H10797

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. RA-10-1-98

Registery No. H-10797

LOCALITY

State ..... Washington

General Locality ..... Puget Sound

Sublocality ..... Rich Passage

.....

1998-99

CHIEF OF PARTY
CAPT Alan D. Anderson, NOAA

.....

LIBRARY & ARCHIVES

DATE ..... OCT 9 1999

☆U.S. GOV. PRINTING OFFICE: 1985—566-054

NOAA FORM 77-28 (11-72)

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

REGISTER NO.

H-10797

HYDROGRAPHIC TITLE SHEET

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.

RA-10-1-98

State: Washington

General locality: Puget Sound

Locality: Rich Passage

Scale: 1:10,000 Date of survey: April 2-11, 1998

Instructions dated: April 17, 1998* Project No.: March 16-17,1999(ADD'L WK) S-N904-RA

Vessel: RA-3 (2123), RA-4 (2124), RA-5 (2125)

Chief of party: CAPT Alan D. Anderson, NOAA

Surveyed by: NOAA Ship RAINIER Personnel

Soundings taken by echo sounder, ~~hand lead, pole~~ Multibeam DSF-6000N, Knudsen 320M, Reson 8101 SWMB

Graphic record scaled by: RAINIER Personnel

Graphic record checked by: RAINIER Personnel

Evaluation by: ~~Protracted by~~ L. Deodato Automated plot by: HP Design Jet 650C

Verification by: M. Bigelow, D. Doles, R. Mayor, J. Ferguson, L. Deodato

Soundings in ~~fathoms~~ feet at ~~MLW~~ MLLW and tenths

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

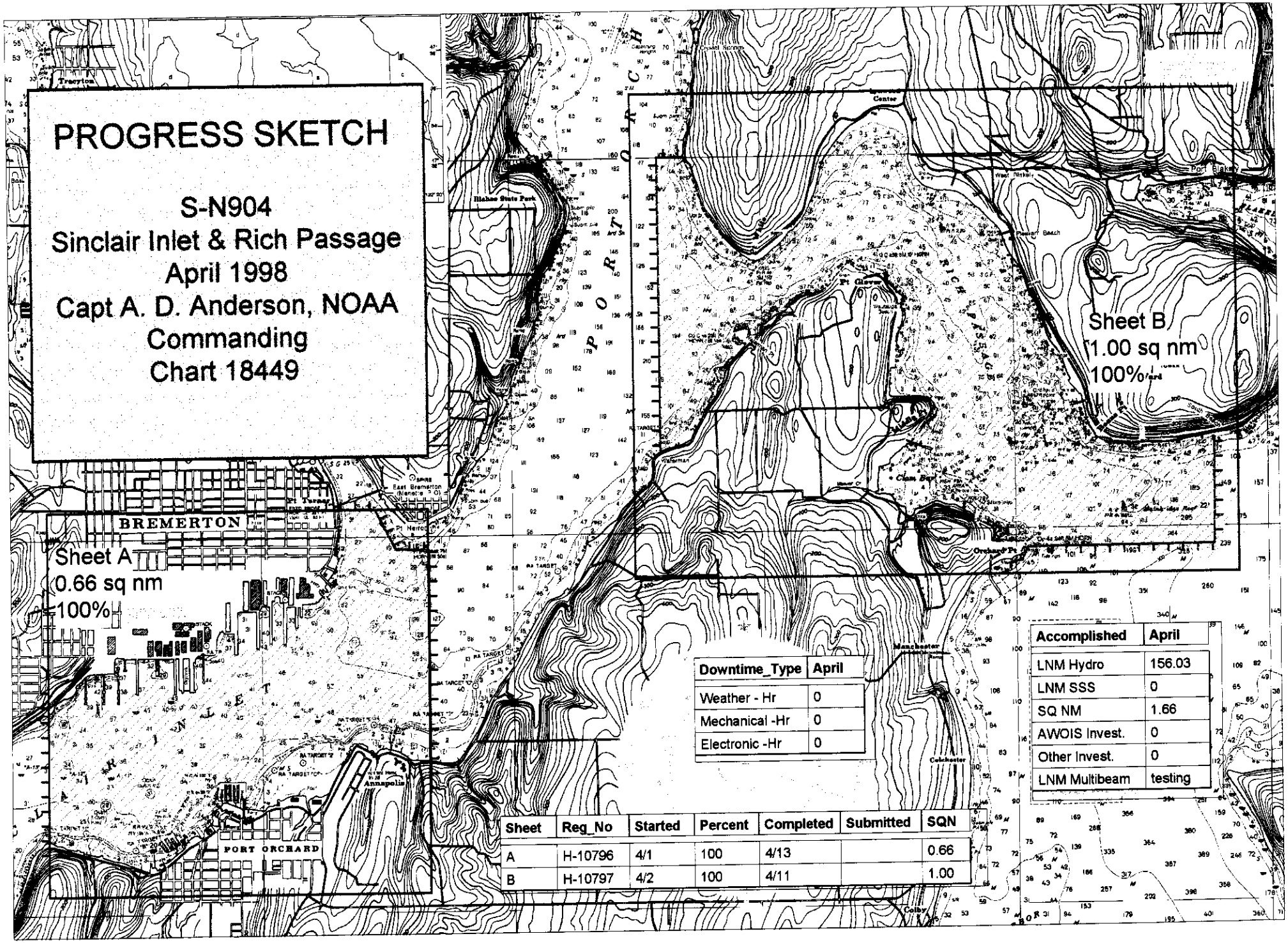
All depths listed in this report are referenced to mean lower low water unless otherwise noted.

* Change 1 dated March 19,1999

Finals √ & SURF √ by MBH 8/16/99

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537.

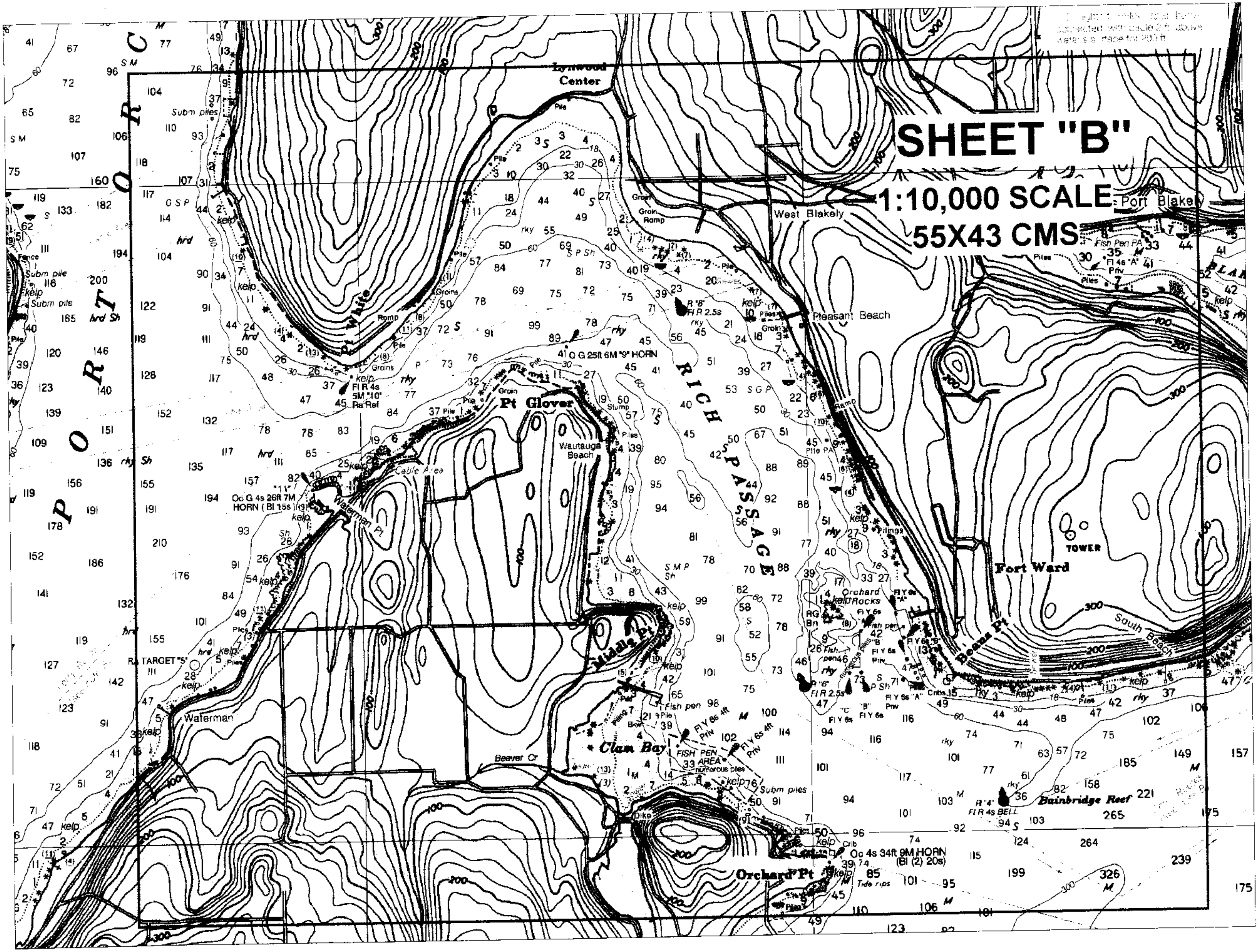
U.S. GOVERNMENT PRINTING OFFICE: 1986 - 652-007/41215



Downtime_Type	April
Weather - Hr	0
Mechanical -Hr	0
Electronic -Hr	0

Accomplished	April
LNM Hydro	156.03
LNM SSS	0
SQ NM	1.66
AWOIS Invest.	0
Other Invest.	0
LNM Multibeam	testing

Sheet	Reg_No	Started	Percent	Completed	Submitted	SQN
A	H-10796	4/1	100	4/13		0.66
B	H-10797	4/2	100	4/11		1.00


SHEET "B"
1:10,000 SCALE
55X43 CMS
RICH PASSAGE
PORT ORCHARD
Lynwood Center
West Blakely
Port Blakely
Pleasant Beach
Fort Ward
TOWER
South Beach
Beans Pt
Pt White
Pt Glover
Wautauga Beach
Waterman Pt
Waterman
Middle Pt
Clam Bay
Beaver Cr
Orchard Pt
Orchard Rocks
Bainbridge Reef
FISH PEN AREA
Cable Area
TARGET "S"
Oc G 4s 26ft 7M HORN (Bl 15s)
Q G 25ft 6M "9" HORN
Oc 4s 34ft 9M HORN (Bl (2) 20s)
Fl R 4s 5M "10" Ra Ref
Fl R 4s BELL


NOTE D
6 Lighted Yellow spar buoys connected with cable 2 ft above water's surface for 200 ft.
Lynwood Center
West Blakely
Port Blakely
Pleasant Beach
Pt Glover
Wautauga Beach
Cable Area
Waterman Pt
Waterman
Middle Pt
Beaver Pt
Fort Ward
TOWER
South Beach
Clam Bay
Beaver Cr
Orchard Pt
BLAKELY HARBOR
H-10797
H-10797_m
PORT ORCHARD
REGULATED
165.13

Descriptive Report to Accompany Hydrographic Survey H-10797

Field Number RA-10-1-98
Scale 1:10,000
April 1998
NOAA Ship RAINIER
Chief of Party: Captain Alan D. Anderson, NOAA

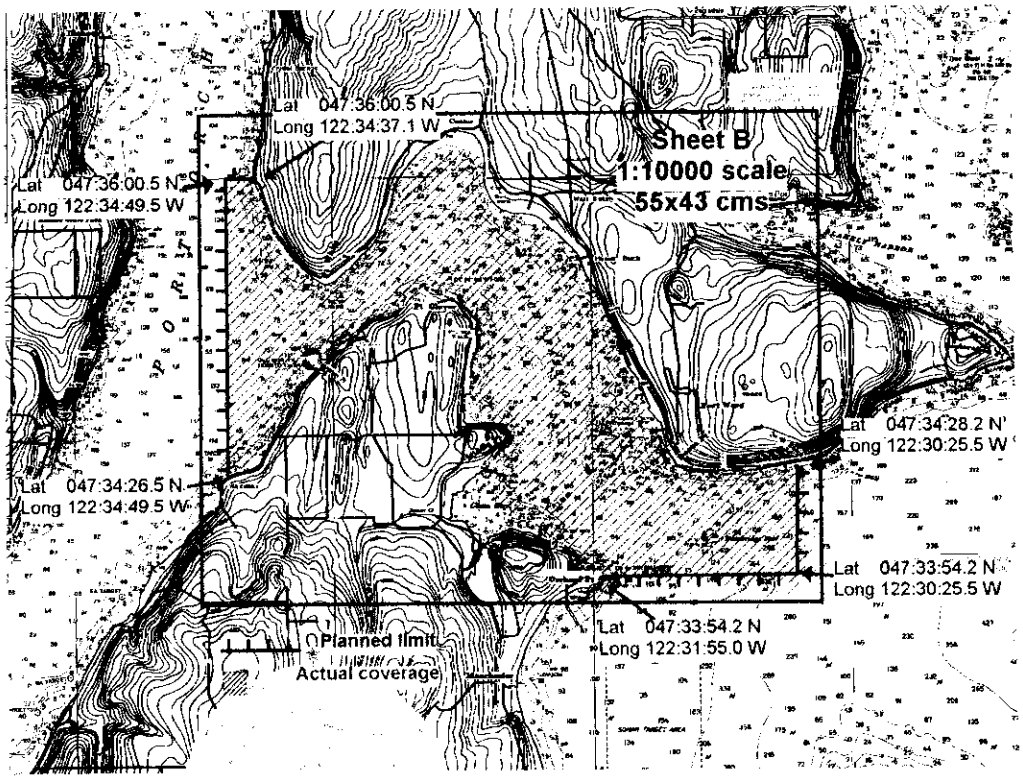
A. PROJECT ✓

This navigable area hydrographic survey was completed as specified by Project Instructions S-N904-RA dated April 17, 1998. Survey H-10797 corresponds to **sheet B** as defined in the sheet layout and **sheet 01** as defined in the Hydrographic Processing System (HPS) program. This survey will provide data to update existing National Ocean Service (NOS) nautical charts. This project responds to a request from the Department of the Navy (Naval Surface Group Pacific Northwest), the USCG 13th District OAN, which is conducting a Waterway Management Study, and from further concerns raised by the Washington State Ferry vessels.

The project area of Rich Passage is the primary waterway that connects Elliott Bay (Seattle, WA) to Sinclair Inlet (Bremerton, WA) and is routinely traveled by Washington State Ferry vessels, Naval vessels enroute to and from the Puget Sound Naval Shipyard, commercial fishing vessels, sailing vessels, and recreational motor vessels. The deepest draft vessel observed in the project area during survey operations was a naval aircraft carrier with a draft of approximately 45 feet. The aircraft carrier was assisted by four tugboats.

B. AREA SURVEYED See Eval Rpt., Section B

The limit of the survey area is shown below on a detail of Chart 18449. To the north and the south of the passage, the inshore limit was the 18 ft curve. Much of the surveyed area includes the 6 Feet and 12 Feet depth curves.



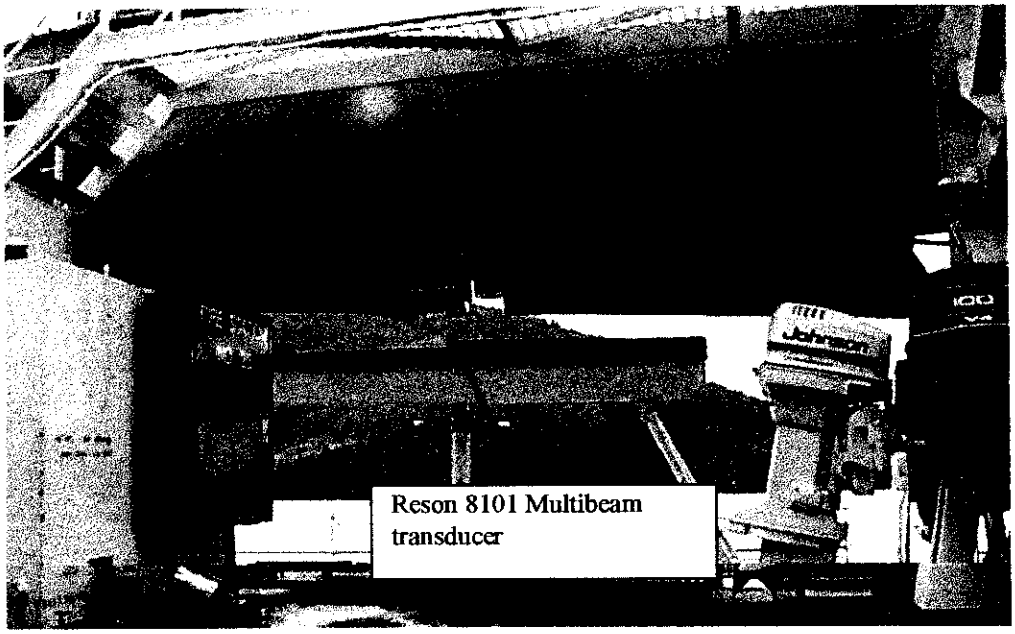
Data acquisition was conducted from April 2, 1998 (DN 092) to April 11, 1998 (DN 101).

C. SURVEY VESSELS ✓

Data were acquired by RAINIER's survey launches (2123, 2124, and 2125) as described below and as noted in more detail in the Survey Information Summary included with this report.

VN	DN	TYPE OF HYDROGRAPHY
2123	96-98, 101	Multibeam
2124	92-93	Mainscheme
2124	93	Splits
2124	94	DEV, XL, SPLITS
2124	98	DEV
2124	101	DP, DEV, XL
2125	92	SPLITS
2125	99	BS
2125	101	DP

This project included the use of a new vessel configuration. Launch 2123 was configured during the 1997-1998 winter inport period with a Reson SeaBat 8101 Shallow Water Multibeam (SWMB) system. The Reson SeaBat 8101 is a multibeam echosounder system that measures relative water depths across a wide swath perpendicular to the vessel's path. The Reson SeaBat 8101 ensonifies the seafloor with a 150° swath consisting of 101 individual 1.5° x 1.5° beams. The system was designed to meet International Hydrographic Organization standards to measure the seafloor at a maximum range of 320 meters. The center of launch 2123's keel was cut and modified to house the transducer. The originally installed DSF-6000N singlebeam transducer remained installed as before. A photograph of the new configuration is shown below with the launch resting in the davits:



D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

Single beam echosounder data were acquired using Hypack version 7.9 from Coastal Oceanographics and processed using Hydrographic Processing System (HPS). Shallow water multibeam echosounder data were acquired using the Reson Seabat 8101 and processed using CARIS software by HSD and will be submitted under a separate cover. The final field sheet was generated using MapInfo (Version 4.5) and MapBasic software developed by N/CS32 and modified by RAINIER personnel.

E. SONAR EQUIPMENT ✓

Traditional side scan sonar (SSS) equipment such as a side scan sonar towfish was not used during this survey. However, it should be noted that the Reson SeaBat 8101 SWMB system provides a low resolution digital SSS record of the SWMB swath. This SSS imagery is primarily used to aid in final processing of the SWMB depth data.

F. SOUNDING EQUIPMENT ✓

The Raytheon DSF-6000N and Knudsen 320M are dual frequency (100 kHz, 24 kHz), digital recording fathometers with analog paper traces. Serial numbers are included in the Separates. Both high and low frequency depths were digitally recorded. The high frequency depths were used as the primary soundings for this survey. No problems that affect survey data were encountered.

The Reson SeaBat 8101 SWMB system previously described in section C has a sonar operating frequency of 240 kHz. This project was the first to use the launch SWMB configuration and served to better evaluate the new configuration under actual field conditions. The need for further improvements in the SWMB processing software was identified as a result of this evaluation. At the time of submittal of this report, the improvements in the SWMB processing software were still being finalized. Consequently, SWMB echosounder data will be evaluated and submitted at a later date. It should be noted that 100% of the minimum required mainscheme, crosslines, splits, and developments were acquired using traditional single beam echosounders and that the SWMB echosounder data that was collected will be used to supplement the single beam data. Shallow Water MultiBeam has been incorporated into the data set and shown on the smooth sheet.

G. CORRECTIONS TO ECHO SOUNDINGS ✓

The following sound velocity casts were used for corrections to single beam data for this survey:

DN	Time (UTC)	Position	TABLE No.	TABLE DEPTH
093	1721	47° 33′ 54″ N 122° 30′ 42″ W	1	135.1 m
097	2153	47° 34′ 20″ N 122° 32′ 06″ W	2	44.5 m

The following sound velocity casts were used for corrections to SWMB data for this survey:

DN	Time (UTC)	Position	Vessel	TABLE DEPTH
096	2153	47° 34′ 20″ N 122° 32′ 06″ W	RA-3	44.5 m
097	1812	47° 34′ 06″ N 122° 31′ 48″ W	RA-3	43.2 m
097	2052	47° 35′ 02″ N 122° 32′ 06″ W	RA-3	43.8 m
098	1632	47° 34′ 21″ N 122° 32′ 00″ W	RA-3	44.8 m
098	1927	47° 35′ 34″ N 122° 34′ 45″ W	RA-3	51.7 m
101	1553	47° 33′ 48″ N 122° 30′ 52″ W	RA-3	109.7 m

101	1924	47° 35′ 08″ N 122° 34′ 42″ W	RA-3	58.1 m

Information on the casts is included in the Survey Information Summary report.

The sound velocity casts were acquired with SBE SEACAT Profilers SN 2543 and SN 2477, calibrated January 10, 1998 and February 6, 1998 respectively. Velocity correctors were computed using the PC programs SEACAT and VELOCITY, version 3.3, 1996. Printouts of the Sound Velocity Corrector Tables used are included in the "Separates to be Included with Survey Data, IV. Sounding Equipment Calibrations and Corrections".

Static draft and transducer offsets for launches 2123, 2124, and 2125 were measured on March 26, 1998.

Settlement and squat values for launch 2123 were last measured on March 24, 1998 in Port Angeles, WA. Settlement and squat values for launch 2124 were last measured on March 14, 1996 in Shilshole Bay, WA. Settlement and squat values for launch 2125 were last measured on March 25, 1997 at Scull Island, AK. No changes to the vessel configurations have occurred since the time of these measurements. Corresponding settlement and squat correctors have been computed in accordance with Hydrographic Manual Section 4.9.4.2., using FPM Fig. 2.3, and are included with project data for S-N904-RA.

Settlement and squat, static draft, transducer offset, and GPS antenna offset correctors were entered into an offset table for each vessel and applied to raw sounding data during post processing. Offset tables 1-6 correspond to the last digit of the vessel number. The offset tables are included with project data for S-N904-RA.

The SWMB launch 2123 is equipped with a POS-MV heave, roll and pitch sensor. Single beam launches 2124 and 2125 are not equipped with heave, roll, and pitch sensors.

Predicted Tidal correctors for this survey were generated by importing predicted tidal data for Seattle tide station 944-7130 from commercial Tide and Current software into HPS. This survey area corresponds to Zone Station PS7 of the Project Instructions and has a time corrector of 0 minutes and a range ratio corrector of 1.00 from the predicted reference station 944-7130.

H. CONTROL STATIONS ✓ See Eval Rpt, section H.

The horizontal datum for this project is NAD 83. The control stations used for this survey are listed in Appendix III. See the S-N904-RA-98 Horizontal Control Report for more information.

I. HYDROGRAPHIC POSITION CONTROL ✓ See Eval Rpt, Section I

All soundings were positioned using differential GPS (DGPS). The USCG differential beacon at Whidbey Island served as the primary method of control. The USCG beacon at Robinson Point served as alternate control.

Launch-to-launch DGPS performance checks were performed in accordance with Section 3.4.4 of the FPM. Two observations of position were made from two different DGPS base stations while the launches were rafted together with their GPS antennae within 2-3 meters of each other.

J. SHORELINE ✓ See Eval Rpt., Section J

There was no photogrammatic shoreline manuscript provided for this survey. Shoreline shown is from NOS Chart 18449, 16th edition, May 1996, and is shown in brown for orientation purposes only.

Limited shoreline verification was conducted in accordance with the Project Instructions. Shoreline from Chart 18449, 16th edition, May 1996, was digitized by RAINIER personnel and displayed in the launch on the Hypack data acquisition screen. During a period of extreme low tide (negative predicted tide values), the launch transited slowly along the shoreline to the limit of its safe navigation, i.e. the Navigable Area Limit Line (NALL), and compared observed field features to the digitized shoreline. Observed field features found offshore or directly along the NALL were positioned with the launch's DGPS and are depicted on the survey. Observed field features seen more than 10-15 meters inshore of the NALL were not positioned and are depicted on the survey using the hydrographer's best representation of what was visually seen and are primarily intended to aid chart compilation. * All observed field features were compared to a digital overlay of data on the chart image in MapInfo. Observed field features were compared to prior survey H9864 by overlaying paper plots of the two surveys. * Prior survey features and soundings inshore of the NALL have been transferred in color to the smooth sheet MapInfo digital file "Rich_Pass_dp_bs.WOR" graphically displays the field hydrographer's final results of the shoreline verification process. Detached positions and changes to the chart are shown in red. It is recommended that the charted shoreline be revised using the fieldwork depictions and notes that are recorded in the MapInfo digital file "Rich_Pass_dp_bs.WOR". Data has been analyzed during office processing and shown on the smooth sheet as warranted.

K. CROSSLINES ✓

Crosslines compared very well with mainscheme hydrography with soundings generally agreeing to within one meter. There was a total of 12.05 nautical miles of crosslines, comprising 26 % of mainscheme hydrography.

L. JUNCTIONS ✓

There are no contemporary surveys that junction with this survey.

M. COMPARISON WITH PRIOR SURVEYS ✓ See Eval Rpt., Section M

Prior surveys covering this survey area are as follows:

Prior Survey	Scale	Date
H-9864	1:10,000	1980
H-5711	1:10,000	1936
H-5652	1:10,000	1934
H-3972	1:10,000	1928
H-3765	1:10,000	1915
H-2483	1:10,000	1900
H-1694	1:20,000	1885

There is no charted data which originates from these prior surveys.

Only prior survey H-9864 was compared with this survey. Soundings from H9864 were found to be in good agreement with those from the current survey with depths generally agreeing to within 2 ft. It should be noted that survey H-10797 developed the 40-45 ft shoal area in the center of Rich Passage more extensively than prior survey H-9864 and that it found several soundings 1-3 ft shoaler than the closest soundings from H-9864. Concur

Final comparisons will be done at PHB after reduction to final sounding datum using tidal information collected concurrently with this survey.

N. ITEM INVESTIGATIONS ✓

There were no AWOIS items assigned for survey H-10797. There were no new features found that warranted an item investigation for survey H-10797. Do not concur. Several features charted seaward of the NALL should have been considered as self-generated AWOIS items. See Eval Rpt., Section O.

O. COMPARISON WITH THE CHART See Eval Rpt., Section O.

This survey was compared in the field to features portrayed on the following charts:

Chart	Scale	Edition Number	Date	Datum
18449	1:25,000	16th	May 4, 1996	NAD 83

Comparison of charted soundings with the survey is described in Section M, Comparison with Prior Surveys, and requires no further discussion. Non-sounding features are discussed in Section J, Shoreline. Final sounding comparisons will be made at PHB after reduction to final vertical datum.

Dangers to Navigation ✓ See Eval Rpt., Section O.

One Danger to Navigation report was submitted in conjunction with this survey. It was dated May 25, 1998 with a corresponding radio message numbered RA-02-98. The Danger to Navigation report addresses the following shoal soundings which may be a danger to deeper draft vessels transiting Rich Passage. (Soundings are based on preliminary real tides except as noted):

FEATURE	DEPTH (MLLW)	LATITUDE (N)	LONGITUDE (W)	POSITION NO.
Shoal depth	44 ft	47° 35′ 28.960″ ✓	122° 32′ 58.800″ ✓	47651
Shoal depth	41 ft	47° 35′ 28.801″ ✓	122° 32′ 51.419″ ✓	47738
Shoal depth	42 ft	47° 35′ 29.254″ ✓	122° 32′ 43.551″ ✓	47796
Shoal depth	40 ft	47° 35′ 24.215″ ✓	122° 32′ 38.750″ ✓	47872
Shoal depth	40 ft	47° 35′ 15.883″ ✓	122° 32′ 30.344″ ✓	48017
Shoal depth	42 ft	47° 35′ 02.405″ ✓	122° 32′ 15.943″ ✓	51429 (See Note)

(Note: Corresponding depth of Position No. 51429 is based on Predicted Tides.)

A copy of the letter is contained in ~~Appendix I of~~ this report.

P. ADEQUACY OF SURVEY ✓ See Eval Rpt., Sections M, O, and P.

Survey H-10797 is complete and is adequate to supersede prior soundings and features in their common areas.

Q. AIDS TO NAVIGATION ✓ See Eval Rpt., Section Q.

The following three floating aids to navigation were positioned by this survey using DGPS:

Name	Charted Position	Survey Position (Average of the two Detached Positions)	Detached Position Fix Numbers	Difference between Charted and Survey Position (meters)
Buoy R "4" ✓ Fl R 4 s BELL	47° 34′ 05.51″ N ✓ 122° 31′ 08.55″ W	47° 34′ 05.58″ N ✓ 122° 31′ 07.06″ W	DP# 49412 DP# 70336	29 m
Buoy R "6" ✓ Fl R 2.5 s	47° 34′ 27.15″ N ✓ 122° 32′ 01.95″ W	47° 34′ 26.01″ N ✓ 122° 32′ 01.64″ W	DP# 49413 DP# 70354	35 m
Buoy R "8" ✓ Fl R 2.5s	47° 35′ 35.9″ N ✓ 122° 32′ 33.35″ W	47° 35′ 35.65″ N ✓ 122° 32′ 32.61″ W	DP# 49414 DP# 70355	16 m

The following six non-floating aids to navigation were positioned by this survey using static GPS (See the following "Section Q: Descriptive Report Inserts"): Attached

Name	Light List No.
	✓
Orchard Point Light	18035 ✓
Orchard Rocks Daybeacon	18055 ✓
Point Glover Light 9	18070 ✓
Point White Light 10	18075 ✓
Waterman Point Light 11	18080 ✓

All aids to navigation positioned by this survey adequately serve their intended purposes. Concur

Special Note: Decatur Reef Light (Light List No. 16835) is outside of the survey area but it was noticed that the light no longer exists. It is shown on Chart 18448 at 47° 34.9′ N, 122° 28.6′ W. It is now marked by a red lighted buoy "2". Chart this floating aid based on the current survey information

R. STATISTICS ✓

Statistics are listed in the Survey Information Summary included with this report.

S. MISCELLANEOUS ✓

Fifteen bottom samples were collected and sent to the Smithsonian Institute.

Rip tides were observed at Point White during the morning of April 3, 1998.

T. RECOMMENDATIONS ✓ See Eval Rpt., Section T

The hydrographer recommends that the charted sounding density for the center of Rich Passage be increased on Chart 18449 in order to better define the 40-45 ft shoal area. Rich Passage is often transited by deep draft vessels enroute to and from the Puget Sound Naval Shipyard. Such vessels include nuclear submarines and naval aircraft carriers with drafts as large as 45 ft. The largest vessels must often wait for high tide and slack current to safely transit the area. An increased selection of charted soundings will aid deep draft vessels in

do not Concur

determining their underkeel clearances along their intended transit routes.

U. REFERRAL TO REPORTS

The following supplemental reports contain additional information relevant to this survey:

Title	Date Sent	Office
S-N904-RA Horizontal Control Report	1998	N/CS34
Project related data for S-N904-RA	1998	N/CS34

Respectfully Submitted,

Eric J. Sipos
Lieutenant Junior Grade, NOAA
Sheet Officer

Approved and Forwarded,

Alan D. Anderson
Captain, NOAA
Commanding Officer

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102-3767

NOAA Ship RAINIER
May 25, 1998

ADVANCE INFORMATION

Commander William Wiedenhoeft
Thirteenth Coast Guard District
915 2nd Avenue, Room 3510
Seattle, WA 98174-1065

Dear Sir:

The following shoal soundings may be a danger to deeper draft vessels transiting Rich Passage and should be included in the Local Notice to Mariners. They were positioned by NOAA Ship RAINIER while conducting hydrographic survey H-10797 in Rich Passage, Washington. The dangers are shown on the attached chartlet and affect chart 18449, 16th edition, May 4, 1996. Positions were acquired using differential GPS and given in NAD 83. Depths are referenced to Mean Lower Low Water using preliminary real tides except as noted.

FEATURE	DEPTH	LATITUDE (N)	LONGITUDE (W)	POSITION NO.
Shoal depth	44 ft	47° 35′ 28.960″	122° 32′ 58.800″	47651
Shoal depth	41 ft	47° 35′ 28.801″	122° 32′ 51.419″	47738
Shoal depth	42 ft	47° 35′ 29.254″	122° 32′ 43.551″	47796
Shoal depth	40 ft	47° 35′ 24.215″	122° 32′ 38.750″	47872
Shoal depth	40 ft	47° 35′ 15.883″	122° 32′ 30.344″	48017
Shoal depth	42 ft	47° 35′ 02.405″	122° 32′ 15.943″	51429 (Note 1)

Note 1: based on predicted tides

This is advance information subject to office review. Questions concerning this letter should be directed to the Chief, Pacific Hydrographic Branch, (206) 526-6835. Refer to survey project S-N904-RA-98 and Danger to Navigation message RA-02-98.

Sincerely,

Alan D. Anderson
Captain, NOAA
Commanding Officer

Attachment

cc: NIMA
PMC
N/CS261
N/CS34

ADVANCE INFORMATION

Lotus cc:Mail for FOO Rainier

Date: 5/26/98
Sender: FOO Rainier
To: WWiedenhoeft@pacnorwest.uscg.mil (William CDR Wiedenhoeft)
cc: Kathy [PHS-NCG245] Timmons, Dennis [PHS-NCG245] Hill, Navinfonet@nima.mil, Lynn [NDS-NCG22] Preston, Chief Survey Technician Rainier, CO Rainier
Priority: Normal
Subject: DTON RA-2-98

The following shoal soundings may be a danger to deeper draft vessels transiting Rich Passage and should be included in the Local Notice to Mariners. These features were positioned by the NOAA Ship RAINIER while conducting hydrographic survey H-10797 in Rich Passage, Washington. The dangers are shown graphically on a chartlet in the hard copy version of this message forwarded separately. They affect chart 18449, 16TH ED., May 4, 1996. Positions were acquired using differential GPS and are given in the NAD 83. Depths are referenced to Mean Lower Low Water using preliminary real tides except as noted.

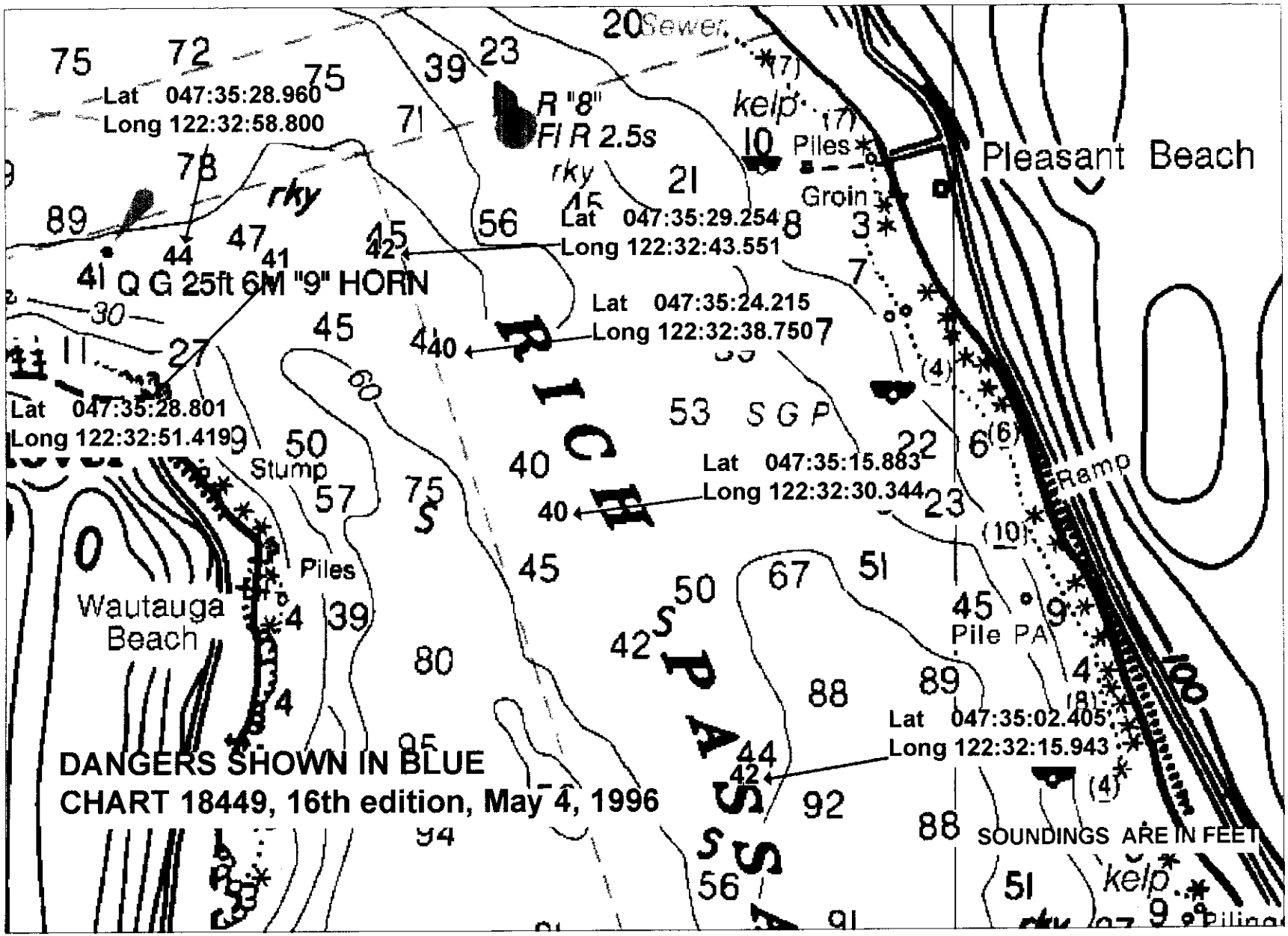
Feature Type	Depth Feet	Latitude (N)	Longitude (W)	Position Number	Depth Meters	Survey Number
Shoal depth	44 ft	47:35:28.960	122:32:58.800	47651	13.4	H-10797
Shoal depth	41 ft	47:35:28.801	122:32:51.419	47738	12.5	H-10797
Shoal depth	42 ft	47:35:29.254	122:32:43.551	47796	12.9	H-10797
Shoal depth	40 ft	47:35:24.215	122:32:38.750	47872	12.2	H-10797
Shoal depth	40 ft	47:35:15.883	122:32:30.344	48017	12.3	H-10797
Shoal depth	42 ft	47:35;02.405	122:32:15.943	51429	13.0	H-10797 (Note1)

Note 1: based on predicted tides.

This is advance information subject to office review. Questions concerning this letter should be directed to the Chief, Pacific Hydrographic Branch, (206) 526-6835. Refer to survey project S-N904-98 and Danger to Navigation message
RA-02-98. More information on current RAINIER survey projects may be obtained by e-mail; contact the Field Operations Officer at FOO.RAINIER@NOAA.GOV. Hard copy (letter) is being sent May 28, 1998 by regular mail.

/S/ Captain Alan D. Anderson, NOAA
Commanding Officer, NOAA Ship RAINIER

DANGERS TO NAVIGATION FOR SURVEY H10797
PROJECT S-N904-RA-98, PERFORMED BY NOAA SHIP RAINIER
APRIL 2, 1998 - APRIL 11, 1998



ADVANCE INFORMATION

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF COAST SURVEY
Pacific Hydrographic Branch
Seattle, Washington 98115-0070

December 16, 1998

Commander (OAN)
Thirteenth Coast Guard District
Federal Building
915 Second Avenue
Seattle, WA 98174-1067

Dear Sir:

During office review of hydrographic survey H-10797, Washington, Southern Puget Sound, Rich Passage, twelve additional dangers to navigation has been identified and affects the following chart.

Chart	Edition/Date	Scale	Datum
18449	16th/May 4, 1996	1:25,000	NAD83

The attached information is provided for publication in the Local Notice to Mariners.

Questions concerning this report should be directed to the Pacific Hydrographic Branch at (206) 526-6835.

Sincerely,

James C. Gardner

James C. Gardner
Commander, NOAA
Chief, Pacific Hydrographic Branch

Enclosures

cc: NIMA
N/CS261

REPORT OF DANGERS TO NAVIGATION

Hydrographic Survey Registry Number: H-10797

Survey Title: State: WASHINGTON
Locality: SOUTHERN PUGET SOUND
Sublocality: RICH PASSAGE

Project Number: OPR-S-N904-RA

Survey Date: April 2-11, 1998

Soundings are reduced to Mean Lower Low Water using approved tides and are positioned on NAD 83.

Chart affected: 18449 16th Edition/May 4, 1996, scale 1:25,000, NAD 83

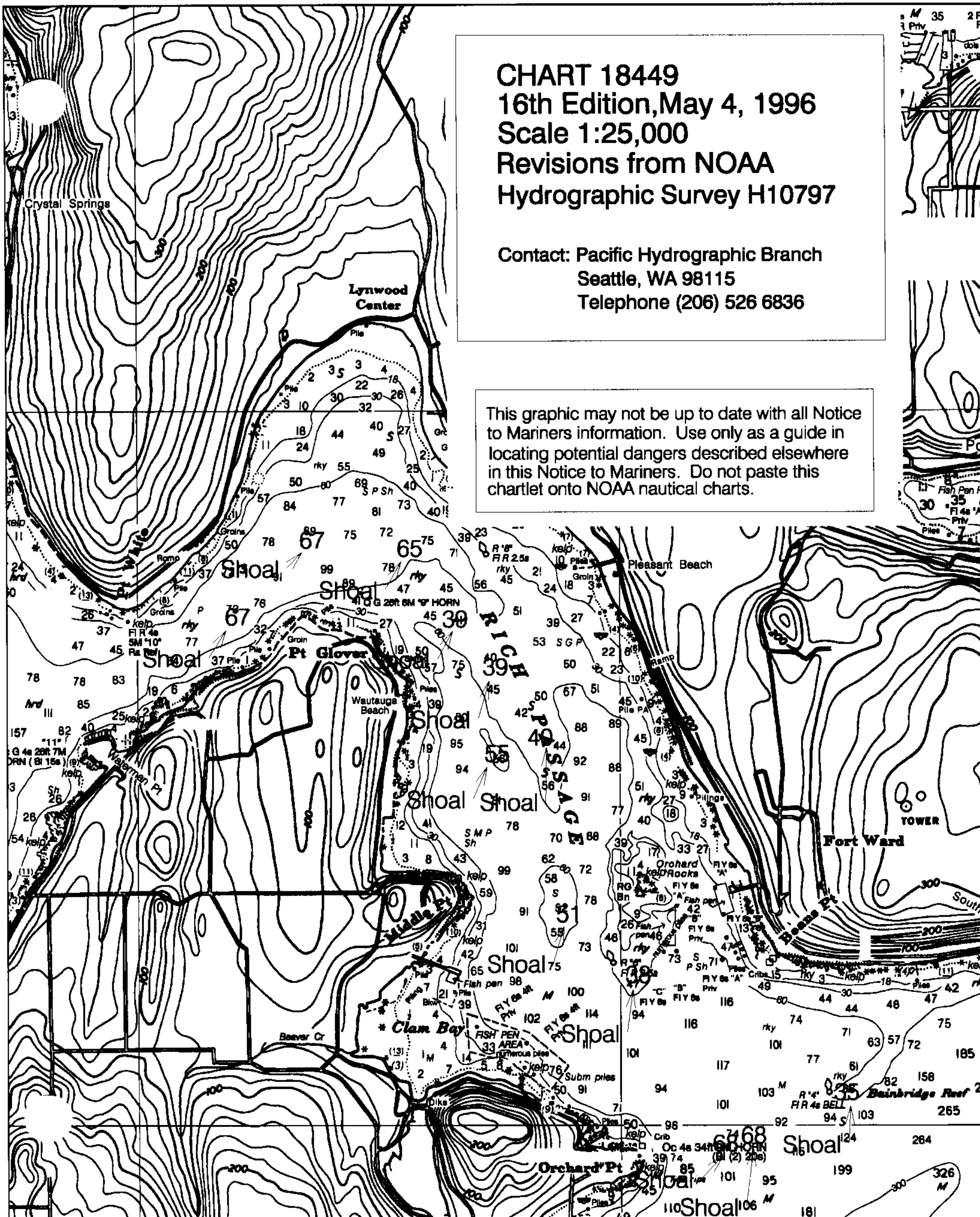
DANGER TO NAVIGATION	LATITUDE(N)	LONGITUDE(W)
Shoal, covers 67 feet	47/35/25.555	122/33/35.284
Shoal, covers 67 feet	47/35/38.429	122/33/16.683
Shoal, covers 65 feet	47/35/37.006	122/32/52.451
Shoal, covers 39 feet	47/35/26.120	122/32/44.300
Shoal, covers 39 feet	47/35/17.019	122/32/31.350
Shoal, covers 40 feet	47/35/05.175	122/32/20.256
Shoal, covers 55 feet	47/35/02.461	122/32/30.998
Shoal, covers 51 feet	47/34/35.450	122/32/13.721
Shoal, covers 38 feet	47/34/25.232	122/31/56.130
Shoal, covers 68 feet	47/33/56.973	122/31/34.679
Shoal, covers 68 feet	47/33/58.296	122/31/27.628
Shoal, covers 35 feet	47/34/05.550	122/31/04.460

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206) 526-6835.

CHART 18449
16th Edition, May 4, 1996
Scale 1:25,000
Revisions from NOAA
Hydrographic Survey H10797

Contact: Pacific Hydrographic Branch
Seattle, WA 98115
Telephone (206) 526 6836

This graphic may not be up to date with all Notice to Mariners information. Use only as a guide in locating potential dangers described elsewhere in this Notice to Mariners. Do not paste this chartlet onto NOAA nautical charts.



Section Q: Descriptive Report Insert ✓

Name of Aid: Orchard Point Light
Light List #: 18035

Method of Positioning GPS: [x] DGPS: [ ] Other: _____

Positioning Information

	Latitude (N)	Longitude (W)
Charted Pos.	47-33-55.0	122-31-55.4
Survey Pos.	47-33-54.69765	122-31-55.49278

	Easting	Northing
Charted Pos.	12587.86	7258.016
Survey Pos.	12585.92	7248.7

Difference between Charted and Surveyed Position: Distance: 10 meters
(Bearing from Surveyed to Charted Position) Bearing: 12 deg T

Characteristics Single-occulting White, 4 seconds
Do characteristics match Light List? Yes [ ] No [ ] NA. [x]
If no, what are the characteristics? _____

Does the aid adequately serve its apparent purpose? Yes [x] No [ ]
If no, why not? _____

New/Uncharted Aids (if information is known or easily obtained)
Date Est: _____
Maintained By: Coast Guard Private? Yes [ ] No [ ]
Is aid seasonally maintained? Yes [ ] No [ ]
Frequency of Maintenance: _____

Apparent Purpose: _____

Other Information: Published position: 47-33.9; 122-31.9

Section Q: Descriptive Report Insert ✓

Name of Aid: Orchard Rocks Daybeacon
Light List #: 18055

Method of Positioning GPS: [x] DGPS: [ ] Other: _____

Positioning Information

	Latitude (N)	Longitude (W)
Charted Pos.	47-34-39.0	122-31-55.0
Survey Pos.	47-34-38.99034	122-31-55.07434

	Easting	Northing
Charted Pos.	12596.78	8616.876
Survey Pos.	12595.23	8616.6

Difference between Charted and Surveyed Position: Distance: 2 meters
(Bearing from Surveyed to Charted Position) Bearing: 79 deg T

Characteristics
Do characteristics match Light List? Yes [ ] No [ ] NA. [x]
If no, what are the characteristics? _____

Does the aid adequately serve its apparent purpose? Yes [x] No [ ]
If no, why not? _____

New/Uncharted Aids (if information is known or easily obtained)
Date Est: _____
Maintained By: Coast Guard Private? Yes [ ] No [ ]
Is aid seasonally maintained? Yes [ ] No [ ]
Frequency of Maintenance: _____

Apparent Purpose: _____

Other Information: Published position: -

Section Q: Descriptive Report Insert ✓

Name of Aid: Point Glover Light 9
Light List #: 18070

Method of Positioning GPS: [x] DGPS: [ ] Other: _____

Positioning Information

	Latitude (N)	Longitude (W)
Charted Pos.	47-35-25.1	122-33-03
Survey Pos.	47-35-24.99561	122-33-02.44703

	Easting	Northing
Charted Pos.	11176.68	10041.36
Survey Pos.	11188.24	10038.1

Difference between Charted and Surveyed Position: Distance: 12 meters
(Bearing from Surveyed to Charted Position) Bearing: 286 deg T

Characteristics Quick, Green
Do characteristics match Light List? Yes [ ] No [ ] NA. [x]
If no, what are the characteristics? _____

Does the aid adequately serve its apparent purpose? Yes [x] No [ ] NA. [ ]
If no, why not? _____

New/Uncharted Aids (if information is known or easily obtained)
Date Est: _____
Maintained By: Coast Guard Private? Yes [ ] No [ ]
Is aid seasonally maintained? Yes [ ] No [ ]
Frequency of Maintenance: _____

Apparent Purpose: _____

Other Information: Published position: 47-35.4N; 122-33.0

Section Q: Descriptive Report Insert

Name of Aid: Point White Light 10
Light List #: 18075

Method of Positioning GPS: [x] DGPS: [ ] Other: _____

Positioning Information

	Latitude (N)	Longitude (W)
Charted Pos.	47-35-24.5	122-34-02.0
Survey Pos.	47-35-24.58848	122-34-02.44703

	Easting	Northing
Charted Pos.	9944.014	10023.76
Survey Pos.	9934.678	10026.5

Difference between Charted and Surveyed Position: Distance: 10 meters
(Bearing from Surveyed to Charted Position) Bearing: 106 deg T

Characteristics Flashing Red, 4 seconds
Do characteristics match Light List? Yes [ ] No [ ] NA. [x]
If no, what are the characteristics? _____

Does the aid adequately serve its apparent purpose? Yes [x] No [ ]
If no, why not? _____

New/Uncharted Aids (if information is known or easily obtained)
Date Est: _____
Maintained By: Coast Guard Private? Yes [ ] No [ ]
Is aid seasonally maintained? Yes [ ] No [ ]
Frequency of Maintenance: _____

Apparent Purpose: _____

Other Information: Published position: 47-35.44; 122-34.0

Section Q: Descriptive Report Insert ✓

Name of Aid: Waterman Point Light 11
Light List #: 18080

Method of Positioning GPS: [x] DGPS: [ ] Other: _____

Positioning Information

	Latitude (N)	Longitude (W)
Charted Pos.	47-35-04.7	122-34-13.3
Survey Pos.	47-35-04.10015	122-34-13.25616

	Easting	Northing
Charted Pos.	9707.373	9412.482
Survey Pos.	9708.273	9394.0

Difference between Charted and Surveyed Position: Distance: 19 meters
(Bearing from Surveyed to Charted Position) Bearing: 357 deg T

Characteristics Single-occulting Green, 4 seconds
Do characteristics match Light List? Yes [ ] No [ ] NA. [x]
If no, what are the characteristics? _____

Does the aid adequately serve its apparent purpose? Yes [x] No [ ]
If no, why not? _____

New/Uncharted Aids (if information is known or easily obtained)
Date Est: _____
Maintained By: Coast Guard Private? Yes [ ] No [ ]
Is aid seasonally maintained? Yes [ ] No [ ]
Frequency of Maintenance: _____

Apparent Purpose: _____

Other Information: Published position: 47-35.1; 122-34.3

[ ]

Section Q: Descriptive Report Insert

Name of Aid: Point Herron Light 12
Light List #: 18085

Method of Positioning GPS: [X] DGPS: [ ] Other: _____

Positioning Information

	Latitude (N)	Longitude (W)
Charted Pos.	47/33.9	122/36.8
Survey Pos.	47/33.933	122/36.823

	Easting	Northing
Charted Pos.	6471.8	7232.9
Survey Pos.	6443	7294.3

Difference between Charted and Surveyed Position: Distance: 68 meters
(Bearing from Surveyed to Charted Position) Bearing: 155 deg T

Characteristics Flashing Red, 6 seconds
Do characteristics match Light List? Yes [X] No [ ]
If no, what are the characteristics? _____

Does the aid adequately serve its apparent purpose? Yes [X] No [ ]
If no, why not? _____

New/Uncharted Aids (if information is known or easily obtained)
Date Est: _____
Maintained By: _____ Private? Yes [ ] No [ ]
Is aid seasonally maintained? Yes [ ] No [ ]
Frequency of Maintenance: _____

Apparent Purpose: _____

Other Information:

Light List #	Light Name	Geographic Position
16825	Tyee Shoal Light	47° 36' 34.64824" N 122° 29' 15.30578" W
16830	Blakely Rock Light	47° 35' 40.00178" N 122° 28' 49.54591" W
16910	Duwamish Head Light	47° 35' 55.98561" N 122° 23' 16.53899" W
16955	Blake Island East Light	47° 32' 27.35897" N 122° 28' 51.25374" W
17100	Point Vashon Light	47° 30' 49.29385" N 122 ° 28' 23.46136" W
17930	Agate Passage Light 2	47 ° 43' 26.76747" N 122 ° 33' 21.76670" W
17965	Battle Point Light	47 ° 39' 47.48282" N 122 ° 35' 37.11583" W
18000	Creosote Light 1	47 ° 36' 58.46545" N 122 ° 29' 47.46341" W
18005	Eagle Harbor Light 3	47 ° 37' 08.86787" N 122 ° 29' 51.75004" W
18010	Eagle Harbor Light 4	47 ° 37' 19.18305" N 122 ° 29' 50.73429" W
18035	Orchard Point Light	47 ° 33' 54.69765" N 122 ° 31' 55.49278" W
18055	Orchard Rocks Daybeacon	47 ° 34' 38.99034" N 122 ° 31' 55.07434" W
18070	Point Glover Light 9	47 ° 35' 24.99561" N 122 ° 33' 02.03653" W
18075	Point White Light 10	47 ° 35' 24.58848" N 122 ° 34' 02.44703" W
18080	Waterman Point Light 11	47 ° 35' 04.10015" N 122 ° 34' 13.25616" W
18085	Point Herron Light 12	47 ° 33' 55.98745" N 122 ° 36' 49.38200" W

List of Horizontal Control Stations ✓

NAME	STATE	TYPE	LATITUDE	LONGITUDE	SITEID	DEC_LAT	DEC_LON
ROBINSON POINT	WA	USCG Beacon	47 23.3N	122 22.5W	887	47.38833333	-122.37500000
WHIDBEY ISLAND	WA	USCG Beacon	48 18.8N	122 41.8W	888	48.31333333	-122.69666667

Navy wants new pier at Bremerton

ASSOCIATED PRESS

BREMERTON — Plans are being made to build a huge new pier at the Puget Sound Naval Shipyard, capable of berthing two nuclear aircraft carriers at once.

The pier would be about one-quarter mile long and would cost about $65 million to construct, according to the Navy's preliminary estimates. Dredging would cost about $16 million.

"This is the Pacific Fleet's No. 1 priority project in the Northwest for 2001," said Navy spokesman Lt. Cmdr. Bill Fenick in Seattle.

The pier is needed now that the shipyard is the permanent home port for the supercarrier USS Carl Vinson and the only major maintenance depot for the West Coast's growing fleet of nuclear-powered carriers.

The new pier would replace the existing Pier Delta, which was built in 1947 for mothballed ships and doesn't meet Navy standards for supporting an aircraft carrier.

"The present pier is insufficient. It's too narrow and too short ... for logistic support of a carrier. It's very difficult," Fenick said.

Pier Delta is about 60 feet wide and about 1,050 feet long. The new pier would be 150 feet wide and 1,310 feet long, or more than three times larger in area than the current berth.

Designs for the pier are still under development, and costs are subject to change, Fenick said. Congress also must approve the spending.

Funding for the pier expansion project will originate in the military construction subcommittee of the House of Representatives. Rep. Norm Dicks, D-Wash., is a key member of the subcommittee and would work to make sure the money makes it into the final defense budget once it is officially requested by the Navy, Dicks spokesman George Behan said.

"This (project) is the future ... because we are assuming there will always be a carrier homeported at the yard from now on," Behan said.

Under the Navy's current plans, dredging for the new pier will be done first and is expected to take about a year. Money for the dredging likely will be requested in the fiscal year 2000 budget, to be debated by Congress next year.

Money for the pier itself should be included in the fiscal 2001 budget, Fenick said. Construction of the pier is expected to take 18 to 20 months.

The Navy is working on an environmental impact study on homeporting nuclear-powered aircraft carriers in the Pacific Fleet.

The study will recommend where all West Coast carriers should be based, and will address whether to base an additional carrier in Bremerton: the USS Abraham Lincoln, now based at Everett.

But Navy officials said the bigger pier will be needed at Bremerton even if the Lincoln's home port stays at Everett, since the ship will be coming to the shipyard every two years for maintenance.

New nuclear-powered carriers due to be based at San Diego in the next decade also will come to Bremerton for repair and maintenance work every six years. The nuclear carriers will replace older oil-fired carriers that are being phased out.

CS31
CS3

DEPARTMENT OF THE NAVY
NAVAL SURFACE GROUP PACIFIC NORTHWEST
2000 WEST MARINE VIEW DRIVE
EVERETT, WA 98207-3200

IN REPLY REFER TO:
9428
Ser 00/
September 8, 1997

CAPT Andrew A. Armstrong
Chief Hydrographic Survey Division, Coast Survey
1315 East West Highway
Silver Spring, Maryland 20910-3282

Dear Captain Armstrong,

Subj: SAFE NAVIGATION FOR PACIFIC NORTHWEST AND RICH PASSAGE

On June 16, 1997 a meeting was held to discuss safe navigation in the Pacific Northwest, including Rich Passage, a major arterial which provides access to Puget Sound Naval Shipyard in Bremerton, WA. In light of several concerns raised about the safe navigation of a large number of Naval and Washington State Ferry vessels, I request that you consider Rich Passage to be included in the surveying effort currently on going in this area.

The number of U.S. Navy ships in the Puget Sound region continues to grow, including nuclear powered Aircraft Carriers which require frequent access to Puget Sound Naval Shipyard. Current charts show a 40 foot sounding in the center of Rich Passage, while Aircraft Carriers and Logistics ships can draw over 37 feet.

The safe navigation meeting provided a forum to discuss factors that expound the need for detailed, accurate charts in this area, including the following highlights:

a. Ship sailing schedules are extremely limited by tide predictions, causing concern for ship Commanding Officers and Pilots in cases of low or wide ranging levels.

b. The 40 foot sounding in the critical narrow portion of the Passage has a sand bottom which may be shifting, possible evidence of which has been observed by formation of a near shore uncharted sand islet which bears at low tide. Most recent soundings were taken in 1980.

c. Navy ships rely heavily on accurate charts for positional visual and radar fixes. Washington State Ferries exclusively use radar and do not use a fathometer in the pilot house.

We need to know the current topography of Rich Passage. Increasingly high volumes of traffic and a minimal margin of error necessitate having current, detailed information to ensure safe navigation through this critical waterway.

Sincerely,

W. D. CENTER
Rear Admiral, U.S. Navy
Commander

NATIONAL OCEANIC ATMOSPHERIC ADMINISTRATION
FILE COPY

OCT 17 1997

Rear Admiral W. D. Center, USN
Commander, Naval Surface Group
Pacific Northwest
2000 West Marine View Drive
Everett, Washington 98207-3200

Dear Admiral Center:

Thank you for your letter (reference 9428, Ser 00, dated September 8, 1997) regarding a request for surveys to ensure safe navigation of Naval and Washington State Ferry vessels in the Pacific Northwest and Rich Passage, Washington.

Our Pacific Hydrographic Party (PHP) is presently conducting hydrographic surveys in northern Puget Sound in the vicinity of San Juan Islands. Considering the high volume of traffic, draft of vessels, and the charted depths in this critical area, I will schedule PHP for survey operations in Rich Passage during FY 98. PHP will accomplish complete bottom coverage with side scan sonar of the navigable corridor in Rich Passage and Sinclair Inlet.

Commander Samuel P. DeBow of my staff is available if you should have any questions concerning survey plans and schedules. His phone number is 301-713-2702.

Sincerely,

Captain Andrew A. Armstrong, III, NOAA
Chief, Hydrographic Surveys Division

cc: N/CS34 - K. Timmons
PHP - E. Burkowitz

A:\WDCENTER.wpd\10/10/97

N/CS31:MFriese:713-2702:jla:10/15/97:a:wdcenter.wpd

CODE	SURNAME	DATE	CODE	SURNAME	DATE

User: carisadm
Host: ra-sgi
Class: ra-sgi
Job: standard_input

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102-3767

April 5, 1998

Ms. Toby Chamberlain
Public Affairs Office
Puget Sound Naval Shipyard

Dear Ms Chamberlain:

The National Oceanic and Atmospheric Administration (NOAA) has received a request from the Commander of the Naval Surface Group, Pacific Northwest to perform hydrographic surveys of Rich Passage and the approach to the Puget Sound Naval Shipyard. (See enclosure.) Personnel and small boats from the NOAA Ship RAINIER will be commencing survey operations on Monday, April 6, 1998. Operations are expected to last one week.

In order to perform a thorough survey that would best promote safe navigation, it is requested that your office grant authorization for NOAA's survey launches to maneuver within the 300 ft limit of the Controlled Industrial Area (CIA) offshore of the shipyard's waterfront.

At no time will NOAA's survey launches proceed inshore of the outermost tip of the shipyard piers and at no time will NOAA personnel disembark and make their way onto the shipyard without first notifying your office and receiving the proper authorization.

In addition to maneuvering the launches within the CIA, it may be necessary to have a NOAA field party come ashore to establish a temporary tide gage. The tide gage would be installed outside of the shipyard, but would require access to four brass disks that serve as tidal benchmarks previously installed inside the shipyard, in 1934 on Farragut Avenue in the vicinity of drydocks No. 1, No. 2, and No. 3.

Attached is a list of NOAA personnel who would be conducting survey operations within the CIA. All personnel on the list are United States citizens. Again, it is requested that NOAA personnel be granted authorization to conduct survey operations inside the Controlled Industrial Area. If you have any questions, please call LT Rick Fletcher, Operations Officer, at 206-660-8747 or at 206-623-1635 (ext. 822 or 823).

Sincerely,

Alan D. Anderson
Alan D. Anderson
Captain, NOAA
Commanding Officer,
NOAA Ship RAINIER

enclosures

Survey Information Summary

Project: OPR-N904-98 **Project Name:** SINCLAIR INLET & RICH PASSAGE

Instructions Dated: **Project Change Info:**

Sheet Letter: B **Registry Number:** H-10797

Sheet Number: RA-10-01-98

Survey Title: RICH PASSAGE

Data Acquisition Dates: **From:** 02-Apr-98 92 **To:** 11-Apr-98 101

Vessel Usage Summary

VESNO	MS	SPLITS	DEV	XL	S/L	DP	BS	DIVE
2124	2	2	3	2		1		
2125		1				1	1	

Sound Velocity Cast Information

Tide Zone Information

Tide Gage Information

Statistics Summary

Type	Total:
BS	15
DEV	38.12
DP	24
MS	45.95
SPLIT	45.24
XL	12.05

Percent XL:	26.2%
SQNM:	1

APPROVAL SHEET

for

H-10797

Standard field surveying and processing procedures were followed in producing this examination in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Survey Guidelines; and the Field Procedures Manual, as updated for 1998.

The digital data and supporting records have been reviewed by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

DATE: June 10, 1998

Approved and Forwarded,

Alan D. Anderson
Captain, NOAA
Commanding Officer
NOAA Ship RAINIER

(11-72) NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

GEOGRAPHIC NAMES

H-10797

Name on Survey	A CHART NO. 18449	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
BAINBRIDGE ISLAND	X		X							1
BAINBRIDGE REEF	X		X							2
BEANS POINT	X		X							3
BEAVER CREEK	X		X							4
CLAM BAY	X		X							5
ENETAI			X							6
FORT WARD	X									7
GLOVER, POINT	X		X							8
ILLAHEE STATE PARK	X		X							9
LYNNWOOD CENTER	X		X							10
MIDDLE POINT	X		X							11
ORCHARD POINT	X		X							12
ORCHARD ROCKS	X		X							13
PLEASANT BEACH	X		X							14
PORT ORCHARD	X		X							15
RICH PASSAGE	X		X							16
~~SINCLAIR INLET (title)~~	X		X							17
SOUTH BEACH	X		X							18
WASHINGTON (title)	X		X							19
WATERMAN	X		X							20
WATERMAN POINT	X		X							21
WAUTAUGA BEACH	X		X							22
WEST BLAKELY	X		X							23
WHITE, POINT	X		X							25
* Does not plot on the smooth sheet. Not a title.										28

Approved

Chief Cartographer JUL 31 1998

NOAA FORM 76-155 SUPERSEDES C&GS 197

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: October 13, 1998

HYDROGRAPHIC BRANCH: Pacific

HYDROGRAPHIC PROJECT: S-N904-RA
HYDROGRAPHIC SHEET: H-10797

LOCALITY: Rich Passage, Washington

TIME PERIOD: April 2 - April 11, 1998

TIDE STATION USED: 944-7130 Seattle, Puget Sound, WA
Lat. 47° 36.2'N Lon. 122° 20.3'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.198 meters

TIDE STATION USED: 944-5958 Bremerton, Sinclair Inlet, WA
Lat. 47° 33.7'N Lon. 122° 37.4'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.310 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: PS2, PS6 & PS7.

Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time.

Thomas M. Mero 10/13/98

CHIEF, REQUIREMENTS AND ENGINEERING BRANCH

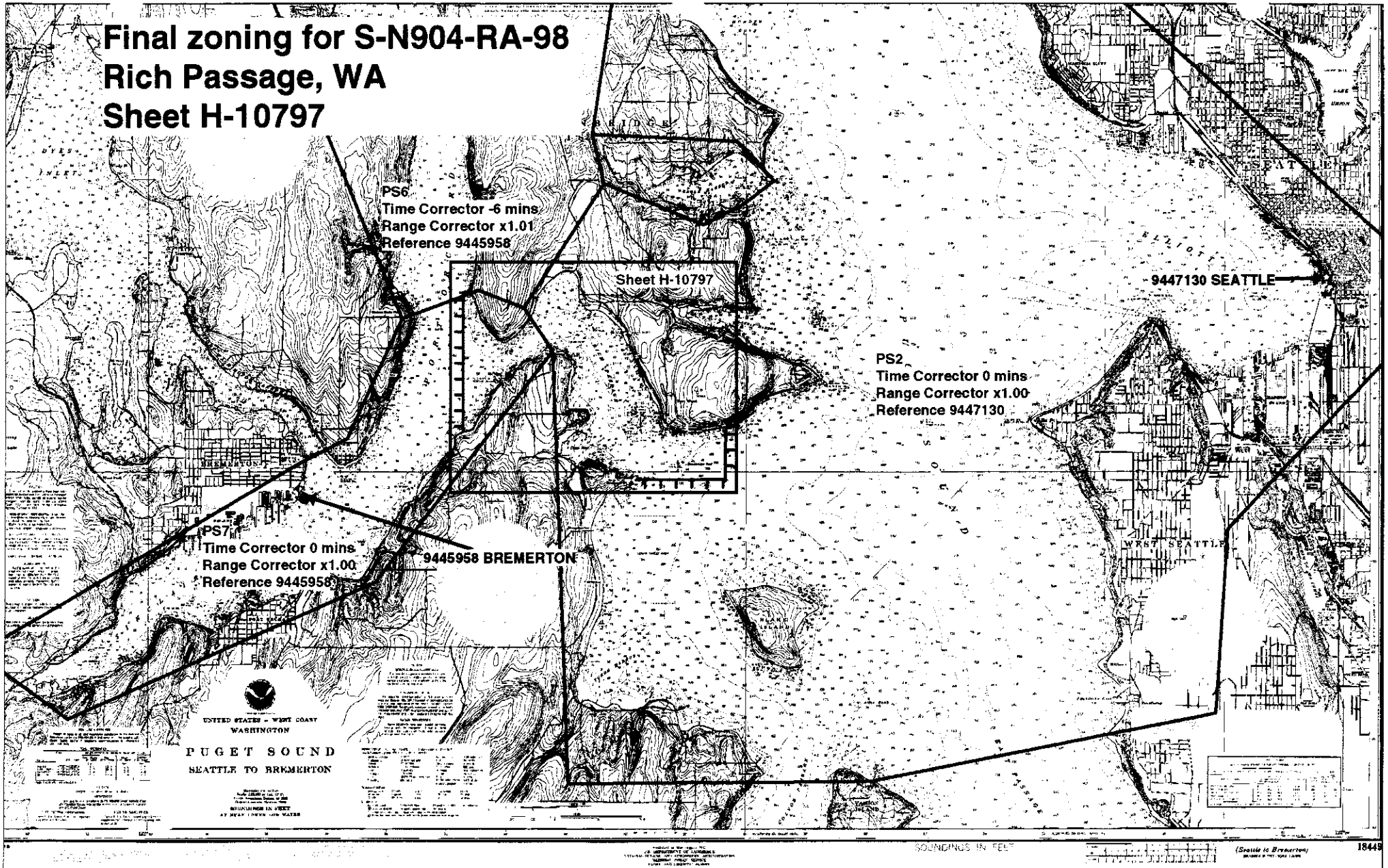
Final tide zone node point locations for OPR N904-RA-98, Sheet H-10797.

Format: Longitude in decimal degrees (negative value denotes Longitude West),
Latitude in decimal degrees
Tide Station (in recommended order of use)
Average Time Correction (in minutes)
Range Correction

	Tide Station Order	AVG Time Correction	Range Correction
Zone PS2			
-122.465472 47.508708	944-7130	0	1.00
-122.369014 47.521458			
-122.365783 47.555867			
-122.304861 47.59997			
-122.405646 47.661072			
-122.535432 47.663657			
-122.542999 47.629764			
-122.502568 47.628413			
-122.492258 47.621062			
-122.500756 47.616752			
-122.512004 47.612822			
-122.539749 47.620597			
-122.56219 47.597286			
-122.554147 47.589174			
-122.549482 47.50828			
-122.465472 47.508708			
Zone PS6			
-122.63699 47.662778	944-5958	-6	1.01
-122.596011 47.5953	944-7130	+6	1.04
-122.574826 47.600564			
-122.56219 47.597286			
-122.539749 47.620597			
-122.542999 47.629764			
-122.535432 47.663657			
-122.535432 47.663657			
-122.63699 47.662778			
Zone PS7			
-122.611291 47.572852	944-5958	0	1.00
-122.624744 47.568119	944-7130	+18	1.03
-122.714093 47.532732			
-122.689364 47.520346			
-122.603443 47.545959			
-122.554147 47.589174			
-122.56219 47.597286			
-122.574826 47.600564			

-122.596011 47.5953
-122.611291 47.572852

Final zoning for S-N904-RA-98
Rich Passage, WA
Sheet H-10797



NOAA FORM 77-27(H) (9-83) | U.S. DEPARTMENT OF COMMERCE | REGISTRY NUMBER

HYDROGRAPHIC SURVEY STATISTICS

H-10797

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	SMOOTH OVERLAYS: POS., ARC, EXCESS	NA
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	NA

DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS	
ACCORDION FILES	1			1		
ENVELOPES						
VOLUMES						
CAHIERS						
BOXES						

SHORELINE DATA

SHORELINE MAPS (List):	DM-10041, DM-10042
PHOTOBATHYMETRIC MAPS (List):	NA
NOTES TO THE HYDROGRAPHER (List):	NA
SPECIAL REPORTS (List):	NA
NAUTICAL CHARTS (List):	18449 16th Ed., 5/4/96

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS VERIFICATION	AMOUNTS EVALUATION	AMOUNTS TOTALS
POSITIONS ON SHEET			
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			
	TIME-HOURS VERIFICATION	TIME-HOURS EVALUATION	TIME-HOURS TOTALS
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS			
VERIFICATION OF SOUNDINGS			
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	375		375
COMPARISON WITH PRIOR SURVEYS AND CHARTS			
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		168	168
GEOGRAPHIC NAMES			
OTHER* (Chart Compilation)		75	75
*USE OTHER SIDE OF FORM FOR REMARKS — TOTALS	375	243	618

Pre-processing Examination by Pacific Hydrographic Branch	*Beginning Date* 7/13/98	*Ending Date* 7/13/98
Verification of Field Data by M. Bigelow, D.Doles,R.Mayor,J.Ferguson,L.Deodato	*Time (Hours)* 375	*Ending Date* 2/12/99
Verification Check by B. Olmstead	*Time (Hours)* 32	*Ending Date* 7/22/99
Evaluation and Analysis by L. Deodato	*Time (Hours)* 243	*Ending Date* 7/19/99
Inspection by B. Olmstead	*Time (Hours)* 20	*Ending Date* 7/27/99

EVALUATION REPORT

H-10797

A. PROJECT

The hydrographer's report contains a complete discussion of the project information.

B. AREA SURVEYED

The survey area is adequately discussed in the hydrographer's report.

The hydrographer has determined the inshore limits of safe navigation by defining a Navigable Area Limit Line (NALL) throughout the survey area. A page-size plot of the charted area depicting the limits of supersession accompany this report as Attachment 1. Charted features and soundings inshore of this limit line have not been specifically addressed during survey operation and should be retained as charted. Additional work was conducted on March 16-17, 1999 and is attached to this report as an "Addendum".

The bottom consists mainly of sand, shells and pebbles. Depths range from 0.5 to 321 feet.

C. SURVEY VESSELS

The hydrographer's report contains adequate information relating to survey vessels.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

Shallow Water MultiBeam (SWMB) and HYPACK single beam survey data were processed using the same Computer Aided Resource Information System (CARIS) and Hydrographic Processing System (HPS) used by the hydrographer and MicroStation 95.

Processed digital data for this survey exists in the standard HPS format, a database format using the .dbf extension. In addition, the smooth sheet drawing is filed in the MicroStation format, i.e.,dgn extension. Copies of these files have been forwarded to the Hydrographic Surveys Division and a backup copy retained at PHB. Database records forwarded are in the Internal Data Format(IDF) and are in compliance with specifications in existence at the time of survey processing.

The drawing files necessarily contain information that is not part of the HPS data set such as geographic names text, line-type data, and minor symbolization. In addition, those soundings deleted from the drawing for clarity purposes remain unrevised in the HPS digital files to preserve the integrity of the original hydrographic data set. Cartographic codes used to describe the digital data are those authorized by Hydrographic Survey Guideline No. 35 and No. 75.

The data are plotted using a Modified Transverse Mercator projection and are depicted on a single sheet.

E. SONAR EQUIPMENT

Sonar equipment has been adequately addressed in the hydrographer's report.

F. SOUNDING EQUIPMENT

Sounding equipment has been adequately addressed in the hydrographer's report.

G. CORRECTIONS TO SOUNDINGS

Soundings below Mean High Water (MHW) have been reduced to Mean Lower Low Water (MLLW). The reducers for single beam data include corrections for an actual tide, dynamic draft, and sound velocity. MultiBeam data includes corrections for an actual tide, dynamic draft, sound velocity and heave, roll, and pitch. These reducers have been reviewed and are consistent with NOS specifications.

Predicted tides were used for reduction of soundings during field processing. During office processing, tide reductions were derived from approved hourly heights zoned direct from the following tide gauges: Seattle, Puget Sound, WA, 944-7130 and Bremerton, Sinclair Inlet, WA, 944-5958.

H. CONTROL STATIONS

Section H and I of the hydrographer's report contain adequate discussions of horizontal control and hydrographic positioning.

The positions of horizontal control stations used during hydrographic operations are field values based on NAD 83. The geographic positions of all survey data are based on NAD 83. The smooth sheet is annotated with an NAD 27 adjustment tick based on values determined with the NGS program NADCON. Geographic positions based on NAD27 may be plotted on the smooth sheet utilizing the NAD 83 projection by applying the following corrections.

Latitude:	-0.652 seconds	(-20.131 meters)
Longitude:	4.484 seconds	(93.697 meters)

I. HYDROGRAPHIC POSITION CONTROL

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 3.75 was computed for survey operations. There was no positional data that exceeded the specified HDOP limits. Periodic DGPS performance checks were conducted in the field and found adequate.

NAD 83 is used as the horizontal datum for plotting and position computations.

Additional information concerning calibrations and system checks can be found in the hydrographer's report and in the separates related to horizontal position control and corrections to position data.

J. SHORELINE

Shoreline maps DM-10041 and DM-10042 were compiled on NAD83 and apply to this survey. Shoreline drawn in black on the smooth sheet originates from the above digital manuscripts as provided in digital format, (.sdf extension), by the Coastal Mapping Program. The digitized files and survey file were merged during MicroStation processing.

Numerous piles shown on DM-10041 and DM-10042 were not verified and/or addressed by the hydrographer. These features are centered around the fish pens in Rich Passage at the following locations and have been transferred to the smooth sheet.

Latitude N	Longitude W
47/34/32	122/31/51
47/34/33	122/31/46
47/34/40	122/31/36
47/34/35	122/31/33
47/34/29	122/31/31
47/34/16	122/32/29
47/34/12	122/32/32

There were no revisions to the Mean High Water Line.

K. CROSSLINES

Crosslines are adequately discussed in the hydrographer's report.

L. JUNCTIONS

Survey H-10797 does not junction with any contemporary survey.

M. COMPARISON WITH PRIOR SURVEYS

The present survey was compared to the following prior surveys.

Survey	Year	Scale	Datum
H-5711	1936	1:10,000	NAD27
H-5652	1934	1:10,000	NAD27

Prior surveys H-5711 and H-5652 cover the entire area of the present survey. A comparison was made using digital copies of this prior work. The registration and legibility of this prior survey to the present survey was good.

With the exception of a few charted soundings and near shore features,H-9864 (1980) and miscellaneous source data since 1934-36 have superseded these older prior surveys. The few prior soundings that are charted reflect differences of 1 to 2 feet with the present survey.

A few features and bottom characteristics were not investigated and or addressed during current survey operations have been brought forward in color to the smooth sheet. With the inclusion of this data, the present survey is adequate to supersede the prior surveys within the common area.

Survey	Year	Scale	Datum
H-9864	1980	1:10,000	NAD27

Prior survey H-9864 basically covers the entire area of the present survey. A comparison was made using a digital copy of this prior work. The registration and legibility of this prior survey to the present survey was good. A comparison of depths from the 1980 survey work reveals the present survey generally shoaler from 1 to 3 feet. A comparison of standard depth curves reveals little change over the past 28 years.

Differences with the prior survey is largely attributed to natural bottom changes with minor differences associated to better data acquisition techniques since 1980.

Numerous prior features and soundings inside the NALL line were not investigated and or addressed during current survey operations and have been transferred in color to the smooth sheet. With the inclusion of this data, the present survey is adequate to supersede the prior survey within the common area.

There is an overall shift of between 5 to 10 meters with the compilation of prior information and the chart. Several features originating from the prior surveys, which are located within the common area, have been shown on the smooth sheet based on the prior survey location and recompiled positionally on the chart drawing. It is the recommendation of the evaluator that all prior source information outside the common area be checked for proper datum shift and scale.

N. ITEM INVESTIGATIONS

There were no AWOIS items assigned to this survey.

O. COMPARISON WITH CHART

Survey H-10797 was compared with the following chart.

Chart	Edition	Date	Scale	Datum
18449	16th	May 4, 1996	1:25,000	NAD83

a. Hydrography

Charted hydrography originates with the previously discussed prior surveys and miscellaneous source data. The prior surveys have been adequately addressed in section M and require no further discussion.

The following charted features from miscellaneous sources should be retained as charted. These features have been subsequently addressed as part of additional work conducted in March 1999. Refer to the "Addendum" attached to this report.

Feature	Latitude N	Longitude W
3 piles	47/36/12	122/34/39
5 piles	47/35/26	122/34/07
pile PA	47/35/12	122/31/55
4 piles (subm)	47/34/03	122/32/13 to
	47/34/10	122/32/24
Breakwater	47/34/20	122/32/44
Ruins	47/33/59	122/32/05
Pier ruins	47/35/05	122/34/02
Subm obstn (unknown)	47/35/49	122/33/29

The following additional features could not be identified with a charted source and are listed below.

Feature	Latitude N	Longitude W
Kelp	47/34/26	122/30/31
Kelp	47/34/24	122/31/02
Kelp	47/34/57	122/31/47
Kelp	47/35/36	122/32/14
Kelp	47/35/24	122/33/59
Kelp	47/35/41	122/34/30
Kelp	47/35/53	122/34/37
Kelp	47/34/28	122/34/48
Kelp	47/34/34	122/34/37
Kelp	47/34/47	122/34/25
Kelp	47/34/59	122/34/16
Kelp	47/35/08	122/34/00
Kelp	47/34/41	122/32/36
Kelp	47/34/30	122/32/37
Mud	47/34/11	122/32/47
Kelp	47/34/09	122/32/20
Kelp	47/33/58	122/31/57

The submerged cable areas in Rich Passage should be retained as charted.

The application of this survey to charts of a scale less than 1:40,000 may require the generalization of features such as ledges, and reefs. The recommended charting disposition of specific ledges or reefs is their depiction as isolated rocks. The application of this survey to charts of a scale greater than 1:40,000 may be accomplished without generalization of features.

With the exception of those items listed above, survey H-10797 is adequate to supersede charted hydrography within the common area. Several of the items listed above were addressed as part of the additional work conducted in March 1999. Refer to the "Addendum" attached to this report for final portrayal and charting disposition.

b. Dangers to navigation

The six dangers to navigation identified by the hydrographer were based on predicted real tides. After application of approved tides and further office processing, twelve other plotted depths were found to be shoaler and supersede the hydrographer's selected depths. These dangers were reported to the USCG on December 16, 1998. Copies of both reports are attached.

P. ADEQUACY OF SURVEY

Except as noted below hydrography contained on survey H-10797 is adequate to:

a. delineate the bottom configuration, determine least depths, and draw the required 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.

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, April 1998 Edition, with the exception of the following.

In the event that the field units submission of survey data will exceed four weeks from the completion of work, the Chief of Party will submit a written explanation for the delay indicating the anticipated transmittal date to the Chief of the appropriate processing section. Marine Center ships will forward their explanation through the Marine Center Director. Fieldwork for survey H-10797 was completed on April 11, 1998 but not received for office processing until July 13, 1998.

A few charted and prior survey features seaward of the NALL were not investigated and or addressed during survey operations. When conducting "limited" shoreline verification the hydrographer shall verify all features within the limits of safe navigation. Features seaward of the NALL should be examined and either verified, changed, or disproved. The additional work conducted in March 1999 satisfactorily addressed several of the features. However, several items remain unresolved.

Q. AIDS TO NAVIGATION

Fixed and floating aids to navigation have been adequately discussed in the hydrographer's report section Q and supplemented as follows.

Point Glover Light 9 (Light List # 18070) should be charted based on the published position of the light as verified by the hydrographer. Currently this fixed aid is charted approximately 150 meters NW of the published and current survey positions.

Radar target "5" a private aid maintained by the US Navy was not verified by the hydrographer but shown on the smooth sheet based on the position from DM 10042 and agrees well with the chart. Retain this fixed aid as charted. Refer to the hydrographer's "Addendum", section J, for position information.

Four charted mooring buoys along the east side of Rich Passage were not located by the hydrographer and should be retained as charted. Refer to the hydrographer's "Addendum", section J, for position information.

The charted nine privately maintained lights on the fish pens were not located by the hydrographer and should be retained as charted. Refer to the hydrographer's "Addendum", section J, for position information.

The charted landmark at Fort Ward was not visually verified by the hydrographer and should be retained as charted. The hydrographer made no charting recommendation for new landmarks within the area of this survey.

R. STATISTICS

Statistics are adequately itemized in the hydrographer's report.

S. MISCELLANEOUS

Miscellaneous information is discussed in the hydrographer's report. No additional miscellaneous were noted during office processing.

T. RECOMMENDATIONS

This is an adequate hydrographic survey. Additional field work is recommended on a low priority basis to verify or disprove all features and soundings carried forward from prior surveys and or retained on the chart. Reference the hydrographer's "Addendum" (attached) regarding additional work conducted in March 1999.

The evaluator does not concur with the hydrographer to further densify the current chart. A selection of depths from the present survey based on the charted sounding density is adequate to safely portray the transit route for deep draft vessels.

U. REFERRAL TO REPORTS

Referral to reports is adequately discussed in the hydrographer's report.

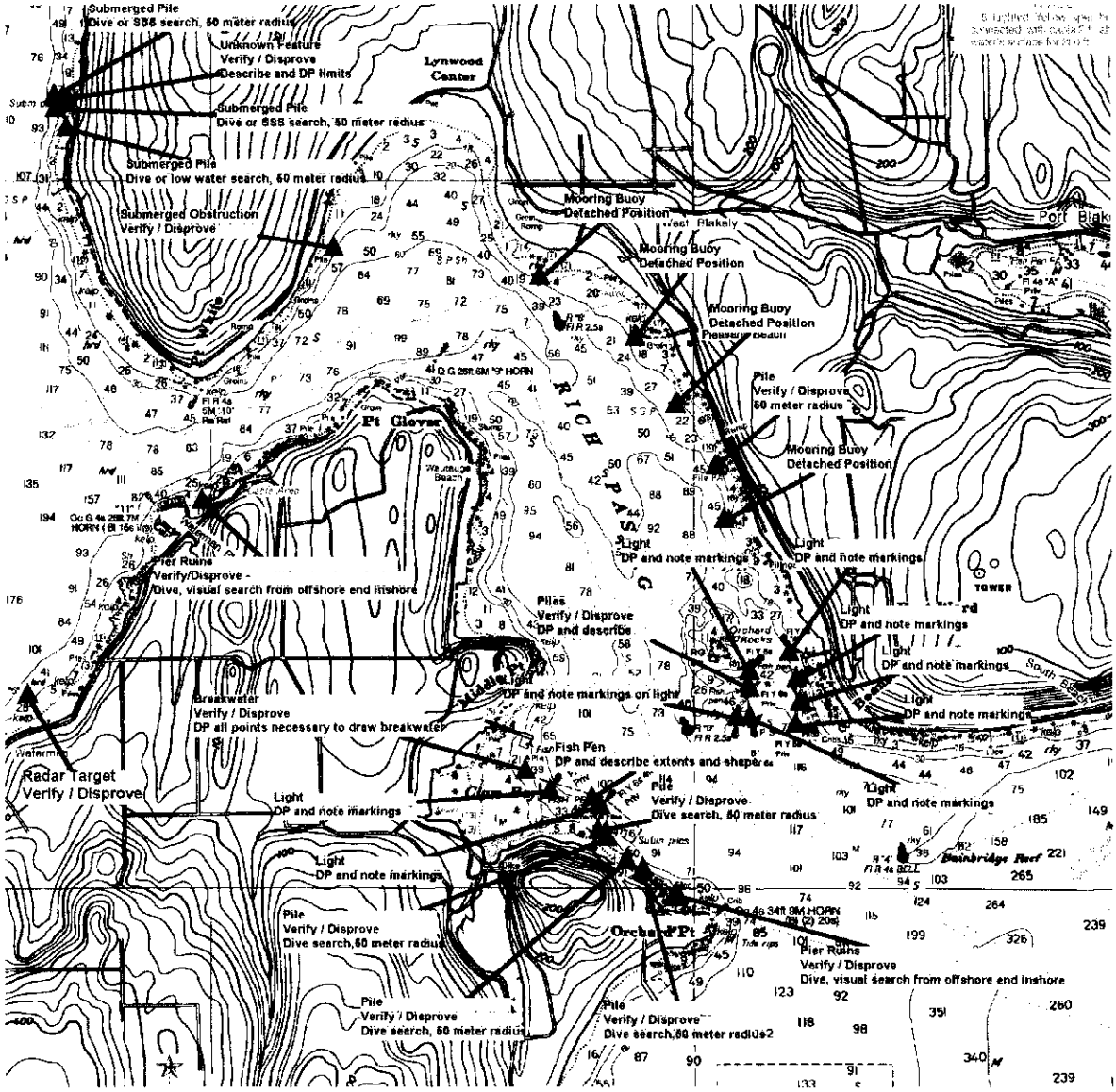
Leonardo T. Deodato
Cartographer

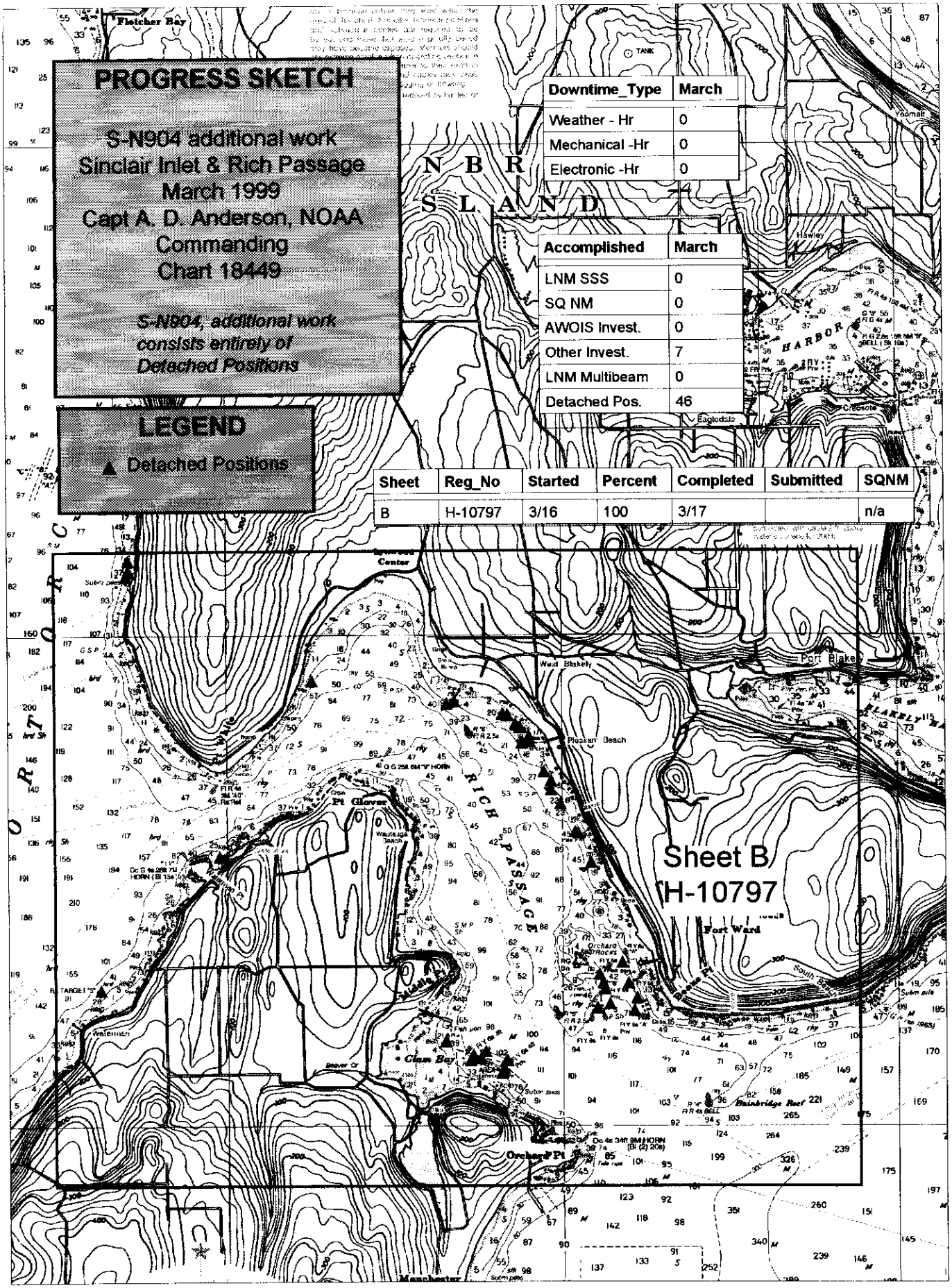
Addendum to Hydrographic Survey H-10797

Field Number RA-10-01-98
Scale 1:10,000
March 1999
NOAA Ship RAINIER
Chief of Party: Captain Alan D. Anderson, NOAA

A. PROJECT ✓

This navigable area survey was amended to Project Instructions S-N904-RA dated April 17, 1998 as Change No. 1 dated March 19, 1999. A number of features requiring special investigation have been identified by N/CS341 as shown below on a detail of NOS Chart 18449. The results of these item investigations will be included with the 1998 survey covering the common area of H-10797 as additional work. Concur





Downtime_Type	March
Weather - Hr	0
Mechanical -Hr	0
Electronic -Hr	0

Accomplished	March
LNM SSS	0
SQ NM	0
AWOIS Invest.	0
Other Invest.	7
LNM Multibeam	0
Detached Pos.	46

Sheet	Reg_No	Started	Percent	Completed	Submitted	SQNM
B	H-10797	3/16	100	3/17		n/a

B. AREA SURVEYED See Eval Rpt., Section B
Data acquisition was conducted March 16th and 17th, 1999 (DN 75 and 76).

C. SURVEY VESSELS ✓
Data were acquired by the Rainier survey launches (vessel numbers 2123, 2124 and 2125) as noted in the Survey Information Summary print out appended to this report.

G. CORRECTIONS TO ECHO SOUNDINGS ✓
Vessel Offset Correctors
The following table shows when the vessel offset correctors used for this survey were last measured:

Vessel No.	Date of static draft and transducer offset measurements	Method of Settlement and Squat Measurement	Date of Settlement and Squat Measurement	Location of Settlement and Squat Measurement
2123	March 26, 1998	OTF	July, 1998	Shilshole, WA
2124	March 26, 1998	Rod leveling	June 11, 1998	Shakan Strait, AK
2125	March 26, 1998	Rod leveling	June 21, 1998	Chilkat Inlet, AK

Settlement and squat correctors were computed in accordance with Hydrographic Manual Section 4.9.4.2, using FPM Fig. 2.4, and are included with project data for S-N904-RA. All offset tables contain offsets for the GPS antenna, as well as static draft measurements, and settlement and squat data. Offset tables # 1-6 correspond to the last digit of the vessel number. The corresponding offset tables were applied to the raw data in HPS during post-acquisition processing.

Predicted Tidal Correctors: ✓
Predicted tidal correctors from Seattle reference station (944-7130) were generated from commercial Tides and Currents software (version 2.5b) and entered into HPS. These correctors were applied to the raw data in HPS during post-acquisition processing.

Real Tidal Correctors: ✓

The operating tide station at Seattle (944-7130) served as control for datum determination. A request dated March 19, 1999 for approved tides, was forwarded to N/CS41 in accordance with FPM 4.2.3. Approved tide note dated July 8, 1999 is attached.

Sound Velocity Correctors:
The following sound velocity cast was used for corrections to detached positions for this survey:

DN	Time (UTC)	Position		TABLE No.	TABLE DEPTH
		Lat	Long		
075	1856	47° 36′ 02″ N	122° 35′ 08″ W	99	45.3 m

This sound velocity cast was acquired with SBE SEACAT Profiler (S/N 2477), calibrated November 13, 1998. Velocity correctors were computed using the PC program VELOCWIN (version 4.0) and applied to the raw data in HPS during post-acquisition processing.

H. HYDROGRAPHIC POSITION CONTROL ✓ See Eval Rpt., Section H
The horizontal datum for this project is NAD 83.

All soundings were positioned using differential GPS (DGPS). The USCG Beacon at Robinson Point was the primary horizontal control for this project. Launch-to-launch DGPS performance checks were performed in accordance with Section 3.4.4 of the FPM. Two observations of position were made from two different DGPS base stations while the launches were rafted together with their GPS antennae within 2-3 meters of each other.

J. SHORELINE

The following is a list of all Detached Positions taken on new features.
It is recommended that they be added to the chart: Concur with clarification*

Smooth Sheet

Fix Number	Feature	Depth Corrected (Meter)	Latitude North	Longitude West	Notes
30002	Southern piling	-4.2	47:36:15.589	122:34:35.393	
30003	Northern Marker	-5.7	47:36:18.192	122:34:35.239	
30005	Mooring buoy	n/a	47:35:43.130	122:32:41.471	Charted buoy ~70m NE
30006	Mooring buoy	n/a	47:35:40.696	122:32:21.551	
30007	Mooring buoy	n/a	47:35:40.272	122:32:19.602	
30008	Mooring buoy	n/a	47:35:40.595	122:32:21.331	Deleted in favor of #30006.
30009	Mooring buoy	n/a	47:35:40.408	122:32:19.808	Deleted in favor of #30007.
30010	Mooring buoy	n/a	47:35:37.871	122:32:16.757	
30011	Mooring buoy	n/a	47:35:37.295	122:32:15.388	
51628	Mooring buoy	n/a	47:35:04.320	122:31:50.138	Charted buoy ~80m SW
51630	Mooring buoy,private	n/a	47:35:18.635	122:32:00.858	
51631	Mooring buoy	n/a	47:35:24.256	122:32:04.236	Charted buoy ~70m SW
51632	Mooring buoy,private	n/a	47:35:26.547	122:32:06.889	
51633	Mooring buoy,private	n/a	47:35:35.045	122:32:12.002	Charted buoy ~70m W
51634	Buoy,private	n/a	47:35:33.915	122:32:11.700	Charted buoy ~70m W
51635	Buoy	n/a	47:35:37.353	122:32:15.201	Deleted in favor of #30011.
51636	Buoy	n/a	47:35:38.243	122:32:16.930	Deleted in favor of #30010.

Pile (5)
Marker (10)
Mooring Buoys
Mooring Buoys

* Mooring buoys to be charted based on legibility at chart scale.

The following is a list of all Detached Positions taken on features that are shown incorrectly on the chart.
It is recommended that the current charted feature be changed as follows: Concur

Fix Number	Feature	Depth * Corrected (Meter)	Latitude North	Longitude West	Notes
30000	Radar Target	-6.2	47:34:33.238	122:34:45.719	New position
51609	Light/SW Corner of Fish Pen	-3.1	47:34:28.709	122:31:47.959	Flashing Amber light and New position
51611	Light/SE Corner of Fish Pen	-3	47:34:29.633	122:31:43.514	Flashing Amber light and New position
51612	Light/SW Corner of Fish Pen	-3.2	47:34:34.722	122:31:36.799	Flashing Amber light and New position
51613	Light/NW Corner of Fish Pen	-3.1	47:34:39.850	122:31:39.065	Flashing Amber light and New position
51619	Light/NE Corner of Fish Pen	-2.8	47:34:36.947	122:31:47.136	Flashing Amber light and New position
51620	Light/NE Corner of Fish Pen	-1	47:34:15.861	122:32:20.243	Flashing Amber light and New position
51621	Fish Pen, NW Corner	-0.9	47:34:18.167	122:32:28.044	New position
51622	Fish Pen, SW Corner	-0.9	47:34:16.385	122:32:29.756	New position
51623	Light/NW Corner of Fish Pen	-3.6	47:34:17.229	122:32:32.551	Flashing Amber light and New position
51624	Fish Pen, SW Corner	-1.1	47:34:16.011	122:32:33.425	New position
51625	Light/NE Corner of Fish Pen	-3.1	47:34:13.869	122:32:21.457	White light and New Position
51626	Fish Pen, SE Corner	-1.2	47:34:12.832	122:32:22.251	New position

* Values listed are heights

The following is a list of all Detached Positions taken on features that were investigated and disproved. It is recommended that these charted features be removed: Concur

Fix Number	Feature	Depth Corrected (Meter)	Latitude North	Longitude West	Notes	
30001	~~Undefined Feature~~ Charted Blue tinted Shoal area	6.18	47:36:14.325	122:34:36.100	5 min. visual Search, 3m water visibility, search radius 100 ft—Nothing significant in the area	concur
30004	Mooring buoy ✓	2.09	47:35:43.814	122:32:38.738	Charted buoy ~70m SW	concur
30012	Mooring buoy ✓	5.49	47:35:33.529	122:32:14.658	Charted buoy ~70m NE	concur
30013	Mooring buoy ✓	6.89	47:35:22.080	122:32:04.201	1 min. visual search	concur
41440	Pile	7.13	47:35:11.491	122:31:54.560	Dive, 20 min @75 ft radius	concur
41441	Subm object ✓	6.83	47:35:48.817	122:33:29.566	Dive, 20 min @50 ft radius	concur
41442	Ruins	3.83	47:35:05.876	122:34:02.948	Dive, 25 min @100 ft radius	concur
41443	Breakwater ✓	8.43	47:34:20.544	122:32:42.420	10 min. visual search, 3m water visibility, search radius 100 ft	concur
51614	Light, Fish pen removed ✓	14.17	47:34:31.193	122:31:33.849	Visual Search and Discussion with Local worker	concur
51615	Light, Fish pen removed ✓	19.17	47:34:28.013	122:31:34.680	Visual Search and Discussion with Local worker	concur
51616	Pile ✓	10.27	47:34:34.748	122:31:45.914	10 min visual search, 2m water visibility -- Charted inside fish pen	subm pile
51617	Pile ✓	10.37	47:34:33.353	122:31:45.292	10 min visual search, 2m water visibility -- Charted inside fish pen	subm pile
51627	Breakwater ✓	8.37	47:34:20.729	122:32:42.224	Visual Search	concur
51629	Pile	8.97	47:35:11.733	122:31:55.603	Visual Search	→ Same as # 41440

The following are 1999 identified features that were not investigated. It is recommended that they remain as charted. *Concur*

Feature	Charted Latitude and Longitude	
Submerged Pile	47-36-14.65 N	122-34-39.04 W
Submerged Pile	47-36-12.28 N	122-34-38.98 W
Submerged Pile	47-36-09.08 N	122-34-36.03 W
Pier Ruins	47-33-58.89 N	122-32-04.8 W
Pile	47-34-03.21 N	122-32-12.97 W
Pile	47-34-04.71 N	122-32-16.89 W
Pile	47-34-08.58 N	122-32-21.9 W
Pile	47-34-09.69 N	122-32-24.06 W

P. ADEQUACY OF SURVEY See Evel Rpt., Sections J and C.

The 1999 additional work to survey H-10797 is complete to supersede prior features in their common areas.

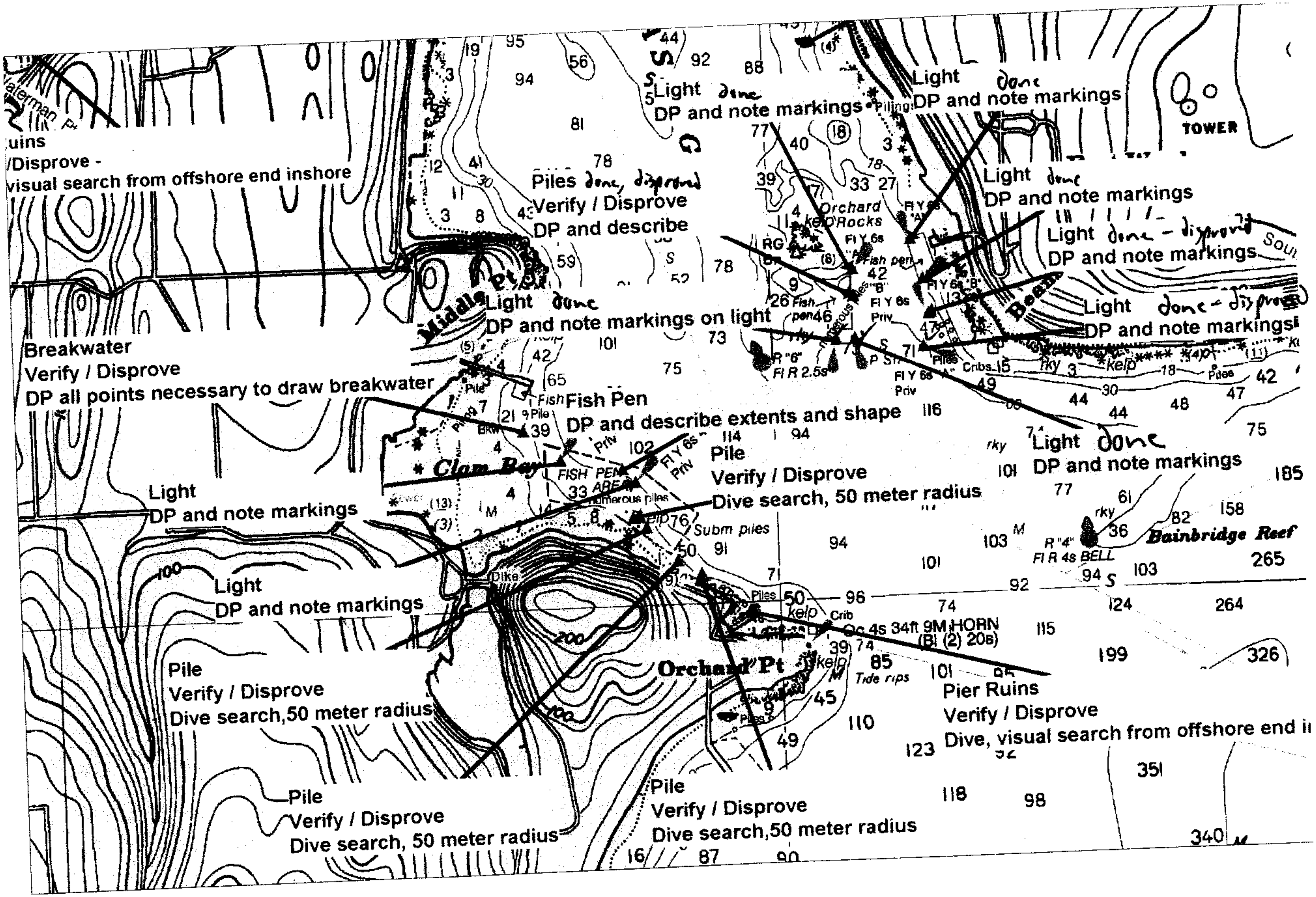
Concur with clarifications

Respectfully Submitted,

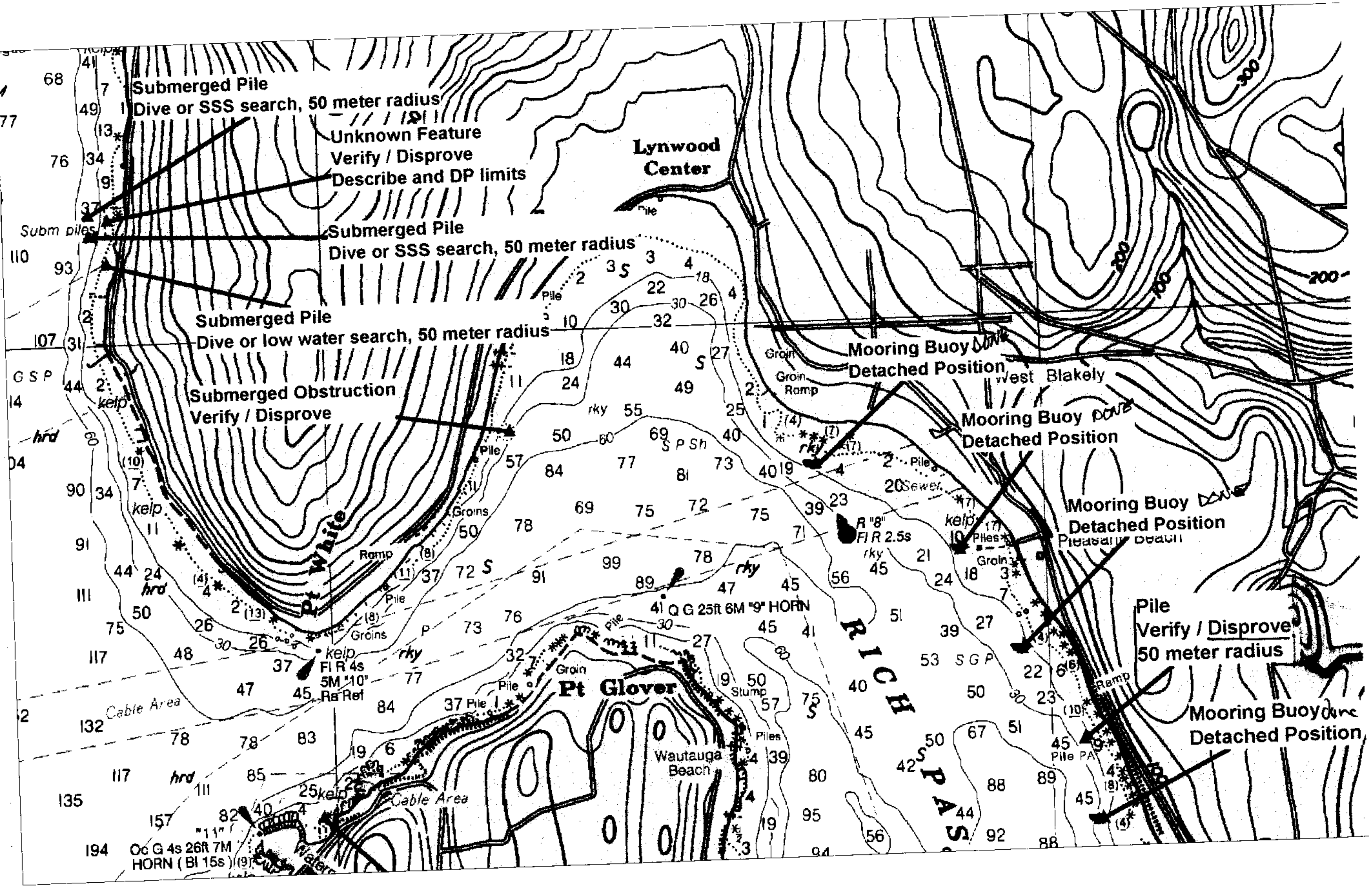
Kimberley Sampadian
Rotating Hydrographer

Approved and Forwarded,

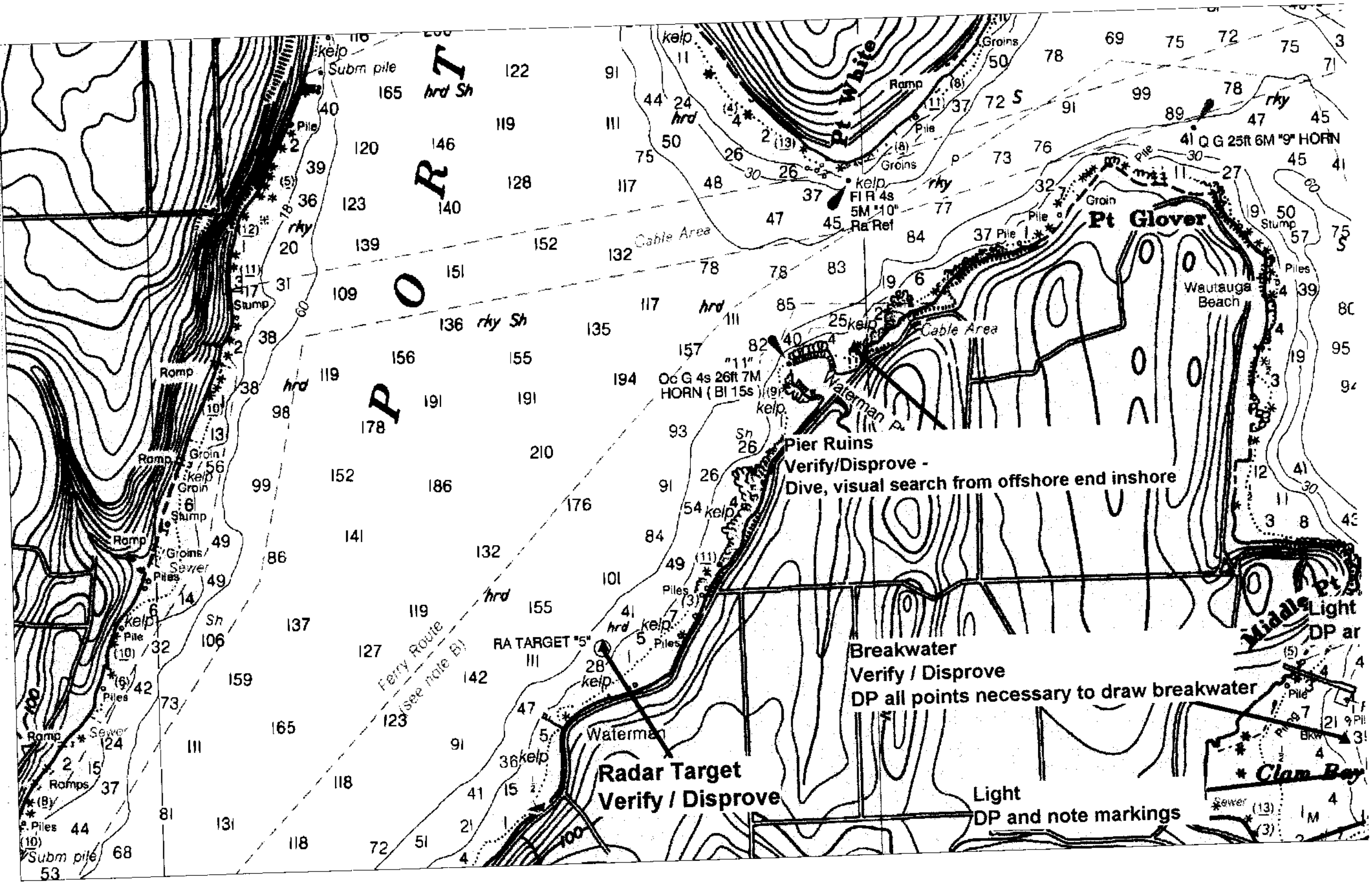
Alan D. Anderson
Captain, NOAA
Commanding Officer

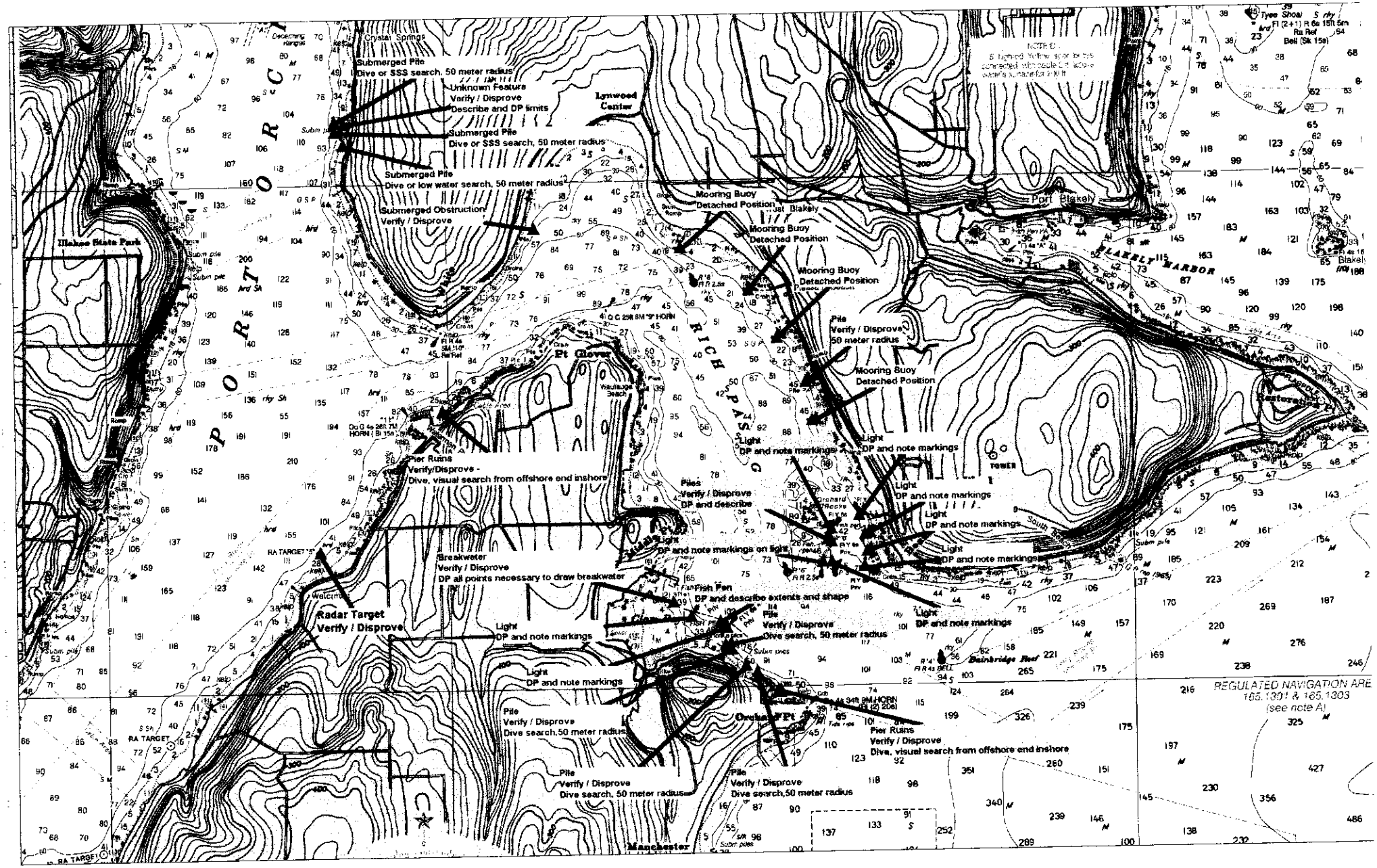


uins
/Disprove -
visual search from offshore end inshore
Piles done, disproved
Verify / Disprove
DP and describe
Light done
DP and note markings
Light done
DP and note markings
Light done
DP and note markings
Light done - disproved
DP and note markings
Light done - disproved
DP and note markings
Middle Pt
Light done
DP and note markings on light
Breakwater
Verify / Disprove
DP all points necessary to draw breakwater
Fish Pen
DP and describe extents and shape
Clam Bay
Pile
Verify / Disprove
Dive search, 50 meter radius
Light done
DP and note markings
Light
DP and note markings
Light
DP and note markings
Orchard Rocks
Orchard Pt
Bainbridge Reef
TOWER
Pile
Verify / Disprove
Dive search,50 meter radius
Pier Ruins
Verify / Disprove
Dive, visual search from offshore end i
Pile
Verify / Disprove
Dive search, 50 meter radius
Pile
Verify / Disprove
Dive search,50 meter radius
Oc 4s 34ft 9M HORN
FISH PEN AREA
Subm piles



Submerged Pile
Dive or SSS search, 50 meter radius
Unknown Feature
Verify / Disprove
Describe and DP limits
Submerged Pile
Dive or SSS search, 50 meter radius
Submerged Pile
Dive or low water search, 50 meter radius
Submerged Obstruction
Verify / Disprove
Lynwood
Center
Mooring Buoy
Detached Position
West Blakely
Mooring Buoy
Detached Position
Mooring Buoy
Detached Position
Pile
Verify / Disprove
50 meter radius
Mooring Buoy
Detached Position
Pt White
Pt Glover
Wautauga Beach
RICH PASS
Subm piles
Cable Area
Q G 25ft 6M "9" HORN
R "8" Fl R 2.5s
Fl R 4s 5M "10" Ra Ref
Oc G 4s 26ft 7M "11" HORN (Bl 15s)


Pier Ruins
Verify/Disprove -
Dive, visual search from offshore end inshore
Breakwater
Verify / Disprove
DP all points necessary to draw breakwater
Radar Target
Verify / Disprove
Light
DP and note markings
Light
DP ar
Pt Glover
Pt White
Middle Pt
Clam Bay
Wautauga Beach
Waterman
Waterman Pt
RA TARGET "5"
"11"
Oc G 4s 26ft 7M
HORN (Bl 15s)
Fl R 4s
5M "10"
Ra Ref
Q G 25ft 6M "9" HORN
Cable Area
Ferry Route
(see note B)
P O R T


Submerged Pile
Dive or SSS search, 50 meter radius
Unknown Feature
Verify / Disprove
Describe and DP limits
Submerged Pile
Dive or SSS search, 50 meter radius
Submerged Pile
Dive or low water search, 50 meter radius
Submerged Obstruction
Verify / Disprove
Mooring Buoy
Detached Position
Mooring Buoy
Detached Position
Mooring Buoy
Detached Position
Pile
Verify / Disprove
50 meter radius
Mooring Buoy
Detached Position
Light
DP and note markings
Light
DP and note markings
Light
DP and note markings
Light
DP and note markings
Light
DP and note markings
Light
DP and note markings on light
Piles
Verify / Disprove
DP and describe
Pier Ruins
Verify/Disprove -
Dive, visual search from offshore end inshore
Breakwater
Verify / Disprove
DP all points necessary to draw breakwater
Fish Pen
DP and describe extents and shape
Radar Target
Verify / Disprove
Light
DP and note markings
Light
DP and note markings
Pile
Verify / Disprove
Dive search, 50 meter radius
Pile
Verify / Disprove
Dive search,50 meter radius
Pile
Verify / Disprove
Dive search, 50 meter radius
Pile
Verify / Disprove
Dive search,50 meter radius
Pier Ruins
Verify / Disprove
Dive, visual search from offshore end inshore
Illahee State Park
Port Orchard
Pt Glover
Rich Passage
Lynwood Center
Port Blakely
Bainbridge Reef
Manchester
Orchard Pt
Restoration Point
REGULATED NAVIGATION AREA
165.1301 & 165.1303
(see note A)

Survey Information Summary

Project: OPR-N904-98 **Project Name:** SINCLAIR INLET & RICH PASSAGE

Instructions Dated: 4/17/98 **Project Change Info:**

Sheet Letter: B **Registry Number:** H-10797

Sheet Number: RA-10-01-98

Survey Title: RICH PASSAGE

Data Acquisition Dates: **From:** 4/2/98 92 **To:** 3/18/99 77

Vessel Usage Summary

VESNO	MS	SPLITS	DEV	XL	S/L	DP	BS	DIVE
2123						1		
2124	2	2	3	2		2		1
2125		1				2	1	

} Combined with 1998 survey work

Sound Velocity Cast Information

Tide Zone Information

Tide Gage Information

Tide Gage #	Gage Name	Installed	Removed
944-7130	SEATTLE, WA		

Statistics Summary

Type	Total:
BS	15
DEV	38.12
DIVE	3
DP	68
MS	45.95
SPLIT	45.24
XL	12.05

Percent XL:	26.2%
SQNM:	1

APPROVAL SHEET

for

H-10797

RA-10-01-98

Standard field surveying and processing procedures were followed in producing this survey in accordance with the Hydrographic Manual, ~~Fifth~~ Edition; the Hydrographic Survey Guidelines; and the Field Procedures Manual, as updated for 1998.

The field sheet and accompanying records have been examined by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

Approved and Forwarded,

Alan D. Anderson
Captain, NOAA
Commanding Officer
NOAA Ship RAINIER

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: July 8, 1999

HYDROGRAPHIC BRANCH: Pacific

HYDROGRAPHIC PROJECT: OPR N904-RA-99
HYDROGRAPHIC SHEET: H-10797

LOCALITY: Sinclair Inlet and Rich Passage, Washington

TIME PERIOD: March 16 - March 17, 1999

TIDE STATION USED: 944-7130 Seattle, Puget Sound, WA
Lat. 47° 36.2'N Lon. 122° 20.3'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.198 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: PS2, PS6 & PS7.

Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time.

Edward N. Mera 7/8/99
CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION

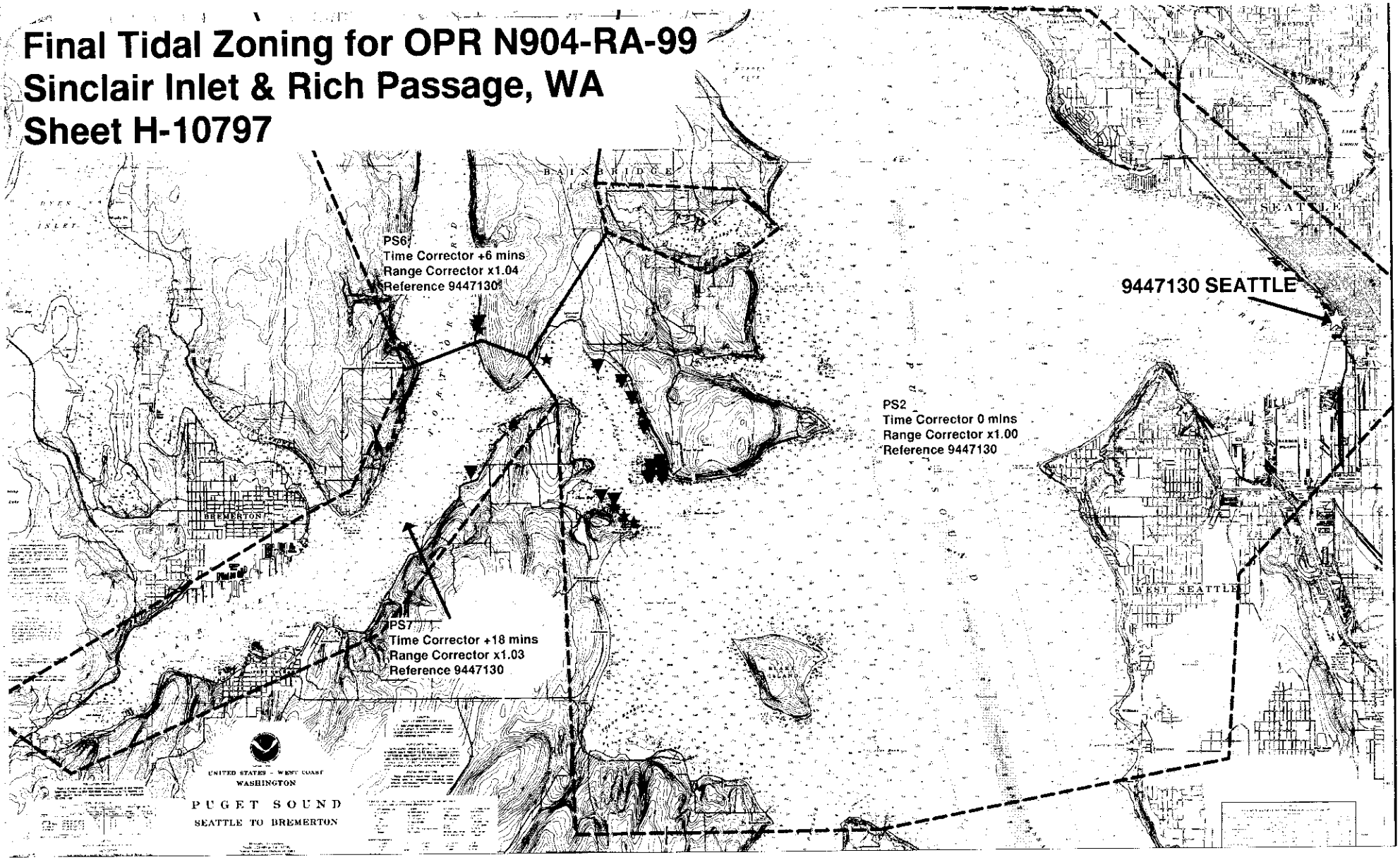
Final tide zone node point locations for OPR N904-RA-99, Sheet H-10797.

Format: Longitude in decimal degrees (negative value denotes Longitude West),
Latitude in decimal degrees
Tide Station (in recommended order of use)
Average Time Correction (in minutes)
Range Correction

	Tide Station Order	AVG Time Correction	Range Correction
Zone PS2			
-122.465472 47.508708	944-7130	0	1.00
-122.369014 47.521458			
-122.365783 47.555867			
-122.304861 47.59997			
-122.405646 47.661072			
-122.535432 47.663657			
-122.542999 47.629764			
-122.502568 47.628413			
-122.492258 47.621062			
-122.500756 47.616752			
-122.512004 47.612822			
-122.539749 47.620597			
-122.56219 47.597286			
-122.554147 47.589174			
-122.549482 47.50828			
-122.465472 47.508708			
Zone PS6			
-122.63699 47.662778	944-7130	+6	1.04
-122.596011 47.5953			
-122.574826 47.600564			
-122.56219 47.597286			
-122.539749 47.620597			
-122.542999 47.629764			
-122.535432 47.663657			
-122.535432 47.663657			
-122.63699 47.662778			
Zone PS7			
-122.611291 47.572852	944-7130	+18	1.03
-122.624744 47.568119			
-122.714093 47.532732			
-122.689364 47.520346			
-122.603443 47.545959			
-122.554147 47.589174			
-122.56219 47.597286			
-122.574826 47.600564			

-122.596011 47.5953
-122.611291 47.572852

Final Tidal Zoning for OPR N904-RA-99
Sinclair Inlet & Rich Passage, WA
Sheet H-10797



ADDENDUM TO EVALUATION REPORT

H-10797

A. PROJECT

This project was initiated following a review of survey results from the 1998 season. That review disclosed several deficiencies, which required additional work to resolve. The evaluation report for the previous survey contains further information on the specific nature of the deficiencies while the hydrographer's report details the additional work conducted to resolve them.

B. AREA SURVEYED

The survey area is graphically depicted in the hydrographer's report, section A. Page-size plots of the charted area depicting the limits of supersession accompany this report as Attachment 1. Additional information is found in the evaluation report of the previous survey work.

C. SURVEY VESSELS

The hydrographer's report contains adequate information relating to survey vessels.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

Survey data were processed using HYPACK, the same Hydrographic Processing System, and MicroStation 95.

Processed digital data for this survey exists in the standard HPS format, a database format using the .dbf extension. In addition, the smooth sheet drawing is filed in the MicroStation format, i.e., dgn extension. Copies of these files have been forwarded to the Hydrographic Surveys Division and a backup copy retained at PHB. Database records forwarded are in the Internal Data Format (IDF) and are in compliance with specifications in existence at the time of survey processing.

The drawing files necessarily contain information that is not part of the HPS data set such as geographic names text, line-type data, and minor symbolization. In addition, those soundings deleted from the drawing for clarity purposes remain unrevised in the HPS digital files to preserve the integrity of the original hydrographic data set. Cartographic codes used to describe the digital data are those authorized by Hydrographic Survey Guideline No. 35 and No. 75.

The data are plotted using a Modified Transverse Mercator projection and are depicted on a single sheet.

E. SONAR EQUIPMENT

Side scan sonar was used on DN 075 for investigation purposes only.

F. SOUNDING EQUIPMENT

Sounding equipment was not addressed by the hydrographer. Survey work was gathered using detached positions only and supported by dives as necessary. Single beam echo sounders were only used for searching the areas during item investigations.

G. CORRECTIONS TO SOUNDINGS

Soundings and elevations below Mean High Water (MHW) have been reduced to Mean Lower Low Water (MLLW) using verified tide correctors obtained from the CO-OPS website for station 944-7130 (Seattle). These correctors were subsequently compared to similar correctors provided by CO-OPS in response to a request for approved tides. The datasets were identical therefore no remedial corrective processing was required to update survey soundings reduced with correctors obtained from the website.

Other corrections to soundings include static draft, dynamic draft (settlement and squat), sound velocity. These reducers have been reviewed and are consistent with NOS specifications.

H. CONTROL STATIONS

Section H of the hydrographer's report contain adequate discussion of hydrographic positioning.

The positions of horizontal control stations used during hydrographic operations are published values based on NAD 83. The geographic positions of all survey data are based on NAD 83.

Additional information is found in the evaluation report for the 1998 survey work.

I. HYDROGRAPHIC POSITION CONTROL

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 3.75 was computed for survey operations. There was no positional data that exceeded the specified HDOP limits. Periodic DGPS performance checks were conducted in the field and found adequate.

NAD 83 is used as the horizontal datum for plotting and position computations.

Additional information concerning calibrations and system checks can be found in the hydrographer's report and in the separates related to horizontal position control and corrections to position data.

J. SHORELINE

Reference the evaluation report for the 1998 survey work and the hydrographer's report, section J.

K. CROSSLINES

There were no crosslines conducted during the additional work.

L. JUNCTIONS

Reference the evaluation report for the 1998 survey work.

M. COMPARISON WITH PRIOR SURVEYS

Reference the evaluation report for the 1998 survey work.

N. ITEM INVESTIGATIONS

There were no AWOIS items assigned to this survey.

O. COMPARISON WITH CHART

Survey H-10797 was compared with the following chart.

Chart	Edition	Date	Scale	Datum
18449	16th	May 4, 1996	1:25,000	NAD83

a. Hydrography

Reference the evaluation report, section O, for the 1998 survey work. Charted items requiring additional work has been adequately addressed except as noted below.

The following charted features originating from miscellaneous sources should be retained as charted.

Feature	Latitude N	Longitude W
5 piles	47/35/26	122/34/07

With the exception of those items listed above, survey H-10797 is adequate to supersede charted hydrography within the common area.

b. Dangers to navigation

No additional dangers to navigation were discovered during survey operations and/or during office processing of this additional work.

P. ADEQUACY OF SURVEY

Except as noted below hydrography contained on survey H-10797 is adequate to:

a. delineate the bottom configuration, determine least depths, and draw the required 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.

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, April 1998 Edition, with the exception of the following.

A few charted and prior survey features seaward of the NALL were not investigated and or addressed during survey operations. When conducting "limited" shoreline verification the hydrographer shall verify all features within the limits of safe navigation. Features seaward of the NALL should be examined and either verified, changed, or disproved.

Q. AIDS TO NAVIGATION

Eight fish pen lights and one fixed aid to navigation were adequately located and serve the purpose intended. Refer to section J of the hydrographer's report for specific positional information and descriptions.

R. STATISTICS

Statistics are adequately itemized in the hydrographer's report.

S. MISCELLANEOUS

Miscellaneous information is discussed in the hydrographer's report. No additional miscellaneous items were noted during office processing.

T. RECOMMENDATIONS

This is an adequate hydrographic survey. Additional items warranting further work are listed in the evaluation report, sections J and O and the hydrographer's report, section J.

U. REFERRAL TO REPORTS

Referral to reports is adequately discussed in the hydrographer's report.

Leonardo T. Deodato
Cartographer

APPROVAL SHEET
H-10797

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 survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Bruce A. Olmstead Date: 7/29/99
Bruce A. Olmstead
Senior Cartographer, Cartographic Section
Pacific Hydrographic Branch

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.

James C. Gardner Date: 8-5-99
James C. Gardner
Commander, NOAA
Chief, Pacific Hydrographic Branch

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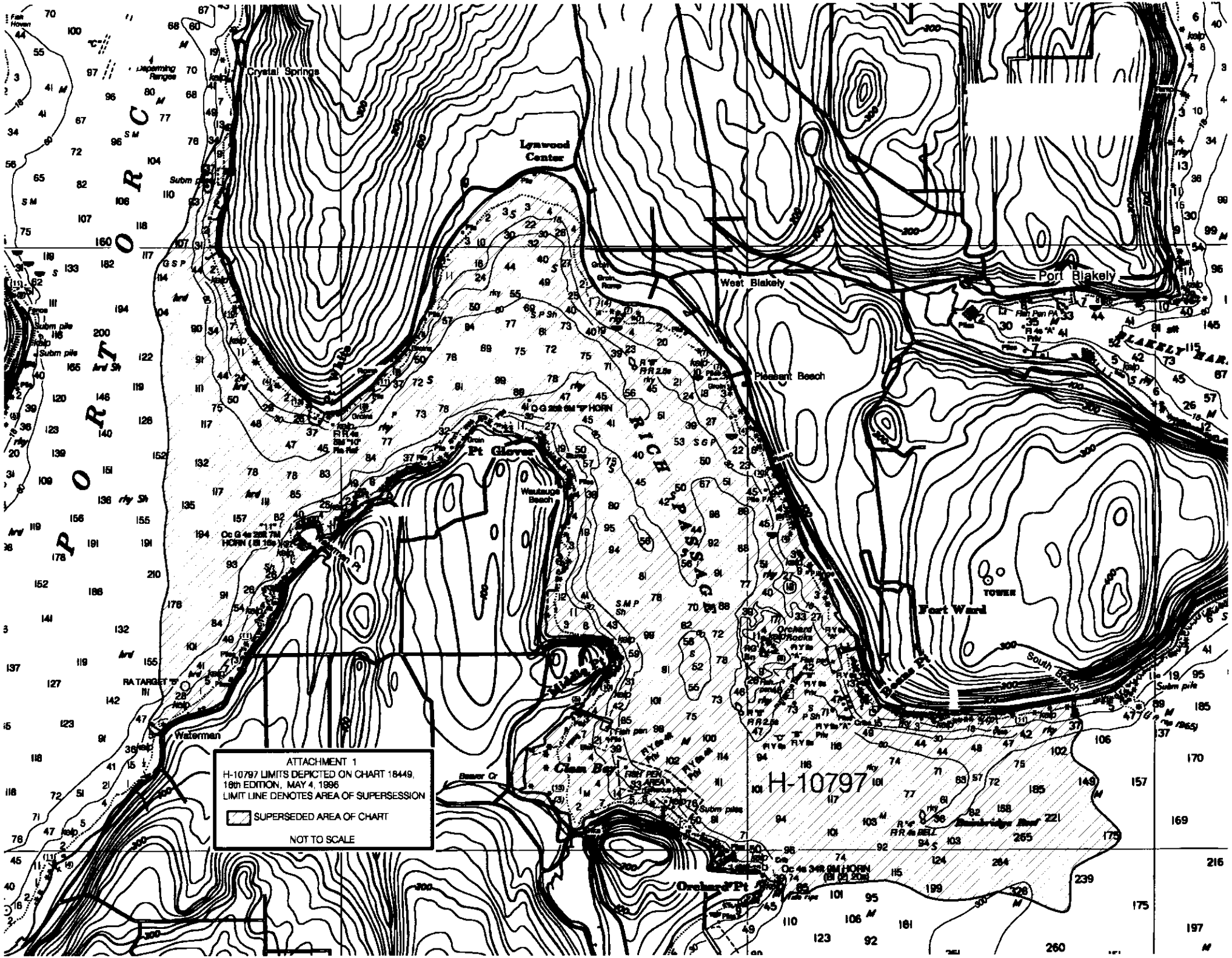
Final Approval

Approved:

Samuel P. De Bow Date: 10/9/99
Samuel P. De Bow
Commander, NOAA
Chief, Hydrographic Surveys Division


Crystal Springs
Lynwood Center
West Blakely
Port Blakely
Pleasant Beach
Pt Glover
Wautauga Beach
Fort Ward
Waterman
Clam Bay
Orchard Pt
Beaver Cr
PORT ORCHARD
RICH PASSAGE
BLAKELY HAR.
ATTACHMENT 1
H-10797 LIMITS DEPICTED ON CHART 18449,
18th EDITION, MAY 4, 1996
LIMIT LINE DENOTES AREA OF SUPERSESSION
SUPERSEDED AREA OF CHART
NOT TO SCALE
H-10797

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10797

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
18449	2/17/99	Leo T. Ducato	Full ~~Part~~ ~~Before~~ After Marine Center Approval Signed Via
			Drawing No. Application of soundings and features from smooth sheet.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
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			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED