 0853	139	20.0		Bluff, 1935 r. 1973	*
002	47° 15' 1088	122° 22' 0340	139	40.0		Tacoma, Kaiser Aluminum Plant Stack, 1973	*
003	47° 15' 1316	122° 26' 0145	139	8.0		Tacoma Harbor, City Waterway Lt., 1973	*
004	47° 16' 0461	122° 25' 0681	139	3.0		Puyallup Waterway Jetty Lt., 1973	*
005	47° 16' 0446	122° 25' 0556	139	4.8		Milwaukee Waterway Shoal Lt., 1973	*
006	47° 16' 1303	122° 24' 1113	139	5.0		Port-Industrial Waterway Lt., 1973	*
007	47° 17' 0448	122° 24' 0876	139	5.0	149835.	Hylebos Waterway Lt. 1973	*
008	47° 15' 1348	122° 25' 1247	139	10.0		Tacoma, Puget Sound Plywood Black Stk 1973	*
009	47° 17' 1526	122° 30' 0456	139	20.0		Ruston Am. Smelting & Refining Co. Stack, 1954	1-1639
011	47° 16' 1378	122° 28' 0616	139	25.0		Pug, 1919	1-87
015	47° 18' 0677	122° 26' 0733	139	15.0	149835.	Brown Pt. L.H., 1935	1-213
018	47° 17' 1797	122° 26' 0517	139	4.0		Pole (1974)	**
019	47° 15' 1676	122° 26' 0854	139	40.0		Cliff, 1919 r. 1933	1-85
020	47° 15' 1526	122° 26' 0958	139	80.0		First Presbyterian Church Spire 1927	1-88
021	47° 16' 1458	122° 24' 0230	139	40.0		Tacoma, Chemical Plant, Gold Dome 1935	1-243
023	47° 19' 1588	122° 29' 0731	139	3.9	149835.	DAV (1974)	**

<u>STA</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>CRT</u>	<u>ELEV</u>	<u>F. KHZ</u>	<u>TYPE/NAME</u>	<u>SOURCE</u>
025	47° 16' 095	122° 26' 0803	139	2.7	149835.	Id (1974)	**
026	47° 16' 1562	122° 28' 0519	139	4.0		Cummings (1974)	**
027	47° 19' 0337	122° 25' 0862	139	2.9		Dash RM 3, 1973	*
029	47° 15' 0526	122° 25' 0333	139	16.0		Tacoma, highest of three concrete stks 1935	1-245
030	47° 15' 1142	122° 25' 0066	139	15.0		Tacoma Harbor, Puyallup Waterway Bridge Control House, 1935	1-245
097	47° 18' 1784	122° 32' 0989	139	0.0		Bor	??
098	47° 19' 0036	122° 32' 1029	139	8.0		Pt. Defiance Lt.	??
028	47° 19' 0200	122° 32' 0856	139	2.0	149835.	Son (1974)	**
100	47° 17' 0720	122° 29' 0503	243	3.0			TP-00730
101	47° 17' 0801	122° 29' 0593	139	3.0			**
102	47° 17' 1264	122° 29' 1005	139	3.0			**
103	47° 17' 1477	122° 29' 1093	139	3.0			**
104	47° 17' 1739	122° 30' 0039	243	3.0			TP-00730
105	47° 18' 0075	122° 30' 0166	243	3.0			TP-00730
106	47° 18' 0189	122° 30' 0280	243	3.0			TP-00730
107	47° 18' 0253	122° 30' 0341	243	3.0			TP-00730
108	47° 18' 0505	122° 30' 0502	243	8.0			**
109	47° 18' 0652	122° 30' 0573	139	8.0			**

<u>STA</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>CRT</u>	<u>ELEV</u>	<u>F. KHZ</u>	<u>TYPE/NAME</u>	<u>SOURCE</u>
110	47° 18' 0721	122° 30' 0653	139	6.0			**
111	47° 18' 0811	122° 30' 0859	139	5.0		Yacht Club Flagpole (1974)	**
112	47° 18' 0728	122° 30' 0987	243	3.0			TP-00730
113	47° 18' 0884	122° 30' 1245	139	3.0			TP-00730
114	47° 18' 1088	122° 31' 0384	139	3.0			**
115	47° 18' 1426	122° 31' 0745	139	3.0			**
116	47° 18' 1807	122° 31' 1085	139	3.0			**
117	47° 19' 0140	122° 32' 0142	139	3.0			**
118	47° 19' 0236	122° 32' 0493	139	3.0			**
119	47° 17' 0527	122° 29' 0308	243	3.0			TP-00730
120	47° 17' 0366	122° 29' 0120	243	3.0			TP-00730
121	47° 17' 0242	122° 29' 0039	243	3.0			TP-00730
122	47° 16' 1803	122° 28' 0905	243	3.0			TP-00731
123	47° 16' 1680	122° 28' 0759	243	3.0			TP-00731
124	47° 16' 1577	122° 28' 0557	243	3.0			TP-00731
125	47° 16' 1489	122° 28' 0615	243	3.0			TP-00731
126	47° 16' 1387	122° 28' 0320	243	3.0			TP-00731
127	47° 16' 1286	122° 28' 0095	243	3.0			TP-00731

<u>STA</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>CRT</u>	<u>ELEV</u>	<u>SOURCE</u>
128	47° 16' 1240	122° 27' 1260	243	3.0	TP-00731
129	47° 16' 1164	122° 27' 1078	243	3.0	TP-00731
130	47° 16' 1042	122° 27' 0837	139	3.0	**
131	47° 16' 0855	122° 27' 0502	243	3.0	TP-00731
132	47° 16' 0778	122° 27' 0306	139	3.0	**
133	47° 16' 0699	122° 27' 0219	139	3.0	***
134	47° 16' 0569	122° 27' 0032	139	3.0	**
135	47° 16' 0483	122° 26' 1192	139	3.0	**
136	47° 16' 0321	122° 26' 1035	139	3.0	**
137	47° 15' 1812	122° 26' 0627	139	3.0	**
138	47° 15' 1372	122° 26' 0386	243	3.0	TP-00734
139	47° 15' 1080	122° 26' 0249	243	4.1	TP-00734
140	47° 16' 1775	122° 25' 1163	139	5.1	**
141	47° 16' 0323	122° 25' 0939	139	4.2	**
142	47° 15' 1552	122° 26' 0000	243	3.0	TP-00734
143	47° 15' 1528	122° 25' 1172	243	3.0	TP-00734
144	47° 15' 1445	122° 25' 1121	243	3.0	TP-00734
145	47° 15' 1415	122° 25' 1108	243	3.0	TP-00734
146	47° 15' 1284	122° 25' 1032	243	3.0	TP-00734

<u>STA</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>CRT</u>	<u>ELEV</u>	<u>SOURCE</u>
147	47° 15' 1158	122° 25' 0974	243	3.0	TP-00734
148	47° 15' 1297	122° 25' 0956	243	3.0	TP-00734
149	47° 15' 1381	122° 25' 0995	243	3.0	TP-00734
150	47° 15' 1570	122° 25' 1017	243	3.0	TP-00734
151	47° 15' 1630	122° 25' 1030	243	3.0	TP-00734
152	47° 15' 1391	122° 25' 0848	243	3.0	TP-00734
153	47° 15' 1624	122° 25' 0917	243	3.0	TP-00734
154	47° 15' 1805	122° 25' 1004	243	3.0	TP-00734
155	47° 16' 0335	122° 25' 0449	243	3.0	TP-00732
156	47° 16' 0087	122° 25' 0298	243	3.0	TP-00732
157	47° 15' 1746	122° 25' 0155	243	3.0	TP-00734
158	47° 15' 1506	122° 24' 1196	243	3.0	TP-00735
159	47° 15' 1817	122° 25' 0090	243	3.0	TP-00734
160	47° 16' 0195	122° 25' 0232	243	3.0	TP-00732
161	47° 16' 0586	122° 25' 0359	243	3.0	TP-00732
162	47° 16' 0353	122° 25' 0090	243	3.0	TP-00732
163	47° 16' 0379	122° 24' 1188	243	3.0	TP-00733
<del>197</del>	47° 18' <sup>1520</sup> 1495	122° 25' <del>1058</del>	139	3.0	**
198	47° 19' 0676	122° 24' 0063	243	3.0	TP-00729



<u>STA</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>CRT</u>	<u>ELEV</u>	<u>SOURCE</u>
199	47° 19' 0676	122° 24' 0063	139	3.0	**
200	47° 19' 0399	122° 25' 0049	243	3.0	TP-00729
201	47° 19' 0275	122° 25' 0431	243	3.0	TP-00729
202	47° 19' 0415	122° 25' 0684	243	3.0	TP-00729
203	47° 19' 0331	122° 25' 0872	243	3.0	TP-00729
204	47° 19' 0093	122° 25' 0872	243	3.0	TP-00729
205	47° 18' 1686	122° 25' 1023 <sup>1025</sup>	139	3.0	**
206	47° 18' 1328 <sup>S</sup>	122° 25' 1074 <sup>O</sup>	139	3.0	**
207	47° 18' 1039	122° 25' 1152	243	3.0	TP-00729
208	47° 18' 0831	122° 26' 0061	243	3.0	TP-00729
209	47° 18' 0738	122° 26' 0347	243	3.0	TP-00729
210	47° 18' 0114	122° 26' 0726	243	3.0	TP-00729
211	47° 17' 1732	122° 26' 0237	243	3.0	TP-00732
212	47° 17' 1589	122° 25' 1254	243	3.0	TP-00732
213	47° 17' 1552	122° 25' 0919	243	3.0	TP-00732
214	47° 17' 1632	122° 25' 0762	243	3.0	TP-00732
215	47° 17' 1611	122° 25' 0612	243	3.0	TP-00732
216	47° 17' 1587	122° 25' 0501	243	3.0	TP-00732
217	47° 17' 1544	122° 25' 0373	243	3.0	TP-00732

<u>STA</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>CRT</u>	<u>ELEV</u>	<u>TYPE/NAME</u>	<u>SOURCE</u>
-218	47° 17' 15 <sup>17</sup> 82	122° 25' 0291	243	3.0		TP-00732
—219	47° 17' 1442	122° 24' 12 <sup>32</sup> 65	243	3.0		TP-00733
401	47° 16' 1009	122° 24' 0849	139	40.0	Port Docks, Black Tank, 1927	1-89
405	47° 16' 0688	122° 25' 0182	243	3.0		TP-00732
408	47° 16' 1062	122° 24' 1248	243	3.0		TP-00733
409	47° 16' 1627	122° 24' 0969	243	3.0		TP-00733
410	47° 17' 0189	122° 24' 1001	243	3.0		TP-00733
411	47° 17' 0126	122° 24' 0805	243	3.0		TP-00733
412	47° 17' 0192	122° 24' 0745	243	3.0		TP-00733
413	47° 16' 1431	122° 24' 0189	139	20.0	Tacoma Red Stack, 1933	1-1005
414	47° 16' 1145	122° 24' 0936	243	3.0		TP-00733
417	47° 16' 0779	122° 24' 0530	243	3.0		TP-00733
418	47° 16' 0587	122° 24' 0110	243	3.0		TP-00733
419	47° 16' 0729	122° 24' 0130	243	3.0		TP-00733
420	47° 16' 0780	122° 24' 0187	243	3.0		TP-00733
421	47° 16' 1073	122° 24' 0511	243	3.0		TP-00733
422	47° 17' 0117	122° 24' 0489	243	3.0		TP-00733
423	47° 17' 0187	122° 24' 0506	243	3.0		TP-00733
424	47° 17' 0031	122° 24' 0672	243	3.0		TP-00733

<u>STA</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>CRT</u>	<u>ELEV</u>	<u>SOURCE</u>
425	47° 17' 0179	122° 24' 0758	243	3.0	TP-00733
426	47° 17' 0115	122° 24' 0818	243	3.0	TP-00733
427	47° 16' 0675	122° 24' 0723	243	3.0	TP-00733
500	47° 16' 1390	122° 29' 0315	243	3.0	***
501	47° 15' 1390	122° 27' 0946	243	3.0	***
504	47° 18' 0926	122° 25' 0630	243	3.0	***
505	47° 15' 0455	122° 25' 0118	243	3.0	TP-00734
506	47° 18' 0384	122° 26' <del>0465</del> <sup>0779</sup>	243	3.0	TP-00729
507	47° 16' 0682	122° 26' 0075	243	3.0	TP-00734
508	47° 17' 0117	122° 24' 0489	243	3.0	TP-00733

\* By PMC field party, 1973  
 \*\* By Ship DAVIDSON, 1974  
 \*\*\* Grid Intersections (Latitude/Longitude)  
 ?? GP's were obtained from PMC over telephone. No documentation available. Verification Branch, please verify with published GP's.

# H9411 Signal List

007	47 17 0448	122 24 0876	AAA
015	47 18 0677	122 26 0733	AAA
018	47 17 1797	122 26 0517	AAA
023	47 19 1588	122 29 0731	AAA
025	47 16 0095	122 26 0803	AAA
026	47 16 1562	122 28 0519	AAA
028	47 17 1264	122 29 1005	AAA
197	47 18 1495	122 25 1058	AAA
199	47 19 0676	122 24 0063	AAA
200	47 19 0399	122 25 0049	AAA
201	47 19 0275	122 25 0431	AAA
202	47 19 0415	122 25 0684	AAA
203	47 19 0331	122 25 0872	AAA
204	47 19 0093	122 25 0872	AAA
205	47 18 1686	122 25 1023	AAA
206	47 18 1329	122 25 1074	AAA
207	47 18 1039	122 25 1152	AAA
208	47 18 0831	122 26 0061	AAA
209	47 18 0738	122 26 0347	AAA
210	47 18 0114	122 26 0726	AAA
211	47 17 1732	122 26 0237	AAA
212	47 17 1589	122 25 1254	AAA
213	47 17 1552	122 25 0919	AAA
214	47 17 1632	122 25 0762	AAA
215	47 17 1611	122 25 0612	AAA
216	47 17 1587	122 25 0501	AAA
217	47 17 1544	122 25 0373	AAA
218	47 17 1582	122 25 0291	AAA
219	47 17 1442	122 24 1205	AAA
410	47 17 0189	122 24 1001	AAA
504	47 18 0926	122 25 0630	AAA
506	47 18 0384	122 26 0465	AAA

→ See Memo dated 2 August, 1974

from: John Oswald, Ship Davidson

To: Chief, Processing Division

Subject: Geographic Positions, Tacoma Hrbr.



H- 9411

FATH. ROSS 1055<sup>48</sup>

DA-1

VELOCITY TABLE 5

000015 0 1005

000075 0 1004

000136 0 1003

000195 0 1002

000254 0 1001

000316 0 0000

000423 0 0001

000720 0 0002

001190 0 0004

001650 0 0006

002100 0 0008

002480 0 0010

002870 0 0012

003200 0 0014

003570 0 0016

003910 0 0018

004250 0 0020

004560 0 0022

004880 0 0024

005200 0 0026

005600 0 0028

005920 0 0030



H-9411

FATH. ROSS 1053

DA-2

VELOCITY TABLE 6

000028 0 1002  
000142 0 1001  
000258 0 0000  
000424 0 0001  
000720 0 0002  
001190 0 0004  
001650 0 0006  
002100 0 0008  
002480 0 0010  
002870 0 0012  
003200 0 0014  
003570 0 0016  
003910 0 0018  
004250 0 0020  
004560 0 0022  
004880 0 0024  
005200 0 0026  
005600 0 0028  
005920 0 0030

## CORRECTIONS TO ECHO SOUNDERS

OPR-412

MARCH-APRIL, 1974

This report contains corrections to be applied to soundings from survey OPR-412 in Commencement Bay, Tacoma, Washington. These corrections should be applied to sheets H-9410, H-9411, and H-9412 for the entire period of the survey.

Sonic velocity corrections were computed using data from a Martek TDC cast in Commencement Bay at approximately N 47° 18.5', 122° 29.0' W on 16 April 1974. This cast data yielded velocity corrections greater than 1/2% of the applicable depth. Velocity correction tables are appended to this report.

Bar checks were made twice daily except when precluded by weather and seas. The bar check results indicate a small amount of Residual Instrument Error for both launches; this is logged accordingly in the appended Transducer Correction Abstracts. The instrument error (PMC OPCODE 3-35), as derived from measured transducer draft and averaged bar check data (appended here-to), has been entered appropriately as part of the TC/TI corrector tape. The bar checks and analog phase checks of the Ross 5000 digitizing system were made as per 3-03.04 X 5 of the PMC OPCODE.

Launch DA-1 used a Ross Fineline 5000 Fathometer for the entire period of the survey. Launch DA-2 used a Ross Fineline 5000 Fathometer for most of the survey; two different Raytheon fathometers also were used in DA-2 in an effort to obtain better soundings over steeply sloping bottom (See Appendix for Abstract of Echo Sounders). The Raytheon 723's were corrected for phase error with a digital phase checker, and the initial was maintained at zero feet.

Since DA-1 is a new launch (28 ft. aluminum), a quick check was made to determine squat and settlement correctors. A range with a cross bearing was found near Hylebos Lt. Soundings were taken over this point while dead in the water and at various speeds up to full cruise. A corrector of +0.8 feet is necessary for DA-1 when planing (1800 rpm +). Squat and settlement correctors were deemed insignificant for this survey due to the steep bottom slopes and the fact that shallow shoreline hydrography was done at non-planing speeds.

Some sounding error is probably due to the actual "pointing" of the transducer, which is a function of how it is mounted on the hull and what the attitude of the launch is at any given sounding. DA-1 was found to change pitch attitude by 4° when running as compared to its



"dead in the water" attitude. This problem exists only for narrow beam fathometers, which are a relatively new item in the NOS inventory. It is felt that "pointing" of the transducer errors probably overshadows both draft and velocity correctors for over 70% of the soundings taken in this survey.

Velocity corrections were computed and correction tables submitted with the survey, even though most velocity corrections were less than 1/2% of the applicable depth. Printouts of all TC/TI tapes and Velocity Correction Table tapes are appended to this report.

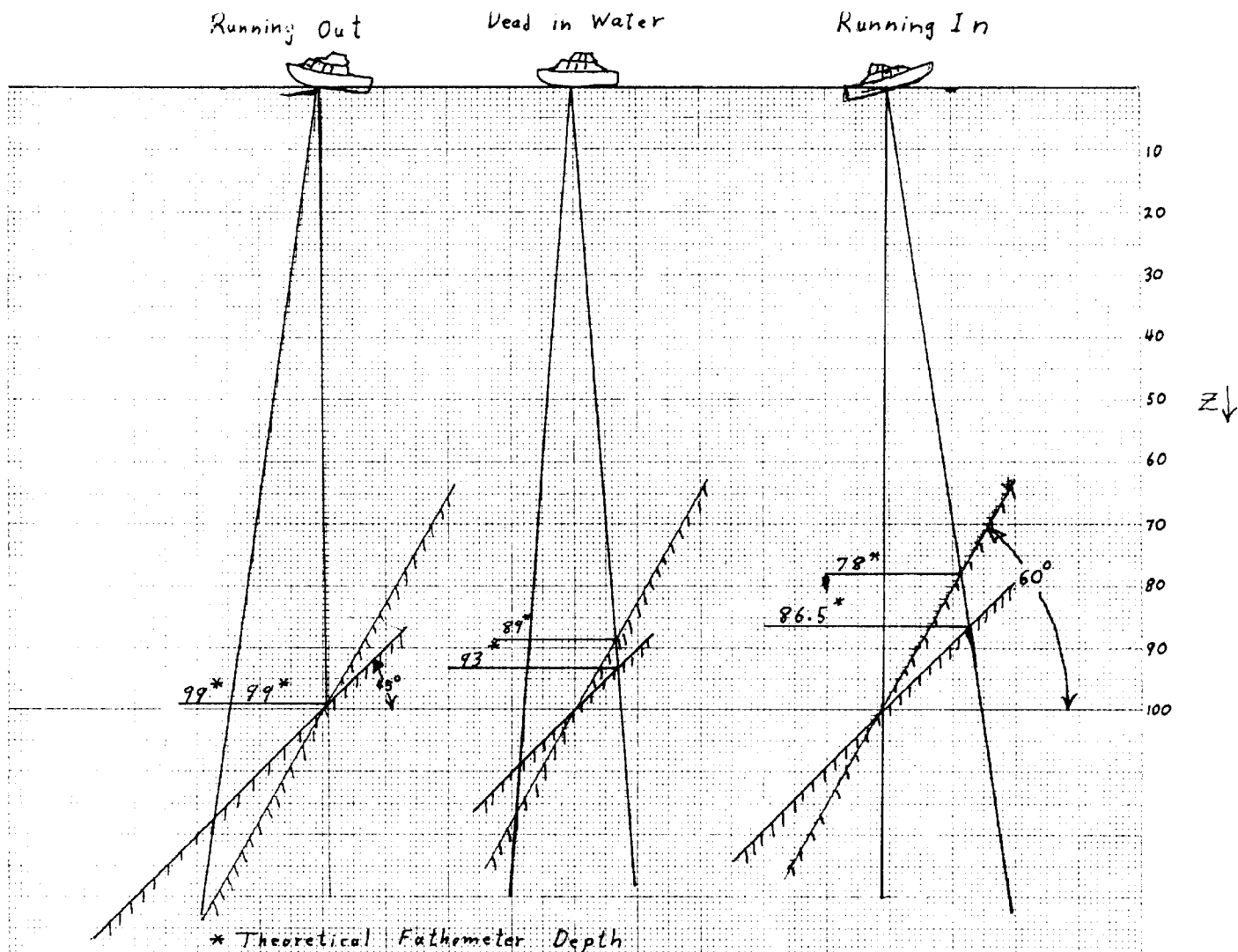
Respectfully submitted,

*Roger W. Mercer*

Roger W Mercer  
ENS, NOAA

Approved and forwarded by,

*Michael H. Fleming*  
Michael H. Fleming  
CDR, NOAA  
Commanding Officer



This diagram assumes: 9° beam width fore and aft

That launch has 4° nose up attitude while running

That transducer is pointed normal to surface when launch isn't running

Bottom has slope of 45° and 60°

This diagram points out the error that is possible with narrow beam transducers. The importance of how the transducer is mounted in the hull and what the running attitude of any given launch at various speeds is should be evident from the above diagrams.

Max.  $\Delta$  for 45° slope  $\cong$  13.5%

Max.  $\Delta$  for 60° slope  $\cong$  21.0%

BAR CHECKS AVERAGED H-9411

DA-1

TRUE DEPTH	MEAN SONIC DEPTH	TD-MSD
6.0	4.4	+1.6
12.0	10.3	+1.7
18.0	16.2	+1.8
24.0	22.1	+1.9
30.0	28.0	+2.0
36.0	33.9	+2.1
42.0	39.8	+2.2
48.0	45.9	+2.1

DA-2

6.0	4.7	+1.3
12.0	10.7	+1.3
18.0	16.6	+1.4
24.0	22.6	+1.4
30.0	28.5	+1.5
36.0	34.5	+1.5
42.0	40.4	+1.6
48.0	46.5	+1.5

## FIELD TIDE NOTE

Field tide reduction of soundings was based on predicted tides from Seattle, Washington, corrected to Commencement Bay, Tacoma, Washington. The interpolations were done by the PDP8/e computer aboard the NOAA Ship FAIRWEATHER MSS-20, using program AM 500. Times of both predicted and recorded tides are based on time zone 000° GMT.

One Fischer & Porter ADR gage was installed on the Municipal Dock of the Port of Tacoma on 19 March, 1974. Location and period of operation is as follows:

Commencement Bay	47° 15.3' N.	37 days
	122° 26.0' W.	19 March - 25 April

The initial ADR gage was replaced on 29 March due to a faulty timer/drive mechanism (#6903A5568M9). The replacement gage (#7304A1380M16F) was installed immediately. (See Below) The ship's officers made frequent checks of the gage and insured the accuracy of the ADR gage. The operation of the gage was excellent.

### LEVELS

Several days were required to level as the vertical displacement was great (about 118 feet), and winds made rod steadying difficult. One new bench mark was established and four others recovered. A total of five marks were leveled to upon installation; and four were leveled to upon removal, including the primary mark and new bench mark. The gage was removed on 25 April, 1974, with levels run to three marks, including the primary bench mark.

### MISSING TIDES

<u>FROM</u>		<u>TO</u>	
<u>DAY</u>	<u>GMT</u>	<u>DAY</u>	<u>GMT</u>
086	2000Z	091	1630Z

No hydrography was run those days except 088 day. Hydrography was resumed on 091 day.

4/22/75

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Pacific Marine Center:

Hourly heights are approved for

Tide Station Used (NOAA Form 77-12): Tacoma, Washington

Period: March 29 - April 25, 1974

HYDROGRAPHIC SHEET: H-9411

OPR: 412

Locality: Tacoma Harbor

0.0 ft. - March 29

Plane of reference (mean lower low water): 0.1 ft. - April

Height of Mean High Water above Plane of Reference is 8.0 ft.

Remarks: Zone direct

*James R. Hubbard*  
for Chief, Tides Branch

GEOGRAPHIC NAMES

Survey No.

H-9411

Name on Survey

Name on Survey	On Chart No.		On previous survey No.		On U.S. nautical charts	From local information	On local maps	P. O. Guide or Map	Rand McNally Atlas	U. S. Light List	
	A	B	C	D							
BROWN'S POINT ✓	6407	H-5932 H-6200			Road Signs				2302		1
COMMENCEMENT BAY ✓	6407										2
DASH POINT ✓	6407	H-5932 H-6200			Road Signs						3
HYLEBOS WATERWAY ✓	6407										4
											5
											6
											7
											8
											9
											10
											11
											12
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											24
											25

APPROVED

*Chas. B. Hamilton*

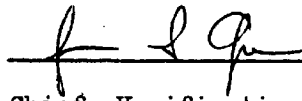
STAFF GEOGRAPHER - C512

16 March 1978

APPROVAL SHEET  
FOR  
SURVEY H- 9411

- A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position print-out has been made. A new final sounding print-out has been made.
- B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Hydrographic Manual. Exceptions are listed in the verifier's report.

Date: 5/23/77

Signed:   
Title: Chief, Verification Branch

**HYDROGRAPHIC SURVEY STATISTICS**  
**HYDROGRAPHIC SURVEY NO. H-9411**

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	BOAT SHEETS (2 parts, mylar)	2 1
DESCRIPTIVE REPORT	1	OVERLAYS (preliminary)	6

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/ SOURCE DOCUMENTS
ENVELOPES			4			
CAHIERS	1					
VOLUMES	5					
BOXES			1-smooth pos. & sndg.*			

T-SHEET PRINTS (List)

SPECIAL REPORTS (List) \*box contains all data other than sheets

**OFFICE PROCESSING ACTIVITIES**

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

PROCESSING ACTIVITY	AMOUNTS			
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS
POSITIONS ON SHEET				1231
POSITIONS CHECKED		1231		
POSITIONS REVISED		8		
DEPTH SOUNDINGS REVISED				
DEPTH SOUNDINGS ERRONEOUSLY SPACED				
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED				

ACTIVITY	TIME (MANHOURS)			
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS
Verification of Control		45		
Verification of Positions		83		
Verification of Soundings		120		
Smooth Sheet Compilation		103		
ALL OTHER WORK		93		
<b>TOTALS</b>		441		

PRE-VERIFICATION BY James Green	BEGINNING DATE 7/18/74	ENDING DATE 7/18/74
VERIFICATION BY F. L. Rosario Inked by L. Deodato,	BEGINNING DATE 8/5/74	ENDING DATE 3/31/77
REVIEW BY C.C.I. F.P. SAULSBURY-6511 Carrilca, 1946	BEGINNING DATE 3/15/79	ENDING DATE 10-12-77

Critique 5 hrs DHA 3-27-78



REGISTRY NO. 4411

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

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

CARDS CORRECTED

DATE \_\_\_\_\_ TIME REQUIRED \_\_\_\_\_ INITIALS \_\_\_\_\_

REMARKS:

REGISTRY NO. \_\_\_\_\_

The magnetic tape containing the data for this survey has not been corrected to reflect the changes made during evaluation and review.

When the magnetic tape has been updated to reflect the final results of the survey, the following shall be completed:

MAGNETIC TAPE CORRECTED

DATE \_\_\_\_\_ TIME REQUIRED \_\_\_\_\_ INITIALS \_\_\_\_\_

REMARKS:

H-9411

Information for Future Presurvey Reviews

Due to extensive construction within the survey area, considerable change may be expected in this area. The existence of charted foreshore items such as piles, dolphins, ruins, etc., should be confirmed or disproved on any future survey.

<u>Position Index</u>		<u>Bottom Change</u>	<u>Use</u>	<u>Resurvey</u>
<u>Lat.</u>	<u>Long.</u>	<u>Index</u>	<u>Index</u>	<u>Cycle</u>
471	1223	3	4	25 years

PACIFIC MARINE CENTER  
VERIFIER'S REPORT

REGISTRY NO: H-9411

FIELD NO: DA-05-02-74

Tacoma Harbor, Commencement Bay, Washington

SURVEYED: 2 April - 25 April 1974

SCALE: 1:5,000

PROJECT NO: OPR-412

SOUNDINGS: Ross Fineline Fathometer  
(Model #544) Raytheon DE-723

CONTROL: Mini-Ranger and  
Visual 3-Point

Chief of Party.....M. H. Fleming, CDR, NOAA  
Surveyed by.....J.J. Kapler, ENS, J. Sarb, ENS,  
R.W. Mercer, ENS, R.H. West, LT(JG)  
Automated Plot by.....Xynetics Plotter, PMC  
Verified by.....F. L. Rosario, Cartographic Tech.  
Inked by.....L. Deodato, Sr. Survey Tech.  
March 30, 1977

I. INTRODUCTION

This is a basic hydrographic survey conducted by the DAVIDSON in Tacoma Harbor, Commencement Bay, Washington during Spring 1974. Project Instructions specified "a thorough evaluation on the relative accuracy in controlling a survey at a scale of 1:5,000" by the use of the Mini-Ranger (Range/Range) system. In effect, OPR-412 was to have been a test project for the use of the Mini-Ranger for large-scale surveys. Time limitations, however, prevented a systematic treatment of problems encountered during the course of the survey (i.e. phase cancellation, reflection from vertical). Consequently, the efforts at "evaluating" the system was not completed. *concur*

Conversion from the IBM 1620 and the PMC Gerber plotter system to the current Xynetics Plotter system affected the verification process. The raw data tapes, preliminary position overlay and preliminary sounding sheets were originally processed and produced by the earlier system. Subsequent computations and plots had to be re-checked, re-computed and re-plotted. ✓

Projection parameters used to prepare the boatsheet have been revised to center the hydrography on the smooth sheet. Parameters used by PMC are appended in the smooth printout. All correctors used to plot and ✓

reduce soundings on H-9411 can be found in the smooth printout.

Field tide reductions of soundings are based on Tacoma predicted tides. Smooth sheet tides are from the Tacoma Harbor standard gage and were approved by Tides Division, Rockville, MD. ✓

While the hydrographer recognized this survey as being incomplete (as per NOS requirements for a 1:5,000 basic hydrographic survey), the survey was evaluated as being "adequate for recreational boating throughout the area and for commercial vessels approaching and departing deep draft docks and anchorages". ✓

## II. CONTROL AND SHORELINE

Refer to Items F and G in the Descriptive Report for a description of horizontal control used for this survey.

Signal #028, as listed in the Descriptive Report's Signal List, has subsequently been re-numbered as #102. See appended memo dated: 2 August 1974.

Apprehension was expressed by the hydrographer concerning periods when signal #203 was supposedly out of position. However, positions involving this signal did not conclusively reflect greater discrepancies or anomalies attributable to any "signal movement"; therefore, data using station has been retained.

The following Class I manuscripts, all unreviewed, were the sources of shoreline transferred to the smooth sheet.

a. TP-00729 ✓

Date of Photography June 1973  
Date of Field Edit March, April 1974 and January 1975

b. TP-00732 ✓

Date of Photography June 1973  
Date of Field Edit March, April 1974 and January 1975

c. TP-00733 ✓

Date of Photography June 1973  
Date of Field Edit March, April, December 1974

III. HYDROGRAPHY

As noted in the Descriptive Report, only 3.8 percent crosslines were run, considerably below the NOS requirements. While recognizing the inhibiting factor of the log-booming areas to the southeast, perhaps ✓ efforts at obtaining detached positions would have been just as effective. Certainly, documented efforts would have allayed the expoused negativity in the Descriptive Report.

There was good agreement with these crosslines that were accomplished. With the exception of log boom areas and the foul areas on the southeast corner of the survey, depth curves, the bottom configuration delineation *concur* and determination of least depths are adequate.

IV. CONDITION OF SURVEY

Fathograms were re-scanned after the crossings initially appeared suspect. References and diagrams reflecting possible sources of discrepancies attributable to the Ross fathometer system (i.e. - it's narrow-beam effects) perpetuated an attitude of extreme cautiousness during verification.

The area approximately 0.3 mile due west of Dash Point (Lat. 47°19'10" Long. 122°26'06") was left with obvious splits between the depths of 128 and 363 feet. *Three sdys. from H-5932(1935) were brought fwd. to supplement hydro in this area.*

Extensive, ever-changing locations of the "log-storage grounds" and "booming grounds" might deem updated work a necessity. The two major areas are at: *See Q.C. Evaluation*

Latitude 47°17'40", Longitude 122°25'35" ✓  
Latitude 47°17'30", Longitude 122°24'50" ✓

The areas approaching "HYLEBOS WATERWAY" at the extreme southeast have ✓ been surveyed as part of H-9412.

Additional lines would have been more appropriate in the area north and northwest of Dash Point (approximately Lat. 47°19'20", Long. 122°25'40"), *concur* where a gap (mini-holiday) exists. ✓ *44 715*

With the exceptions noted above, this smooth sheet and accompanying overlays, hydrographic records and reports are adequate and conform to the requirements of the Provisional Hydrographic Manual.

## V. JUNCTIONS

Junctional soundings with H-9410 (DA-05-01-74) to the west, reflect excellent agreement. Soundings agreed to within 2 feet, all at depths in excess of 470 feet.

The junction effected between H-9411 and H-9412 (DA-05-03-74), to the south, depicts a reasonably satisfactory one. The "log-booming" or "log storage" areas as referred to in the Descriptive Report (also as depicted both on the boatsheet and the comparison chart (#18091) precluded much-needed inshore sounding lines.

Topographic details at the extreme southeastern limits of H-9411 should be referred to H-9412, where the major portion of the hydrography was realized.

Soundings at the extreme southwest limits reflects good agreement between the three contemporary surveys: H-9410, H-9411, H-9412.

The junction notes have been inked accordingly.

## VI. COMPARISON WITH PRIOR SURVEYS

1. Comparison with H-5932 (1935), Scale 1:10,000 soundings in fathoms

Depths at areas up to about 400 feet agreed very satisfactorily, considering that H-9411 was surveyed in the foot mode. This current survey reflects a shoaling trend of up to about 13 feet.

However, the rounding-off process of the plotted fathoms mode on the prior survey, could account for much of the difference. Also, it is not known as to the type of control or sounding equipment used on H-5932. The satisfactory junction with H-9412 to the south and H-9410 to the west; however, supports the shoaling trend.

At depths in excess of 500 feet, differences of up to 25 feet shoaler soundings resulted on this survey. Comparison of soundings in the inshore areas was excellent, with concurrent agreement also between H-5932 and H-6200 (1936).

2. Comparison with H-6201 (1936) Scale 1:5,000 soundings in feet

Survey H-6201 covers the extreme southeastern portion of H-9411, its northern limits being at approximately Lat. 47°17'22" and its western limits being Long. 122°24'50". The major changes (i.e. landfilling, pier construction, dredging) within the overlapping areas make comparisons between these two surveys impractical. ✓

Also, the area and/or approaches to HYLEBOS WATERWAY has been superseded by H-9412.

3. Comparison with H-6200 (1935) Scale 1:5,000 soundings in feet

The comparisons confirm the general statement in Section K of the Descriptive Report. H-9411 differ less than 5 feet shoaler than 6200 over 95% of the sheet. However, in the most extreme cases, the differences range from 0-26 feet. ✓

Many charted soundings were unidentified. One reason was the illegibility of the prior survey copies.

With the transfer of soundings from H-<sup>5932</sup>~~5901~~ and H-6200 to fill in void areas wherever possible, H-9411 supersedes the above prior surveys for areas of common coverage. *concur JPS*

VII. COMPARISON WITH THE CHART

The smooth sheet was compared with Chart 6407 (#18091), 12th Edition, January 27, 1973 (Copy is enclosed.). *now 18453*

Although there was no pre-survey review for this project, reported chart discrepancies are discussed in Section K of the Descriptive Report. The sources of these reported chart discrepancies are not part of the hydrographic records and are not available to the verifier. Also see Project Instructions, Change #3, dated March 18, 1974, for additional chart discrepancy items. *not available at Q.C.I.*

Item #1. An inspection of the smooth sheet does not confirm the existence of a reported shoal 400 yards northwest of Dash Point; however, its existence is not conclusively disproven. The Class I manuscript, TP-00729, does not reflect the shoal either. Refer to the Descriptive Report, Paragraph Q, for the hydrographer's recommendation that this area be marked by a floating navigational aid. Additional field work is recommended. *See Q.C.I.*

*Do not concur*

Item #2. The "piles" referred to (about <sup>150</sup>~~200~~ m south of Brown Pt. Lt.) do not appear on the chart <sup>but not on</sup> and the Class I manuscript, TP-~~00729~~. The pier ruins, about ~~50~~<sup>25</sup> meters SE of the reported piles, were transferred from the Class I manuscript, TP-~~00729~~. ✓

Item #3. The position of the dolphin in question (which served as signal #506) is confirmed by the Class I manuscript, TP-~~00729~~ and the chart. *Chart as shown on the present survey in lat. 47°18.21', long. 122°26.62'* ✓

Item #4. Only the "ramp", composed of marine railway ruins, was found to exist as confirmed by the Class I manuscript, TP-~~00729~~. The dolphin referred to does not exist. It is recommended that this "ramp" be shown in future editions of the chart.

Item #5. The barge moorages at:

- |                      |                      |
|----------------------|----------------------|
| 1. Latitude 47°17.7' | 2. Latitude 47°17.6' |
| Longitude 122°25.7'  | Longitude 122°25.3'  |

were depicted in a different size and configuration on the chart as opposed to those depicted on Class I T-sheets, TP-~~00732~~ and TP-~~00733~~. The limits of these mooring areas are not depicted on the smooth sheet, *nor are they depicted on the chart.*

Item #6. The single vessel at: Latitude 47°17'23", Longitude 122°25'13" is not plotted on this sheet. It was inferred from the raw data and boatsheet information that this single vessel was temporarily moored at the barge moorage. The position of this vessel falls between position #598 and #599. ✓

Item #7. The marine railway is depicted on the Class I T-sheet, TP-~~00732~~ and is transferred as such onto the smooth sheet.

VIII. COMPLIANCE WITH PROJECT INSTRUCTIONS

With the exceptions noted previously in this report, this survey adequately complies with the Project Instructions.

IX. ADDITIONAL FIELD WORK

Additional field work is recommended as follows:

- a. Developmental lines to conclusively prove or disprove the reported shoal as per item #1 of Section K and Section Q in the Descriptive Report. *do not concur JPS.*

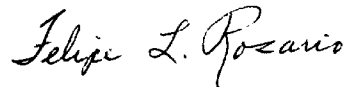


- b. Additional sounding lines or detached positions in the log-booming areas as per Section Q, too.
- c. To update survey data in view of the extensive construction since the date of the survey.

X. NOTES TO THE COMPILER

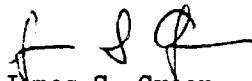
The smooth sheet was compiled and inked by Mr. Leonardo Deodato, Senior Survey Technician on NOAA Ship RAINIER for cross-training purposes.

Respectfully submitted,



Felipe L. Rosario  
Cartographic Technician  
March 30, 1977

Examined and approved,



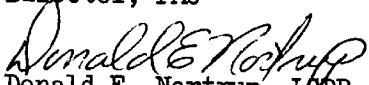
James S. Green  
Chief, Verification Branch



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL OCEAN SURVEY, Pacific Marine Center  
1801 Fairview Ave. E., Seattle, WA 98102

Date: 20 May 1977

To: Eugene A. Taylor, RADM  
Director, PMC

From:   
Donald E. Nortrup, LCDR  
Chief, Processing Division

Subject: PMC Hydrographic Survey Inspection Team Report, H-9411

This is a basic hydrographic survey of a portion of Commencement Bay, WA. The survey was conducted by NOAA Ship DAVIDSON in 1974 in accordance with Project Instructions OPR-412-DA-72<sub>4</sub>, dated 01 March 1974.

This survey was undertaken, in part, to determine the feasibility of utilizing Mini-Ranger III to control 1:5,000 harbor surveys. The survey was undertaken prior to the implementation of the M/R baseline calibration procedure, therefore, electronic control correctors were determined from daily calibrations. The M/R test indicated accuracy very slightly less than what was subsequently determined to be acceptable for 1:5,000 scale surveys. M/R control was used exclusively in the deep water, generally greater than 200 feet, portions of the survey. The near shore portion of the survey was controlled by visual methods.

The first of the aluminum hydrographic survey launches was utilized during this project. This fact, along with the M/R test requirement and a severely limited time frame for the operation combined to aggravate the accomplishment of quality hydrography.

Although the field edit work in the survey area was less than vigorous, the applicable shoreline manuscripts have been upgraded to Class I *See Q.C.* status indicating acceptability of field edit data. The 12th Edition of Chart 6407 (18091) depicts a dolphin at 47°19.23'N, 122°25.60'W and a group of three offshore piles centered at 47°18.43'N, 122°26.40'W. Neither of these obstructions was verified or disproved by this survey. It is recommended that these items continue to be charted unless some other disproving evidence exists.

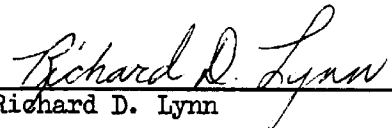


Hydrography on this survey is generally acceptable. Line spacing in the extreme south east corner of the survey area exceeds maximum spacing required by project instructions. A 150 X 250 meter holiday exists at 47°19.2'N, 122°26.1'W. Prior survey soundings, where available, have been carried forward in log storage and booming areas.

Since the density of hydrography on this survey is considerably greater than that of prior surveys and since depths are generally shoaler than prior survey depths, this survey is considered to be adequate to supersede prior surveys.

The inspection team finds survey H-9411 to be a fair basic survey, and with the aforementioned exceptions, adequate for charting purposes. Administrative approval is recommended.

  
\_\_\_\_\_  
Donald E. Nortrup, LCDR

  
\_\_\_\_\_  
Richard D. Lynn

  
\_\_\_\_\_  
Dean R. Seidel, LCDR

  
\_\_\_\_\_  
David B. MacFarland, LCDR

ADMINISTRATIVE APPROVAL  
H-9411

The smooth sheet and reports of this survey have been examined and the survey is adequate for charting and to supersede common areas of prior surveys.



\_\_\_\_\_  
Eugene A. Taylor, RADM  
Director  
Pacific Marine Center

03 June '77  
Date



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SURVEY  
Rockville, Md. 20852

C352/FPS

October 12, 1977

TO: *A. J. Patrick*  
A. J. Patrick  
Chief, Marine Surveys Division

THRU: Chief, Quality Control Branch

FROM: F. P. Saulsbury  
Quality Evaluator

SUBJECT: Quality Control Report for H-9411 (1974), Washington, Puget Sound, Northeast Portion of Commencement Bay

Survey H-9411 was inspected to evaluate the accuracy and adequacy of the survey with respect to data acquisition, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, shoreline transfer, smooth plotting, decisions and actions taken by the verifier, and the cartographic presentation of data. In general, it was found to conform to the National Ocean Survey's standards and requirements except as noted by the verifier and the Hydrographic Inspection Team and as follows:

1. Sections of the low-water curve were not developed.
2. Minor revisions and additions to depth curves were made during quality control inspection.
3. Overlapping depth curves in the junctional area on the south with H-9412 (1974) were made coincidental during quality control inspection.
4. Revisions to the positions of descriptions of signals falling off-shore of the high water line were made during quality control inspection. They were moved from a position adjacent to the signal location in the water to a position adjacent to the signal number and enclosed in parentheses as is standard procedure.
5. The log storage grounds in the vicinity of latitude  $47^{\circ}17.70'$ , longitude  $122^{\circ}25.60'$  and noted on the present survey as having changeable limits were not developed on the present survey because of inaccessibility. However, soundings carried forward from prior surveys adequately cover the bottom in this area and no additional work is necessary.



The booming grounds in the vicinity of latitude 47°17.50', longitude 122°24.80' are permanent with changeable limits. Very few soundings were acquired in this area on both the present and prior surveys because of inaccessibility. As the area is likely to be inaccessible to general navigation, further sounding in it should have no immediate priority.

The limits of the log storage and log booming grounds are changeable, differ from the limits now charted, and should be charted from the latest available source.

6. The following items were revised on the smooth sheet during quality control inspection from information shown on the boat sheet in red. These items are considered to have originated with the field edit. One item is not shown and the remainder differ with counterpart information on the Class I photogrammetric manuscripts.

pile - (not shown on T-sheet) in latitude 47°19.18', longitude 122°25.27'  
rock - revised from rock awash to rock bare 4 feet at M.H.W. in latitude 47°18.91', longitude 122°25.82'  
rock - revised from rock awash to rock bare 3 feet at M.H.W. in latitude 47°18.62', longitude 122°25.89'  
rock - elevation revised from (0) to (2) in latitude 47°18.41', longitude 122°26.22'

7. Survey information was added to the four detached positions located in the vicinity of latitude 47°17.30', longitude 122°24.53'. Also a depth and elevation was added to the pile in this area.

8. The dolphin charted in latitude 47°19.23', longitude 122°25.60' from an undetermined source prior to the date of the present survey was not investigated on the present survey and does not appear on the contemporary photogrammetric manuscript. Its retention on the chart as a submerged dolphin is recommended.

9. The pier ruins charted in the vicinity of latitude 47°18.47', longitude 122°26.07' and originating as a pier on H-5932 (1935) should be charted as they appear on the present survey.

10. The three piles charted in the vicinity of latitude 47°18.42', longitude 122°26.40' from H-5932 (1935) were not investigated on the present survey and do not appear on the contemporary photogrammetric manuscript. They were brought forward to the present survey as submerged piles and should be charted as such.

11. The ruins or groin charted in latitude 47°18.39', longitude 122°26.41' from an undetermined source prior to the date of the present

is not mentioned in the survey records nor is it shown on the contemporary photogrammetric manuscript. It is considered to have been removed during construction in this area.

12. The pier ruins charted in latitude  $47^{\circ}18.29'$ , longitude  $122^{\circ}26.58'$  and originating with a pier on H-5932 (1935) could not be found at this location according to information in the Descriptive Report and on the boat sheet. However, pier ruins were located 20 meters south of this extending 10 to 15 feet seaward of a bulkhead and uncovering 1 foot at M.H.W. The prior piling are considered to be nonexistent.

13. The line of dolphins charted approximately along the low water line between longitude  $122^{\circ}25.12'$  and  $122^{\circ}25.72'$  from H-5932 (1935) and H-6200 (1936) should be charted as shown on the present survey.

14. The piers, floats, boathouses, and marine railway charted in the vicinity of latitude  $47^{\circ}17.80'$ , longitude  $122^{\circ}25.15'$  from an undetermined source prior to the date of the present survey should be charted as they appear on the present survey.

15. The row of piles charted approximately 30 meters offshore between latitudes  $47^{\circ}17.31'$  and  $47^{\circ}17.64'$  and the four piles charted in the vicinity of latitude  $47^{\circ}17.31'$ , longitude  $122^{\circ}24.51'$ , both groups from H-6200 (1936), are not mentioned in the present survey records nor do they appear on the contemporary photogrammetric manuscript. Their continued existence is considered doubtful. ✓

16. The uncharted grounding reported in Chart Letter 1724 (1971) as occurring 400 yards northwest of Dash Point in approximate latitude  $47^{\circ}19.32'$ , longitude  $122^{\circ}25.95'$  and addressed earlier in the Descriptive Report falls in an unsurveyed area on the present survey. According to information in the chart letter this shoal covers approximately 6 feet at M.L.L.W. coming up from general depths in the 180-foot range. Since this is all but impossible, in this area, two alternatives are suggested. Either the reported position is in error, actually being much closer to Dash Point, which in itself deserves the placement of an aid marking the Dash Point spit, or the vessel hung up on one of the many deadheads common throughout the survey area.

17. Soundings brought forward from prior survey H-5932 (1935) were originally inked in blue. The use of this color, because of its poor reproduction quality, is to be avoided if possible. Junctional soundings from H-5932 (1935) transferred to H-6200 (1936) were carried forward to the present survey from the latter survey as well as from H-5932. Generally neither of these identical soundings were positioned correctly and occasionally their value was incorrect. The aforementioned deficiencies were

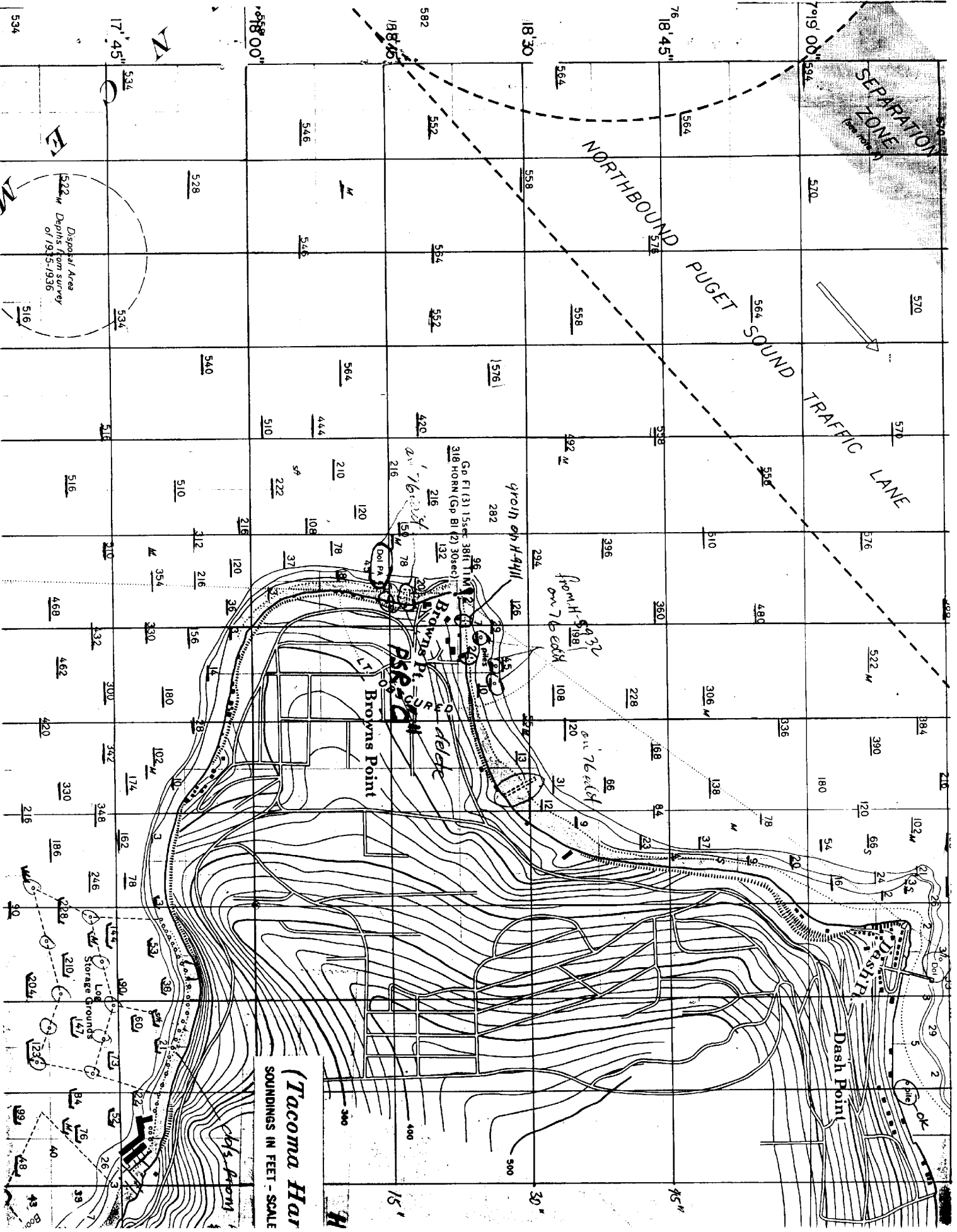
corrected and several bottom characteristics and inshore soundings were added, to supplement a paucity of both, during quality control inspection.

With these additions the present survey is adequate to supersede the prior surveys within the common area.

18. The names of electronic control stations falling off the sheet were not annotated on the arcs on the arc overlay.

cc:  
C351





SEPARATION ZONE

NORTHBOUND PUGET SOUND TRAFFIC LANE

Browns Point

DASH Pt

Tacoma Har  
SOUNDINGS IN FEET - SCALE

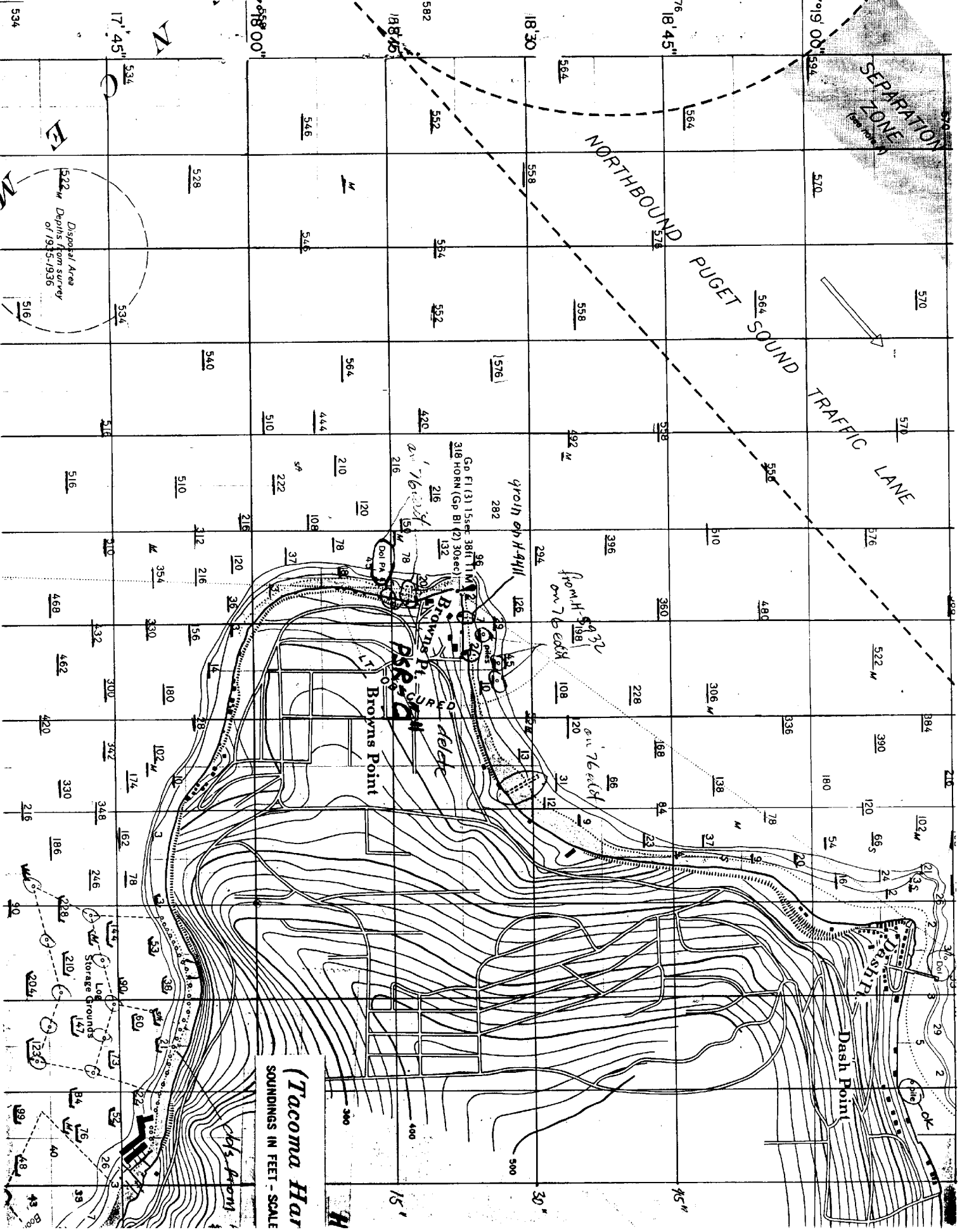
Disposal Area  
Depths from survey  
of 1935-1936

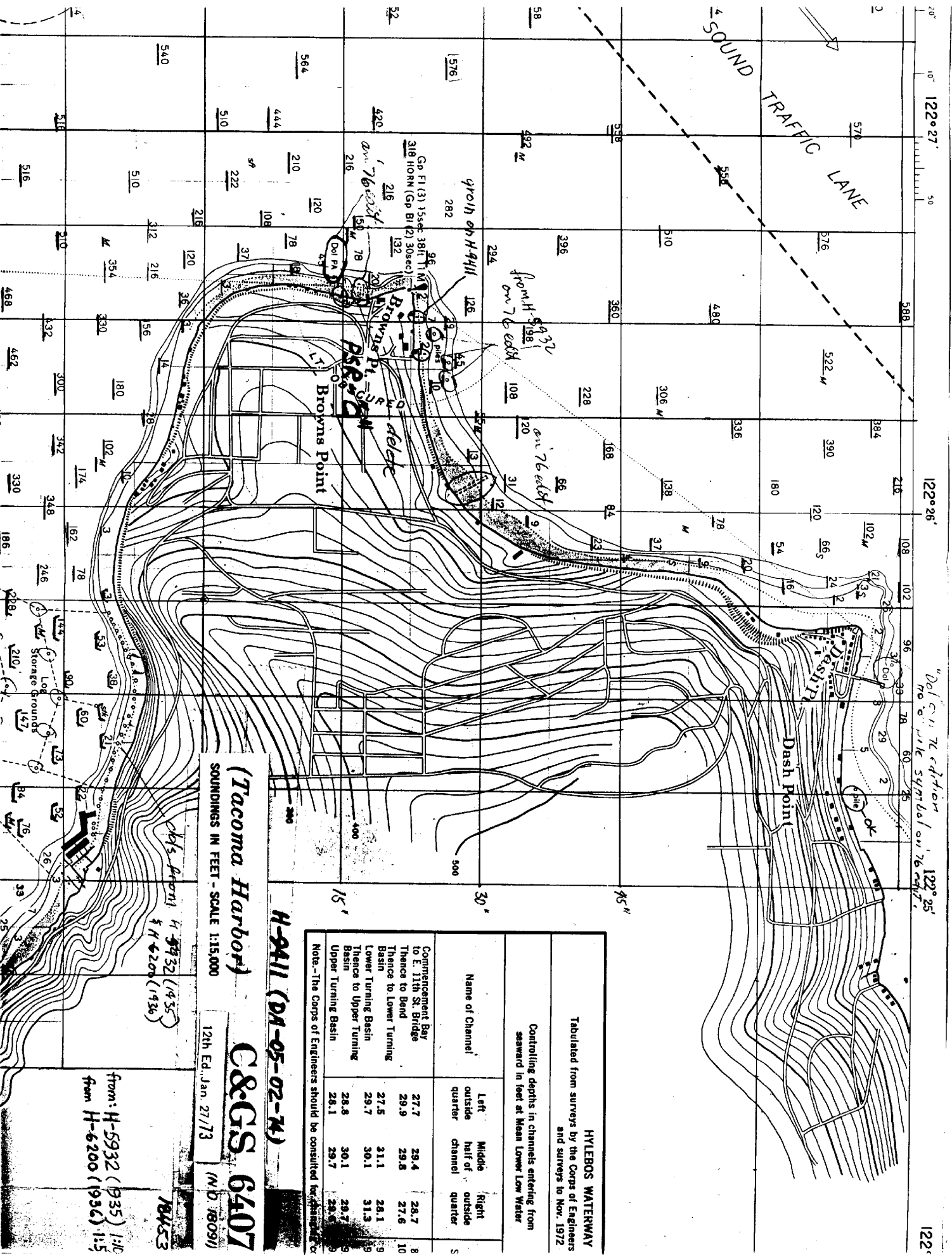
Go Pt (1) 15 sec  
318 HORN (GP BI (2) 30 sec)

from H-1982  
on 76 edd

BROWN'S Pt.  
SECURED

Log  
Storage Grounds





"Dol C 11" 7c edition  
No. 001 like symbol on '76 chart"

**HYLEBOS WATERWAY**  
Tabulated from surveys by the Corps of Engineers and surveys to Nov. 1972

Name of Channel	Controlling depths in channels entering from seaward in feet at Mean Lower Low Water		
	Left outside quarter	Middle half of channel	Right outside quarter
Commencement Bay to E. 11th St. Bridge	27.7	29.4	28.7
Thence to Bend	29.9	29.8	27.6
Thence to Lower Turning Basin	27.5	31.1	28.1
Lower Turning Basin Thence to Upper Turning Basin	29.7	30.1	31.3
Upper Turning Basin	28.8	30.1	29.7
Upper Turning Basin	28.1	29.7	28.8

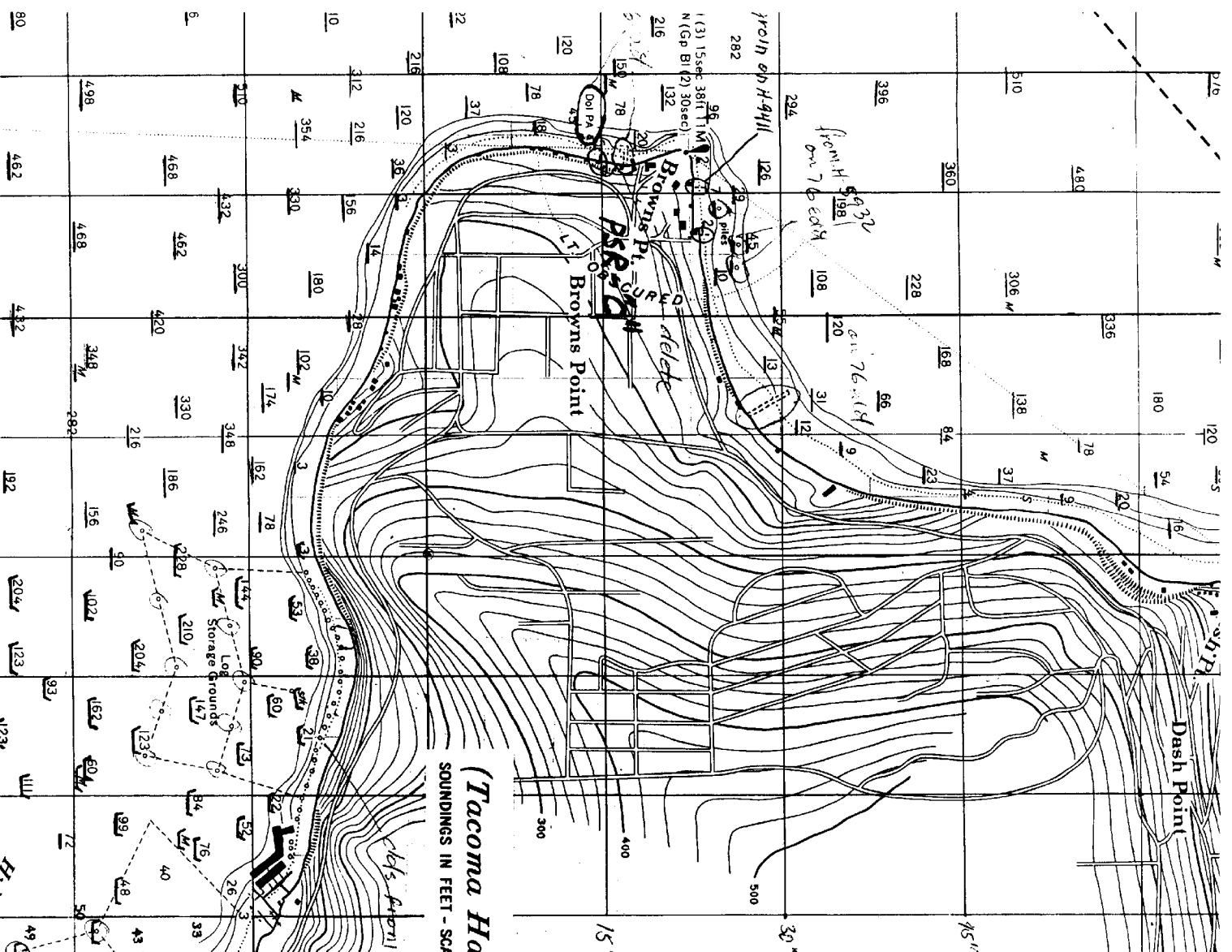
Note: -The Corps of Engineers should be consulted for details.

**H-9411 (DA-05-02-74)**  
**(Tacoma Harbor)**  
SOUNDINGS IN FEET - SCALE 1:15,000  
**C&GS 6407**  
12th Ed. Jan. 27/73  
(N.D. 18091)

Ch's from H-5932 (1935)  
H-6200 (1936)

from H-5932 (1935) 1:10  
from H-6200 (1936) 1:15

18453



(Tacoma Harbor)  
SOUNDINGS IN FEET - SCALE 1:15,000

C&G S 6407

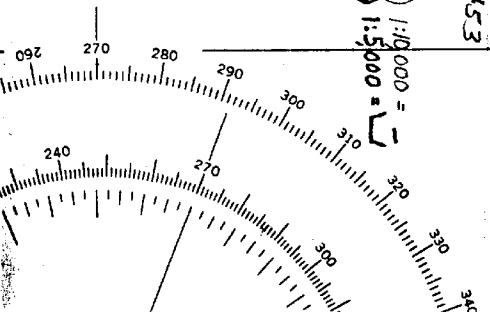
12th Ed. Jan 27/73

(N.O. 18091)

H-9411 (DA-05-02-74)

18453

from: H-5932 (1935) 1:10,000 = 1/15,000  
from H-6200 (1936) 1:5,000 = 1/15,000



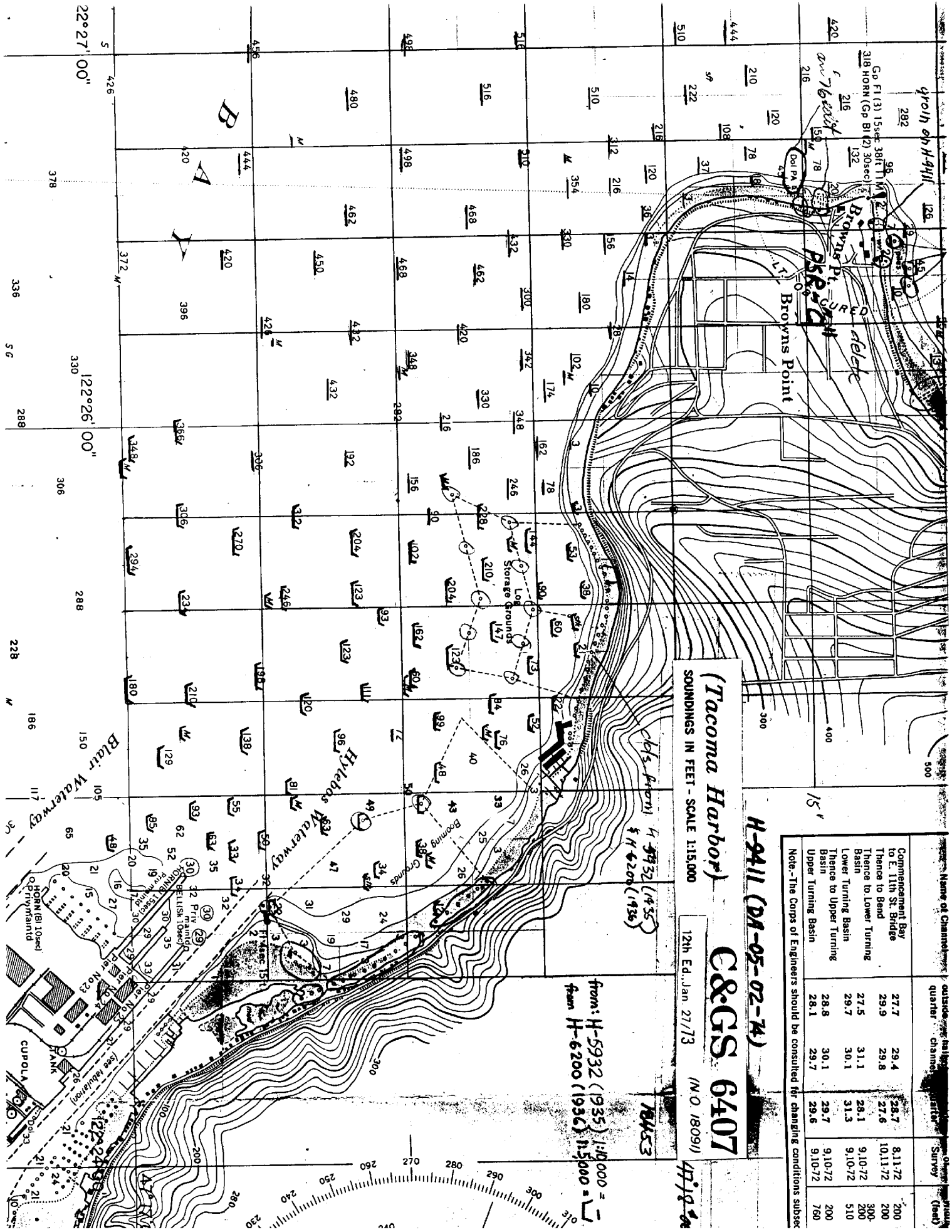
Controlling depths in channels entering from seaward in feet at Mean Lower Low Water		Project Dimensions					
Name of Channel	Left outside quarter	Middle half of channel	Right outside quarter	Date of Survey	Width (feet)	Length (naut. miles)	Depth (feet)
Commitment Bay to E. 11th St. Bridge	27.7	29.4	28.7	8-11-72	200	1.0	30
Thence to Bend	29.9	29.8	27.6	10-11-72	200	0.5	30
Thence to Lower Turning Basin	27.5	31.1	28.1	9-10-72	300-200	0.35	30
Lower Turning Basin	29.7	30.1	31.3	9-10-72	510	0.24	30
Thence to Upper Turning Basin	28.8	30.1	28.7	9-10-72	200	0.35	30
Upper Turning Basin	28.1	29.7	28.6	9-10-72	780	0.28	30

Note - The Corps of Engineers should be consulted for changing conditions subsequent to the above.

HYLEBOS WATERWAY  
Tabulated from surveys by the Corps of Engineers - report of Dec. 1972 and surveys to Nov. 1972

18448  
1180 feet

47° 19' 00"



(Tacoma Harbor)  
SOUNDINGS IN FEET - SCALE 1:15,000

C&GS 6407

12th Ed. Jan. 27/73

(N.O. 18091)

H-9411 (DA-05-02-74)

Name of Channel	outside quarter	middle channel	inside quarter	Survey	Depth (feet)	
Commemoration Bay to E. 11th St. Bridge	27.7	29.4	28.7	8.11-72	200	
	29.9	29.8	27.6	10.11-72	200	
	Tence to Lower Turning Basin	27.5	31.1	28.1	9.10-72	300-200
	Lower Turning Basin	29.7	30.1	31.3	9.10-72	510
	Tence to Upper Turning Basin	28.8	30.1	29.7	9.10-72	200
Upper Turning Basin	28.1	29.7	29.6	9.10-72	760	

Note - The Corps of Engineers should be consulted for changing conditions subject

from: H-5932 (1935) 1:10,000 =  $\frac{1}{15000}$   
from: H-6200 (1936) 1:15,000 =  $\frac{1}{15000}$

Chk's from H-9432 (1935) & H-6200 (1936)

TRUCS

4719-24



