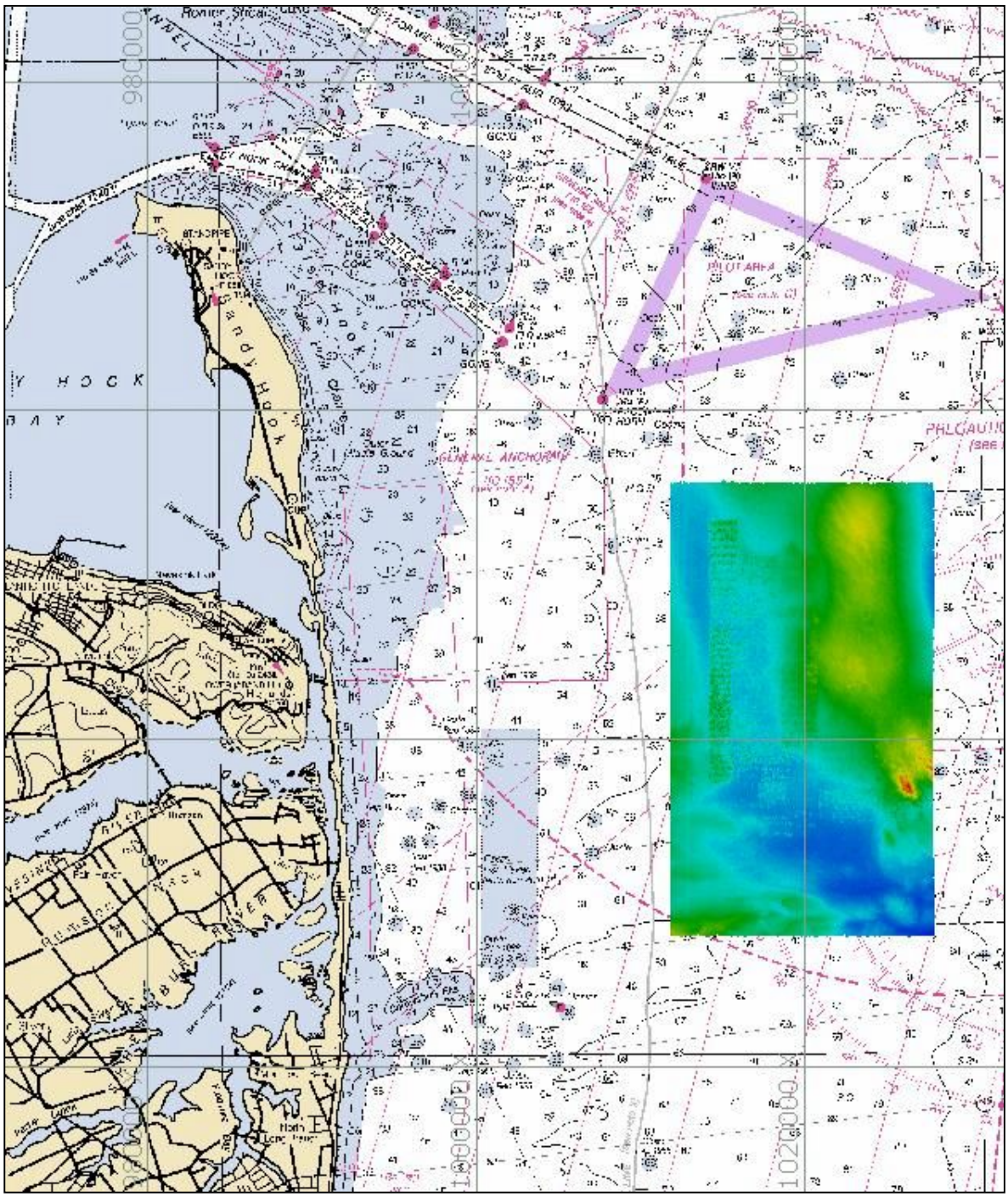
H.A.R.S.

(Historic Area Remediation Site)



2008 Multibeam Bathymetry

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1.0 Introduction

As part of Rogers Surveying's Indefinite Delivery Contract with The United States Army Corps of Engineers. Rogers Surveying was tasked with surveying the HARS (Historic Area Remediation Site). The HARS, which was re-designated as a remediation site in September 1977 was formerly known as the Mud Dump Site (MDS), and was used for the deposit of sediments dredged from the New York / New Jersey Harbor Estuary. The remediation consists of placing a one-meter "cap" layer of uncontaminated dredged material on top of the existing surface sediments within the nine-Priority Remediation Areas (PRA's) of the HARS.

2.0 Objective

The primary objective of this task order is to obtain current high-accuracy multibeam bathymetry of the site, to be used in the monitoring and planning of dredge placement. The site limits being bounded by North latitude of 40º 25.728, a South latitude of 40º 21.211' and East longitude of 73º 50.669, a West longitude of 73º 54.048'. The total survey coverage area being approximately 15.6 square miles. (Figure 2.0-1). Rogers Surveying was given a scope of work and proceeded to perform survey operations on 6/17/08 (Table 2.0-1).

3.0 Procedure

The survey data was collected utilizing multibeam technology, and collected in accordance with The U.S. Army Corps of Engineers Manual 1110-2-1003. All survey data was collected with the survey vessel "Red Rogers" (Table 3.0-1). The "Red Rogers" is a 36' long catamaran with a beam of 12' that has berthing for 2. Survey operations were run on a 24-hour basis when fuel, weather and crew staffing permitted. The vessel is equipped with a *RESON* 8101 multibeam sonar. Vessel motion corrections are supplied by an *APPLANIX* 320 (POS/MV), Differential GPS corrections are supplied by a *TRIMBLE* Pro-Beacon receiver. Speed of sound profiles are recorded thru the water column with a *SEABIRD* SBE19 CTD profiler V2 (Table 3.0-1).

A seabed mounted water pressure gauge was installed at latitude N 41 º42' 23.6578" and longitude W 75º 08' 15.2015". It was anchored in approximately 45' of water (Figures 3.0-1 and 3.0-2). Its position was marked with a 48" tall lighted buoy. The gauge was preset to record data for 60 seconds every 6 minutes. Water levels were also recorded at the Coast Guard station located at Sandy Hook, New Jersey. The survey vessel was additionally equipped with Real Time Kinematic GPS, which augmented vessel position and provided real time water levels. The GPS reference station at the time of the survey was located in Lido Beach, New York and corrections were provided via a cellular Internet GPS network.

Figure 2.0-1
Historic Area Restoration Site (HARS).

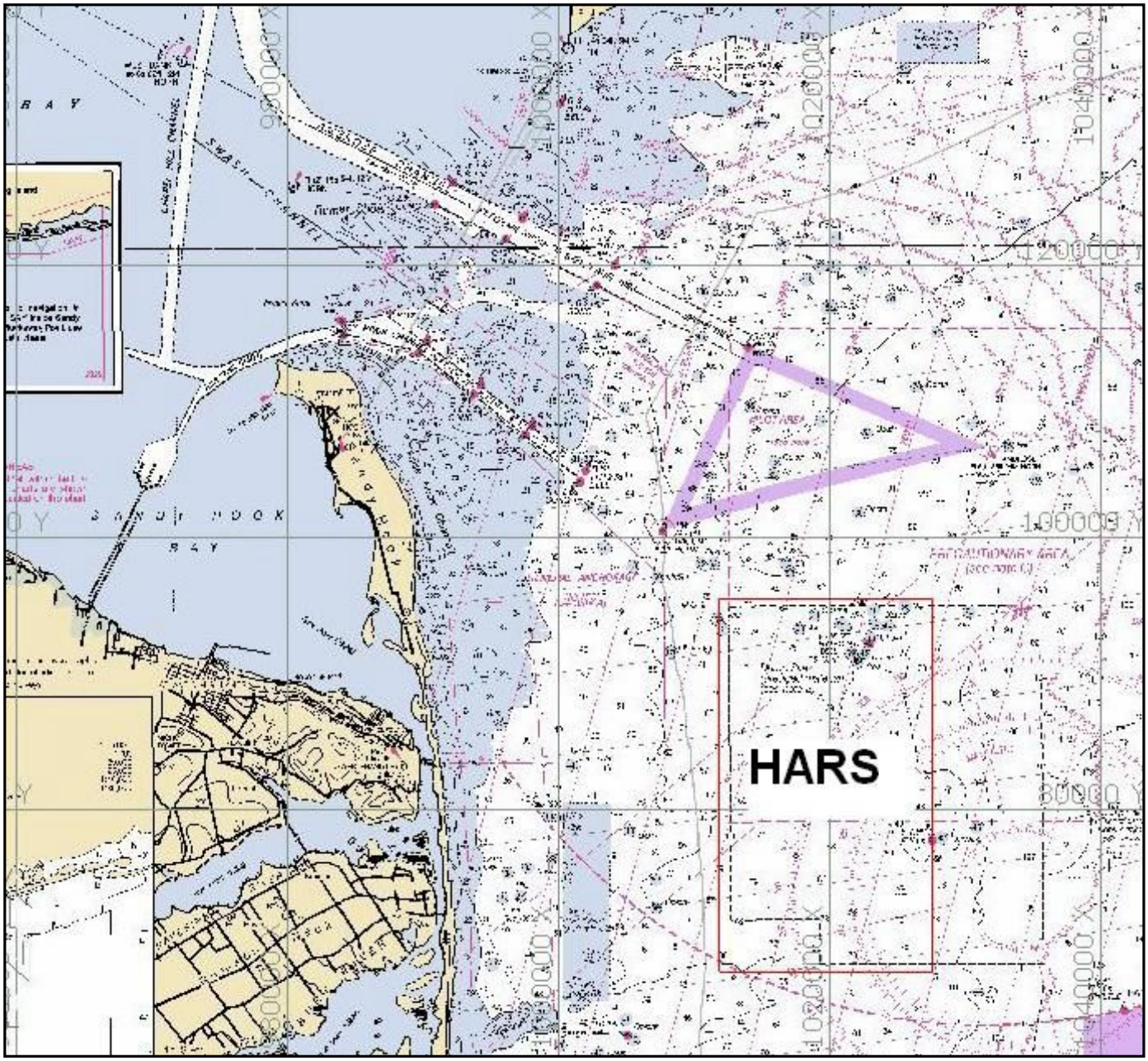


Table 2.0-1

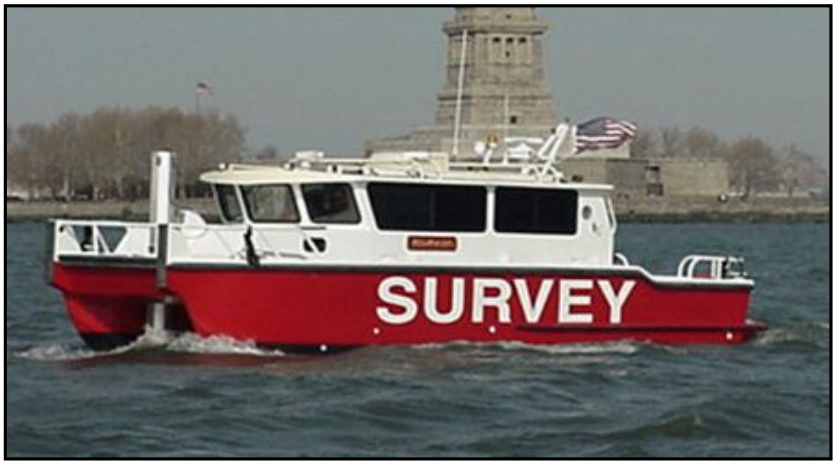
Summary of survey operations on board survey vessel Red Rogers for the 2008 multibeam survey at the HARS.

DATE	Operations
06/03/08	Patch Test performed on survey vessel Red Rogers for multibeam system calibration.
06/17/08	Set tide staff at Sandy Hook at 4 Nails top of Dock. Bench run completed 05/23/07 from KV0709 field book 671/60
	Deployed survey buoy and submersible tide recorder, checked RTK network coverage on site. Performed squat test.
06/18/08	Mobilization to HARS, commenced multibeam survey.
06/19/08	Continued 24 hour Survey from previous day. Demobilization.
06/23/08	Mobilization to HARS, commenced multibeam survey.
06/24/08	Continued 24 hour Survey from previous day. Demobilization.
07/07/08	Mobilization to HARS, commenced multibeam survey, Suspended due to generator failure, demob.
07/08/08	Mobilization to HARS, commenced multibeam day survey. Demobilize.
07/17/08	Mobilization to HARS, commenced multibeam day survey. Demobilize.
07/18/08	Mobilization to HARS, commenced multibeam day survey. Demobilize.
07/23/08	Mobilization to HARS, commenced multibeam day survey. Demobilize.
07/30/08	Mobilization to HARS, commenced multibeam day survey. Demobilize.
07/31/08	Mobilization to HARS, retrieved survey buoy and submersible tide recorder. Demobilize, No further field work due.

Table 3.0-1
Equipment used during the 2008 multibeam survey at the HARS.

System	**Model**	***Accuracy**
Multibeam	Reson Seabat 8101 (150/210 deg) 240 kHz, beam width 1.5 degree along and across track, 101 horizontal beams.	4 cm Nadir, 5 cm 45 degrees, 1.25 range resolution.
Position		
Differential GPS	Trimble Pro Beacon	3-5 meters DGPS USCG, 3 meters DGPS WAAS
RTK GPS	Trimble R8 GNSS VRS Rover with Controller	1 cm + 1 ppm
Inertial Navigation System	TSS POS M/V 320 Motion (HPR) & Heading	Roll Pitch 0.02 (1 sigma DGPS, 2 sigma RTK) Heave 5cm or 5% 20 seconds or less Heading 0.02 (1 sigma) Position 0.5 - 2m (DGPS), 0.02 - 0.10 (RTK) Velocity 0.03 m/s horizontal
Data Acquisition and Navigation	Hypack 2008 Hysweep Survey Running on a Super Logic computer, with dual Aptec Raid removable disk drives .	
Sound Velocity	SeaBird SBE 19plusV2	
Tide Gauges		
Dockside Pressure Gauge	WL16 Water Level Logger (Deployed at Sandy Hook)	+/- 0.1% of full scale at constant temperature, +/- 0.2% over 35 deg (F) to 70 deg (F) Automatic barometric pressure compensation.
Submersible Pressure Gauge	Valeport Midas WLR (Deployed at HARS)	Range –5 to +35 deg (C). +/-0.01 deg (C)

Survey Vessel	
M/V Red Rogers	LOA= 36', Beam= 10', Draft= 2.5, Max Speed
Propulsion	Twin Volvo KAD 44P-C Turbo Diesel Engines with DPE Stern Drives
Power	Owen 6.5 kilowatt Generator with UPS & DC power supplies



R/V *Red Rogers*

Figure 3.0-1
Deployment of the Valeport Midas WLR Submersible Tide Gauge during the 2008 multibeam survey at the HARS.

Submersible Gauge Buoy

Buoy Deployment

Figure 3.1-1
Location of WL16 Water Level Logger Dockside Tide Gauge at Sandy Hook (left) and Sandy Hook Tidal Station information (right), during the 2008 multibeam survey at the HARS.

Global Water Level Logger at Sandyhook

Sandy Hook, NJ — Station ID: 8531680

Station Information

Latitude: 40° 28.0' N
Longitude: 74° 0.6' W
Established: Jan 7 1910
Present Installation: Sep 26 1989
NOAA Chart #: 12327
Time Meridian: 75

Mean Range: 4.70 ft.
Diurnal Range: 5.22 ft.

Click image for larger image.

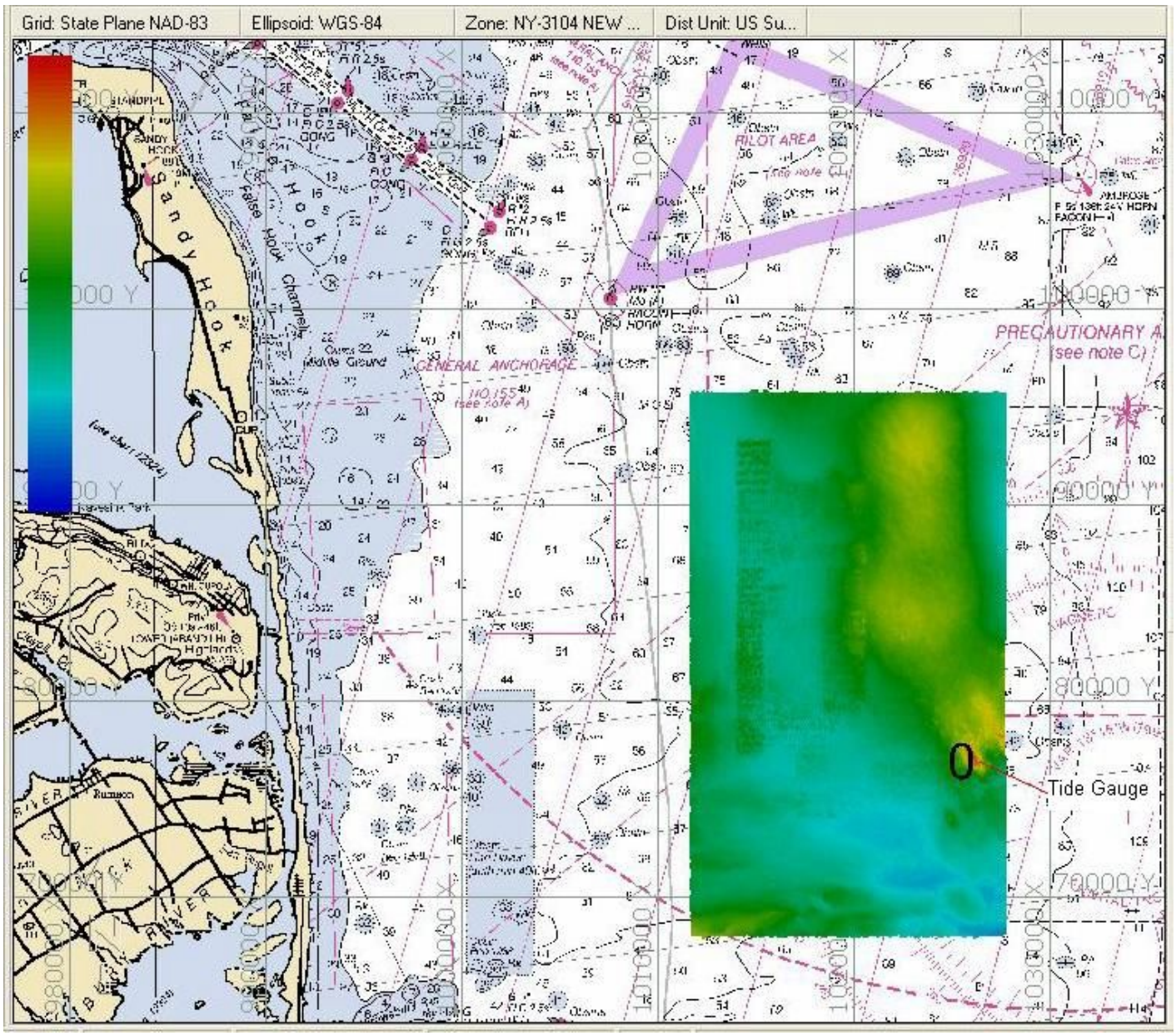
Minimum Water Level:
-4.71 ft. below MLLW
(02/02/1976)

Maximum Water Level:
4.86 ft. above MHHW
(09/12/1960)

Data Types Available:	Station and Bench Mark Drawing	Station Location Chartlet
Primary Water Level Backup Water Level Wind Air Temperature Water Temperature Barometric Pressure Barometric Pressure Conductivity	Click HERE for Drawing (Not for navigational use)	Click HERE for Map (Not for navigational use)

N.O.A.A. Station “Sandyhook”

Figure 3.0-2
Final Multibeam coverage with submersible Tide Gauge location.



3.1 Data Acquisition

The survey vessel *Red Rogers* is permanently berthed in Elizabeth, New Jersey. The voyage from the vessels homeport to the HARS is approximately 1.5 hours. Prior to multibeam survey operations the WL16 Tide Gauge data logger was installed at the Sandy Hook Coast Guard station and referenced to a tide board at the dock, which had previously been referenced to National Geodetic Survey (NGS) disk KV0709 (Figure 3.1-1). This having been done and a float test performed to confirm that the RTK GPS tide reading on the survey vessel agreed with the tide board at the dock, the survey vessel transited to the HARS for commencement of multibeam data collection.

Once at the HARS the initial task was to lower the multibeam transducer head and perform a sound velocity profile (SVP). The information from the SVP was used to provide the Reson 8101 multibeam processor with a sound velocity surface value used for beam steerage. In addition the sound velocity profile was used in the Hypack data acquisition and processing software and applied to the multibeam data.

Having performed and applied the SVP correction, multibeam data collection began. Survey lines were run in a general North-South direction with cross check lines (see Section 5.0) being run in an East-West direction.

Constant monitoring of the Reson 8101 screen and adjustment of range, transmit/ receive power settings were made if required to accurately map and encompass the swath width needed. The swath width was set to 60 deg. either side of nadir (center beam of multibeam) and lines were run to provide a 60% swath data coverage. In addition to monitoring the Reson 8101, it was also necessary to monitor the Hypack navigation software, which provided quality information on GPS and inertial navigation sensors, motion reference unit sensor and the multibeam data from the Reson 8101.

3.2 Sound Velocity Profiles

Sound velocity profiles were taken during the course of the survey using a Sea Bird SBE 19plus Version 2 CTD. Casts were obtained before, during and after each survey period. During survey operations casts were taken not less than three hours apart and at opposite ends of the HARS to account for any spatial changes. The SeaBird was last calibrated by the manufacturer on 05/25/07 and is periodically checked against our Odom Digibar Pro velocity profiler. A total of 46 SVP casts were taken over the course of the Multibeam survey (Table 3.2-0). Plots of all SVP casts are shown in Figures 3.2-1 to 3.2-47.

3.3 Survey Line Report

Multibeam survey lines were run in a North-South direction primarily to best facilitate vessel operation under wave and current conditions at the time of the survey. Table 3.3-1 and 3.3-2 lists survey line start and stop times with location and direction run.

Table 3.3-1
Multibeam Survey Lines run during the 2008 multibeam survey at the HARS.

Line	Date	Time	Latitude	Longitude	Direction	Line	Date	Time	Latitude	Longitude	Direction
000_1138	6/18/08	11:38	N40-21.202084	W73-50.650274	North	000_1540	06/23/08	15:40	N40-21.205809	W73-51.793852	North
000_1238	6/18/08	12:38	N40-25.740503	W73-50.674899	South	000_1640	06/23/08	16:40	N40-25.742363	W73-51.682125	South
000_1334	6/18/08	13:34	N40-21.200955	W73-50.725035	North	000_1742	06/23/08	17:42	N40-21.194488	W73-51.862579	North
000_1537	6/18/08	15:37	N40-25.741747	W73-50.751823	South	000_1835	06/23/08	18:35	N40-25.742297	W73-51.757169	South
000_1637	6/18/08	16:37	N40-21.200551	W73-50.812270	North	000_1948	06/23/08	19:48	N40-21.194151	W73-51.960640	North
000_1738	6/18/08	17:38	N40-25.744638	W73-50.830136	South	000_2039	06/23/08	20:39	N40-25.748260	W73-51.840003	South
000_1832	6/18/08	18:32	N40-21.198063	W73-50.899095	North	000_2137	06/23/08	21:37	N40-21.202829	W73-52.044228	North
000_1927	6/18/08	19:27	N40-25.742877	W73-50.885564	South	**000_2241**	06/23/08	22:41	N40-25.709468	W73-51.933357	**East (Cross-Line)**
000_2029	6/18/08	20:29	N40-21.203891	W73-50.974978	North	000_2249	06/23/08	22:49	N40-25.741662	W73-51.887037	South
000_2132	6/18/08	21:32	N40-25.737046	W73-50.966180	South	000_0043	06/24/08	0:43	N40-25.747908	W73-51.957113	South
000_2221	6/18/08	22:21	N40-21.226483	W73-51.058432	**East (Cross-Line)**	000_0157	06/24/08	1:57	N40-21.201900	W73-52.191348	North
000_2229	6/18/08	22:29	N40-21.195498	W73-51.050656	North	000_0305	06/24/08	3:05	N40-25.745205	W73-52.003246	South
000_2337	6/18/08	23:37	N40-25.739429	W73-51.014115	South	000_0329	06/24/08	3:29	N40-23.722249	W73-51.951979	North
000_0029	6/19/08	0:29	N40-21.202539	W73-51.140918	North	000_0359	06/24/08	3:59	N40-25.746096	W73-52.053545	South
000A0124	6/19/08	1:24	N40-25.741600	W73-51.084378	South	000_0457	06/24/08	4:57	N40-21.191128	W73-52.269338	North
000_0234	6/19/08	2:34	N40-21.196392	W73-51.221869	North	000_0559	06/24/08	5:59	N40-25.744002	W73-52.113120	South
000_0331	6/19/08	3:31	N40-25.745467	W73-51.135914	South	000_0651	06/24/08	6:51	N40-21.217630	W73-52.333301	North
000_0417	6/19/08	4:17	N40-21.191228	W73-51.304629	North	000_0804	06/24/08	8:04	N40-25.723311	W73-52.177659	South
000_0537	6/19/08	5:37	N40-25.724840	W73-51.203947	South	000_0855	06/24/08	8:55	N40-21.190422	W73-52.373521	North
000_0607	6/19/08	6:07	N40-22.641551	W73-51.123787	North	**000_1002**	06/24/08	10:02	N40-25.730791	W73-52.210663	**East (Cross-Line)**
000_0647	6/19/08	6:47	N40-25.587807	W73-51.266710	North	000_1009	06/24/08	10:09	N40-25.740813	W73-52.191273	South
000_0650	6/19/08	6:50	N40-25.747561	W73-51.225530	South	000_1104	06/24/08	11:04	N40-21.190113	W73-52.441781	North
000_0721	6/19/08	7:21	N40-22.640847	W73-51.174133	**East (Cross-Line)**	000_1251	06/24/08	12:51	N40-25.739007	W73-54.032845	South
000_0732	6/19/08	7:32	N40-22.619853	W73-51.162066	North	000_1336	06/24/08	13:36	N40-21.204307	W73-54.024487	North
000_0822	6/19/08	8:22	N40-25.744612	W73-51.293760	South	000_1433	06/24/08	14:33	N40-25.747861	W73-53.976787	South
000_0917	6/19/08	9:17	N40-21.191721	W73-51.400899	North	000_1525	06/24/08	15:25	N40-21.201118	W73-53.959385	North
000_1028	6/19/08	10:28	N40-25.740211	W73-51.380609	South	000_1133	07/07/08	11:33	N40-25.744796	W73-53.904797	South
000_1138	6/19/08	11:38	N40-21.217621	W73-51.476386	North	000_0838	07/08/08	8:38	N40-25.742973	W73-53.867503	South
000_1244	6/19/08	12:44	N40-25.739613	W73-51.438610	South	000_0929	07/08/08	9:29	N40-21.192032	W73-53.899230	North
000_1335	6/19/08	13:35	N40-21.199397	W73-51.545778	North	000_1029	07/08/08	10:29	N40-25.746068	W73-53.797377	South
000_1432	6/19/08	14:32	N40-25.741878	W73-51.493597	South	000_1128	07/08/08	11:28	N40-21.200610	W73-53.833838	North
000_1534	6/19/08	15:34	N40-21.197092	W73-51.632648	North	000_1237	07/08/08	12:37	N40-25.746335	W73-53.719853	South
000_1627	6/19/08	16:27	N40-25.731628	W73-51.581272	**East (Cross-Line)**	000_1330	07/08/08	13:30	N40-21.197371	W73-53.780901	North
000_1246	6/23/08	12:46	N40-25.743696	W73-51.606069	South	000_1420	07/08/08	14:20	N40-25.745930	W73-53.638703	South
000_1344	6/23/08	13:44	N40-21.206312	W73-51.703815	North	000_1519	07/08/08	15:19	N40-21.209201	W73-53.705987	North
000_1438	6/23/08	14:38	N40-25.746148	W73-51.621569	South	**000_1611**	07/08/08	16:11	N40-25.704962	W73-53.553145	**West (Cross-Line)**

Table 3.3-2
Multibeam Survey Lines run during the 2008 multibeam survey at the HARS.

Line	Date	Time	Latitude	Longitude	Direction
000_0902	07/17/08	9:02	N40-21.203643	W73-53.677823	North
000_0958	07/17/08	9:58	N40-25.748356	W73-53.518116	South
000_1041	07/17/08	10:41	N40-21.196665	W73-53.611565	North
000_1148	07/17/08	11:48	N40-25.743698	W73-53.443362	South
000_1235	07/17/08	12:35	N40-21.200722	W73-53.541039	North
000_1329	07/17/08	13:29	N40-25.744570	W73-53.351383	South
000_1431	07/17/08	14:31	N40-21.206978	W73-53.456417	North
000_1534	07/17/08	15:34	N40-25.745578	W73-53.291583	South
000_1634	07/17/08	16:34	N40-21.201492	W73-53.402453	North
000_1728	07/17/08	17:28	N40-25.746765	W73-53.197365	South
000_1820	07/17/08	18:20	N40-21.235929	W73-53.329133	**West (Cross-Line)**
000_0842	07/18/08	8:42	N40-25.741153	W73-53.157177	South
000_0931	07/18/08	9:31	N40-21.199429	W73-53.285935	North
000_1028	07/18/08	10:28	N40-25.745642	W73-53.099450	South
000_1134	07/18/08	11:34	N40-21.198081	W73-53.213943	North
000_1228	07/18/08	12:28	N40-25.746445	W73-53.008197	South
000_1314	07/18/08	13:14	N40-21.197125	W73-53.135994	North
000_1421	07/18/08	14:21	N40-25.743995	W73-52.889429	South
000_1512	07/18/08	15:12	N40-21.192124	W73-53.055583	North
000_1604	07/18/08	16:04	N40-25.713984	W73-52.840372	**West (Cross-Line)**
000_0803	07/23/08	8:03	N40-25.743420	W73-52.850504	South
000_0843	07/23/08	8:43	N40-21.200056	W73-53.003076	North
000_0945	07/23/08	9:45	N40-25.743826	W73-52.804422	South
000_1044	07/23/08	10:44	N40-21.202516	W73-52.938948	North
000_1143	07/23/08	11:43	N40-25.746641	W73-52.740845	South
000_1228	07/23/08	12:28	N40-24.286532	W73-52.652757	South
000_1310	07/23/08	13:10	N40-21.199261	W73-52.872814	North
000_1403	07/23/08	14:03	N40-25.729167	W73-52.668460	**West (Cross-Line)**
000_0955	07/30/08	9:55	N40-21.478733	W73-52.688631	South
000_0959	07/30/08	9:59	N40-21.201594	W73-52.804119	North
000_1054	07/30/08	10:54	N40-25.747117	W73-52.619625	South
000_1140	07/30/08	11:40	N40-21.196880	W73-52.717534	North
000_1147	07/30/08	11:47	N40-21.641073	W73-52.570733	South
000_1153	07/30/08	11:53	N40-21.196390	W73-52.615733	North
000_1157	07/30/08	11:57	N40-21.310807	W73-52.518018	South
000_1159	07/30/08	11:59	N40-21.199091	W73-52.529738	North
000_1203	07/30/08	12:03	N40-21.199630	W73-52.487246	North
000_1217	07/30/08	12:17	N40-22.385303	W73-52.514486	South
000_1231	07/30/08	12:31	N40-22.369720	W73-52.495036	North
000_1245	07/30/08	12:45	N40-23.285028	W73-52.284602	North
000_1340	07/30/08	13:40	N40-25.134792	W73-52.352521	South
000_1409	07/30/08	14:09	N40-22.629985	W73-52.567195	North
000_1448	07/30/08	14:48	N40-25.746623	W73-52.547764	South
000_1518	07/30/08	15:18	N40-22.825799	W73-52.473417	North
000_1533	07/30/08	15:33	N40-24.156189	W73-52.451374	South
000_1549	07/30/08	15:49	N40-22.915743	W73-52.441330	North
000_1554	07/30/08	15:54	N40-23.281197	W73-52.307010	**West (Cross-Line)**
000_1558	07/30/08	15:58	N40-23.194885	W73-52.428779	North
000_1600	07/30/08	16:00	N40-23.394953	W73-52.401778	North
000_1604	07/30/08	16:04	N40-23.714966	W73-52.358910	South
000_1608	07/30/08	16:08	N40-23.763136	W73-52.374014	North
000_1613	07/30/08	16:13	N40-24.246383	W73-52.444597	North
000_1617	07/30/08	16:17	N40-24.749782	W73-52.477834	North
000_1628	07/30/08	16:28	N40-25.746189	W73-52.483393	South
000_1639	07/30/08	16:39	N40-25.120995	W73-52.336382	North
000_1645	07/30/08	16:45	N40-25.747599	W73-52.397206	South
000_1655	07/30/08	16:55	N40-25.600394	W73-52.325210	North
000_1657	07/30/08	16:57	N40-25.745353	W73-52.323830	South
000_1701	07/30/08	17:01	N40-25.703179	W73-52.658410	**East (Cross-Line)**
000_1705	07/30/08	17:05	N40-25.731582	W73-52.266389	**East (Cross-Line)**

Table 3.2-0

Sound Velocity Profiles (SVP's) taken during the 2008 multibeam survey at the HARS.

Date	Time	CTD File #	NAD83 NY LI (F		Depth	Latitude	Longitude
			Easting	Northing	Feet MLW	N	W
06/18/08	11:30	svp-061808-1129	1027766	67615	82	40.35215340	73.84387477
06/18/08	14:29	svp-061808-1425	1027449	96031	75	40.43015176	73.84483458
06/18/08	17:31	svp-061808-1728	1027075	95914	76	40.42983064	73.84617578
06/18/08	20:19	svp-061808-2016	1026521	67744	85	40.35251162	73.84834367
06/18/08	23:25	svp-061808-2325	1026011	95665	69	40.42915348	73.84999955
06/19/08	2:23	svp-061908-0223	1025990	67212	75	40.35105451	73.85024994
06/19/08	5:22	svp-061908-0522	1025750	95163	64	40.42777729	73.85094196
06/19/08	8:13	svp-061908-0811	1024760	95719	63	40.42930790	73.85449479
06/19/08	9:13	svp-061908-0915	1024287	67541	78	40.35196495	73.85635727
06/19/08	12:35	svp-061908-1234	1024077	95621	61	40.42904159	73.85694718
06/19/08	15:29	svp-061908-1526	1022886	68036	78	40.35332973	73.86138348
06/19/08	16:33	svp-061908-1633	1025367	95148	60	40.42773741	73.85231656
06/23/08	12:45	svp 062308-1223	1023095	95777	62	40.42947284	73.86047388
06/23/08	13:42	svp-062308-1342	1022793	68079	79	40.35344909	73.86171528
06/23/08	16:34	svp-062308-1633	1023111	95815	57	40.42957817	73.86041504
06/23/08	19:41	svp-062308-1938	1022024	67960	74	40.35312542	73.86447367
06/23/08	22:35	svp-062308-2244	1021759	95905	65	40.42983060	73.86526997
06/24/08	1:51	svp-062408-0127	1021190	67435	75	40.35168858	73.86746901
06/24/08	4:55	svp-062408-0450	1020181	67517	67	40.35191699	73.87109073
06/24/08	7:55	svp-062408-0755	1020673	95659	63	40.42915984	73.86917248
06/24/08	11:00	svp-062408-1057	1019681	67626	70	40.35221741	73.87288276
06/24/08	12:41	svp-062408-1245	1011912	95579	76	40.42897333	73.90064301
06/24/08	15:22	svp-062408-1518	1011876	67543	52	40.35201761	73.90088461
06/24/08	16:29	svp-062408-1629	1011881	95279	74	40.42814915	73.90075479
07/07/08	11:18	svp-070708-1114	1012053	95203	77	40.42793995	73.90013745
07/08/08	8:31	svp-070808-0828	1012871	95349	74	40.42833901	73.89719735
07/08/08	11:23	svp-070808-1120	1012528	67724	54	40.35251260	73.89854437
07/08/08	12:28	svp-070808-1227	1013237	95629	77	40.42910552	73.89588281
07/08/08	15:17	svp-070808-1517	1013398	68085	54	40.35350131	73.89542263
07/17/08	8:49	svp-071708-0844	1014624	75720	75	40.37445397	73.89099108
07/17/08	11:43	svp-071708-1139	1014534	95829	69	40.42964964	73.89122221
07/17/08	14:26	svp-071708-1422	1014465	67808	60	40.35273776	73.89159726
07/17/08	15:27	svp-071708-1524	1015210	95797	65	40.42956002	73.88879521
07/17/08	18:29	svp-071708-1824	1013673	68579	62	40.35485570	73.89443482
07/18/08	8:36	svp-071808-0836	1016494	94757	68	40.42670061	73.88418800
07/18/08	11:29	svp-071808-1126	1015531	67985	63	40.35322036	73.88776981
07/18/08	14:19	svp-071808-1411	1017465	95669	62	40.42920050	73.88069736
07/18/08	16:16	svp-071808-1609	1015835	95425	65	40.42853681	73.88655142
07/23/08	7:57	svp-072308-0753	1017575	95524	63	40.42880246	73.88030154
07/23/08	10:37	svp-072308-1037	1016942	68076	66	40.35346429	73.88270751
07/23/08	13:07	svp-072308-1305	1016955	67699	67	40.35243004	73.88266246
07/23/08	14:12	svp-072308-1407	1016589	95548	66	40.42887275	73.88384359
07/30/08	9:02	svp-073008-0857	1019339	72638	50	40.36597632	73.87408298
07/30/08	9:48	svp-073008-0948	1018252	71780	74	40.36362559	73.87798780
07/30/08	12:45	svp-073008-1242	1019870	80791	63	40.38835253	73.87213500
07/30/08	15:48	svp-073008-1546	1019016	78121	79	40.38102842	73.87521531
07/30/08	17:19	svp-073008-1719	1027695	95481	80	40.42864036	73.84395277

Figure 3.2-1
SVP 061808_1129 taken during the 2008 multibeam survey at the HARS.

CTD PROFILE # 061808-1129

Date	Time	NAD83 NY		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/18/08	11:30	1027766	67615	82	40.35215340	73.84387477

1516.17	0.26
1516.21	0.89
1516.09	1.67
1515.85	2.43
1515.61	3.24
1515.23	4.08
1515.02	4.90
1514.24	5.72
1509.91	6.54
1505.06	7.32
1502.35	8.13
1500.61	8.96
1498.70	9.75
1496.13	10.50
1494.80	11.25
1494.03	11.98
1493.18	12.69
1492.28	13.40
1491.60	14.12
1491.03	14.84
1490.26	15.55
1489.82	16.27
1489.56	16.98
1489.43	17.70
1489.29	18.41
1489.18	19.13
1489.13	19.86
1489.10	20.60
1489.02	21.34
1488.96	22.08
1488.92	22.81
1488.88	23.53
1488.77	24.24
1488.52	24.91
1488.52	25.11

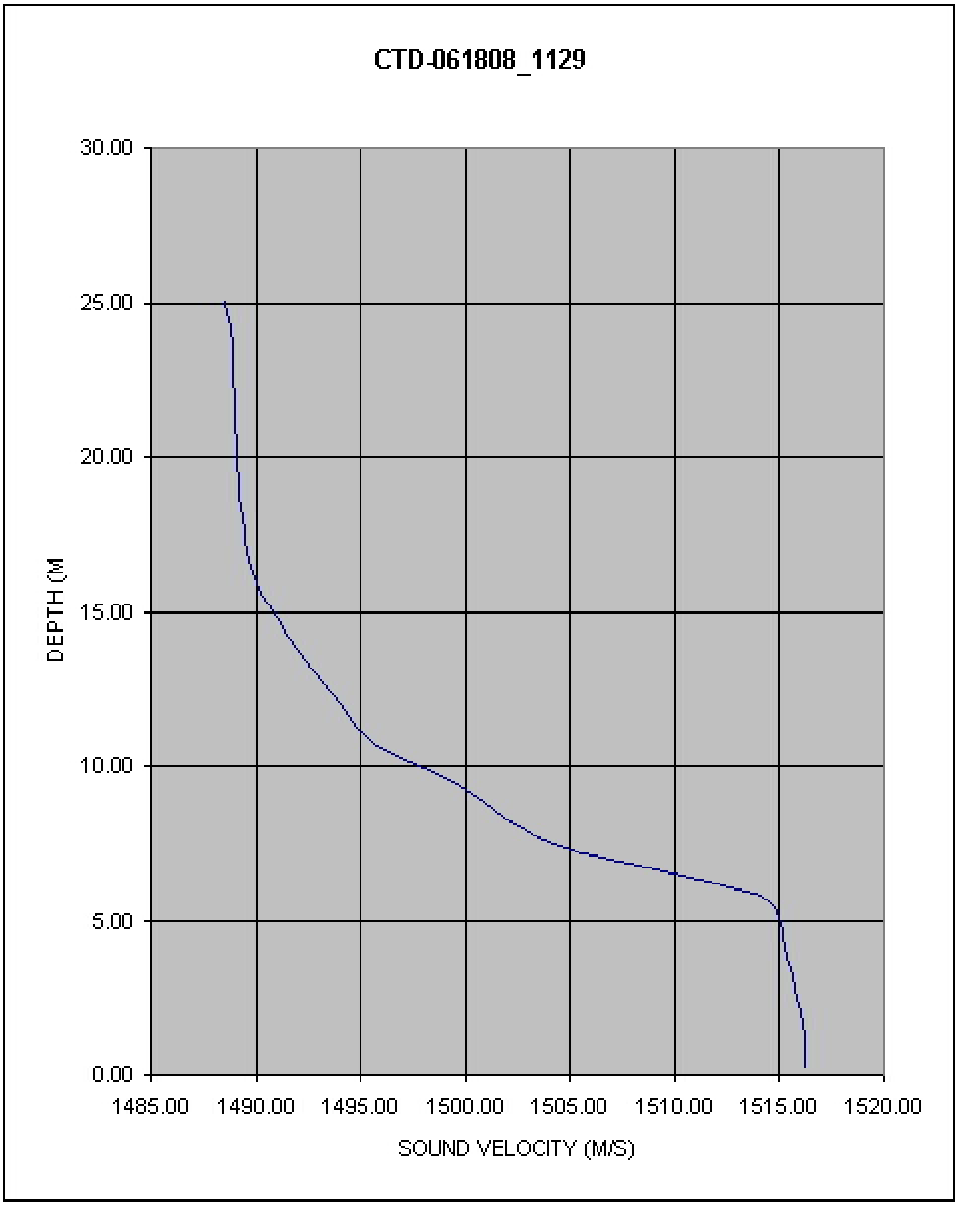


Figure 3.2-2
SVP 061808_1425 taken during the 2008 multibeam survey at the HARS.

CTD PROFILE # 061808-1425

Date	Time	NAD83 NY		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/18/08	14:29	1027449	96031	75	40.43015176	73.84483458

1517.13	0.62
1516.63	1.33
1516.51	2.01
1516.46	2.66
1516.38	3.26
1516.23	3.92
1516.02	4.60
1515.77	5.29
1515.61	5.98
1515.46	6.67
1515.23	7.34
1514.83	8.01
1514.08	8.70
1512.94	9.37
1512.02	10.03
1511.01	10.69
1509.71	11.35
1507.53	12.01
1503.68	12.68
1499.37	13.34
1496.48	13.99
1494.63	14.66
1493.55	15.33
1492.88	16.01
1492.40	16.67
1491.81	17.35
1491.38	18.05
1491.20	18.73
1491.09	19.41
1491.07	20.08
1491.04	20.74
1491.02	21.42
1491.01	22.09
1491.04	22.69
1490.86	22.84

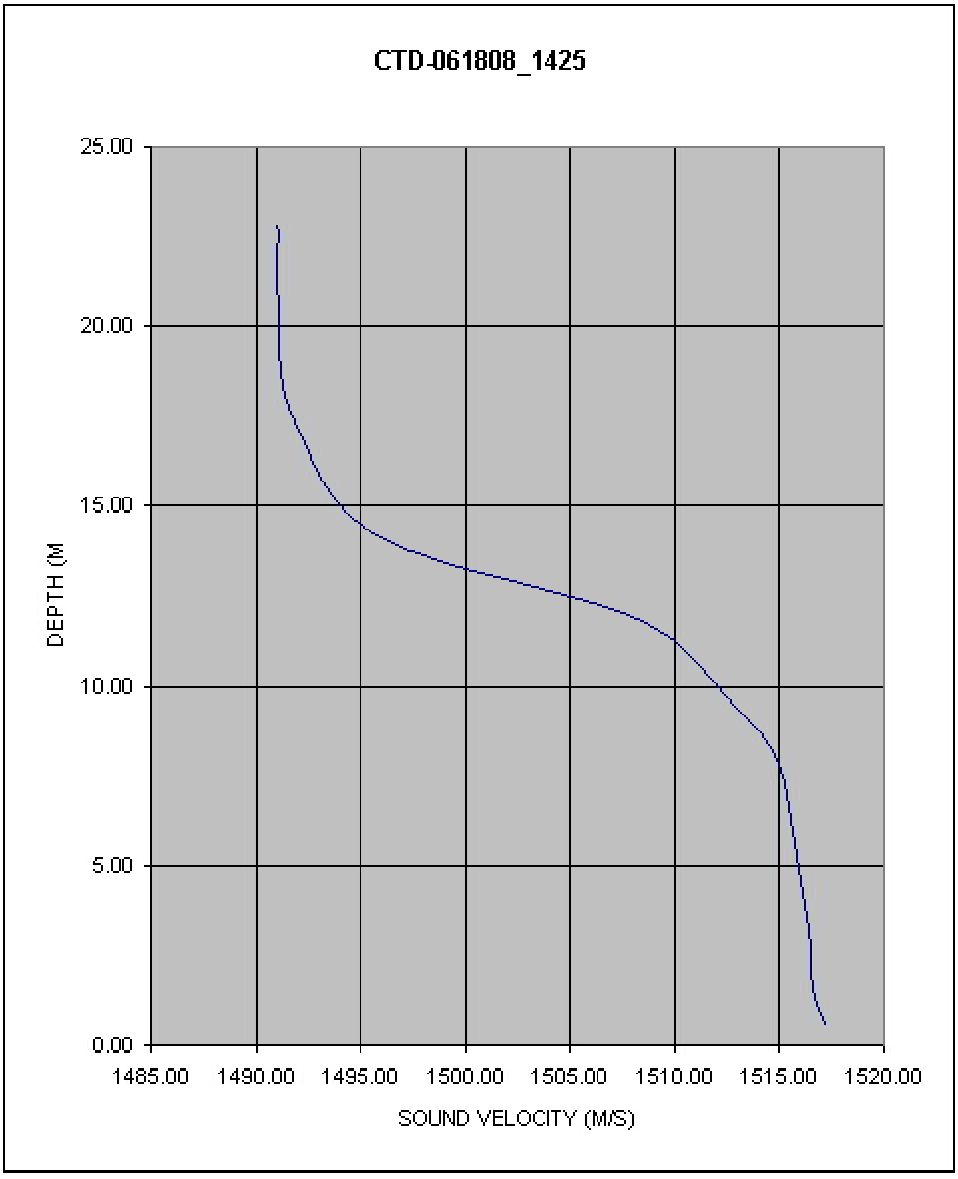


Figure 3.2-3
SVP 061808_1728 taken during the 2008 multibeam survey at the HARS.

CTD PROFILE # 061808-1728

Date	Time	NAD83 NY		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/18/08	17:31	1027075	95914	76	40.42983064	73.84617578

1514.30	0.20
1515.41	0.90
1515.70	1.60
1515.82	2.30
1515.92	3.00
1515.98	3.69
1516.01	4.36
1516.01	5.01
1516.00	5.67
1515.97	6.32
1515.87	6.99
1515.45	7.67
1513.95	8.35
1508.52	9.07
1501.24	9.76
1497.65	10.44
1495.38	11.11
1493.71	11.82
1492.58	12.48
1491.86	13.16
1491.56	13.84
1491.40	14.50
1491.12	15.21
1490.89	15.90
1490.71	16.58
1490.49	17.30
1490.34	18.00
1490.18	18.71
1490.09	19.42
1490.06	20.12
1490.05	20.85
1490.05	21.54
1490.05	22.21
1490.09	22.85
1490.42	23.00

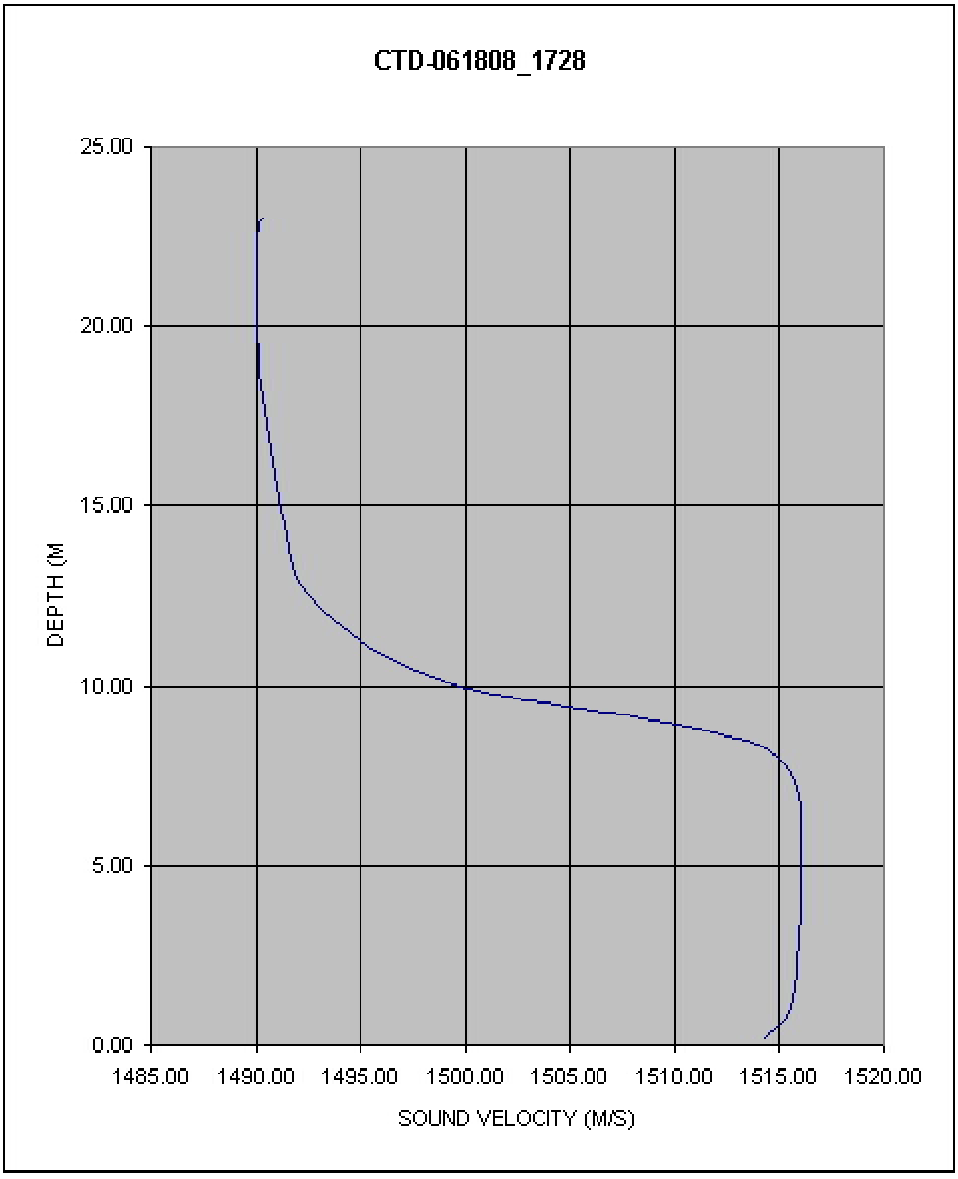


Figure 3.2-4
SVP 061808_2016 taken during the 2008 multibeam survey at the HARS.

1515.60	0.42
1515.64	0.92
1515.65	1.37
1515.65	1.84
1515.66	2.36
1515.67	2.89
1515.67	3.34
1515.69	3.83
1515.71	4.32
1515.72	4.75
1515.71	5.19
1515.68	5.61
1515.67	6.02
1515.65	6.38
1515.59	6.88
1515.42	7.43
1515.17	7.94
1514.84	8.41
1514.16	8.87
1511.70	9.35
1508.11	9.81
1505.02	10.23
1501.96	10.67
1499.44	11.13
1497.40	11.59
1496.24	11.99
1495.57	12.34
1494.92	12.77
1494.09	13.27
1493.30	13.81
1492.70	14.34
1492.21	14.80
1491.80	15.23
1491.26	15.70
1490.29	16.23
1489.68	16.80
1489.22	17.34
1488.85	17.82
1488.58	18.29
1488.41	18.68
1488.24	19.14
1488.09	19.67
1487.98	20.14
1487.88	20.49
1487.74	20.88
1487.58	21.39
1487.40	21.91
1487.29	22.42
1487.23	22.90
1487.22	23.29
1487.20	23.65
1487.19	24.00
1487.18	24.41
1487.18	24.95
1487.19	25.49
1487.21	25.70

CTD PROFILE # 061808-2016

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/18/08	20:19	1026521	67744	85	40.35251162	73.84834367

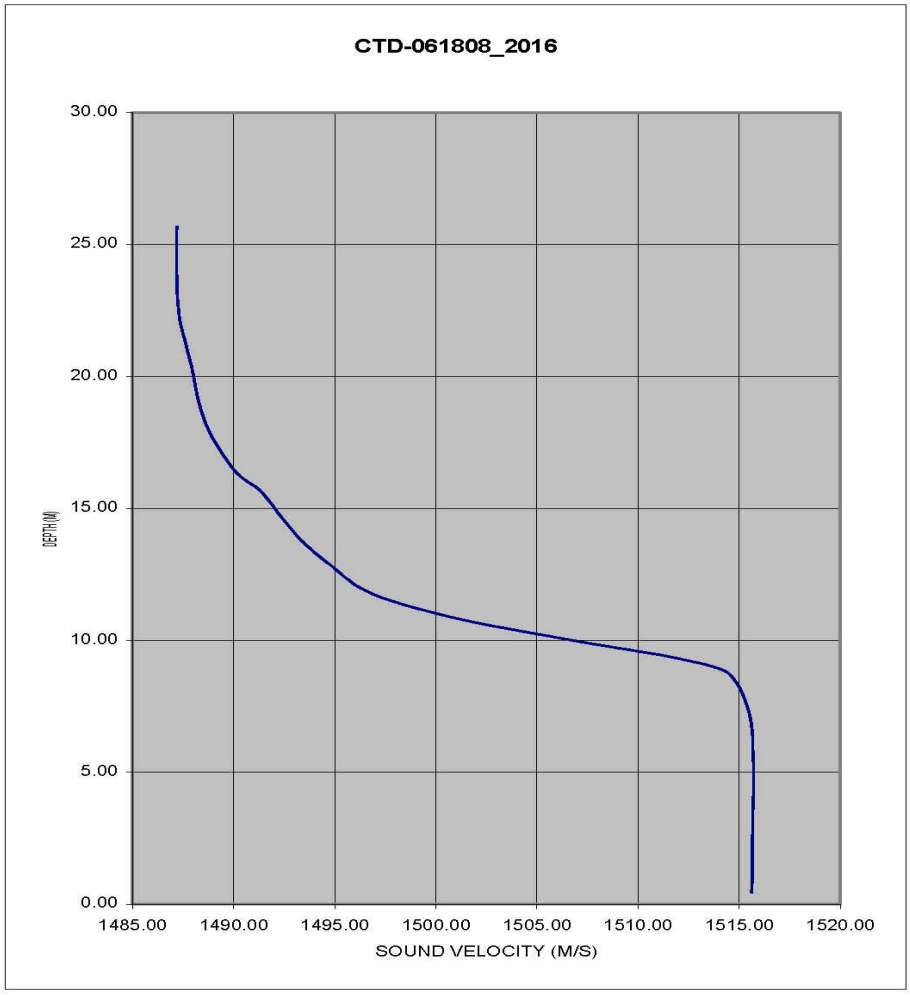


Figure 3.2-5
SVP 061808_2325 taken during the 2008 multibeam survey at the HARS.

CTD PROFILE # 061808-2325

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/18/08	23:25	1026011	95665	69	40.42915348	73.84999955

1514.82	0.56
1514.91	1.21
1514.96	1.88
1515.02	2.58
1515.03	3.26
1514.96	3.92
1514.59	4.58
1513.55	5.25
1512.15	5.92
1510.81	6.58
1509.72	7.24
1508.53	7.92
1506.87	8.59
1502.63	9.26
1498.33	9.92
1495.36	10.58
1493.63	11.22
1492.39	11.87
1491.62	12.52
1491.18	13.16
1490.91	13.80
1490.67	14.44
1490.48	15.08
1490.41	15.69
1490.36	16.26
1490.29	16.85
1490.25	17.45
1490.19	18.08
1490.13	18.74
1490.07	19.41
1490.04	20.09
1490.08	20.66
1490.03	21.08

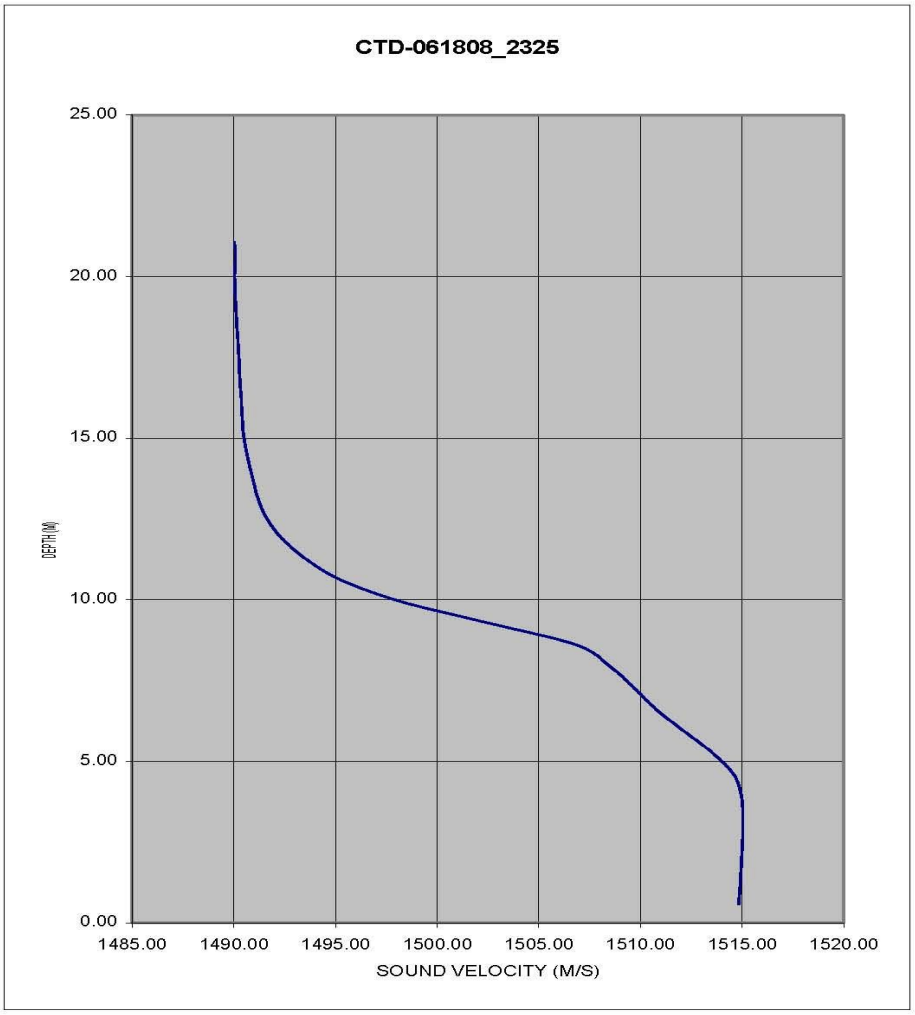


Figure 3.2-6
SVP 061908_0223 taken during the 2008 multibeam survey at the HARS.

1514.01	0.08
1513.98	0.55
1513.98	1.01
1514.02	1.41
1514.09	1.83
1514.26	2.31
1514.44	2.78
1514.58	3.18
1514.59	3.50
1514.96	3.92
1515.34	4.39
1515.41	4.86
1515.10	5.17
1514.93	5.42
1514.53	5.70
1514.28	5.80
1511.68	6.05
1507.56	6.50
1502.78	7.00
1500.58	7.51
1499.06	8.03
1496.88	8.54
1495.66	9.04
1495.21	9.51
1494.91	9.90
1494.46	10.26
1493.73	10.60
1493.10	10.94
1492.77	11.32
1492.50	11.81
1491.91	12.35
1491.45	12.76
1491.23	13.05
1491.04	13.43
1490.86	13.86
1490.73	14.29
1490.64	14.71
1490.56	15.17
1490.48	15.59
1490.44	15.96
1490.41	16.44
1490.39	16.95
1490.35	17.40
1490.24	17.81
1490.02	18.18
1489.65	18.61
1489.35	19.08
1489.19	19.52
1489.07	19.98
1488.91	20.51
1488.75	21.00
1488.59	21.37
1488.44	21.74
1488.26	22.18
1488.08	22.62

CTD PROFILE # 061908-0223

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/19/08	2:23	1025990	67212	75	40.35105451	73.85024994

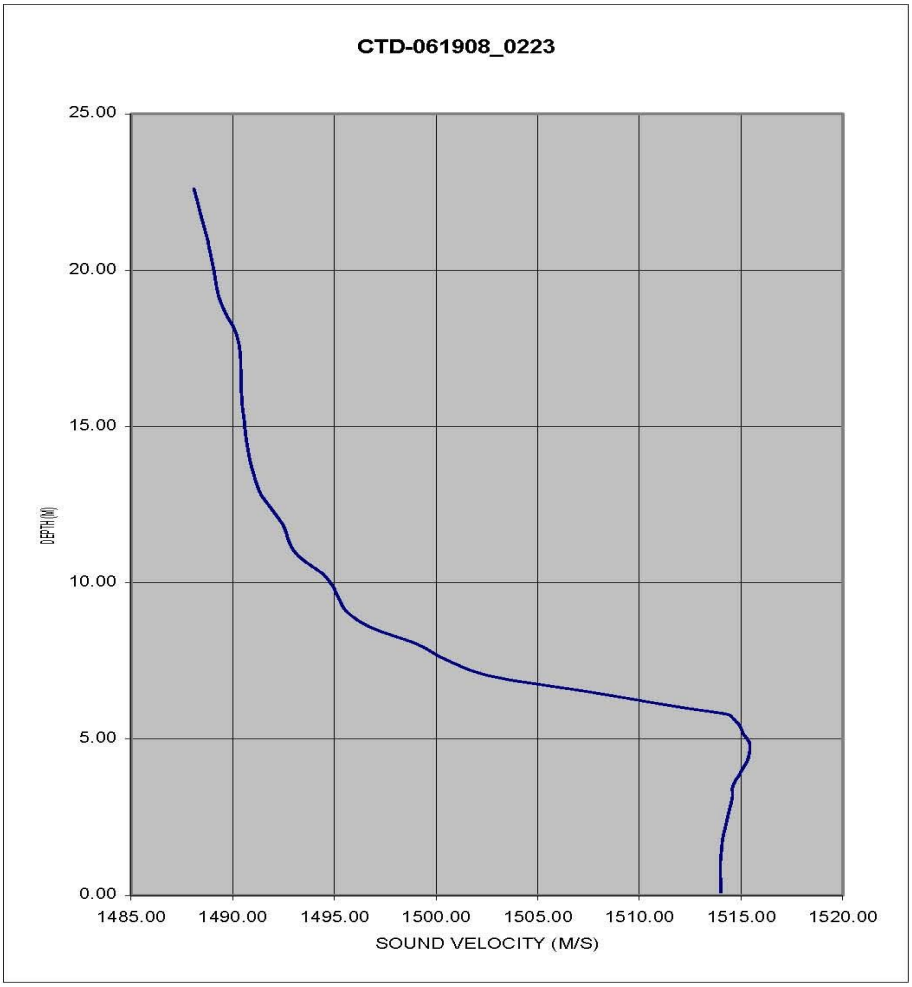


Figure 3.2-7
SVP 061908_0522 taken during the 2008 multibeam survey at the HARS.

1509.98	0.33
1510.06	0.78
1510.13	1.15
1510.17	1.45
1510.19	1.77
1510.31	2.18
1510.71	2.57
1511.35	2.90
1511.55	3.12
1511.96	3.47
1512.35	3.90
1512.52	4.26
1512.47	4.44
1512.67	4.70
1512.97	5.09
1513.09	5.42
1512.98	5.59
1513.02	5.67
1513.05	6.05
1512.99	6.53
1512.85	6.93
1512.66	7.16
1512.59	7.26
1512.53	7.35
1512.04	7.51
1511.25	7.68
1510.41	7.88
1508.50	8.24
1505.42	8.67
1502.58	9.03
1500.63	9.26
1499.35	9.38
1498.44	9.59
1496.64	9.98
1495.22	10.39
1494.37	10.75
1493.82	10.99
1493.55	11.14
1493.36	11.39
1493.09	11.68
1492.89	11.95
1492.74	12.16
1492.64	12.48
1492.41	12.93
1491.90	13.32
1491.60	13.59
1491.43	13.85
1491.28	14.22
1491.17	14.70
1491.07	15.17
1490.99	15.60
1490.97	15.98
1490.96	16.37
1490.96	16.78
1490.95	17.17
1490.94	17.46

1490.92	17.71
1490.91	18.00
1490.91	18.33
1490.91	18.68
1490.91	18.96
1490.91	19.28
1490.91	19.45

CTD PROFILE # 061908-0522

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/19/08	5:22	1025750	95163	64	40.42777729	73.85094196

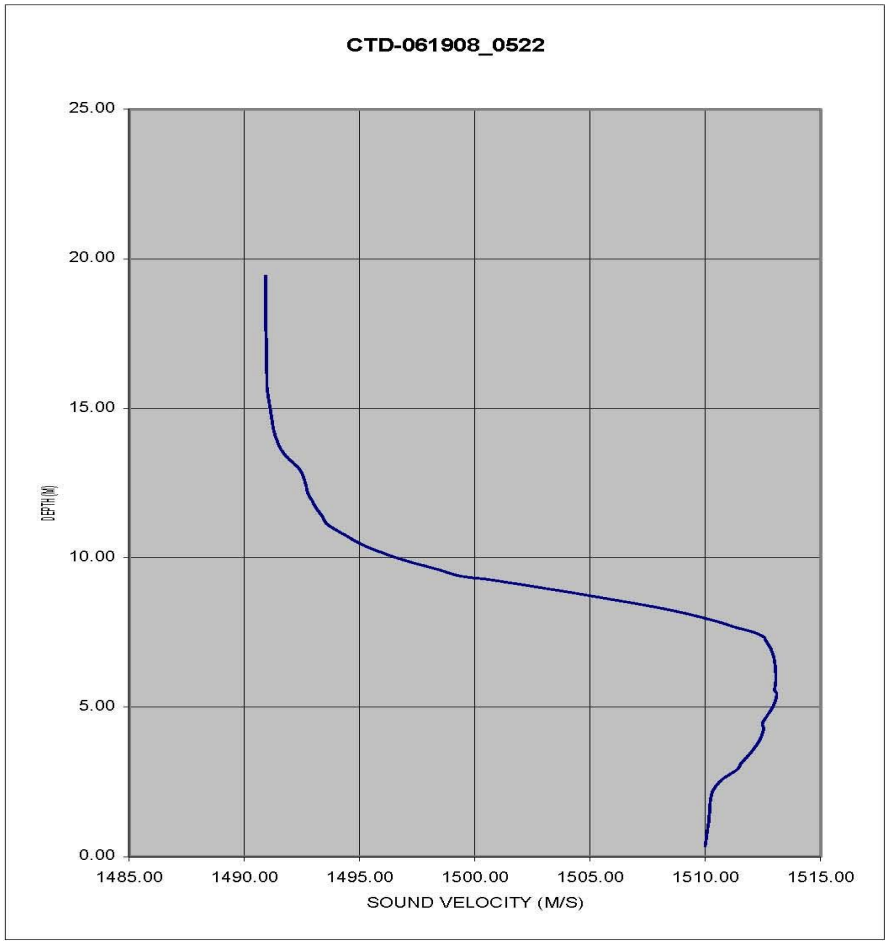


Figure 3.2-8
SVP 061908_0811 taken during the 2008 multibeam survey at the HARS.

CTD PROFILE # 061908-0811

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/19/08	8:13	1024760	95719	63	40.42930790	73.85449479

1513.13	0.12
1512.82	0.58
1513.02	1.10
1513.25	1.66
1513.54	2.26
1513.97	2.93
1514.27	3.62
1514.10	4.34
1513.81	5.08
1513.03	5.82
1511.11	6.54
1508.85	7.29
1507.62	8.02
1506.00	8.73
1503.21	9.41
1500.41	10.06
1497.70	10.70
1495.26	11.37
1493.77	12.06
1492.92	12.75
1492.07	13.46
1491.32	14.17
1490.86	14.89
1490.61	15.59
1490.50	16.26
1490.46	16.93
1490.44	17.59
1490.43	18.27
1490.46	18.90
1490.73	19.12

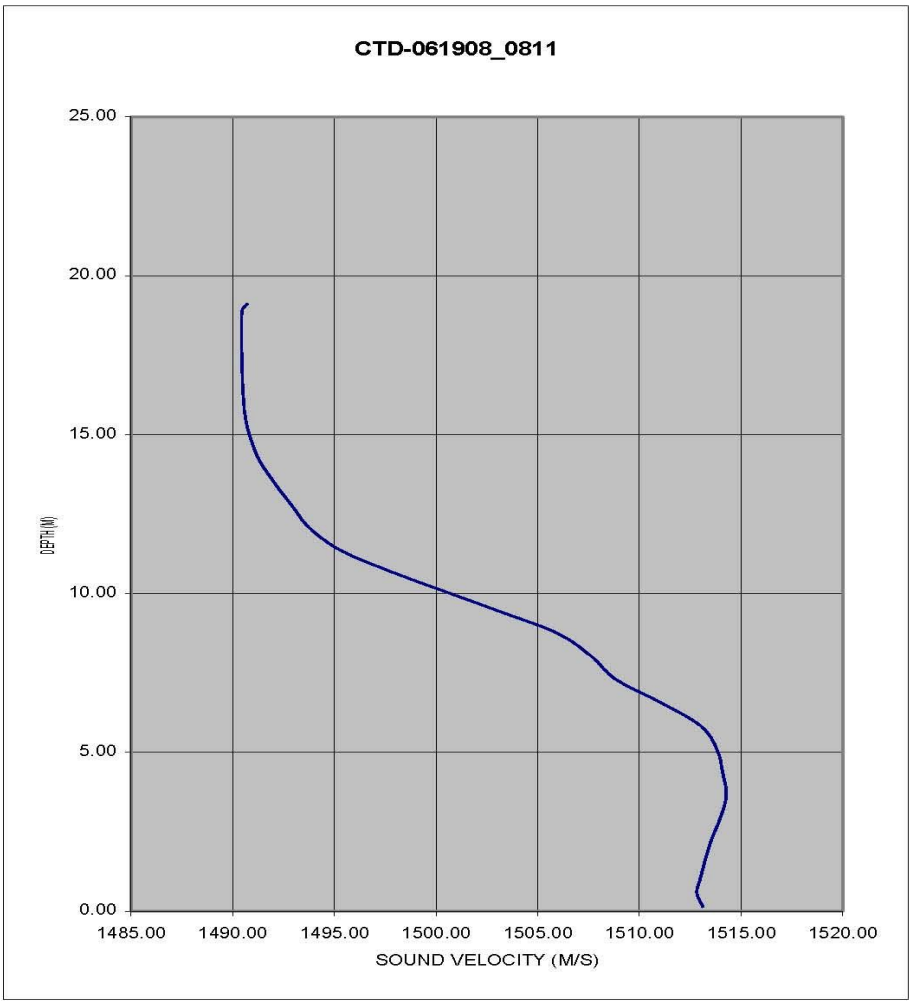


Figure 3.2-9
SVP 061908_0915 taken during the 2008 multibeam survey at the HARS.

CTD PROFILE # 061908-0915

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/19/08	9:13	1024287	67541	78	40.35196495	73.85635727

1512.62	0.22
1512.65	0.90
1512.72	1.63
1512.99	2.34
1513.39	3.00
1513.82	3.63
1514.07	4.22
1514.21	4.79
1514.12	5.35
1513.92	5.92
1513.61	6.48
1513.23	7.05
1512.85	7.63
1512.49	8.19
1510.74	8.75
1506.12	9.32
1501.61	9.90
1497.91	10.48
1495.75	11.06
1493.70	11.64
1492.24	12.23
1491.37	12.81
1490.67	13.41
1490.25	14.00
1490.09	14.57
1490.03	15.15
1489.96	15.73
1489.88	16.32
1489.75	16.92
1489.53	17.53
1489.09	18.15
1488.60	18.78
1488.34	19.42
1488.25	20.07
1488.23	20.74
1488.10	21.41
1487.79	22.09
1487.56	22.77
1487.47	23.45
1487.46	23.79
1487.47	23.86
1487.48	23.87

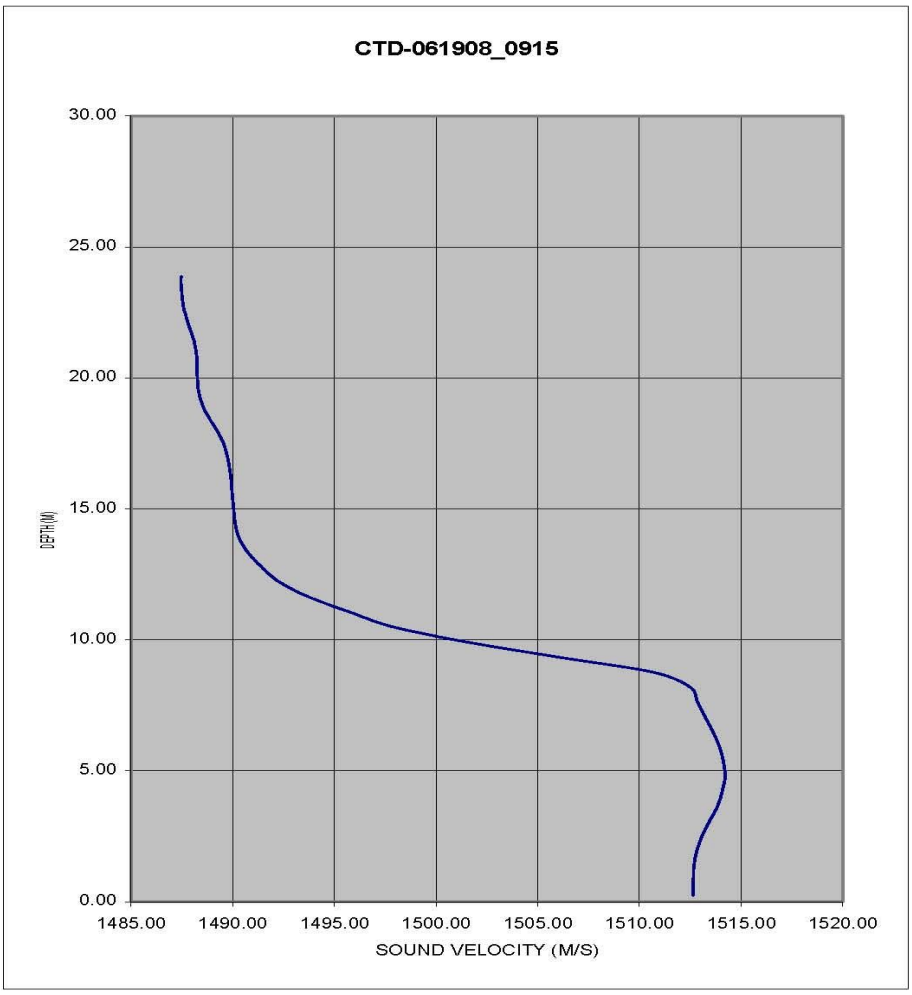


Figure 3.2-10
SVP 061908_1234 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 061908-1234

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/19/08	12:35	1024077	95621	61	40.42904159	73.85694718

1516.87	0.22
1516.43	0.58
1515.72	0.94
1515.03	1.35
1514.66	1.69
1514.49	1.98
1514.39	2.36
1514.33	2.69
1514.24	3.05
1514.13	3.41
1514.03	3.78
1513.99	4.22
1513.89	4.71
1513.67	5.15
1513.58	5.47
1513.55	5.73
1513.35	6.09
1512.88	6.54
1512.30	6.97
1511.83	7.30
1511.55	7.58
1511.00	7.96
1510.22	8.40
1509.82	8.70
1509.14	9.12
1507.51	9.58
1505.24	9.95
1502.90	10.29
1501.08	10.68
1498.98	11.17
1496.81	11.70
1494.95	12.26
1493.61	12.85
1492.85	13.35
1492.39	13.80
1492.08	14.26
1491.89	14.73
1491.84	15.14
1491.74	15.51
1491.43	15.92
1491.06	16.36
1490.77	16.84
1490.44	17.22
1490.29	17.70
1490.25	18.21
1490.24	18.58

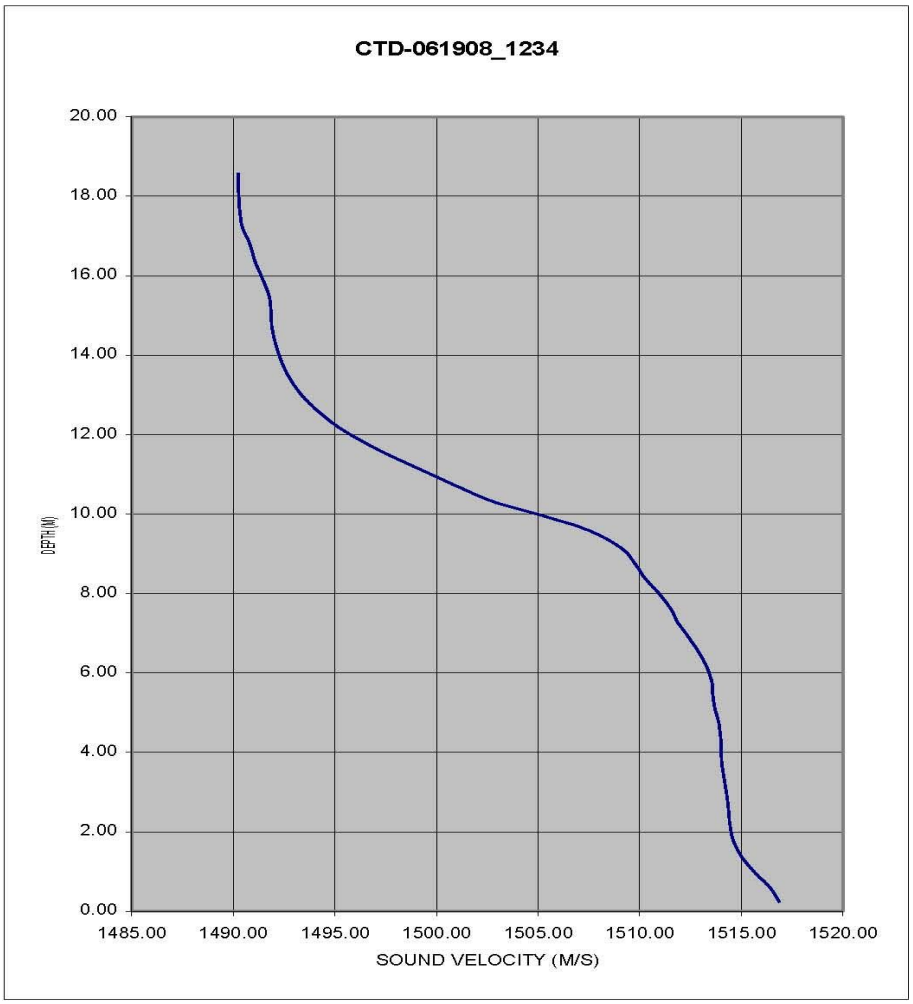


Figure 3.2-11
SVP 061908_1526 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 061908-1526

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/19/08	15:29	1022886	68036	78	40.35332973	73.86138348

1516.75	0.19
1516.27	0.64
1515.89	1.13
1515.43	1.57
1515.09	1.99
1514.89	2.48
1514.79	2.94
1514.74	3.32
1514.74	3.60
1514.73	3.93
1514.70	4.38
1514.70	4.78
1514.68	5.17
1514.63	5.60
1514.52	6.04
1514.35	6.51
1514.17	6.94
1513.98	7.34
1513.63	7.78
1513.14	8.23
1512.42	8.74
1511.54	9.21
1509.93	9.68
1507.00	10.18
1502.97	10.66
1499.39	11.15
1497.53	11.65
1496.59	12.18
1495.65	12.71
1494.68	13.21
1493.83	13.75
1493.11	14.31
1492.75	14.77
1492.66	15.12
1492.40	15.55
1492.16	16.09
1492.03	16.66
1491.74	17.21
1491.30	17.70
1491.01	18.08
1490.84	18.49
1490.62	18.97
1490.23	19.43
1489.80	19.88
1489.47	20.33
1489.26	20.81
1489.10	21.36
1488.96	21.88
1488.76	22.38
1488.51	22.89
1488.21	23.38
1488.02	23.70

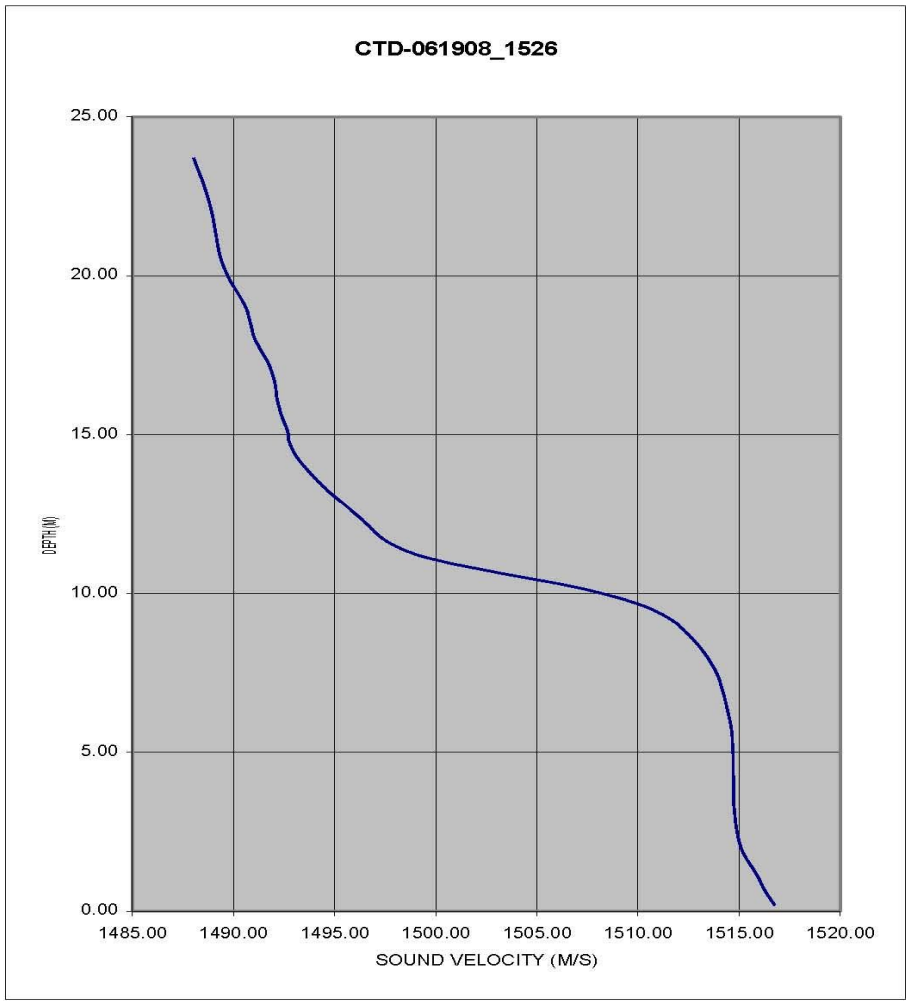


Figure 3.2-12
SVP 061908_1633 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 061908-1633

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/19/08	16:33	1025367	95148	60	40.42773741	73.85231656

1517.18	0.52
1517.17	1.09
1516.44	1.66
1516.03	2.29
1515.96	2.89
1516.06	3.44
1516.21	3.95
1516.33	4.45
1516.28	4.95
1515.93	5.47
1515.22	6.01
1514.82	6.57
1514.63	7.12
1514.35	7.64
1513.95	8.15
1513.10	8.64
1511.67	9.10
1509.36	9.67
1505.82	10.29
1502.39	10.87
1499.78	11.42
1497.38	12.00
1495.69	12.57
1494.49	13.15
1493.80	13.73
1493.19	14.32
1492.43	14.91
1491.80	15.49
1491.39	16.05
1491.09	16.59
1490.96	17.14
1490.67	17.66
1490.40	18.17
1490.33	18.40

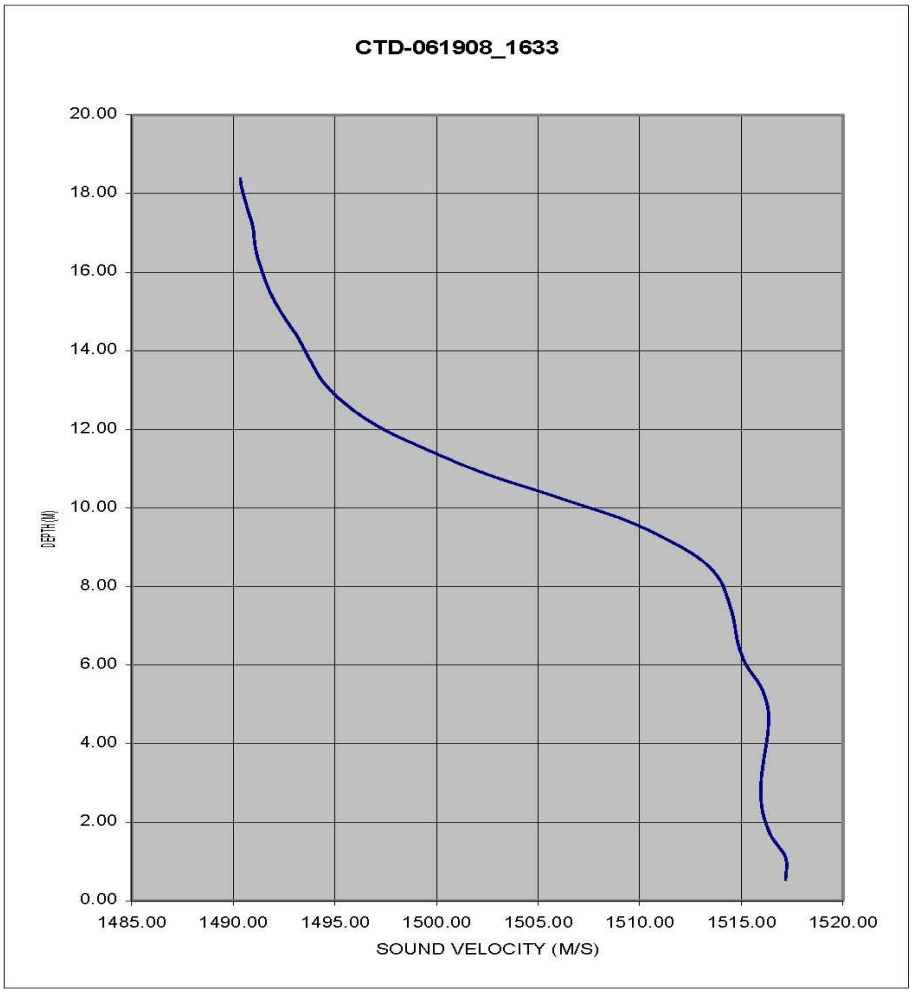


Figure 3.2-13
SVP 062308_1223 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 062308-1223

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/23/08	12:45	1023095	95777	62	40.42947284	73.86047388

1513.50	0.19
1513.16	0.84
1512.78	1.60
1512.41	2.34
1512.23	3.07
1512.29	3.85
1512.82	4.59
1513.09	5.34
1513.11	6.08
1512.68	6.78
1511.88	7.45
1509.65	8.10
1504.66	8.75
1500.67	9.41
1498.36	10.09
1495.94	10.80
1494.36	11.52
1493.04	12.23
1491.09	12.92
1489.22	13.63
1488.21	14.34
1487.78	15.04
1487.55	15.73
1487.28	16.43
1486.80	17.14
1486.43	17.85
1486.24	18.55
1486.20	18.91

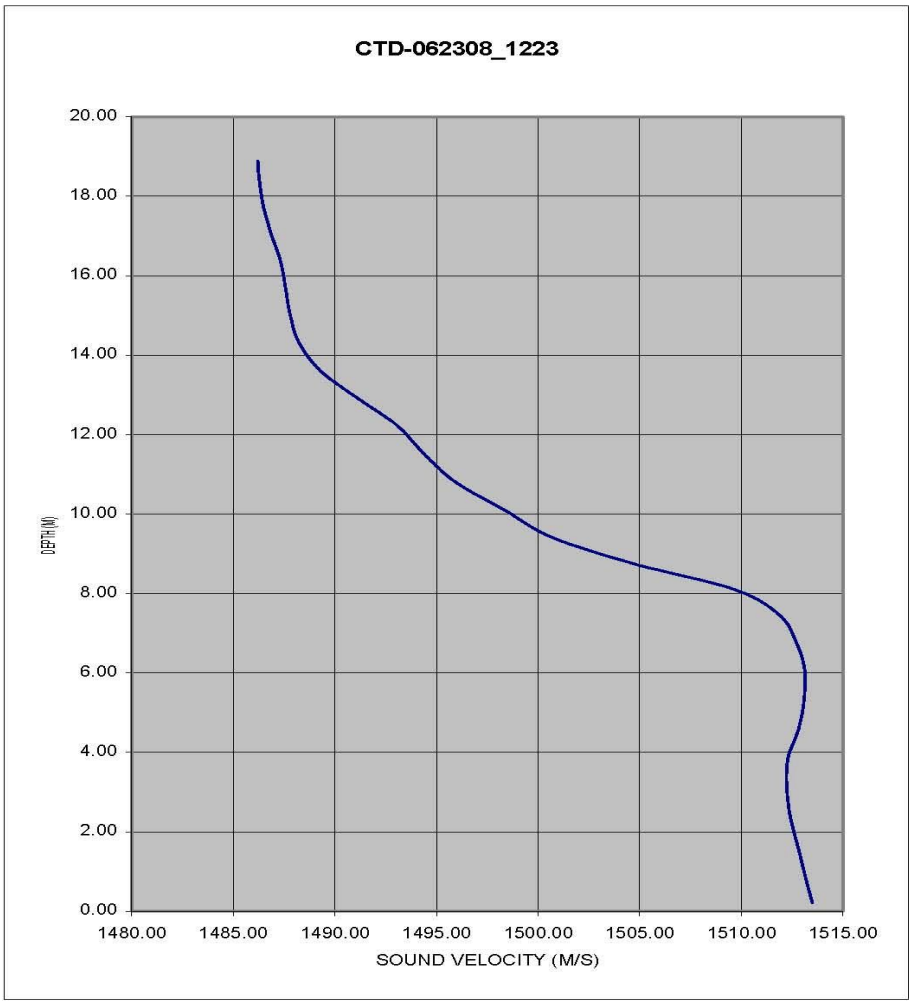


Figure 3.2-14
SVP 062308_1342 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 062308-1342

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/23/08	13:42	1022793	68079	79	40.35344909	73.86171528

1514.35	0.26
1514.29	0.82
1514.25	1.49
1514.21	2.20
1514.13	2.95
1514.05	3.77
1513.98	4.61
1513.70	5.45
1513.21	6.26
1512.29	7.01
1511.18	7.74
1509.87	8.48
1506.52	9.19
1502.46	9.86
1499.74	10.53
1496.75	11.21
1494.36	11.91
1490.89	12.63
1487.76	13.37
1486.47	14.11
1485.94	14.83
1485.60	15.54
1485.32	16.24
1485.12	16.93
1484.89	17.62
1484.70	18.32
1484.48	19.03
1484.30	19.75
1484.20	20.46
1484.16	21.17
1484.14	21.88
1484.11	22.61
1484.02	23.34
1484.02	23.98
1484.29	24.13

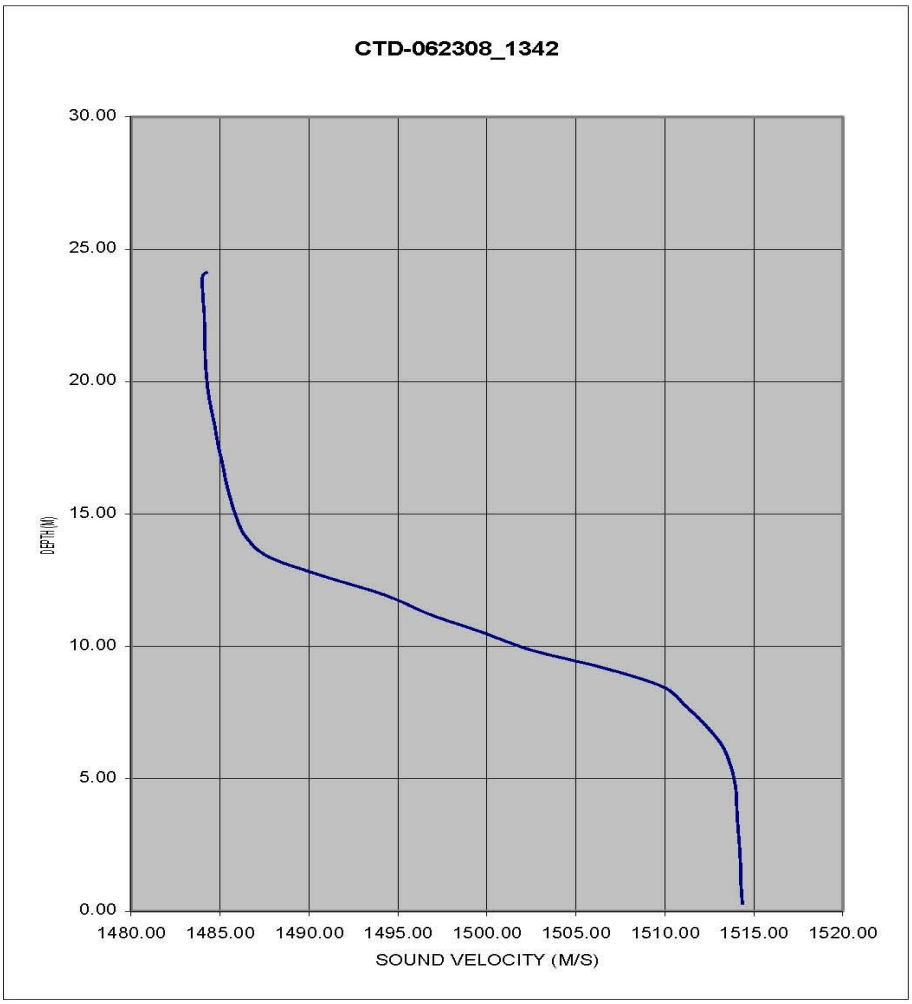


Figure 3.2-15
SVP 062308_1633 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 062308-1633

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/23/08	16:34	1023111	95815	57	40.42957817	73.86041504

1514.06	0.32
1514.09	1.02
1514.14	1.73
1513.76	2.45
1513.35	3.13
1513.02	3.89
1512.64	4.62
1512.30	5.35
1511.41	6.06
1509.16	6.74
1506.79	7.40
1504.75	8.05
1503.15	8.65
1501.44	9.23
1499.51	9.89
1497.63	10.60
1495.38	11.29
1492.78	11.99
1489.82	12.70
1488.17	13.40
1487.47	14.08
1486.94	14.74
1486.13	15.38
1485.34	16.01
1485.02	16.65
1484.97	17.14
1484.99	17.32

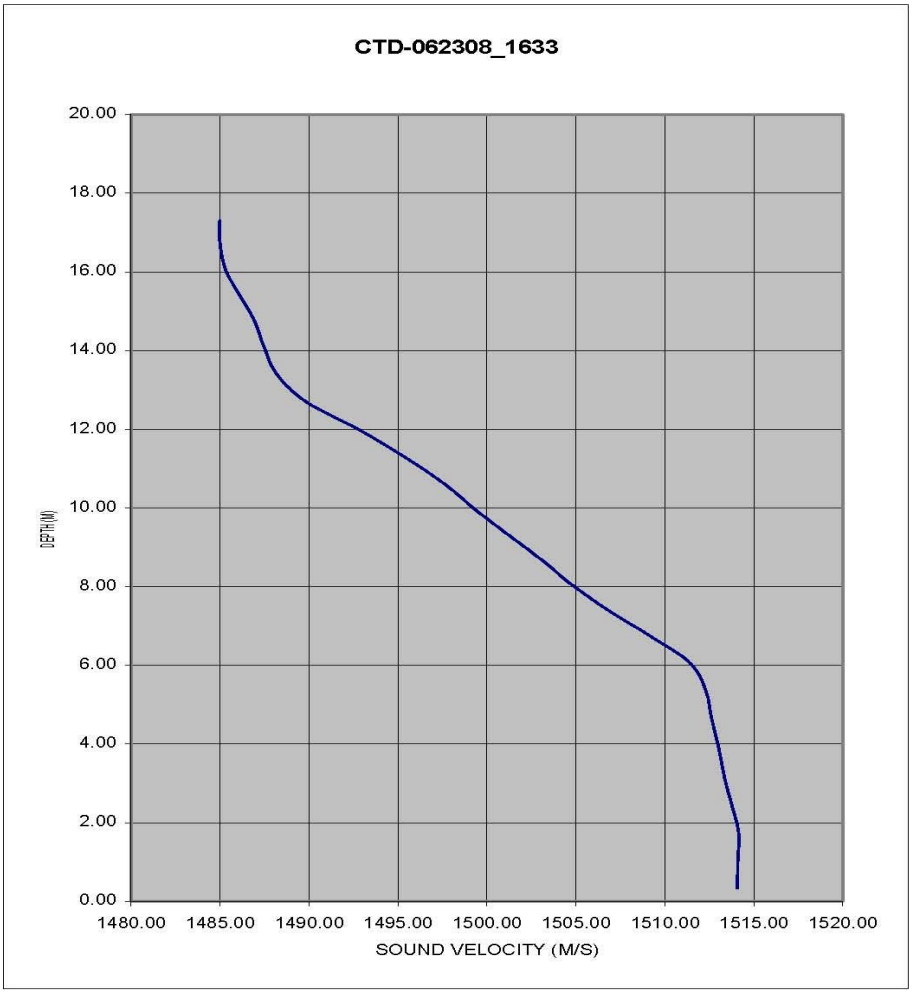


Figure 3.2-16
SVP 062308_1938 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 062308-1938

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/23/08	19:41	1022024	67960	74	40.35312542	73.86447367

1515.64	0.16
1515.37	0.71
1515.29	1.30
1515.26	1.90
1515.24	2.47
1515.23	2.97
1515.19	3.28
1515.11	3.56
1514.86	4.02
1514.49	4.49
1513.82	4.98
1513.16	5.41
1512.39	5.83
1511.15	6.27
1509.76	6.67
1508.73	7.02
1505.70	7.48
1501.05	8.00
1497.85	8.50
1497.14	8.85
1496.12	9.21
1495.27	9.69
1494.62	10.19
1493.94	10.68
1492.89	11.19
1491.84	11.69
1490.90	12.17
1490.30	12.63
1489.90	13.11
1489.69	13.58
1489.50	13.99
1489.05	14.47
1488.33	15.03
1487.78	15.59
1487.46	16.06
1487.51	16.37
1486.56	16.70
1485.46	17.18
1484.84	17.74
1484.61	18.31
1484.51	18.84
1484.45	19.34
1484.41	19.92
1484.36	20.50
1484.30	20.98
1484.24	21.23
1484.24	21.22
1484.26	21.37
1484.21	21.78
1484.19	22.35
1484.20	22.59

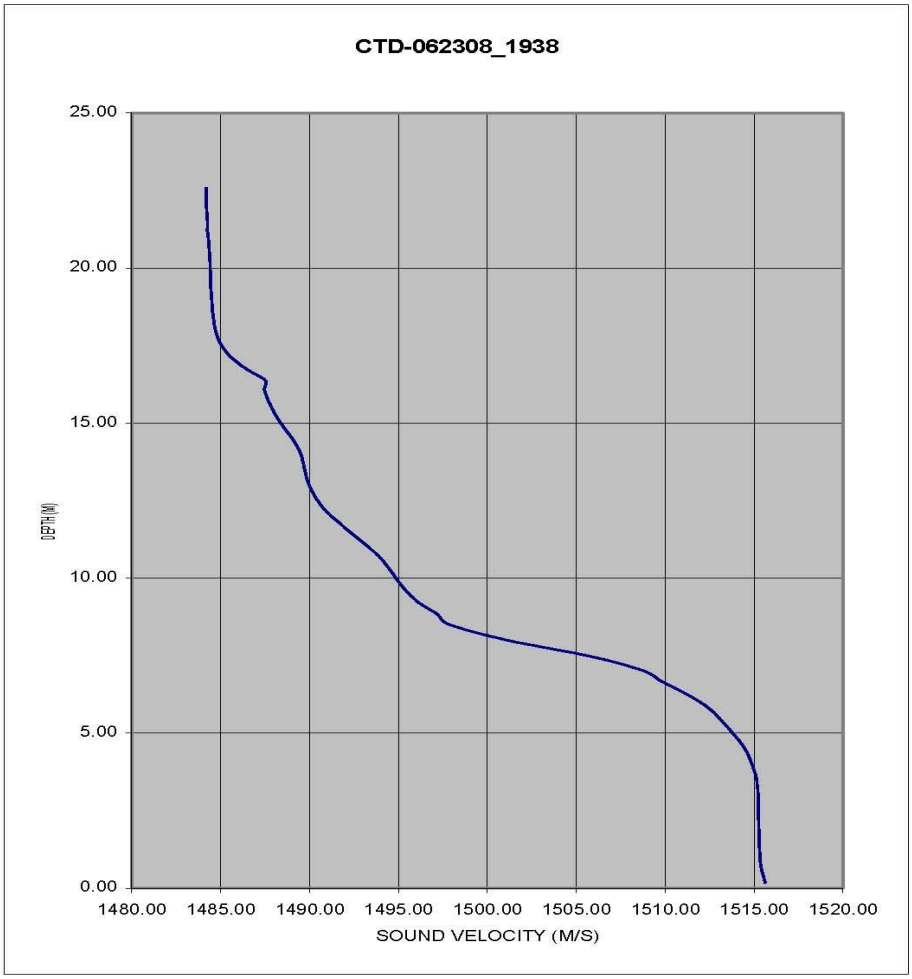


Figure 3.2-17
SVP 062308_2244 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 062308-2244

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/23/08	22:35	1021759	95905	65	40.42983060	73.86526997

1513.19	0.54
1513.24	0.61
1513.22	0.80
1513.17	1.28
1513.21	1.80
1513.29	2.32
1513.32	2.72
1513.33	3.01
1513.33	3.25
1513.32	3.63
1513.16	4.03
1512.97	4.37
1512.71	4.82
1512.29	5.26
1511.50	5.70
1510.77	6.06
1510.25	6.36
1509.71	6.56
1509.08	6.96
1508.88	7.46
1508.68	7.89
1507.92	8.28
1506.84	8.55
1505.04	8.91
1500.67	9.43
1496.05	9.96
1493.20	10.28
1491.83	10.56
1491.31	10.97
1491.02	11.46
1490.46	11.96
1490.03	12.36
1489.88	12.67
1489.78	13.12
1489.67	13.63
1489.42	14.04
1489.06	14.40
1488.76	14.79
1488.48	15.20
1488.26	15.65
1488.05	16.16
1487.89	16.67
1487.81	17.12
1487.74	17.54
1487.55	17.90
1487.18	18.31
1486.77	18.79
1486.54	19.26
1486.48	19.63

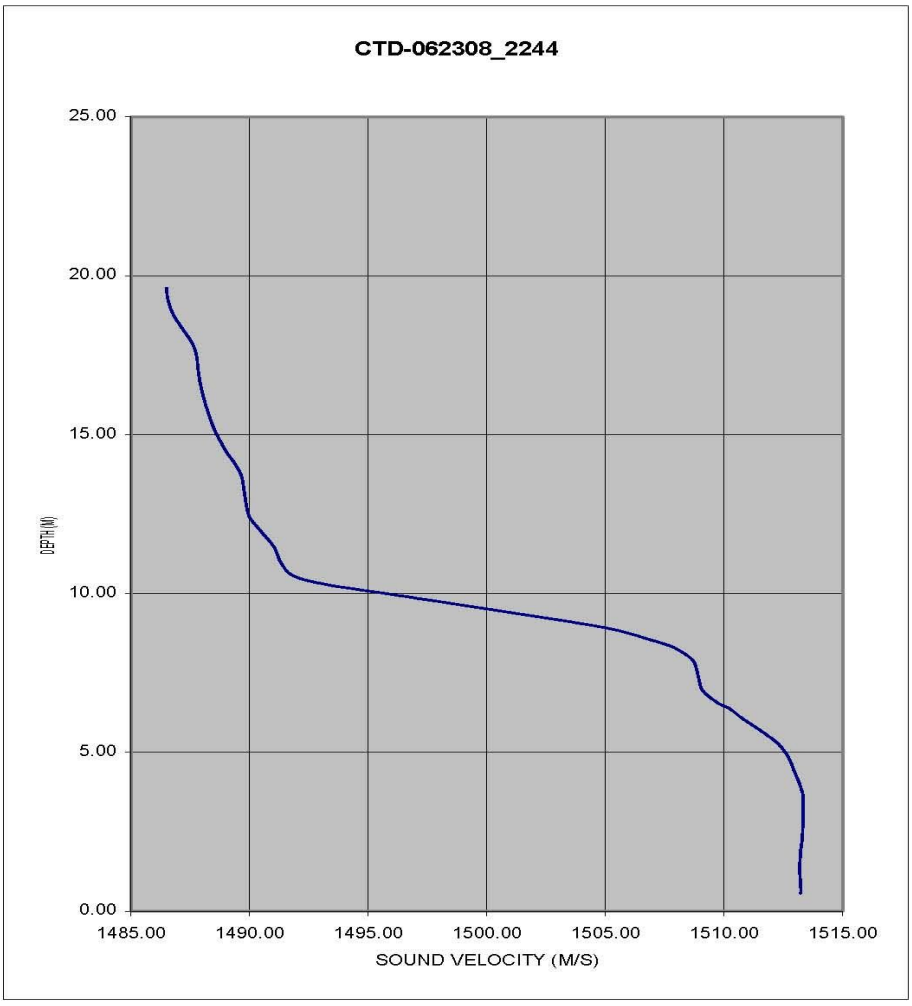


Figure 3.2-18
SVP 062408_0127 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 062408-0127

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/24/08	1:51	1021190	67435	75	40.35168858	73.86746901

1514.24	0.11
1514.16	0.92
1514.13	1.67
1514.15	2.32
1514.17	2.93
1514.19	3.51
1514.21	4.05
1514.22	4.59
1514.23	5.14
1514.22	5.69
1514.15	6.25
1513.98	6.80
1513.59	7.36
1512.80	7.91
1510.80	8.49
1506.94	9.11
1503.02	9.74
1500.53	10.37
1498.92	10.99
1497.76	11.61
1497.08	12.22
1496.35	12.82
1494.31	13.44
1491.74	14.11
1489.41	14.76
1487.62	15.41
1486.47	16.07
1485.86	16.73
1485.56	17.38
1485.39	18.03
1485.16	18.68
1484.94	19.32
1484.76	19.98
1484.62	20.63
1484.52	21.29
1484.50	21.88
1484.46	22.51
1484.75	22.73

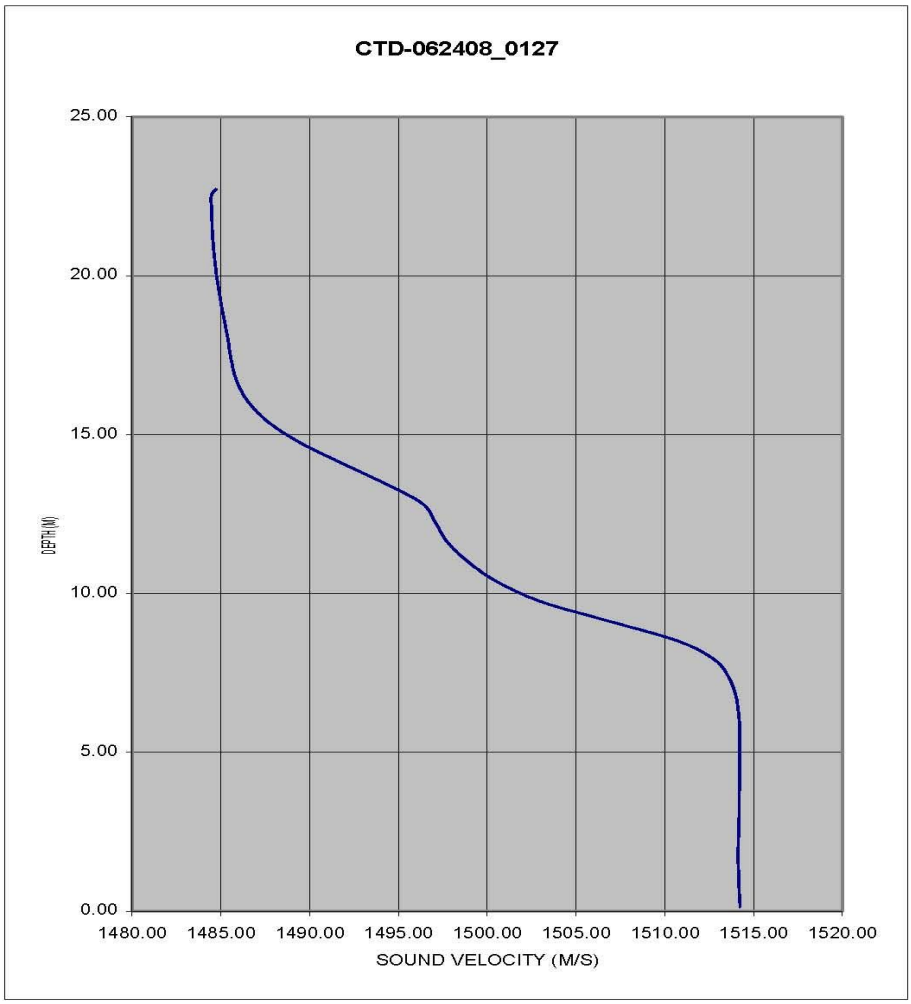


Figure 3.2-19
SVP 062408_0450 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 062408-0450

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/24/08	4:55	1020181	67517	67	40.35191699	73.87109073

1514.73	0.38
1514.62	0.76
1514.59	1.16
1514.59	1.43
1514.64	1.77
1514.65	2.00
1514.71	2.33
1514.77	2.50
1515.06	2.92
1514.91	3.37
1514.50	3.75
1513.95	4.22
1513.58	4.60
1513.38	4.95
1512.99	5.28
1512.47	5.62
1512.19	5.88
1511.47	6.22
1509.05	6.71
1506.10	7.20
1504.31	7.61
1502.98	8.01
1502.39	8.26
1502.39	8.43
1501.12	8.83
1499.01	9.30
1497.71	9.81
1496.54	10.33
1495.86	10.74
1495.46	11.00
1494.10	11.46
1493.21	12.01
1492.23	12.61
1490.63	13.15
1489.15	13.50
1488.33	13.78
1487.70	14.28
1486.88	14.84
1486.24	15.23
1485.96	15.53
1485.85	15.96
1485.65	16.52
1485.37	16.99
1485.20	17.45
1485.10	18.00
1485.05	18.46
1485.03	18.67
1485.00	19.06
1484.98	19.61
1484.98	20.12
1484.98	20.30

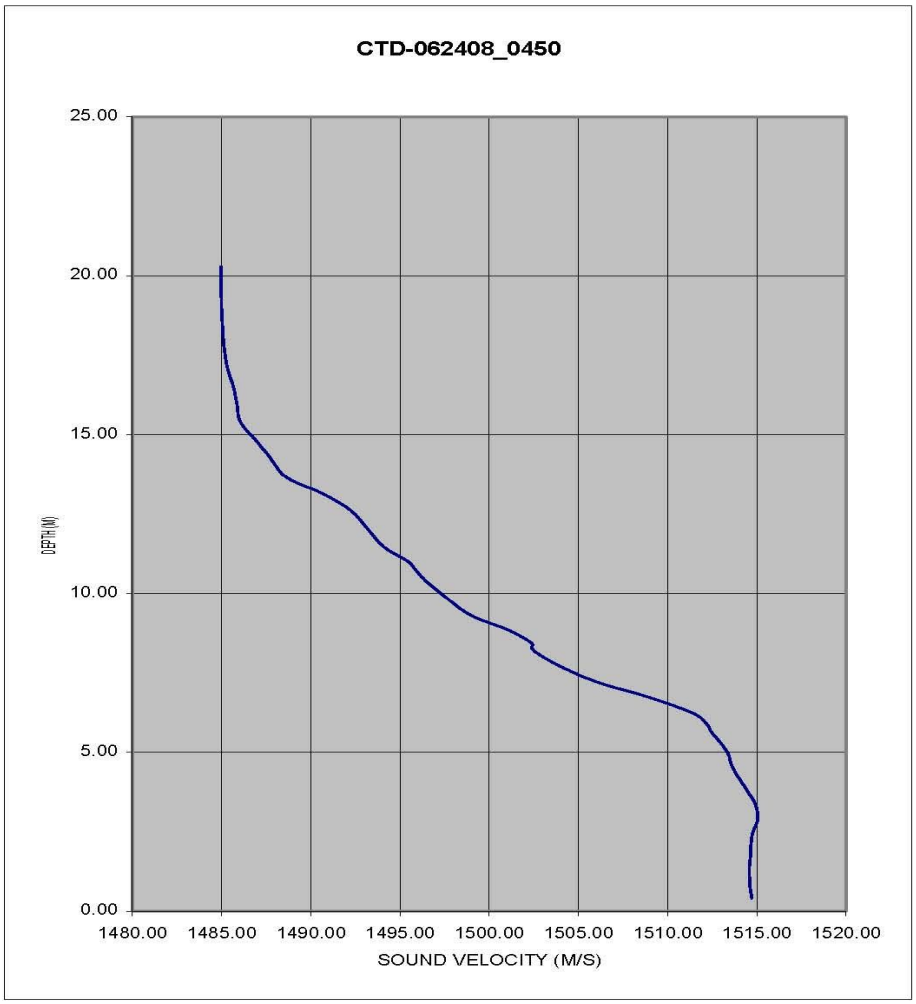


Figure 3.2-20
SVP 062408_0755 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 062408-0755

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/24/08	7:55	1020673	95659	63	40.42915984	73.86917248

1508.77	0.56
1508.52	1.20
1508.46	1.74
1508.46	2.32
1508.49	2.93
1508.53	3.55
1508.56	4.16
1508.58	4.78
1508.65	5.36
1508.72	5.95
1508.86	6.49
1508.90	6.97
1508.95	7.49
1509.00	8.04
1509.09	8.61
1509.17	9.19
1509.24	9.75
1509.21	10.31
1509.09	10.73
1508.86	11.11
1508.20	11.58
1507.07	12.11
1505.63	12.66
1503.91	13.23
1501.54	13.79
1499.11	14.28
1496.59	14.82
1493.61	15.41
1490.79	16.00
1489.44	16.58
1488.88	17.14
1488.60	17.72
1488.45	18.22
1488.13	18.81
1487.94	19.26

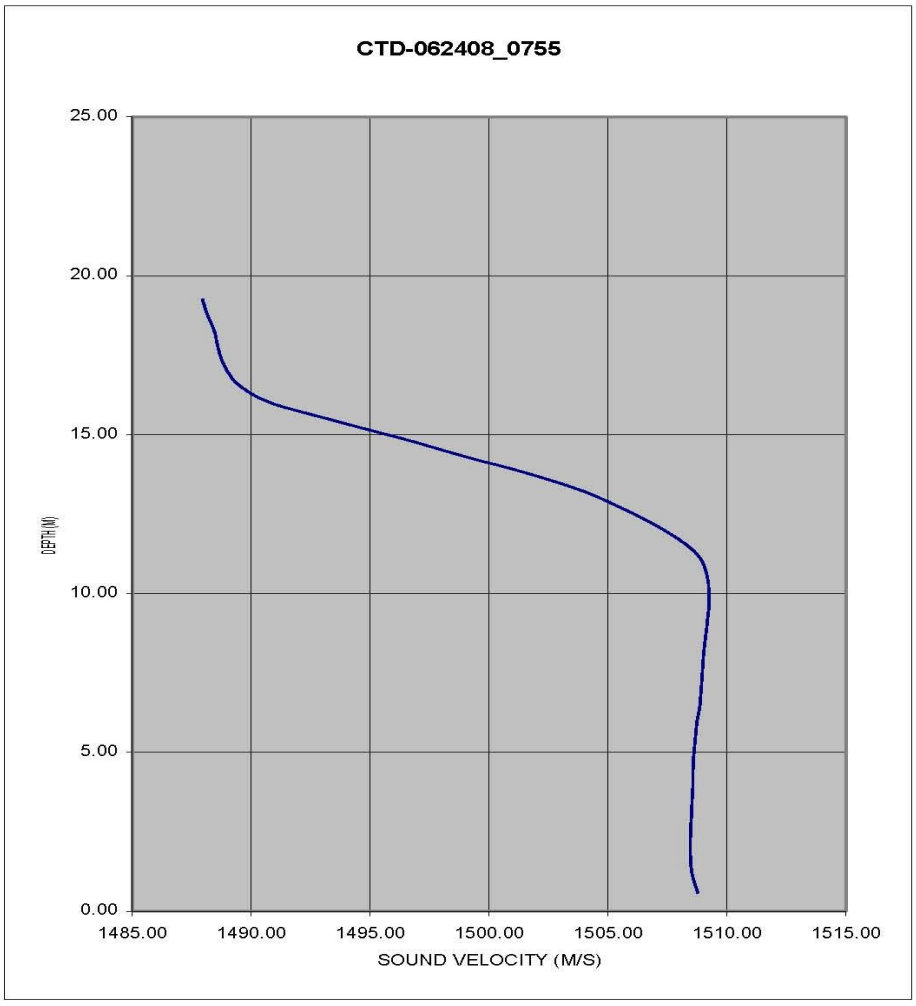


Figure 3.2-21
SVP 062408_1057 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 062408-1057

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/24/08	11:00	1019681	67626	70	40.35221741	73.87288276

1514.36	0.18
1513.82	0.89
1513.48	1.62
1513.32	2.34
1513.27	3.03
1513.23	3.64
1513.29	4.24
1513.48	4.85
1513.91	5.47
1514.21	6.09
1514.13	6.71
1513.41	7.37
1511.86	8.03
1509.84	8.72
1507.23	9.40
1504.86	10.10
1502.04	10.79
1499.36	11.46
1497.13	12.10
1495.37	12.75
1493.89	13.41
1491.65	14.08
1489.73	14.77
1488.33	15.45
1487.33	16.14
1486.49	16.82
1485.86	17.49
1485.37	18.14
1484.95	18.78
1484.77	19.42
1484.71	20.08
1484.68	20.75
1484.69	21.09
1484.71	21.16
1484.73	21.22
1484.71	21.29

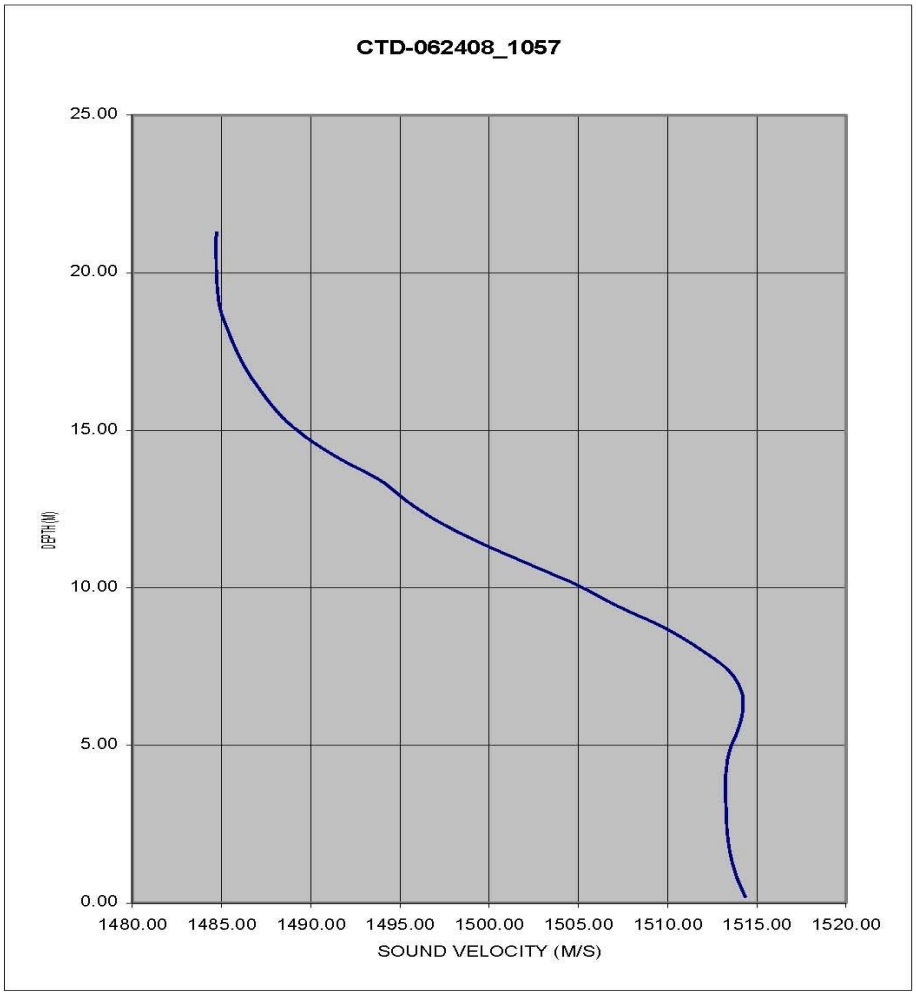


Figure 3.2-22
SVP 062408_1245 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 062408-1245

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/24/08	12:41	1011912	95579	76	40.42897333	73.90064301

1513.50	0.77
1512.16	1.58
1510.67	2.34
1509.32	3.12
1508.27	3.83
1507.93	4.48
1507.81	5.12
1507.85	5.74
1508.00	6.35
1508.14	6.94
1508.30	7.53
1508.48	8.13
1508.87	8.73
1508.02	9.34
1503.74	9.94
1500.05	10.55
1497.94	11.16
1496.21	11.77
1494.81	12.40
1493.72	13.04
1492.31	13.70
1491.03	14.36
1490.24	15.03
1489.71	15.70
1489.39	16.37
1489.14	17.03
1488.80	17.70
1488.55	18.36
1488.37	19.02
1488.19	19.69
1487.96	20.35
1487.79	21.03
1487.70	21.70
1487.67	22.37
1487.67	23.05
1487.70	23.29

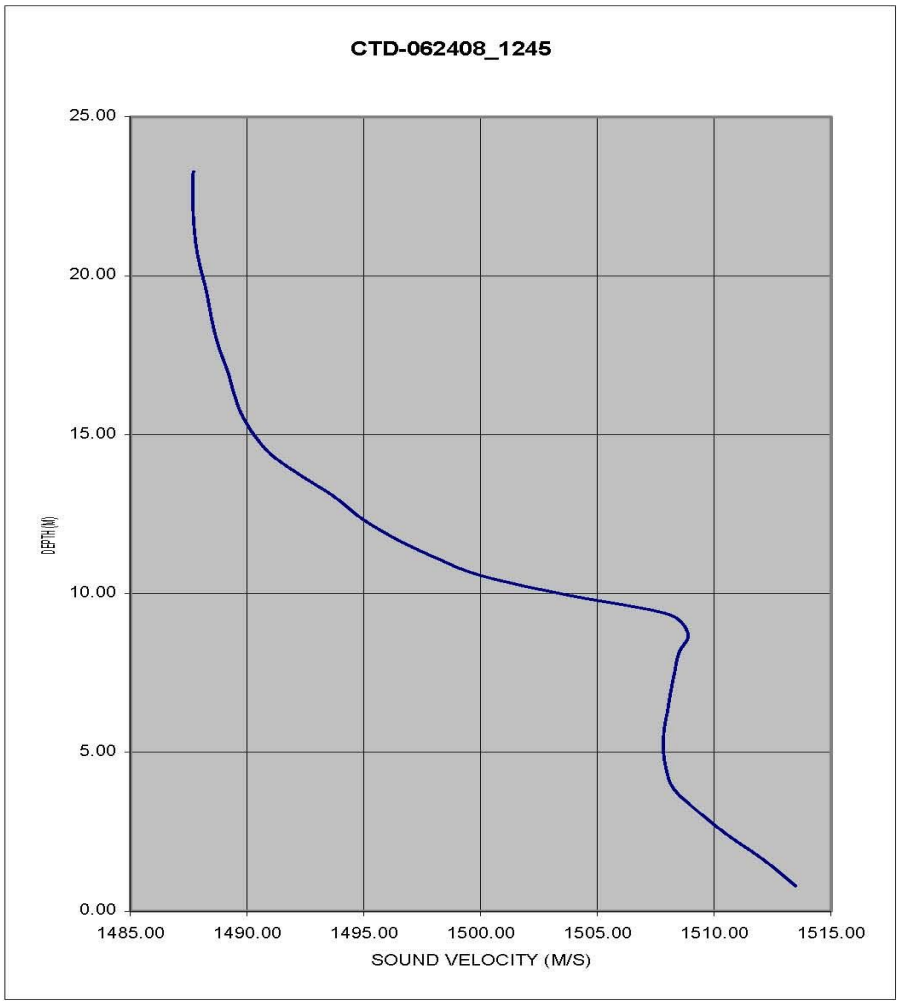


Figure 3.2-23
SVP 062408_1518 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 062408-1518

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/24/08	15:22	1011876	67543	52	40.35201761	73.90088461

1515.52	0.36
1514.75	0.93
1514.15	1.47
1513.65	1.93
1513.41	2.24
1513.23	2.65
1513.18	3.14
1513.20	3.65
1513.31	4.16
1513.31	4.65
1513.32	5.11
1513.31	5.54
1513.09	5.99
1512.87	6.45
1512.58	6.94
1512.18	7.46
1511.14	7.95
1508.37	8.42
1504.47	8.88
1498.97	9.36
1495.23	9.81
1494.32	10.13
1493.42	10.48
1492.77	10.99
1491.89	11.60
1490.94	12.25
1490.08	12.92
1489.36	13.60
1488.99	14.28
1488.86	14.95
1488.80	15.61
1489.18	15.88
1489.51	15.93

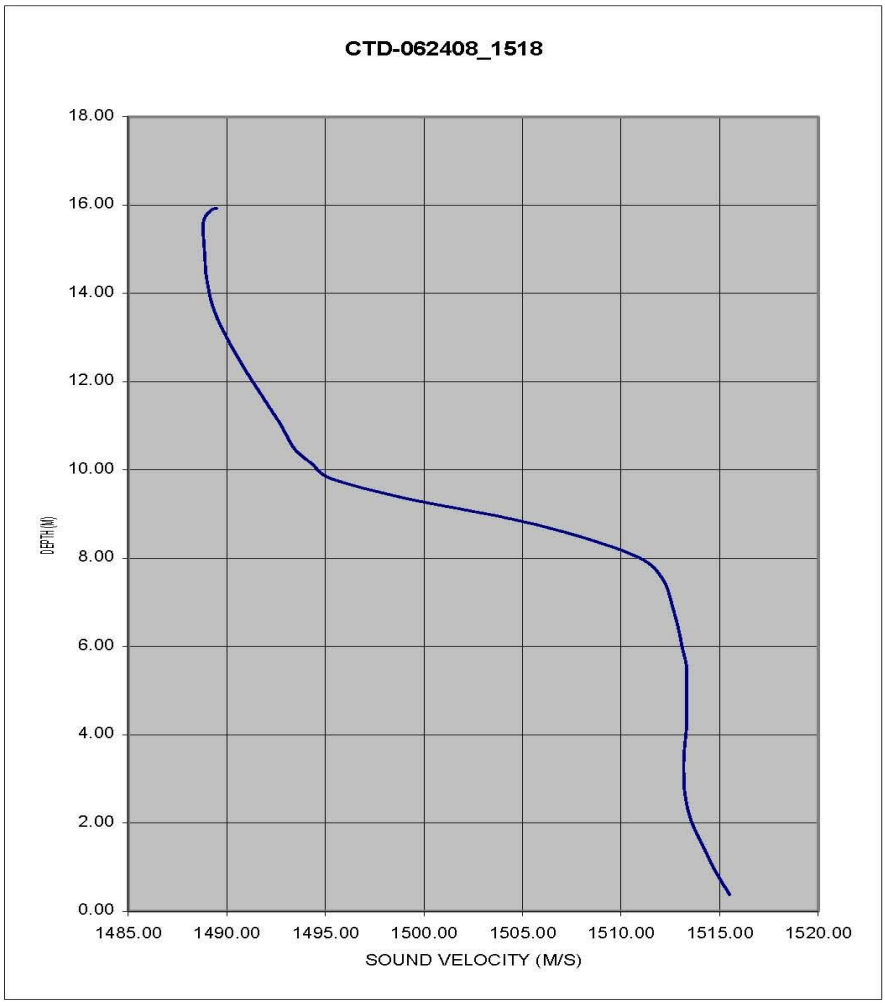


Figure 3.2-24
SVP 062408_1629 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 062408-1629

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
06/24/08	16:29	1011881	95279	74	40.42814915	73.90075479

1512.84	0.28
1512.51	0.98
1511.98	1.83
1510.20	2.66
1508.50	3.47
1508.17	4.23
1508.38	4.95
1508.66	5.62
1508.91	6.25
1509.04	6.81
1509.36	7.37
1509.55	7.93
1509.19	8.50
1506.36	9.08
1501.86	9.67
1498.56	10.26
1496.52	10.86
1495.16	11.44
1494.02	12.03
1493.20	12.62
1492.51	13.21
1491.31	13.81
1490.10	14.41
1489.28	15.02
1488.57	15.67
1488.08	16.36
1487.82	17.03
1487.68	17.69
1487.58	18.35
1487.49	19.01
1487.44	19.68
1487.35	20.35
1487.25	21.01
1487.19	21.67
1487.18	22.29
1487.18	22.54

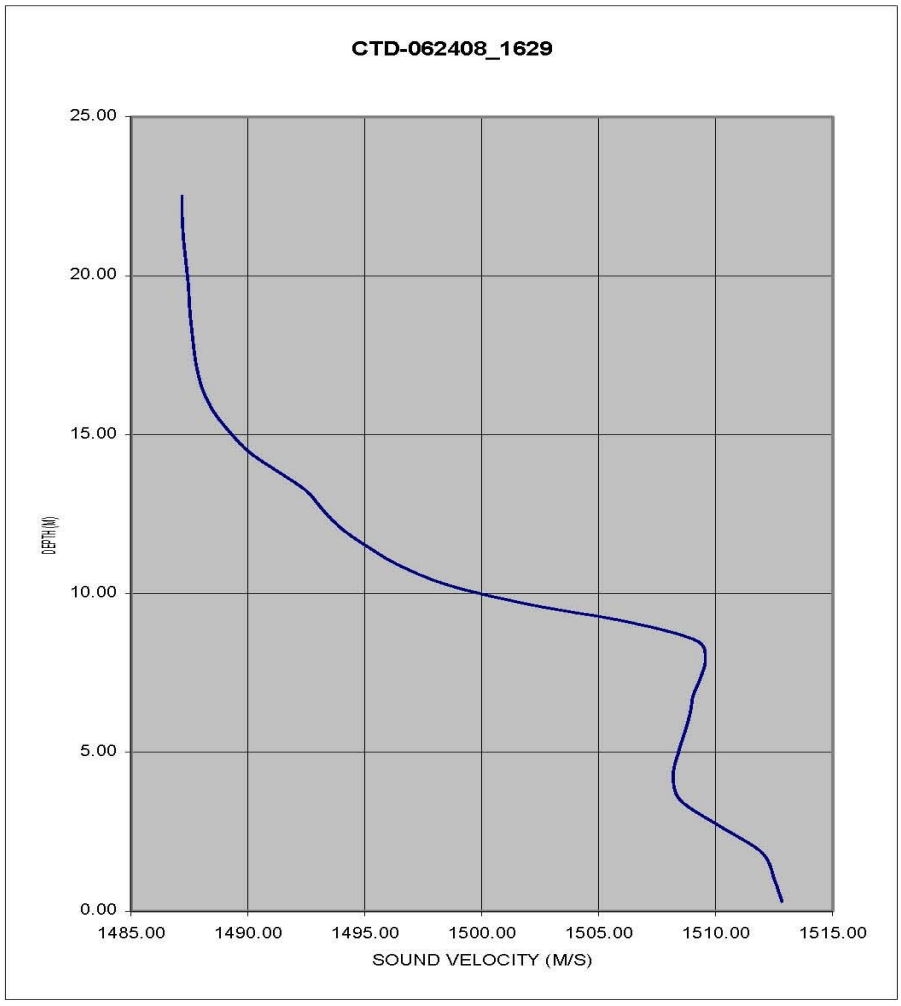


Figure 3.2-25
SVP 070708_1114 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 070708-1114

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/07/08	11:18	1012053	95203	77	40.42793995	73.90013745

1517.49	0.68
1516.81	1.44
1515.60	2.20
1513.99	2.93
1511.67	3.68
1509.63	4.41
1508.11	5.10
1505.95	5.81
1503.92	6.52
1502.60	7.24
1501.94	7.96
1501.25	8.67
1500.50	9.39
1499.88	10.09
1499.45	10.80
1499.10	11.53
1498.62	12.25
1497.82	12.98
1496.91	13.70
1496.28	14.44
1496.00	15.18
1495.87	15.93
1495.76	16.65
1495.65	17.35
1495.55	18.07
1495.40	18.82
1495.14	19.57
1494.95	20.32
1494.67	21.07
1494.10	21.81
1493.69	22.54
1493.58	23.24
1493.58	23.51

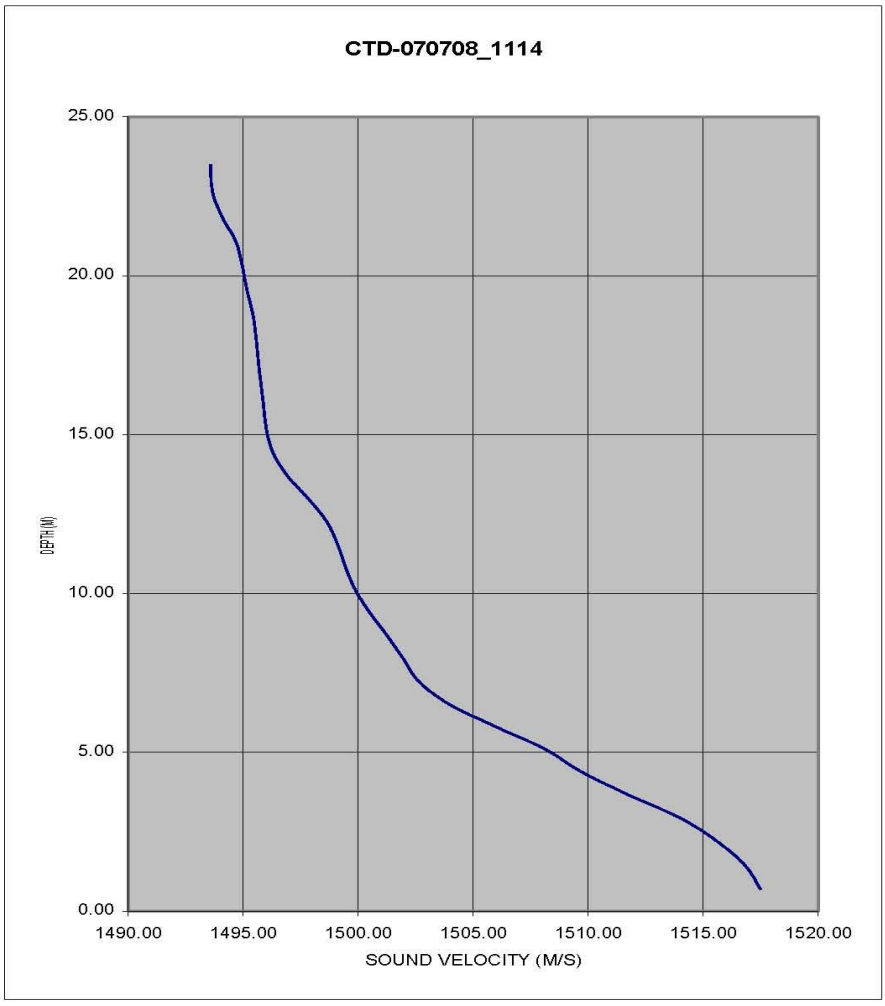


Figure 3.2-26
SVP 070808_0828 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 070808-0828

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/08/08	8:31	1012871	95349	74	40.42833901	73.89719735

1514.94	0.11
1514.75	0.71
1515.22	1.38
1516.22	2.08
1517.03	2.87
1517.67	3.61
1518.34	4.31
1518.78	4.99
1519.19	5.65
1519.31	6.27
1519.23	6.88
1519.12	7.47
1519.02	8.07
1518.77	8.67
1518.41	9.29
1517.44	9.91
1514.71	10.53
1510.72	11.17
1506.01	11.84
1502.22	12.49
1499.61	13.15
1498.22	13.81
1497.64	14.48
1497.37	15.14
1497.20	15.79
1497.03	16.45
1496.87	17.12
1496.75	17.81
1496.68	18.51
1496.64	19.20
1496.62	19.90
1496.61	20.60
1496.61	21.29
1496.60	21.97
1496.67	22.52
1496.98	22.61

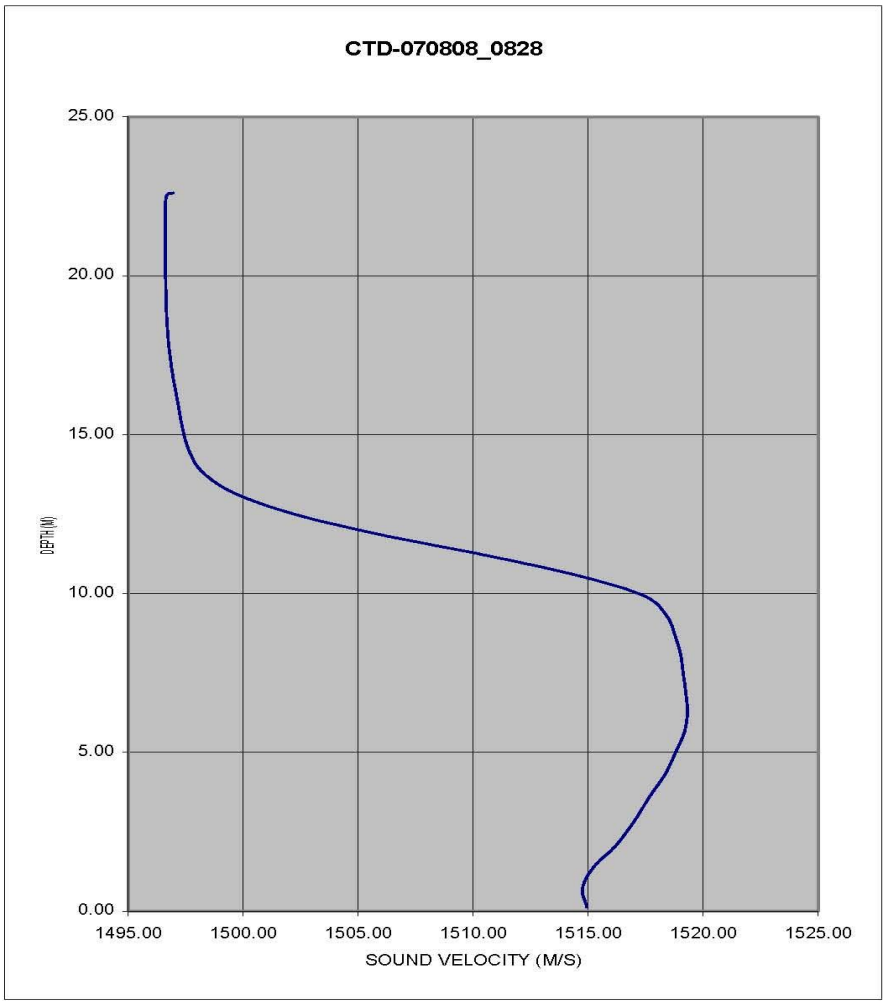


Figure 3.2-27
SVP 070808_1120 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 070808-1120

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/08/08	11:23	1012528	67724	54	40.35251260	73.89854437

1518.31	0.59
1518.77	1.30
1519.22	2.09
1519.31	2.89
1518.64	3.69
1517.44	4.49
1516.27	5.29
1515.08	6.08
1511.28	6.83
1505.34	7.56
1502.12	8.27
1500.36	8.99
1498.89	9.74
1497.90	10.46
1497.50	11.18
1496.97	11.87
1496.30	12.56
1495.83	13.26
1495.44	13.98
1495.09	14.69
1494.87	15.40
1494.73	16.10
1494.67	16.40

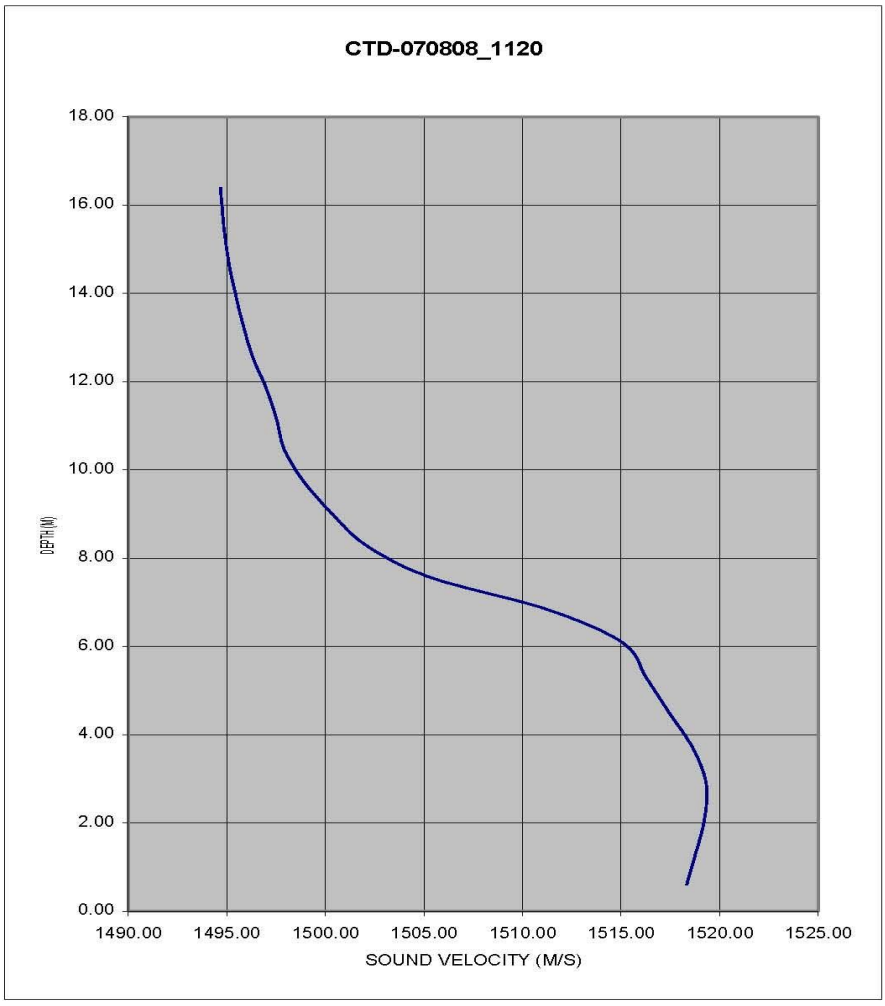


Figure 3.2-28
SVP 070808_1227 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 070808-1227

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/08/08	12:28	1013237	95629	77	40.42910552	73.89588281

1519.62	0.38
1518.99	1.06
1518.56	1.75
1518.29	2.46
1518.08	3.16
1516.35	3.85
1512.99	4.51
1511.30	5.15
1510.79	5.79
1509.84	6.42
1508.35	7.02
1507.47	7.60
1506.54	8.16
1505.13	8.71
1502.60	9.28
1499.74	9.85
1497.92	10.45
1497.09	11.07
1496.78	11.68
1496.65	12.29
1496.58	12.89
1496.54	13.48
1496.50	14.06
1496.44	14.65
1496.39	15.23
1496.36	15.84
1496.33	16.46
1496.30	17.08
1496.27	17.71
1496.24	18.35
1496.23	19.00
1496.22	19.67
1496.23	20.34
1496.22	21.01
1496.22	21.68
1496.22	22.32
1496.22	22.95
1496.34	23.33

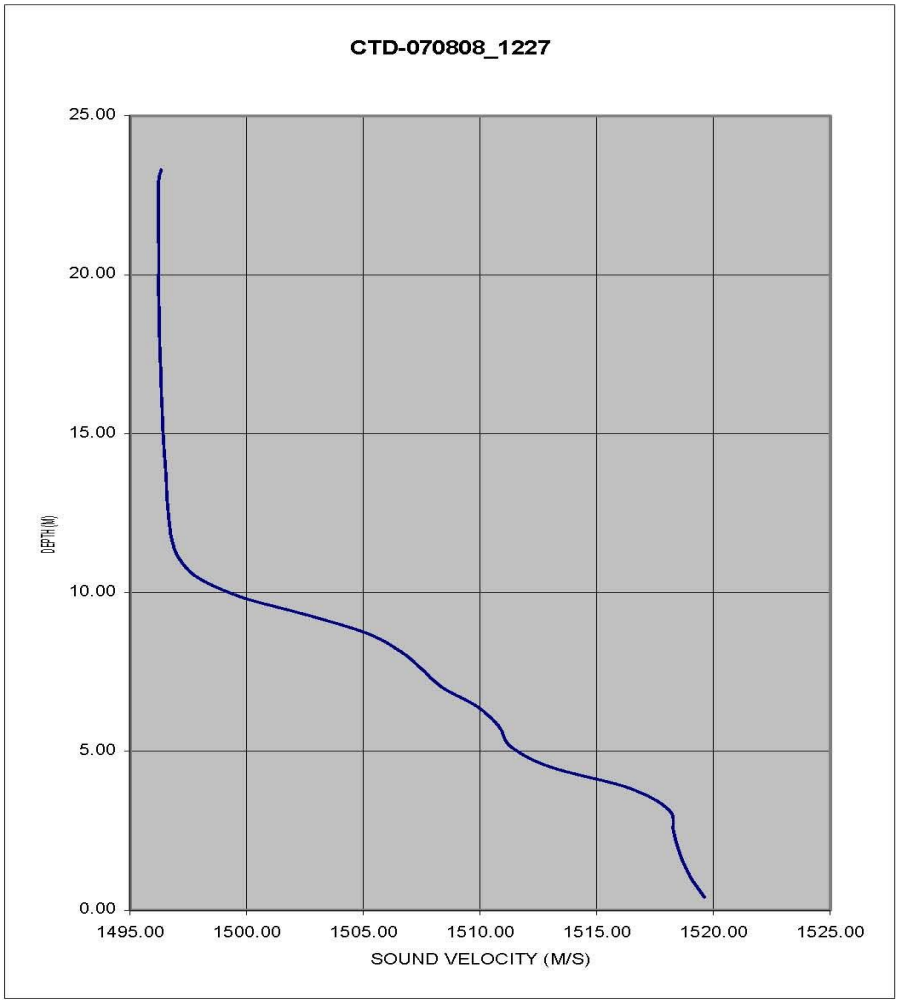


Figure 3.2-29
SVP 070808_1517 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 070808-1517

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/08/08	15:17	1013398	68085	54	40.35350131	73.89542263

1520.09	0.30
1520.00	1.05
1520.04	1.78
1520.18	2.46
1520.22	3.09
1520.22	3.72
1520.00	4.36
1519.58	4.98
1518.87	5.60
1517.15	6.27
1514.62	6.94
1511.10	7.62
1504.16	8.28
1499.14	8.94
1497.15	9.60
1496.38	10.25
1496.09	10.89
1495.96	11.54
1495.87	12.19
1495.82	12.86
1495.73	13.53
1495.53	14.23
1495.38	14.93
1495.29	15.63
1495.31	16.25
1495.65	16.40

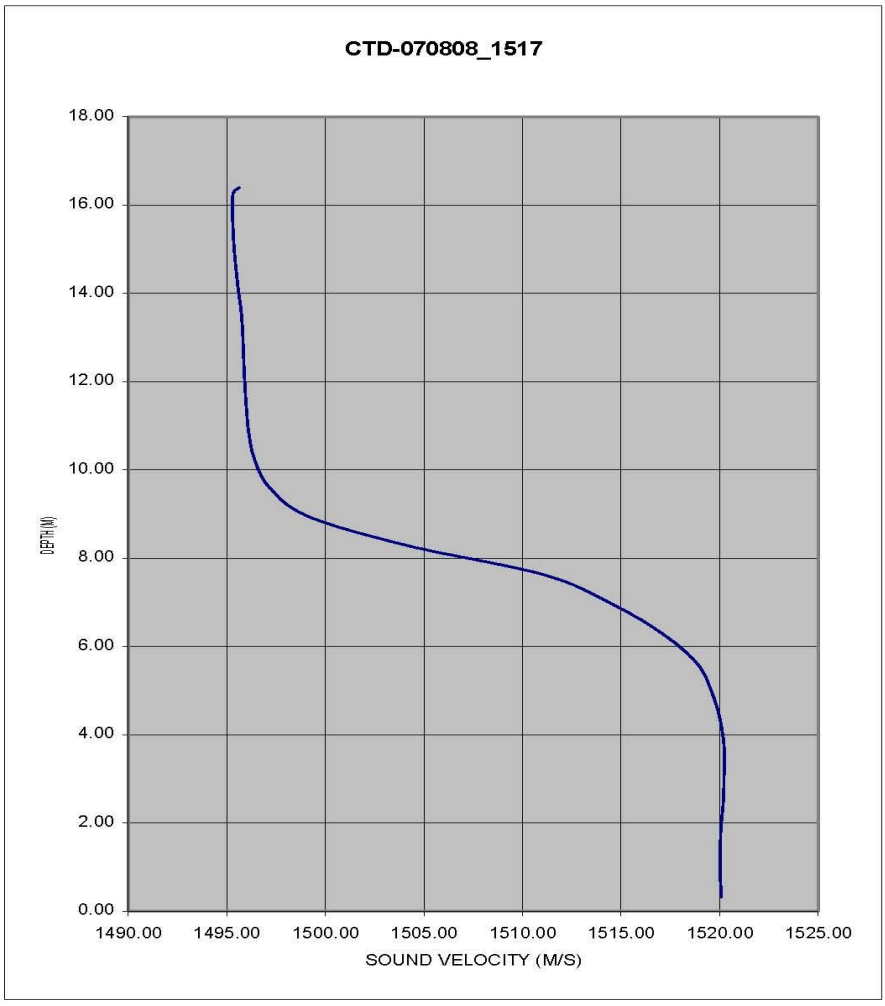


Figure 3.2-30
SVP 071708_0844 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 071708-0844

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/17/08	8:49	1014624	75720	75	40.37445397	73.89099108

1515.94	0.42
1515.61	1.02
1515.68	1.66
1515.68	2.32
1515.57	2.98
1515.72	3.67
1515.69	4.36
1515.54	5.11
1514.97	5.81
1514.05	6.46
1513.47	7.10
1512.14	7.73
1509.61	8.38
1507.47	9.03
1505.64	9.67
1503.77	10.32
1501.46	10.96
1499.77	11.60
1497.76	12.25
1496.23	12.91
1495.38	13.58
1494.90	14.24
1494.69	14.92
1494.57	15.60
1494.37	16.27
1494.16	16.95
1494.03	17.62
1493.94	18.29
1493.87	18.96
1493.79	19.63
1493.69	20.29
1493.52	20.97
1493.30	21.63
1493.12	22.30
1493.07	22.70

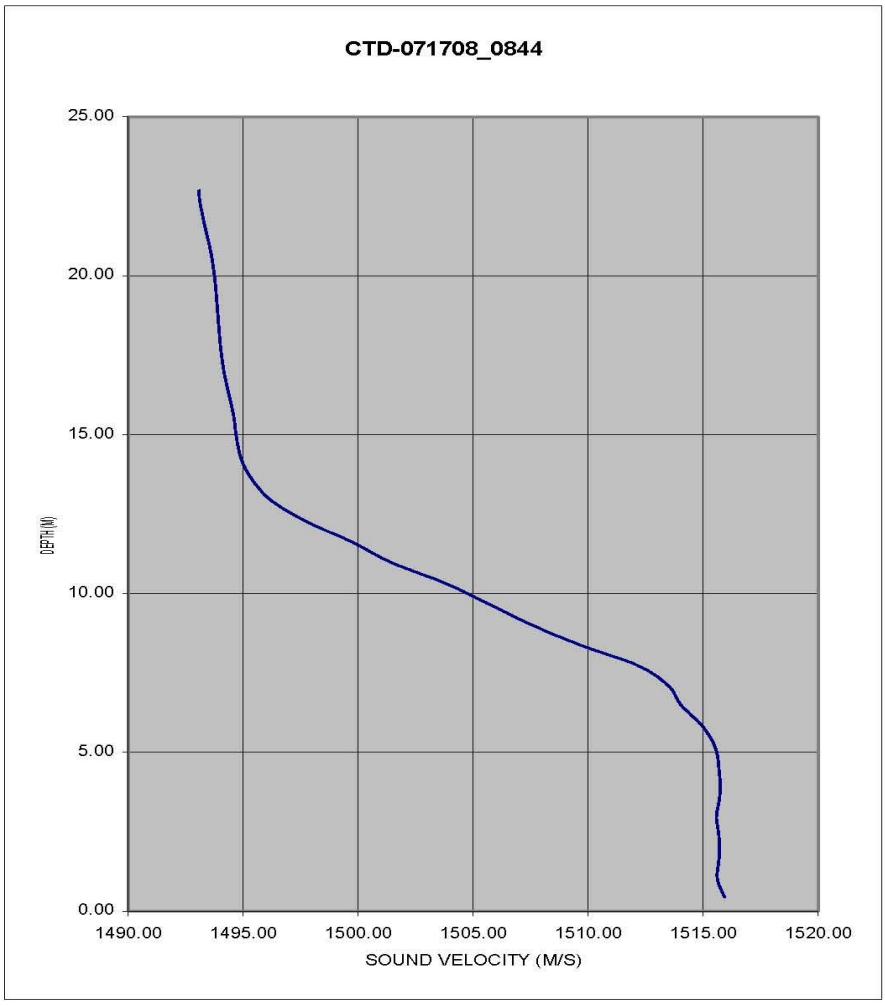


Figure 3.2-31
SVP 071708_1139 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 071708-1139

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/17/08	11:43	1014534	95829	69	40.42964964	73.89122221

1521.99	0.05
1520.57	0.41
1518.72	0.87
1517.52	1.56
1516.72	2.38
1516.42	3.18
1515.71	3.96
1514.46	4.77
1512.66	5.58
1510.54	6.36
1508.96	7.10
1507.41	7.80
1506.15	8.46
1505.38	9.14
1504.98	9.78
1504.56	10.47
1504.07	11.23
1502.99	12.02
1500.86	12.81
1498.77	13.58
1497.84	14.33
1497.53	15.07
1497.40	15.82
1497.34	16.57
1497.32	17.32
1497.29	18.07
1497.22	18.81
1497.12	19.55
1496.96	20.28
1496.77	20.97
1496.98	21.16

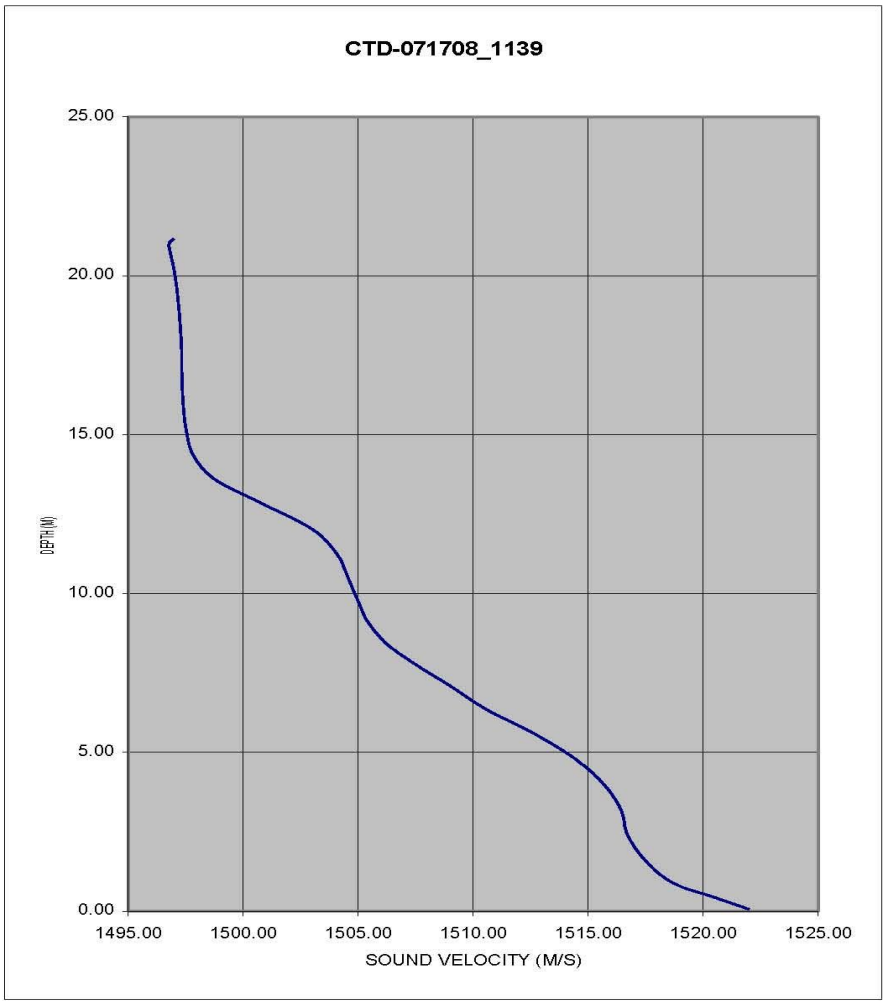


Figure 3.2-32
SVP 071708_1422 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 071708-1422

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/17/08	14:26	1014465	67808	60	40.35273776	73.89159726

1521.15	0.65
1518.71	1.45
1517.79	2.28
1516.53	3.09
1514.97	3.90
1513.81	4.64
1513.16	5.36
1512.96	6.03
1512.63	6.66
1511.92	7.29
1511.18	7.93
1509.49	8.57
1507.69	9.23
1506.57	9.89
1505.38	10.55
1504.36	11.21
1503.30	11.87
1501.33	12.53
1499.26	13.17
1497.69	13.82
1496.25	14.47
1495.36	15.12
1494.99	15.79
1494.85	16.46
1494.78	17.14
1494.90	17.70
1495.43	17.88
1496.18	17.96

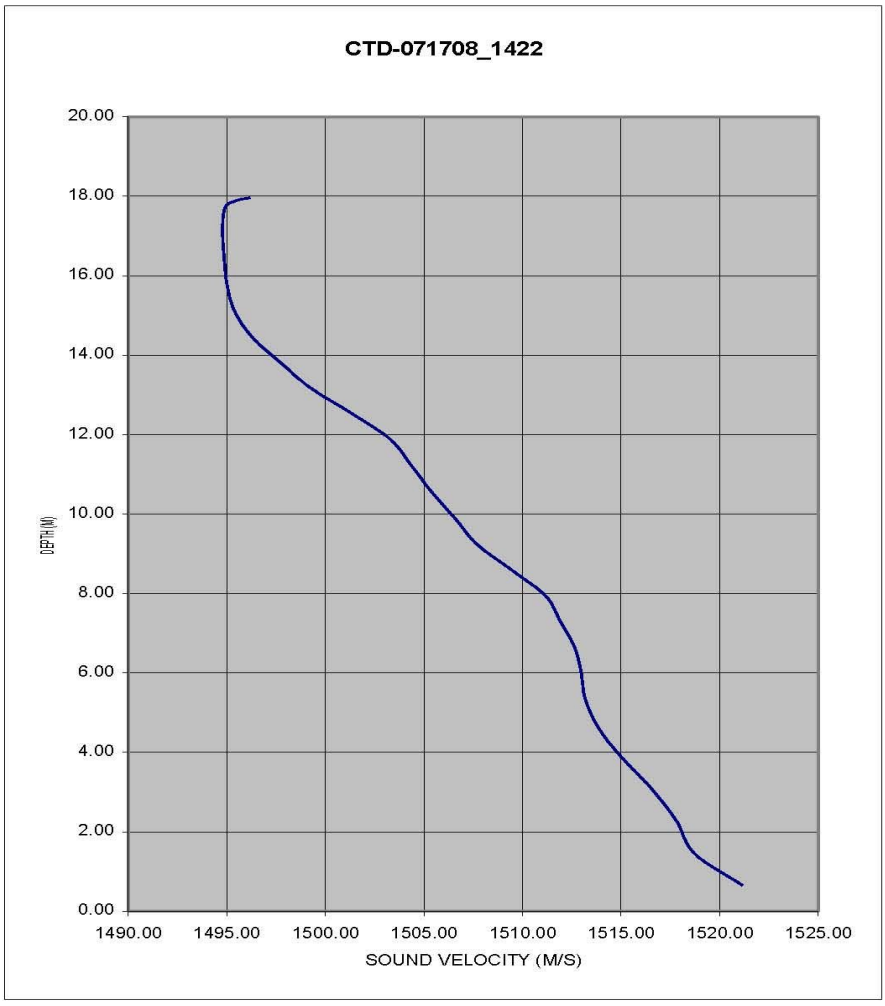


Figure 3.2-33
SVP 071708_1524 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 071708-1524

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/17/08	15:27	1015210	95797	65	40.42956002	73.88879521

1522.38	0.37
1521.47	1.07
1520.20	1.80
1518.61	2.52
1516.93	3.23
1515.67	3.96
1514.01	4.69
1513.50	5.37
1514.02	6.02
1514.49	6.68
1514.70	7.38
1514.45	8.10
1513.60	8.79
1512.19	9.45
1510.46	10.09
1509.40	10.73
1507.89	11.37
1506.16	12.00
1505.00	12.63
1503.63	13.25
1501.98	13.88
1500.50	14.50
1499.26	15.14
1498.24	15.79
1497.44	16.44
1496.88	17.09
1496.58	17.74
1496.46	18.38
1496.42	19.02
1496.48	19.61
1496.90	19.79

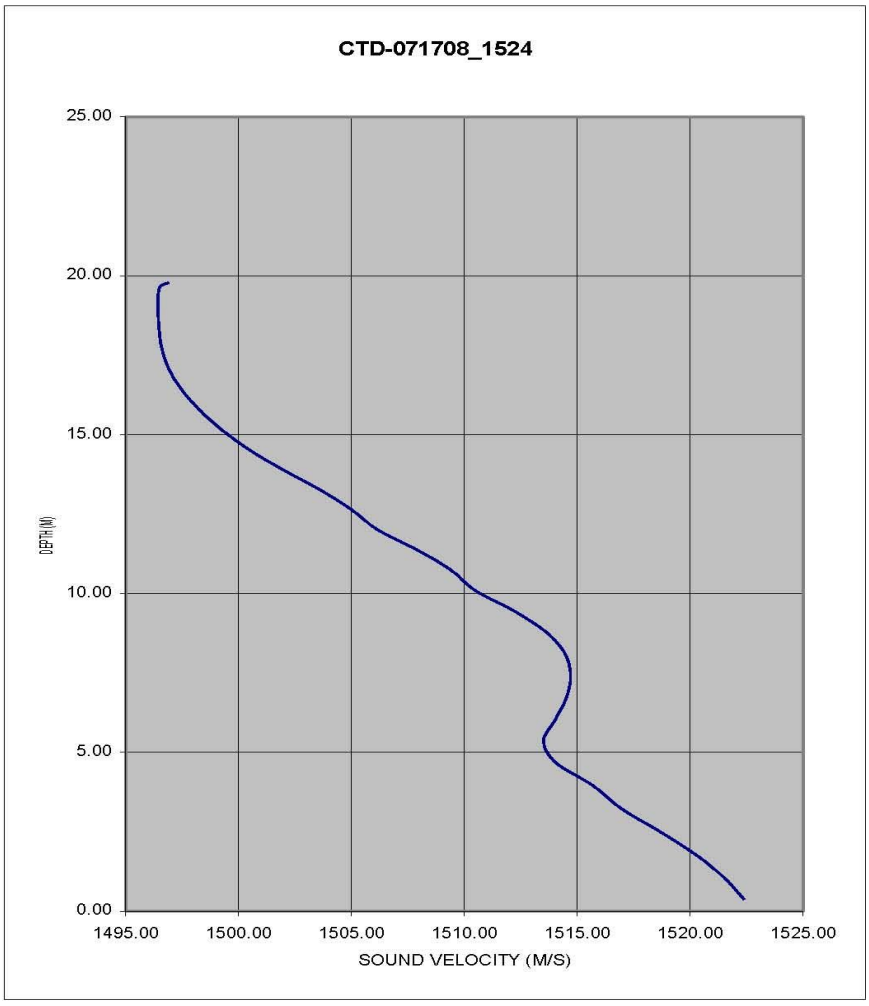


Figure 3.2-34
SVP 071708_1824 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 071708-1824

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/17/08	18:29	1013673	68579	62	40.35485570	73.89443482

1521.59	0.55
1521.52	1.29
1521.18	1.94
1520.40	2.53
1518.70	3.13
1517.15	3.74
1516.34	4.33
1515.89	4.90
1514.90	5.46
1513.71	6.03
1512.98	6.60
1512.53	7.15
1512.19	7.70
1511.91	8.24
1511.37	8.79
1510.57	9.34
1509.49	9.89
1507.85	10.44
1505.57	11.03
1503.32	11.64
1501.36	12.31
1499.54	12.98
1497.68	13.68
1496.25	14.38
1495.41	15.08
1495.05	15.78
1494.88	16.47
1494.81	17.14
1494.77	17.81
1494.76	18.46
1495.07	18.71

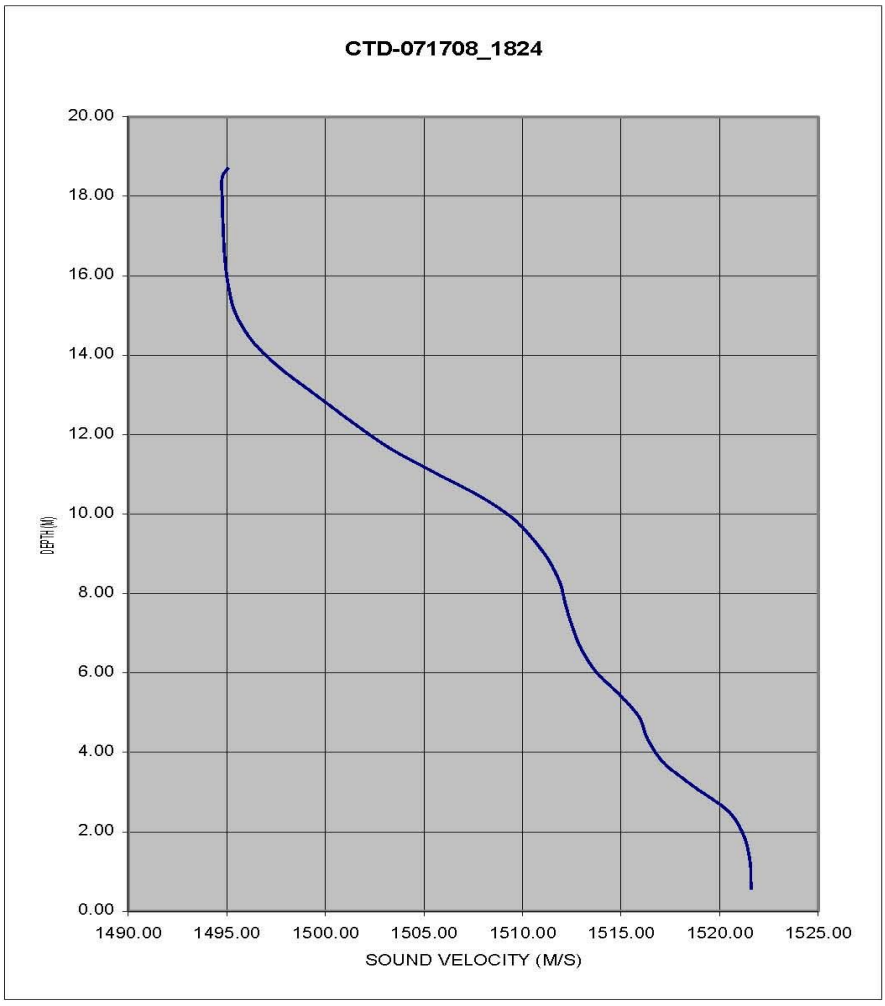


Figure 3.2-35
SVP 071808_0836 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 071808-0836

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/18/08	8:36	1016494	94757	68	40.42670061	73.88418800

1516.80	0.19
1516.73	0.93
1516.69	1.68
1516.46	2.47
1516.12	3.24
1515.39	3.97
1513.92	4.67
1512.40	5.36
1511.55	6.05
1510.96	6.74
1510.33	7.42
1509.22	8.07
1507.14	8.72
1505.91	9.36
1505.27	10.03
1503.49	10.72
1501.33	11.41
1500.35	12.08
1499.97	12.75
1499.61	13.42
1498.95	14.10
1497.99	14.79
1497.00	15.49
1496.45	16.18
1496.20	16.89
1495.93	17.60
1495.44	18.31
1494.82	19.02
1494.42	19.73
1494.32	20.40
1494.55	20.63

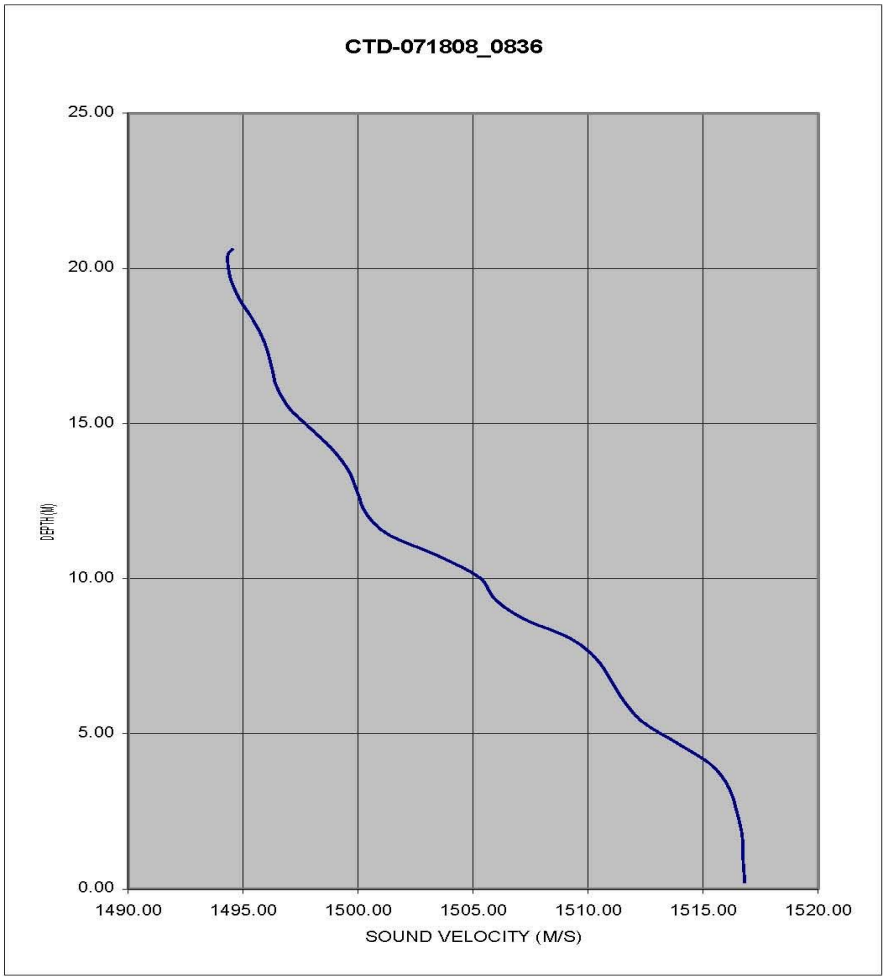


Figure 3.2-36
SVP 071808_1126 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 071808-1126

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/18/08	11:29	1015531	67985	63	40.35322036	73.88776981

1519.40	0.50
1518.25	1.15
1517.47	1.81
1516.77	2.52
1516.38	3.22
1516.17	3.88
1516.08	4.51
1515.88	5.14
1515.62	5.77
1515.46	6.44
1514.79	7.14
1512.83	7.83
1509.80	8.48
1505.02	9.11
1500.41	9.72
1497.79	10.37
1496.69	10.94
1496.29	11.44
1496.04	11.93
1495.89	12.40
1495.63	12.93
1495.33	13.56
1495.22	14.19
1495.10	14.77
1495.00	15.34
1494.86	15.97
1494.75	16.65
1494.68	17.37
1494.65	18.11
1494.71	18.78
1495.09	19.04
1495.37	19.12

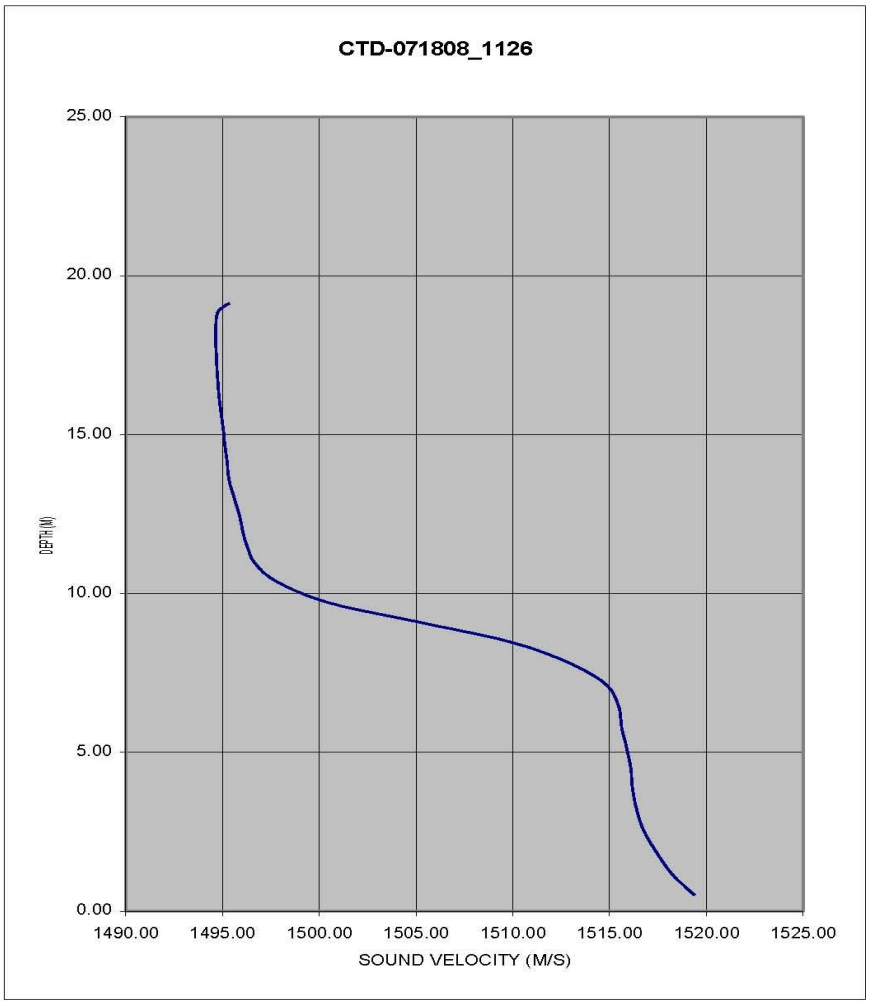


Figure 3.2-37
SVP 071808_1411 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 071808-1411

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/18/08	14:19	1017465	95669	62	40.42920050	73.88069736

1524.50	0.26
1524.02	0.98
1521.24	1.75
1518.45	2.54
1516.92	3.28
1516.66	4.01
1517.11	4.65
1517.35	5.30
1516.46	5.97
1515.29	6.64
1513.73	7.31
1511.65	8.00
1509.88	8.67
1508.88	9.32
1508.15	9.98
1507.17	10.62
1505.97	11.26
1504.53	11.92
1503.12	12.58
1501.58	13.25
1500.47	13.92
1499.56	14.61
1498.67	15.31
1497.43	16.01
1496.32	16.74
1495.71	17.48
1495.46	18.22
1495.44	18.86
1495.88	19.02

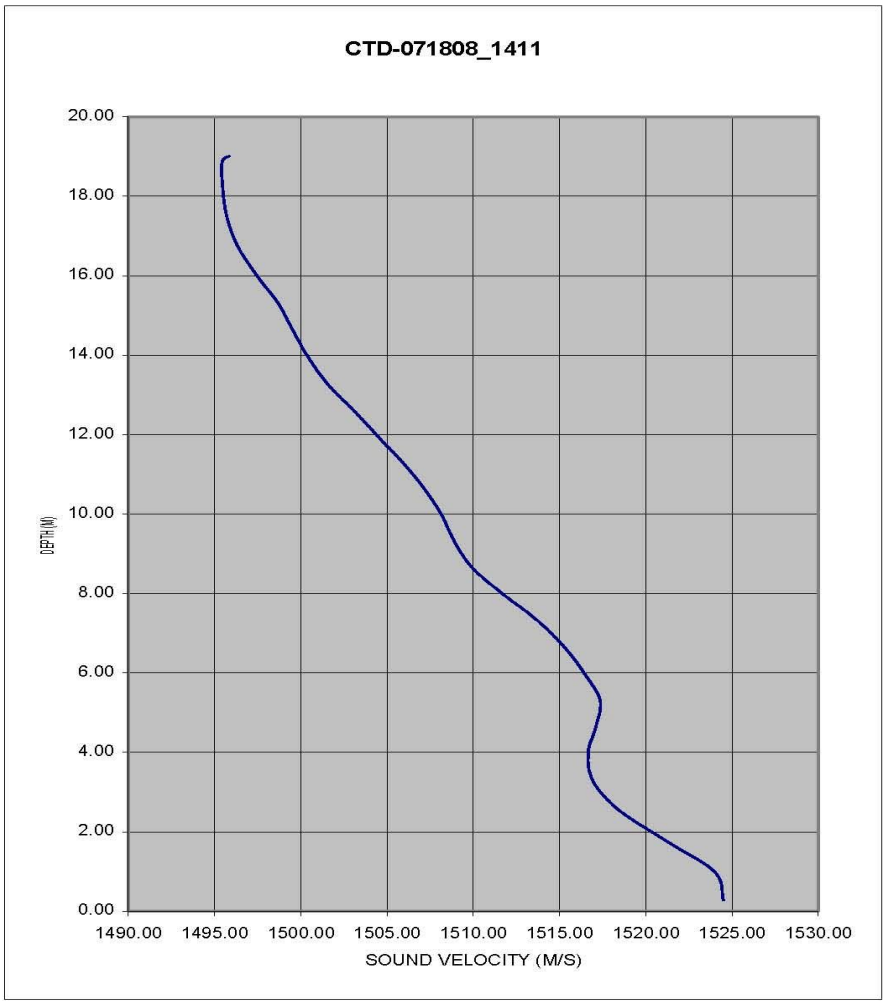


Figure 3.2-38
SVP 071808_1609 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 071808-1609

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/18/08	16:16	1015835	95425	65	40.42853681	73.88655142

1522.03	0.39
1521.53	1.11
1520.17	1.83
1518.18	2.52
1516.95	3.17
1516.10	3.83
1515.12	4.49
1514.04	5.14
1513.40	5.77
1513.02	6.40
1512.63	7.02
1512.24	7.63
1511.39	8.23
1510.42	8.84
1509.81	9.44
1509.52	10.03
1509.06	10.60
1508.05	11.18
1506.21	11.76
1503.85	12.35
1502.12	12.94
1501.12	13.52
1500.21	14.10
1499.03	14.71
1497.54	15.33
1496.47	15.95
1495.90	16.59
1495.61	17.24
1495.49	17.90
1495.43	18.57
1495.39	19.26
1495.74	19.60

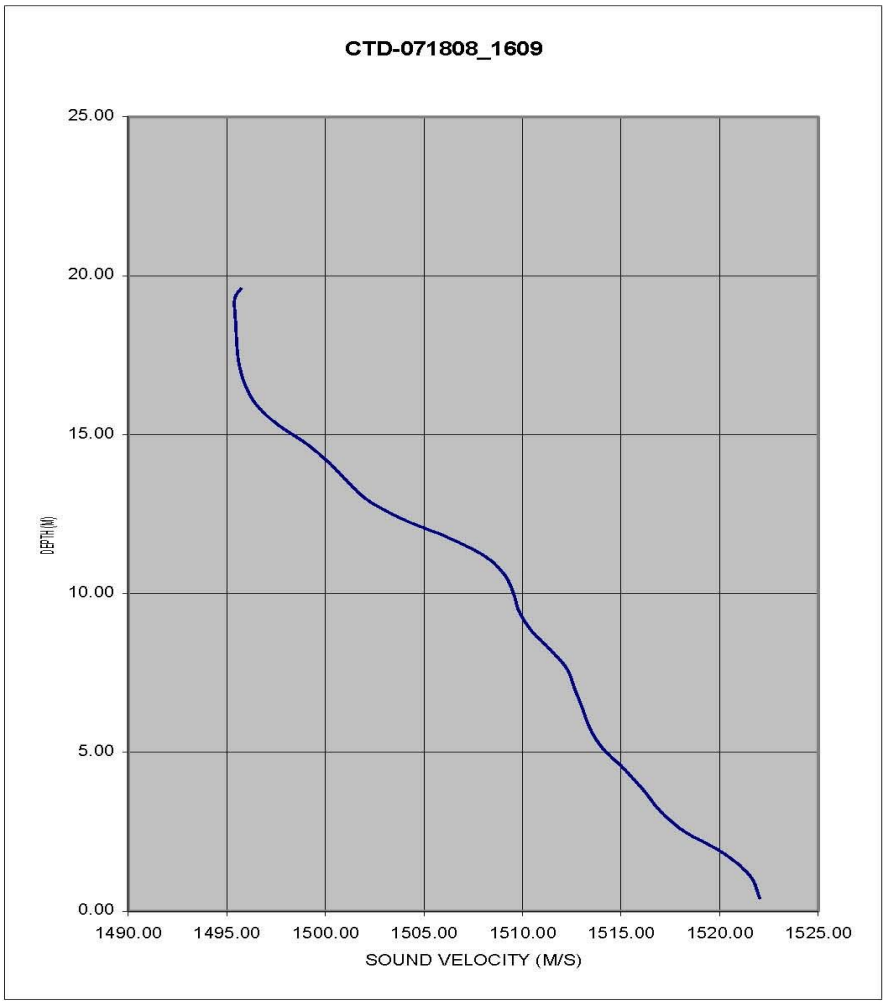


Figure 3.2-39
SVP 072308_0753 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 072308-0753

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/23/08	7:57	1017575	95524	63	40.42880246	73.88030154

1515.13	0.46
1514.94	1.29
1514.25	2.12
1512.48	2.82
1510.98	3.55
1510.27	4.15
1509.63	4.86
1509.02	5.53
1508.53	6.22
1507.82	6.94
1506.35	7.65
1503.41	8.35
1501.69	9.05
1501.04	9.73
1499.85	10.35
1498.68	10.91
1496.42	11.59
1494.59	12.21
1493.65	12.81
1492.81	13.49
1491.86	14.17
1489.51	14.86
1487.18	15.54
1485.91	16.23
1484.60	16.92
1483.43	17.58
1482.65	18.27
1482.27	18.96
1482.50	19.27

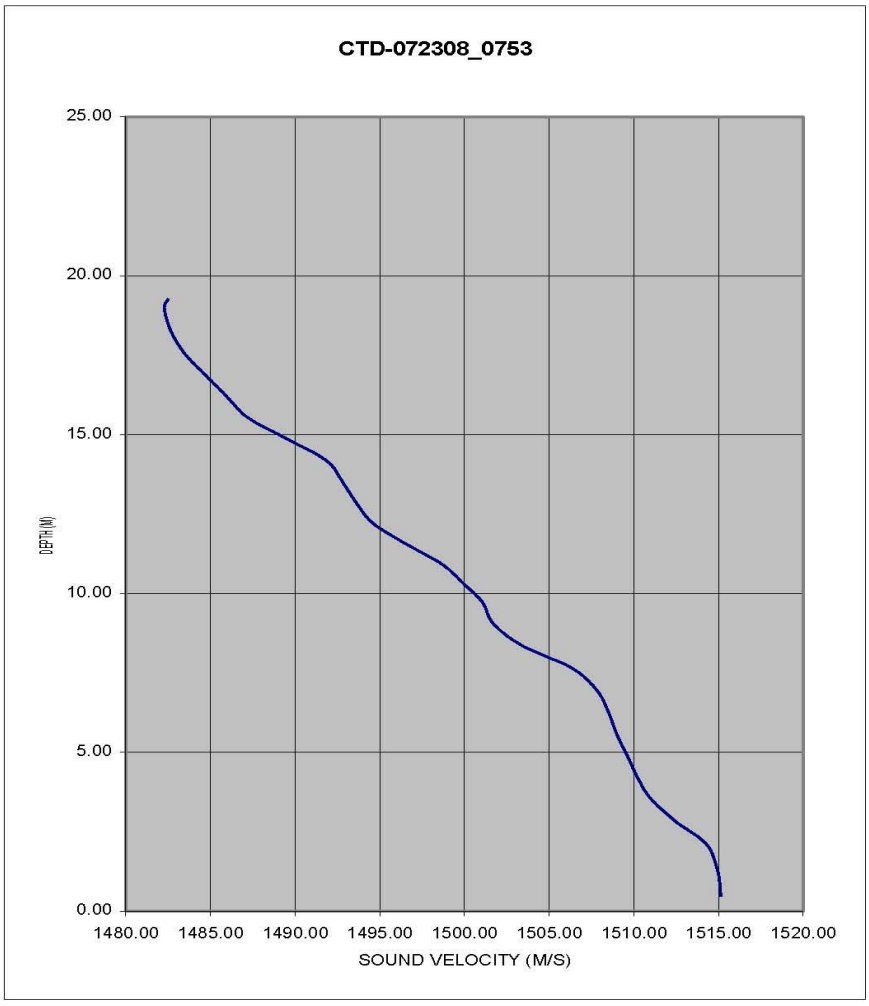


Figure 3.2-40
SVP 072308_1037 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 072308-1037

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/23/08	10:37	1016942	68076	66	40.35346429	73.88270751

1517.45	0.63
1517.46	1.31
1517.42	1.96
1516.93	2.60
1516.23	3.23
1515.82	3.84
1514.67	4.44
1513.08	5.03
1511.34	5.61
1509.99	6.19
1508.14	6.77
1505.50	7.35
1503.52	7.94
1502.07	8.54
1501.06	9.14
1500.13	9.75
1497.60	10.38
1494.95	11.02
1493.64	11.68
1493.08	12.33
1492.77	12.98
1492.53	13.63
1492.00	14.28
1491.06	14.94
1490.45	15.59
1489.99	16.22
1489.34	16.83
1488.26	17.44
1487.02	18.05
1485.81	18.67
1484.77	19.32
1484.36	19.85
1484.87	19.98

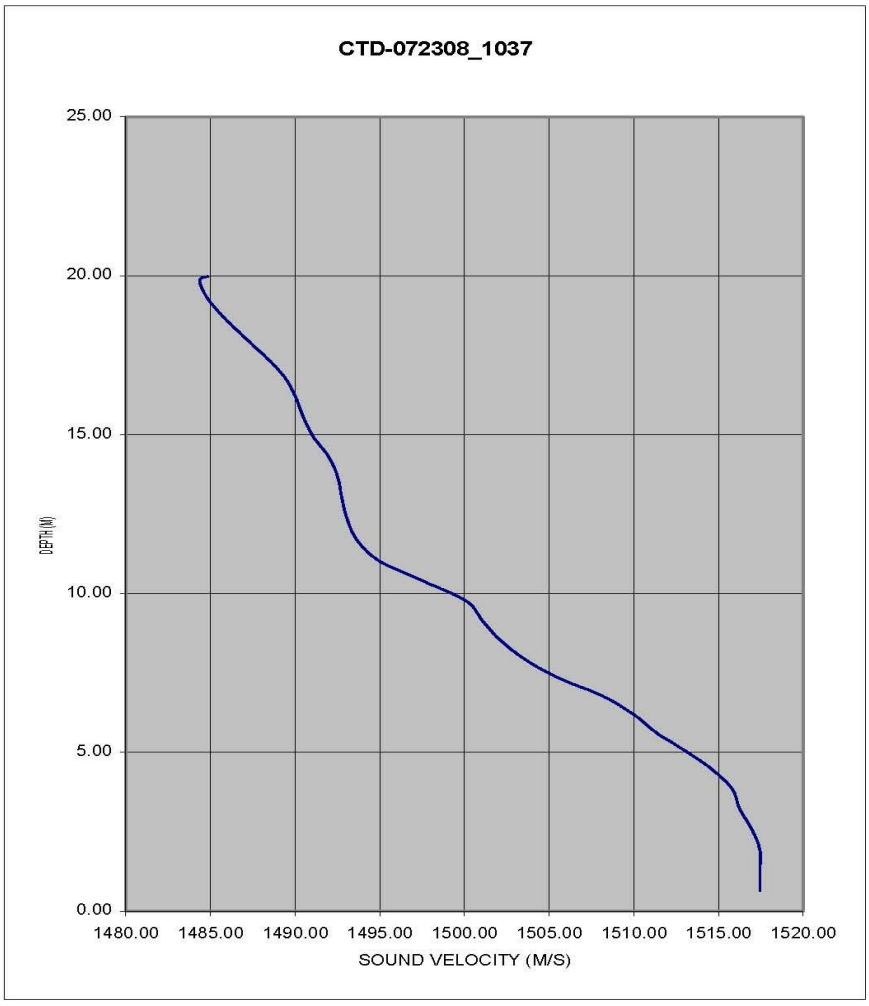


Figure 3.2-41
SVP 072308_1305 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 072308-1305

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/23/08	13:07	1016955	67699	67	40.35243004	73.88266246

1517.79	0.17
1517.76	0.99
1517.55	1.90
1516.98	2.71
1516.37	3.49
1515.34	4.21
1514.12	4.90
1512.89	5.53
1511.17	6.14
1509.11	6.75
1507.28	7.39
1505.36	8.05
1502.70	8.69
1499.76	9.35
1496.22	10.02
1492.13	10.68
1489.67	11.36
1488.58	12.03
1488.08	12.70
1487.83	13.35
1487.65	14.00
1487.11	14.67
1486.20	15.33
1485.45	16.01
1484.95	16.68
1484.55	17.36
1484.33	18.05
1484.15	18.73
1484.04	19.42
1483.99	20.08
1484.34	20.35

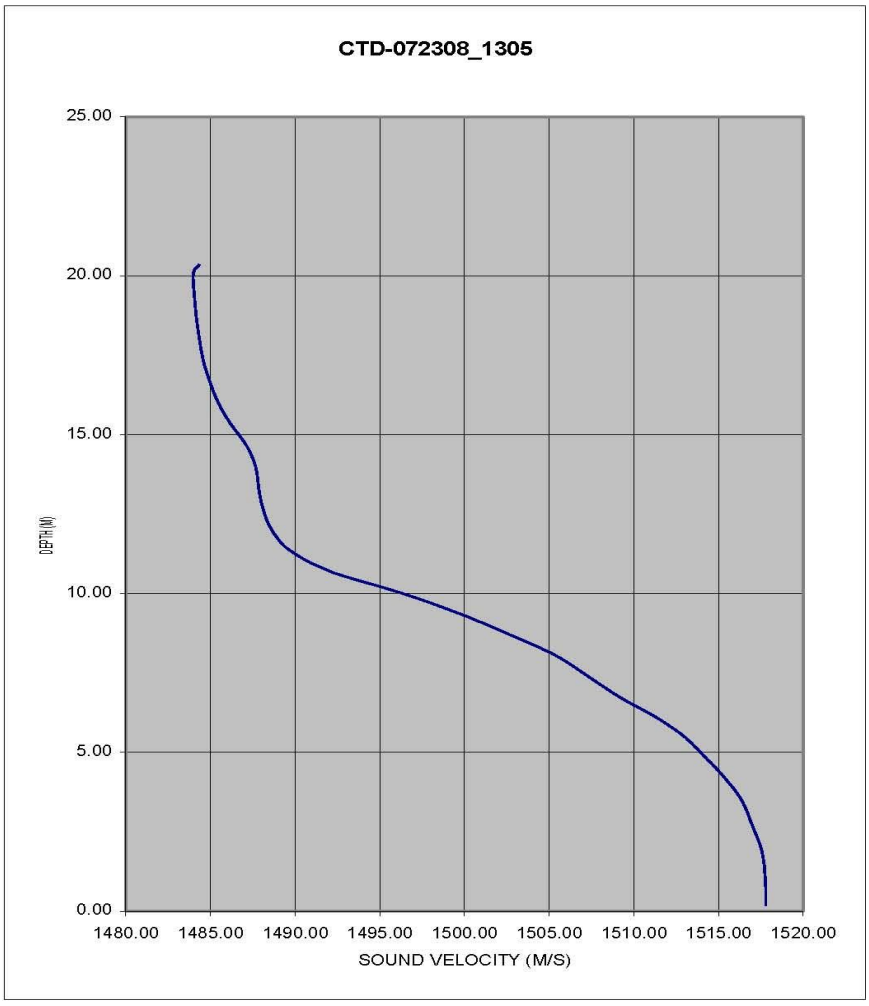


Figure 3.2-42
SVP 072308_1407 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 072308-1407

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/23/08	14:12	1016589	95548	66	40.42887275	73.88384359

1518.01	0.09
1517.98	0.70
1517.98	1.35
1517.95	2.04
1517.75	2.73
1517.40	3.38
1516.34	3.98
1515.05	4.59
1513.59	5.21
1511.15	5.82
1507.86	6.41
1504.80	7.01
1502.11	7.63
1500.67	8.26
1499.79	8.89
1498.91	9.51
1498.06	10.13
1497.16	10.77
1496.10	11.41
1494.51	12.06
1492.78	12.70
1490.85	13.34
1488.79	13.99
1487.35	14.65
1486.31	15.32
1485.59	15.99
1485.03	16.67
1484.55	17.34
1484.25	18.01
1484.09	18.68
1484.01	19.35
1484.13	19.86

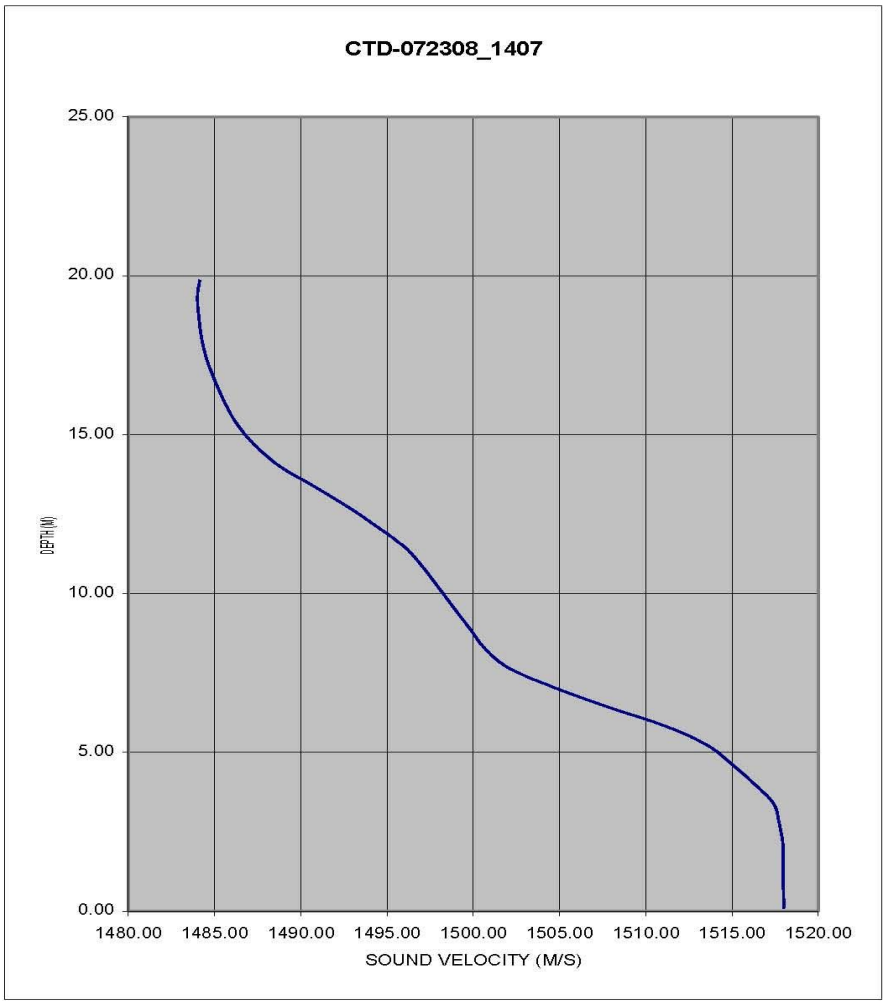


Figure 3.2-43
SVP 073008_0857 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 073008-0857

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/30/08	9:02	1019339	72638	50	40.36597632	73.87408298

1519.42	0.05
1519.26	0.43
1519.62	0.85
1520.07	1.41
1519.91	2.20
1520.19	3.03
1521.34	3.81
1521.90	4.60
1521.68	5.36
1520.80	6.04
1519.07	6.65
1517.05	7.27
1515.50	7.87
1514.25	8.46
1513.10	9.05
1511.65	9.63
1509.06	10.23
1505.95	10.83
1503.95	11.43
1502.29	12.04
1499.03	12.67
1496.73	13.32
1495.63	13.97
1494.76	14.63
1493.79	15.30

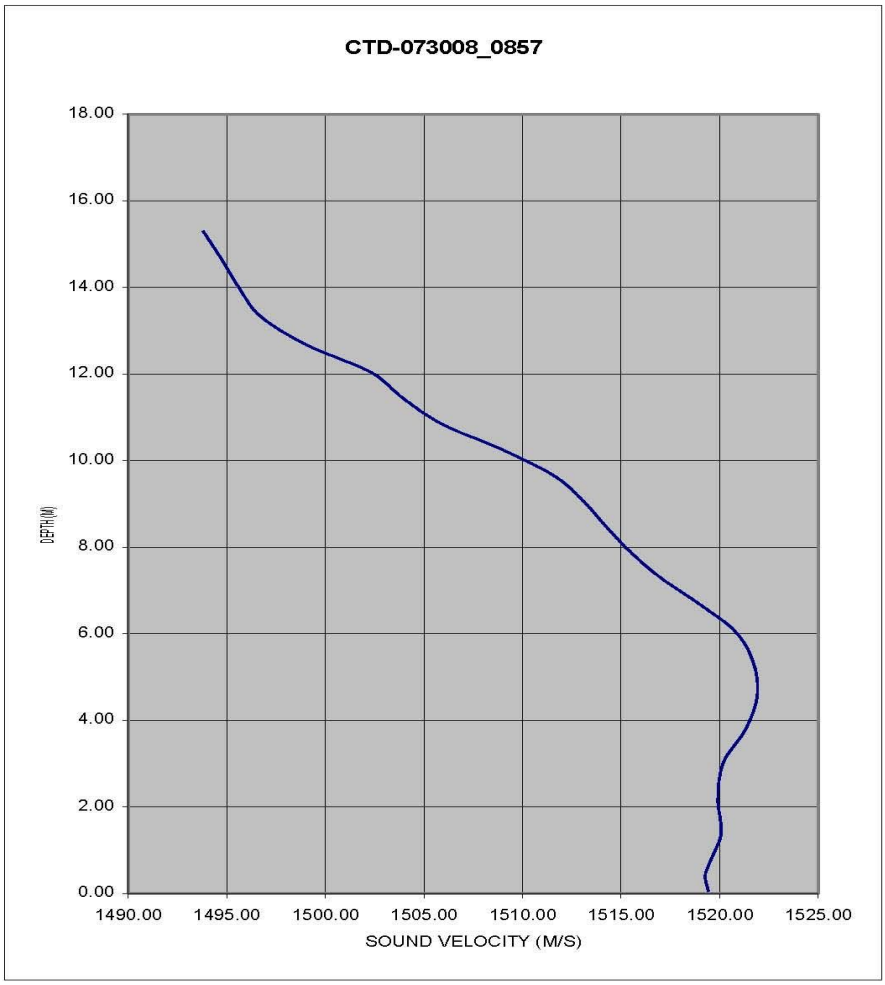


Figure 3.2-44
SVP 073008_0948 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 073008-0948

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/30/08	9:48	1018252	71780	74	40.36362559	73.87798780

1519.92	0.57
1520.10	1.36
1520.77	2.16
1520.31	2.88
1520.38	3.57
1521.14	4.25
1521.59	4.91
1521.68	5.58
1521.23	6.24
1520.51	6.92
1519.51	7.59
1518.02	8.26
1515.97	8.95
1513.89	9.65
1511.74	10.36
1510.24	11.06
1508.24	11.76
1505.25	12.45
1502.27	13.16
1499.53	13.86
1496.66	14.57
1494.29	15.28
1492.90	15.98
1492.19	16.69
1491.83	17.40
1491.51	18.11
1491.07	18.80
1490.52	19.51
1489.73	20.23
1488.79	20.96
1488.15	21.69
1488.02	22.27
1488.44	22.37

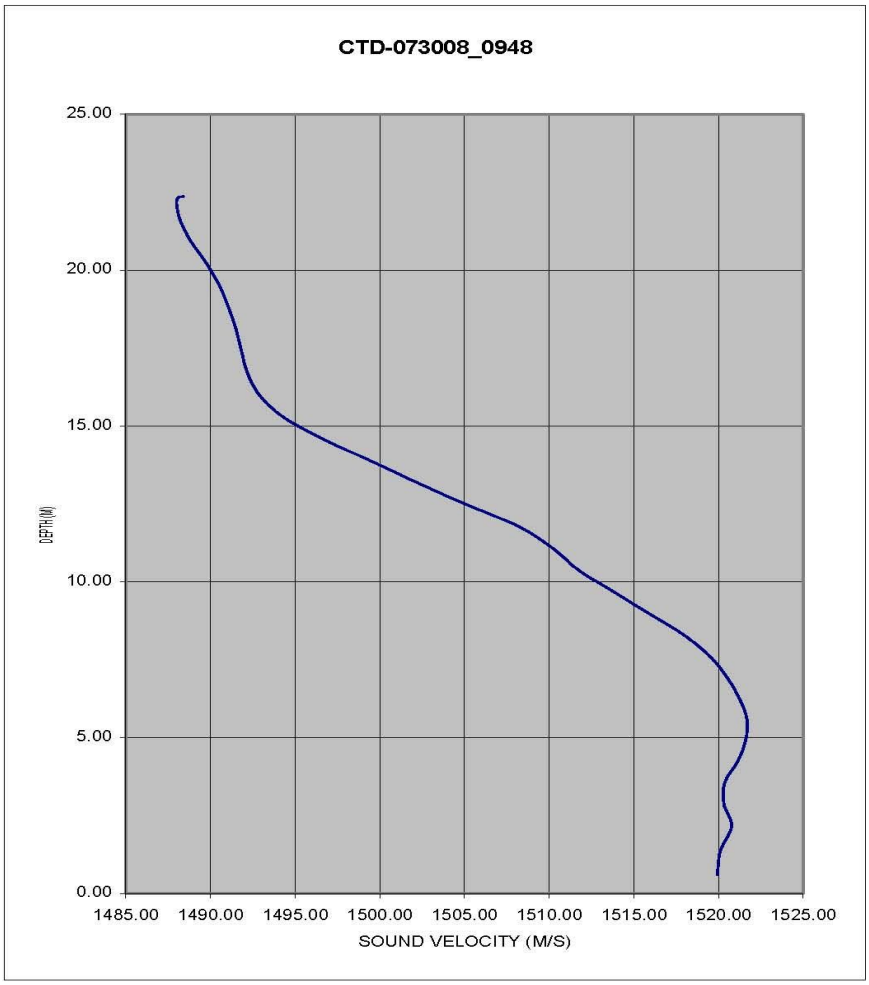


Figure 3.2-45
SVP 073008_1242 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 073008-1242

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/30/08	12:45	1019870	80791	63	40.38835253	73.87213500

1522.24	0.49
1519.98	1.19
1519.36	1.90
1519.98	2.60
1520.71	3.32
1520.14	4.04
1519.12	4.74
1518.37	5.45
1517.85	6.15
1517.40	6.84
1517.05	7.52
1516.64	8.20
1516.27	8.87
1516.11	9.54
1515.57	10.20
1514.69	10.87
1514.08	11.56
1514.18	12.27
1509.89	12.96
1502.04	13.64
1496.92	14.31
1494.86	14.96
1493.90	15.63
1492.92	16.29
1491.88	16.96
1491.08	17.63
1490.75	18.31
1490.64	18.97
1491.07	19.24

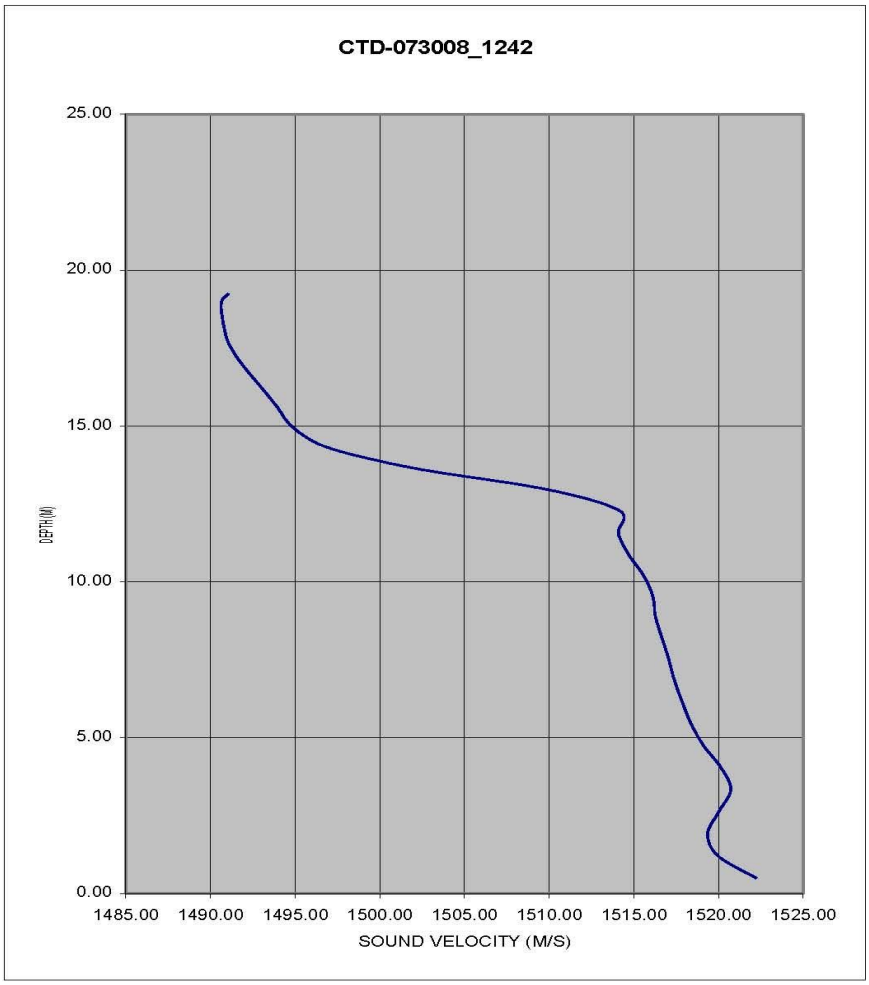


Figure 3.2-46
SVP 073008_1546 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 073008-1546

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/30/08	15:48	1019016	78121	79	40.38102842	73.87521531

1523.82	0.27
1523.48	0.91
1521.36	1.63
1519.47	2.38
1518.94	3.08
1519.33	3.75
1520.23	4.36
1520.77	4.96
1521.09	5.57
1521.47	6.18
1521.55	6.83
1521.30	7.50
1520.48	8.18
1519.14	8.84
1517.56	9.51
1514.73	10.17
1510.26	10.87
1505.93	11.57
1503.70	12.26
1500.86	12.94
1498.05	13.63
1496.56	14.31
1495.40	14.99
1494.21	15.66
1492.78	16.35
1491.79	17.03
1491.18	17.72
1490.88	18.40
1490.61	19.10
1490.36	19.78
1490.07	20.47
1489.81	21.17
1489.67	21.88
1489.61	22.59
1489.59	23.30
1489.70	23.91

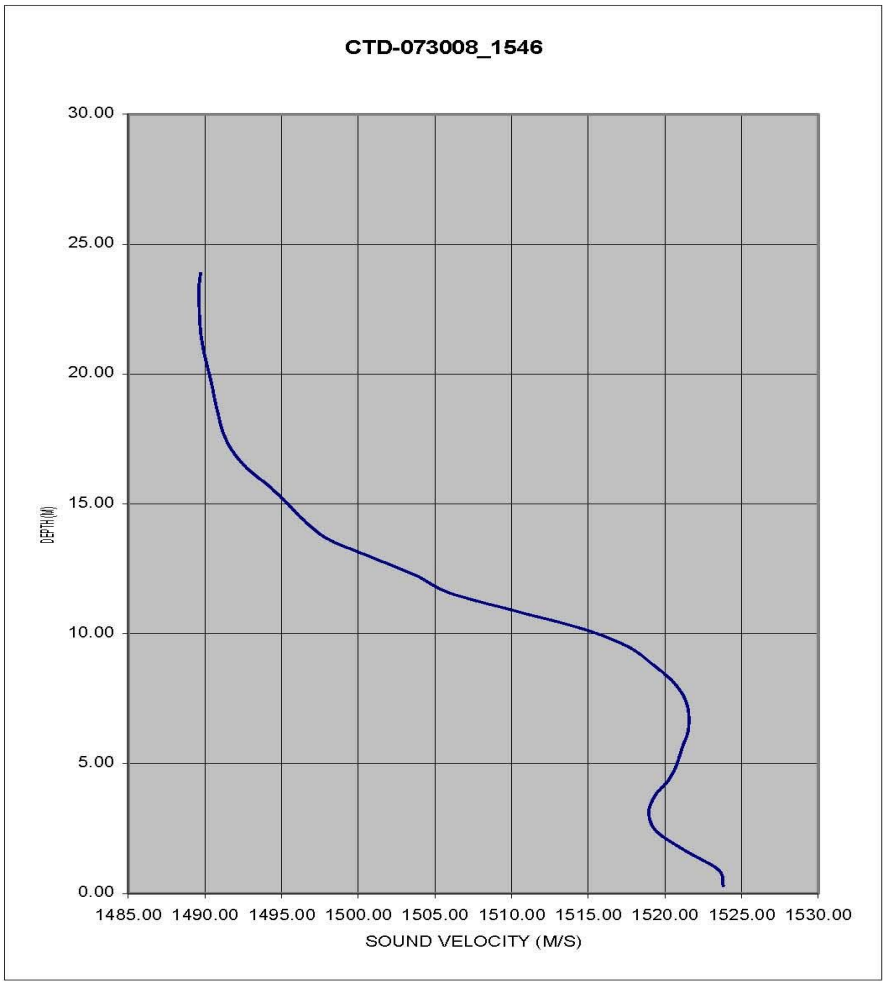
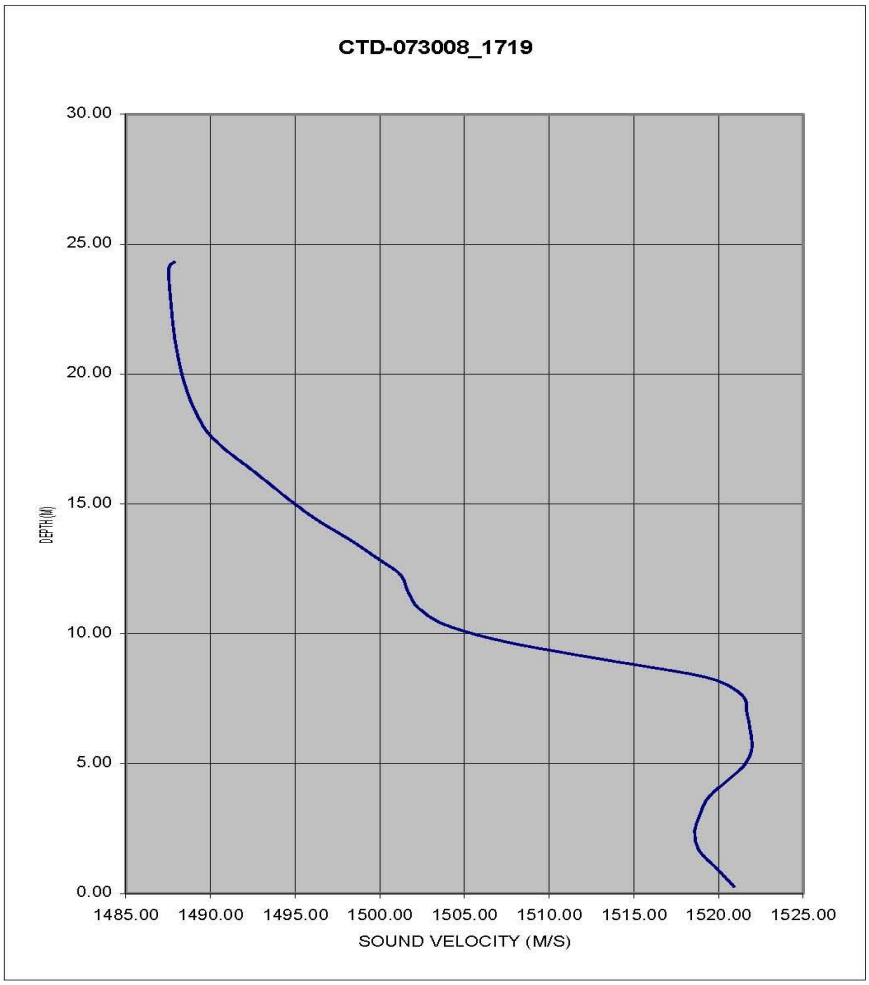


Figure 3.2-47
SVP 073008_1719 taken during the 2008 multibeam survey at the HARS

CTD PROFILE # 073008-1719

Date	Time	NAD83 NY LI (Feet)		Depth	Latitude	Longitude
		Easting	Northing	Feet MLW	N	W
07/30/08	17:19	1027695	95481	80	40.42864036	73.84395277

1520.94	0.24
1519.92	0.94
1518.87	1.64
1518.60	2.34
1518.89	3.01
1519.37	3.67
1520.46	4.31
1521.55	4.96
1521.97	5.61
1521.87	6.27
1521.67	6.94
1521.38	7.63
1519.39	8.30
1513.59	8.96
1507.92	9.62
1504.12	10.28
1502.36	10.94
1501.67	11.60
1501.21	12.27
1499.74	12.95
1498.19	13.63
1496.44	14.32
1494.94	15.01
1493.62	15.70
1492.25	16.40
1490.86	17.10
1489.76	17.81
1489.13	18.52
1488.67	19.23
1488.32	19.95
1488.08	20.65
1487.89	21.34
1487.76	22.04
1487.66	22.73
1487.57	23.43
1487.55	24.09
1487.88	24.32



4.0 Tidal Corrections and Data Analysis

In keeping with prior bathymetry surveys at the HARS site and the subsequent analysis of the Tidal data from those surveys, a similar study of the tidal data from the 2008 survey was also carried out.

For the 2008 bathymetry survey the “Valeport Midas WLR” submersible tide gauge was deployed prior to collection of multibeam data at the HARS site. This gauge which measures pressure was located on the sea floor attached to an anchor with an additional attachment to a surface lighted buoy (see Figure 3.0-2).
In addition to the submersible tide gauge a “WL 16 Water Level Logger” manufactured by “Global Water Instrumentation INC.” tide gauge was set at the Coast Guard Station at Sandy Hook (Figure 3.1-1) in close proximity to the NOAA reference tide station, prior to commencement of each multibeam survey period, of which there were six (6) trips in total for the 2008 bathymetry survey. The purpose of this tide gauge was to provide a back up in the event that the NOAA reference tide station experienced problems such that there would have been a shortage of tidal information at Sandy Hook. This tide gauge was referenced to NAVD88.
For the 2008 bathymetry survey it was also decided to utilize Real Time Kinematic GPS (RTK) on board the survey vessel to provide real time water level elevations. This system was also referenced to NAVD88. Unfortunately due to drops in the cellular network providing the RTK corrections the RTK data set is not as complete as expected. This coupled with the fact that the Base Station providing the corrections was on the limit of the range for which required accuracies are needed.

As with previous surveys at the HARS site, tide data from NOAA’s reference tide station at Sandy Hook was downloaded from N.O.A.A. and compared to the tide data from the submersible tide gauge at the HARS site for the period spanning the duration of the Survey. This was done primarily to generate range and time offsets from NOAA’s Sandy Hook gauge to actual tidal readings at the HARS site. The results proved to be very consistent with the range and time correctors from the 2006 bathymetry survey, with some additional observations to be considered for future surveys.

Tidal analysis procedures began with the downloading from NOAA’s web site of tidal data from Sandy Hook reference station (Station ID 8531680) for the period spanning the bathymetry survey operations. The data was downloaded, referenced to NAVD88 and converted to a spreadsheet format. It was then referenced to MLW as per the USACOE such that 0’ MLW is 1.73’ below 0’ NGVD29 and 2.84’ below NAVD88.
Meteorological observations for the same time period were also downloaded from the meteorological reference station at the now decommissioned Ambrose Light (Station ALSN6 - Ambrose Light, NY), which was accessed through the National Data Buoy Center for all but one of the survey days required. For the additional day meteorological data was downloaded from the next closest reference station to the HARS site, located at Robins Reef (Station ID: 8530973) in New York Harbor. The meteorological data was also converted to a spreadsheet format and the barometric pressure from these files used to correct the raw depth readings from the submersible tide gauge. In addition this data set provided a detailed account of wind speed and direction in the

event that a more thorough tidal analysis need be performed and also to assist in questions pertaining to discrepancies in the relationship between the tidal conditions at the HARS site compared to those at Sandy Hook.

The 2008 bathymetry survey was performed during the time period from 06/18/08 to 07/30/08, however it was decided to analyze the data in sub-groups such that there would not be an over generalization of the range and time correctors. The sub-groups of which there were 6 spanned from 2 days to 8 days and overlapped the periods of multibeam data collection.

Figures 4.0-1 to 4.0-5 shows the working datasheets for calculations of range and time offsets between the NOAA tide gauge at Sandy Hook and the submersible tide gauge at the HARS site. The initial range correctors (to be applied to the Sandy Hook NOAA tide data) were calculated by establishing the difference between the mean range of high and low tide at the submersible tide gauge compared to the mean range of high and low tide at the Sandy Hook tide gauge. As the data showed there is a general diurnal trend to the tidal data at HARS and Sandy Hook, and so care was taken to ensure an even number of high and low tide cycles were used in the range corrector calculations. Slight modifications of these correctors can be seen when barometric pressure corrected submersible tide data (data calculations in red) was used in the calculations instead of the raw submersible tide data.

During analysis of the tide data it was discovered that there appeared to have been a disturbance of the submersible tide gauge on 06/22/08 at approximately 21:30. It may have been a result of the surface buoy being dragged causing tipping of the tide gauge transducer cage, resulting in a jump in the recorded data of about 0.3'. Survey operations were not being conducted at that time and subsequently tidal data analysis did not encompass the period during the suspected disturbance. Instead range, offset and MLW corrections were carried out separately on the data prior to the disturbance which is reflected in the calculated value of MLW at the HARS site being 2.95' as opposed to the calculated values after the disturbance which ranged from 2.59' to 2.73' (see Figures 4.0-1 to 4.0-5).

The time offset (to be applied to the Sandy Hook tide data) was established by meaning the time differences between the times of high and low tide at the submersible gauge with the times of high and low tide at Sandy Hook.

Once the range factors were determined (Figures 4.0-1 to 4.0-5) they were applied to the MTL values of the Sandy Hook tide data for their particular analysis period in order to generate MTL values at the submersible tide gauge. This was done as the submersible tide gauge was not referenced or calibrated to a vertical datum, and the readings recorded are relative only to the change in water level caused by the changing pressure. Following this the submersible tide data was referenced to MLW (i.e. same datum as Sandy Hook) by subtracting the calculated MLW elevation of the MTL at the submersible gauge from the average raw barometric pressure corrected MTL reading, resulting in a difference which in turn was deducted from the submersible raw readings, producing a submersible tidal data set referenced to MLW as per scope of work specs (0' MLW is 1.73' below 0' NGVD29 and 2.84' below NAVD88). Below are the formulas used to generate the correctors.

MTL (HARS)=MTL (Sandy Hook)(Range Corrector)
Range Corrector =Average Range @ HARS / Average Range @ Sandy Hook
Time Offset = Average of time differences between times of high and low water at Sandy Hook and HARS site.

In order to establish the tidal relationship, both temporally and in magnitude between the recorded tide data at Sandy Hook and at the HARS site it was necessary to apply the newly generated range and time correctors to the Sandy Hook data and produce error plots of the difference between Sandy Hook data (corrected to HARS site) and submersible tide data (corrected to MLW). It was also decided to compare the Sandy Hook data (corrected to HARS site using historic range and time offset correctors) to the submersible data (corrected to MLW), and also compare the RTK GPS data to the submersible data set. The results are shown in Figures 4.0-1-6 to 4.0-1-15 and in summary the following errors were deduced from the data analysis.

Over the duration of the survey (06/18/08-07/30/08) the Average calculated error between the HARS submersible tide data (corrected for barometric pressure and MLW) and the NOAA tide data (with 2008 Range and Time offset correctors) was 0.09' with a standard deviation of 0.07' and a maximum error of 0.37'. The Average calculated error between the HARS submersible tide data (corrected for barometric pressure and MLW) and the NOAA tide data (with 2006 Range and Time offset correctors) was 0.08' with a standard deviation of 0.06' and a maximum error of 0.35, while the RTK GPS average error was 0.13' with a standard deviation of 0.09' and a maximum error of 0.44'. (Table 4.0-1-16)

Figure 4.0-1-1
Working excel data sheet for Range and Offset Corrector calculations.
Data collection period 06/18/08 to 06/20/08

TIDE VALUES IN HYPACK FORMAT***

	NOAA MLW SANDY HOOK			NOAA SANDY HOOK USING -3.14 AS MTL TIME OF MTL	TIME	RAW	HARS SUBMERSIBLE CORRECTED Density/Baro-press	USING 41.92 MTL TIME OF MTL	Time Diff	USING 41.88 MTL TIME OF MTL	Time Diff		Using Lows & Highs Noaa to Submersible TIME DIFF.
6/18/2008	2:30	-0.8	LOW	6/18/08 5:34	2:02	39.62	39.76	6/18/08 5:18	0:16	6/18/08 5:28	0:06	ebb	0:28
	8:24	-4.94	HIGH	6/18/08 11:08	8:06	43.35	43.51	6/18/08 10:46	0:22	6/18/08 10:41	0:27	Flood	0:18
	14:24	-1.43	LOW	6/18/08 16:44	13:56	40.13	40.26	6/18/08 16:19	0:25	6/18/08 16:25	0:19	ebb	0:28
	20:26	-5.76	HIGH		19:39	44.30	44.49					Flood	0:47
6/19/2008	3:06	-0.85	LOW	6/18/08 23:58	2:25	39.65	39.76	6/18/08 23:41	0:17	6/18/08 23:36	0:22	Ebb	0:41
	9:24	-4.82	HIGH	6/19/08 6:21	8:36	43.40	43.51	6/19/08 6:03	0:18	6/19/08 6:07	0:14	Flood	0:48
	15:00	-1.17	LOW	6/19/08 11:55	14:40	40.11	40.11	6/19/08 11:35	0:20	6/19/08 11:33	0:22	Ebb	0:20
	21:00	-5.78	HIGH	6/19/08 17:29	20:37	44.42	44.45	6/19/08 17:03	0:26	6/19/08 17:01	0:28	Flood	0:23
6/20/2008	3:54	-0.53	LOW	6/20/08 0:24	3:23	39.56	39.51	6/20/08 0:10	0:14	6/20/08 0:12	0:12	Ebb	0:31
	9:54	-4.77	HIGH	6/20/08 7:07	9:27	43.48	43.41	6/20/08 6:52	0:15	6/20/08 6:45	0:22	Flood	0:27
	15:36	-1.15	LOW	6/20/08 12:13	15:17	40.17	40.02	6/20/08 11:48	0:25	6/20/08 12:04	0:09	Ebb	0:19
	21:54	-5.62	HIGH	6/20/08 18:14	21:14	44.34	44.28	6/20/08 17:53	0:21	6/20/08 17:43	0:31	Flood	0:40
								AVG=	0:19	AVG=	0:19		0:30 TIME OFFSET

AT SANDY HOOK TO DATE		*AT HARS TO DATE*		
AVERAGE LOWS	-0.99	AVERAGE LOWS	39.87	39.90
AVERAGE HIGHS	-5.28	AVERAGE HIGHS	43.88	43.94
AVERAGE RANGE	**-4.29**	**AVERAGE RANGE**	**4.01**	**4.04**

FOR PERIOD 6/18 THRU 6/20 THE RANGE RATIO FROM SANDY HOOK TO HARS SITE IS : 0.934

AT SANDY HOOK 6/18 thru 6/20
USING AVERAGE LOWS AND HIGHS
CALCULATED MTL= 3.14 MLW

AT HARS 6/18 thru 6/20
USING AVERAGE LOWS AND HIGHS
CALCULATED MTL= 41.88 RAW
41.92 RAW Corrected
0.941 corrected

USING 3.14 MLW AS BEING THE VALUE OF MTL AT SANDY HOOK AND THE RANGE RATIO OF 0.934
THE VALUE OF MTL AT HARS IS CALCULATED TO BE 2.93 MLW 2.95 CORRECTED

**********TENTATIVELY**********

THEREFORE THE SUBMERSIBLE TIDE DATA AT THE HARS SITE WILL REQUIRE 41.88 (AVERAGE MTL) - 2.93 = 38.95
TO BE DEDUCTED FROM THE RAW READINGS FOR THE PERIOD 6/18 THRU 6/20

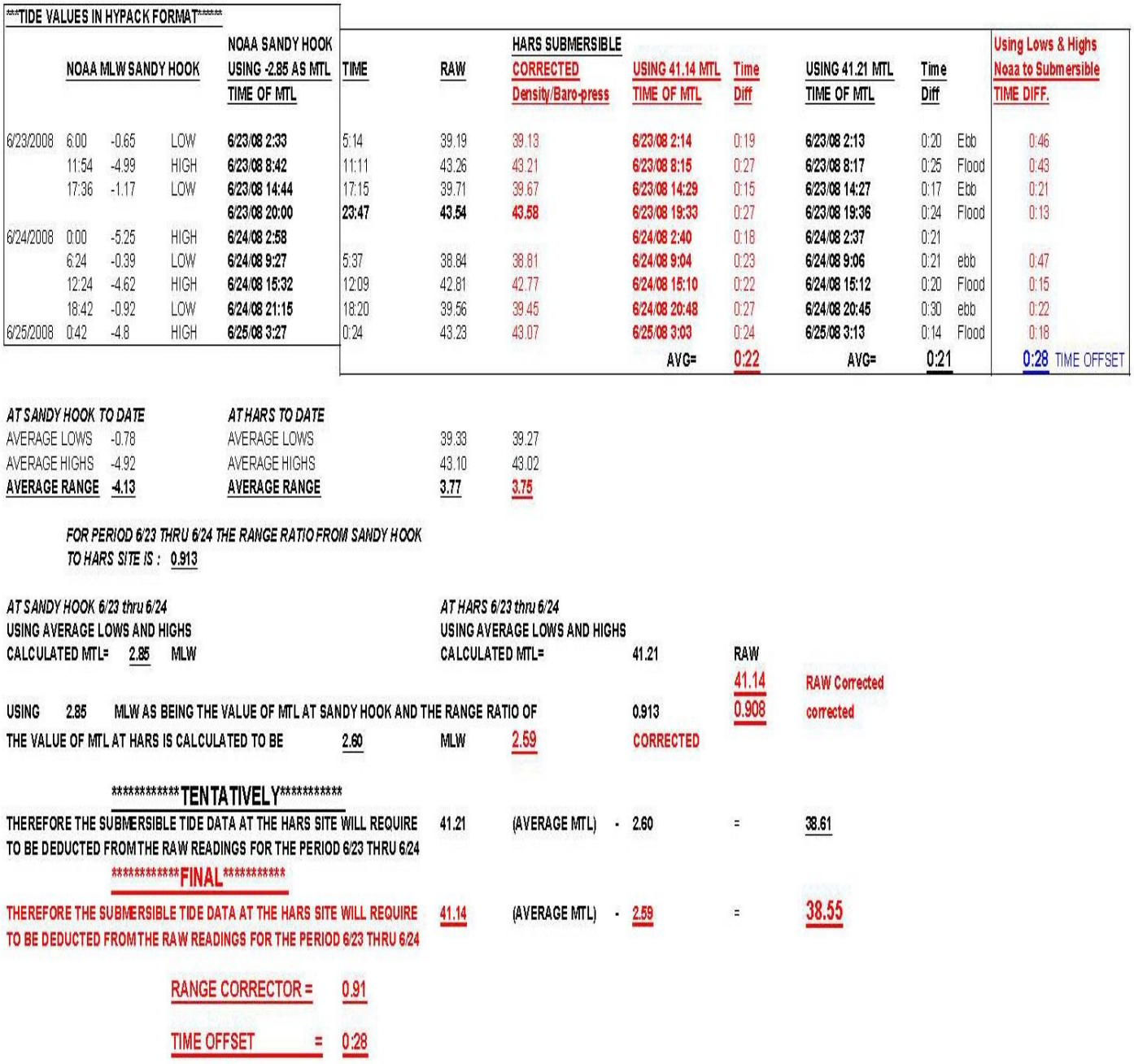
**********FINAL**********

THEREFORE THE SUBMERSIBLE TIDE DATA AT THE HARS SITE WILL REQUIRE 41.92 (AVERAGE MTL) - 2.95 = 38.97
TO BE DEDUCTED FROM THE RAW READINGS FOR THE PERIOD 6/18 THRU 6/20

RANGE CORRECTOR = 0.94

TIME OFFSET = 0:30

Figure 4.0-1-2
Working excel data sheet for Range and Offset Corrector calculations.
Data collection period 06/23/08 to 06/24/08



TIDE VALUES IN HYPACK FORMAT**

	NOAA MLW SANDY HOOK			NOAA SANDY HOOK USING -2.85 AS MTL TIME OF MTL	TIME	RAW	HARS SUBMERSIBLE CORRECTED Density/Baro-press	USING 41.14 MTL TIME OF MTL	Time Diff	USING 41.21 MTL TIME OF MTL	Time Diff		Using Lows & Highs Noaa to Submersible TIME DIFF.
6/23/2008	6:00	-0.65	LOW	6/23/08 2:33	5:14	39.19	39.13	6/23/08 2:14	0:19	6/23/08 2:13	0:20	Ebb	0:46
	11:54	-4.99	HIGH	6/23/08 8:42	11:11	43.26	43.21	6/23/08 8:15	0:27	6/23/08 8:17	0:25	Flood	0:43
	17:36	-1.17	LOW	6/23/08 14:44	17:15	39.71	39.67	6/23/08 14:29	0:15	6/23/08 14:27	0:17	Ebb	0:21
				6/23/08 20:00	23:47	43.54	43.58	6/23/08 19:33	0:27	6/23/08 19:36	0:24	Flood	0:13
6/24/2008	0:00	-5.25	HIGH	6/24/08 2:58				6/24/08 2:40	0:18	6/24/08 2:37	0:21		
	6:24	-0.39	LOW	6/24/08 9:27	5:37	38.84	38.81	6/24/08 9:04	0:23	6/24/08 9:06	0:21	ebb	0:47
	12:24	-4.62	HIGH	6/24/08 15:32	12:09	42.81	42.77	6/24/08 15:10	0:22	6/24/08 15:12	0:20	Flood	0:15
	18:42	-0.92	LOW	6/24/08 21:15	18:20	39.56	39.45	6/24/08 20:48	0:27	6/24/08 20:45	0:30	ebb	0:22
6/25/2008	0:42	-4.8	HIGH	6/25/08 3:27	0:24	43.23	43.07	6/25/08 3:03	0:24	6/25/08 3:13	0:14	Flood	0:18
								AVG=	0:22	AVG=	0:21		0:28 TIME OFFSET

AT SANDY HOOK TO DATE

AVERAGE LOWS	-0.78
AVERAGE HIGHS	-4.92
AVERAGE RANGE	4.13

AT HARS TO DATE

AVERAGE LOWS	39.33	39.27
AVERAGE HIGHS	43.10	43.02
AVERAGE RANGE	3.77	3.75

FOR PERIOD 6/23 THRU 6/24 THE RANGE RATIO FROM SANDY HOOK TO HARS SITE IS : 0.913

AT SANDY HOOK 6/23 thru 6/24
USING AVERAGE LOWS AND HIGHS
CALCULATED MTL= 2.85 MLW

AT HARS 6/23 thru 6/24
USING AVERAGE LOWS AND HIGHS
CALCULATED MTL= 41.21

RAW 41.14 RAW Corrected
0.908 corrected

USING 2.85 MLW AS BEING THE VALUE OF MTL AT SANDY HOOK AND THE RANGE RATIO OF 0.913
THE VALUE OF MTL AT HARS IS CALCULATED TO BE 2.60 MLW 2.59 CORRECTED

**********TENTATIVELY**********

THEREFORE THE SUBMERSIBLE TIDE DATA AT THE HARS SITE WILL REQUIRE 41.21 (AVERAGE MTL) - 2.60 = 38.61
TO BE DEDUCTED FROM THE RAW READINGS FOR THE PERIOD 6/23 THRU 6/24

**********FINAL**********

THEREFORE THE SUBMERSIBLE TIDE DATA AT THE HARS SITE WILL REQUIRE 41.14 (AVERAGE MTL) - 2.59 = 38.55
TO BE DEDUCTED FROM THE RAW READINGS FOR THE PERIOD 6/23 THRU 6/24

RANGE CORRECTOR = 0.91

TIME OFFSET = 0:28

Figure 4.0-1-3
Working excel data sheet for Range and Offset Corrector calculations.
Data collection period 07/06/08 to 07/09/08

TIDE VALUES IN HYPACK FORMAT**													
	NOAA MLW SANDY HOOK			NOAA SANDY HOOK USING -2.84 AS MTL TIME OF MTL	TIME	RAW	HARS SUBMERSIBLE CORRECTED Density/Baro-press	USING 41.04 MTL TIME OF MTL	Time Diff	USING 41.17 MTL TIME OF MTL	Time Diff		Using Lows & Highs Noaa to Submersible TIME DIFF.
7/6/2008	5:18	0.14	LOW	7/6/08 1:58	4:37	38.37	38.20	7/6/08 1:37	0:21	7/6/08 1:38	0:20	Ebb	0:41
	11:24	-5.54	HIGH	7/6/08 8:15	10:55	43.76	43.59	7/6/08 7:46	0:29	7/6/08 7:46	0:29	Flood	0:29
	17:24	-0.53	LOW	7/6/08 14:15	16:59	39.10	38.87	7/6/08 13:54	0:21	7/6/08 13:57	0:18	Ebb	0:25
	23:36	-5.78	HIGH	7/6/08 20:00	22:56	44.02	43.85	7/6/08 19:28	0:32	7/6/08 19:25	0:35	Flood	0:40
7/7/2008	6:00	-0.06	LOW	7/7/08 2:37	5:21	38.58	38.38	7/7/08 2:15	0:22	7/7/08 2:18	0:19	Ebb	0:39
	12:12	-5.33	HIGH	7/7/08 9:06	11:39	43.55	43.37	7/7/08 8:41	0:25	7/7/08 8:39	0:27	Flood	0:33
	18:18	-0.59	LOW	7/7/08 15:04	17:36	39.12	38.92	7/7/08 14:45	0:19	7/7/08 14:48	0:16	Ebb	0:42
7/8/2008	0:24	-5.14	HIGH	7/7/08 20:49	0:08	43.36	43.32	7/7/08 20:20	0:29	7/7/08 20:19	0:30	Flood	0:16
	6:54	-0.26	LOW	7/8/08 3:17	6:19	38.70	38.58	7/8/08 2:53	0:24	7/8/08 2:52	0:25	Ebb	0:35
	13:12	-5.24	HIGH	7/8/08 9:54	12:37	43.35	43.24	7/8/08 9:31	0:23	7/8/08 9:35	0:19	Flood	0:35
	19:06	-0.94	LOW	7/8/08 16:04	18:41	39.24	39.18	7/8/08 15:39	0:25	7/8/08 15:35	0:29	Ebb	0:25
7/9/2008	1:30	-4.84	HIGH	7/8/08 21:57	0:59	42.94	42.96	7/8/08 21:29	0:28	7/8/08 21:40	0:17	Flood	0:31
	7:18	-0.65	LOW	7/9/08 3:58	6:56	38.87	38.89	7/9/08 3:29	0:29	7/9/08 3:21	0:37	Ebb	0:22
	14:00	-5.01	HIGH	7/9/08 10:36	13:35	43.04	43.10	7/9/08 10:09	0:27	7/9/08 10:24	0:12	Flood	0:25
	20:12	-1.16	LOW	7/9/08 17:09	19:39	39.40	39.53			7/9/08 16:39	0:30	Ebb	0:33
				7/9/08 22:57				AVG=	0:25	AVG=	0:24		0:31 TIME OFFSET

AVERAGE LOWS	-0.37	AVERAGE LOWS	38.85	38.69
AVERAGE HIGHS	-5.31	AVERAGE HIGHS	43.50	43.39
AVERAGE RANGE	-4.94	AVERAGE RANGE	4.65	4.70

FOR PERIOD 7/06 THRU 7/09 THE RANGE RATIO FROM SANDY HOOK TO HARS SITE IS : 0.94

AT SANDY HOOK 7/06 thru 7/09

USING AVERAGE LOWS AND HIGHS
CALCULATED MTL= 2.84 MLW

AT HARS 7/06 thru 7/09

USING AVERAGE LOWS AND HIGHS
CALCULATED MTL= 41.17 RAW
41.04 RAW Corrected
USING 2.84 MLW AS BEING THE VALUE OF MTL AT SANDY HOOK AND THE RANGE RATIO OF 0.94 0.95 corrected
THE VALUE OF MTL AT HARS IS CALCULATED TO BE 2.67 MLW 2.71 CORRECTED

**********TENTATIVELY**********

THEREFORE THE SUBMERSIBLE TIDE DATA AT THE HARS SITE WILL REQUIRE TO BE DEDUCTED FROM THE RAW READINGS FOR THE PERIOD 7/06 THRU 7/09 — 41.17 (AVERAGE MTL) - 2.67 = 38.50

**********FINAL**********

THEREFORE THE SUBMERSIBLE TIDE DATA AT THE HARS SITE WILL REQUIRE TO BE DEDUCTED FROM THE RAW READINGS FOR THE PERIOD 7/06 THRU 7/09 — 41.04 (AVERAGE MTL) - 2.71 = 38.33

RANGE CORRECTOR = 0.95

TIME OFFSET = 0:31

Figure 4.0-1-4
Working excel data sheet for Range and Offset Corrector calculations.
Data collection period 07/17/08 to 07/24/08

TIDE VALUES IN HYPACK FORMAT**

	NOAA MLW SANDY HOOK		NOAA SANDY HOOK USING -2.84 AS MTL TIME OF MTL	TIME	RAW	HARS SUBMERSIBLE CORRECTED Density/Baro-press	USING 41.09MTL TIME OF MTL	Time Diff	USING 41.15 MTL TIME OF MTL	Time Diff	Using Lows & Highs Noaa to Submersible TIME DIFF.
7/17/2008	2:18	-0.55	7/17/08 5:18	1:36	39.16	38.92	7/17/08 5:04	0:14	7/17/08 4:51	0:27	0:42
	8:00	-4.37	7/17/08 10:38	7:40	42.72	42.49	7/17/08 10:13	0:25	7/17/08 10:28	0:10	0:20
	14:06	-0.86	7/17/08 16:38	13:37	39.47	39.21	7/17/08 16:13	0:25	7/17/08 16:03	0:35	0:29
	20:12	-5.62	7/17/08 23:30	19:34	43.80	43.65	7/17/08 23:10	0:20	7/17/08 23:17	0:13	0:38
7/18/2008	2:54	-0.33	7/18/08 5:55	2:20	38.88	38.69	7/18/08 5:37	0:18	7/18/08 5:30	0:25	0:34
	8:30	-4.41	7/18/08 11:17	8:17	42.66	42.51	7/18/08 10:57	0:20	7/18/08 11:01	0:16	0:13
	14:42	-0.8	7/18/08 17:18	14:07	39.30	39.12	7/18/08 16:54	0:24	7/18/08 16:48	0:30	0:35
	20:48	-5.56	7/19/08 0:03	20:04	43.76	43.66	7/18/08 23:45	0:18	7/18/08 23:45	0:18	0:44
7/19/2008	3:30	-0.27	7/19/08 6:38	2:50	38.77	38.66	7/19/08 6:16	0:22	7/19/08 6:15	0:23	0:40
	9:18	-4.63	7/19/08 11:58	8:47	42.79	42.70	7/19/08 11:34	0:24	7/19/08 11:37	0:21	0:31
	15:36	-0.68	7/19/08 18:00	15:05	39.14	39.02	7/19/08 17:35	0:25	7/19/08 17:34	0:26	0:31
	21:24	-5.48	7/20/08 0:38	20:55	43.62	43.58	7/20/08 0:16	0:22	7/20/08 0:11	0:27	0:29
7/20/2008	4:06	-0.06	7/20/08 7:09	3:27	38.52	38.46	7/20/08 6:47	0:22	7/20/08 6:47	0:22	0:39
	10:06	-4.79	7/20/08 12:52	9:38	42.91	42.87	7/20/08 12:23	0:29	7/20/08 12:24	0:28	0:28
	16:00	-0.72	7/20/08 18:36	15:35	39.10	39.03	7/20/08 18:09	0:27	7/20/08 18:12	0:24	0:25
	21:54	-5.52	7/21/08 1:23	21:32	43.63	43.71	7/21/08 1:05	0:18	7/21/08 0:56	0:27	0:22
7/21/2008	4:54	-0.07	7/21/08 7:37	4:04	38.49	38.55	7/21/08 7:06	0:31	7/21/08 7:17	0:20	0:50
	10:36	-5.15	7/21/08 13:30	10:15	43.18	43.27	7/21/08 13:17	0:13	7/21/08 13:05	0:25	0:21
	16:42	-0.82	7/21/08 19:16	16:19	39.21	39.27	7/21/08 18:39	0:37	7/21/08 18:46	0:30	0:23
	22:24	-5.45	7/22/08 2:04	22:09	43.50	43.66	7/22/08 1:46	0:18	7/22/08 1:35	0:29	0:15
7/22/2008	5:24	-0.19	7/22/08 8:07	4:41	38.59	38.67	7/22/08 7:33	0:34	7/22/08 7:40	0:27	0:43
	11:12	-5.18	7/22/08 14:25	10:45	43.33	43.38	7/22/08 14:08	0:17	7/22/08 14:03	0:22	0:27
	17:36	-0.89	7/22/08 19:55	16:56	39.32	39.28	7/22/08 19:23	0:32	7/22/08 19:29	0:26	0:40
	23:42	-5.29	7/23/08 2:42	23:21	43.53	43.55	7/23/08 2:16	0:26	7/23/08 2:14	0:28	0:21
7/23/2008	5:48	-0.33	7/23/08 8:42	5:04	38.84	38.80	7/23/08 8:17	0:25	7/23/08 8:17	0:25	0:44
	12:18	-5.38	7/23/08 15:31	11:36	43.52	43.45	7/23/08 14:58	0:33	7/23/08 14:59	0:32	0:42
	18:24	-0.99	7/23/08 20:38	17:47	39.31	39.26	7/23/08 20:14	0:24	7/23/08 20:19	0:19	0:37
7/24/2008	0:24	-4.92	7/24/08 3:17	0:05	43.20	43.22	7/24/08 2:50	0:27	7/24/08 2:44	0:33	0:19
	6:24	-0.55	7/24/08 9:26	5:48	38.88	38.82	7/24/08 9:06	0:20	7/24/08 9:07	0:19	0:36
	12:54	-5.59	7/24/08 15:56	12:41	43.73	43.71					
	19:06	-1.07					AVG=	0:23	AVG=	0:24	0:31 TIME OFFSET

AVERAGE LOWS	-0.54	AVERAGE LOWS	39.01	38.92
AVERAGE HIGHS	-5.13	AVERAGE HIGHS	43.30	43.26
AVERAGE RANGE	**-4.59**	**AVERAGE RANGE**	**4.29**	**4.34**

FOR PERIOD 7/17 THRU 7/24 THE RANGE RATIO FROM SANDY HOOK TO HARS SITE IS : 0.94

AT SANDY HOOK 7/17 thru 7/24

USING AVERAGE LOWS AND HIGHS
CALCULATED MTL= 2.83 MLW

AT HARS 7/17 thru 7/24

USING AVERAGE LOWS AND HIGHS
CALCULATED MTL= 41.15

USING 2.83 MLW AS BEING THE VALUE OF MTL AT SANDY HOOK AND THE RANGE RATIO OF 0.94

THE VALUE OF MTL AT HARS IS CALCULATED TO BE 2.65 MLW 2.68 CORRECTED

RAW 41.09 0.95 RAW Corrected corrected

**********TENTATIVELY**********

THEREFORE THE SUBMERSIBLE TIDE DATA AT THE HARS SITE WILL REQUIRE TO BE DEDUCTED FROMTHE RAW READINGS FOR THE PERIOD 7/17 THRU 7/24: 41.15 (AVERAGE MTL) - 2.65 = 38.50

**********FINAL**********

THEREFORE THE SUBMERSIBLE TIDE DATA AT THE HARS SITE WILL REQUIRE TO BE DEDUCTED FROMTHE RAW READINGS FOR THE PERIOD 7/17 THRU 7/24: 41.09 (AVERAGE MTL) - 2.68 = 38.41

RANGE CORRECTOR = 0.95

TIME OFFSET = 0:31

Figure 4.0-1-5
Working excel data sheet for Range and Offset Corrector calculations.
Data collection period 07/29/08 to 07/31/08

TIDE VALUES IN HYPACK FORMAT**												
	NOAA MLW SANDY HOOK		NOAA SANDY HOOK USING -2.92 AS MTL TIME OF MTL	TIME	RAW	HARS SUBMERSIBLE CORRECTED Density/Baro-press	USING 41.28 MTL TIME OF MTL	Time Diff	USING 41.12 MTL TIME OF MTL	Time Diff	Using Lows & Highs Noaa to Submersible TIME DIFF.
7/28/2008	4:48	-4.63	7/28/08 1:30								
	10:06	-0.64	7/28/08 13:01								
	16:54	-6.00	7/28/08 20:24	16:26	44.07	44.20	7/28/08 20:06	0:18	7/28/08 20:08	0:16	0:28
	23:42	-0.59	7/29/08 2:36	22:58	39.04	39.11	7/29/08 2:13	0:23	7/29/08 2:09	0:27	0:44
7/29/2008	5:12	-4.71	7/29/08 7:56	4:55	42.80	42.89	7/29/08 7:38	0:18	7/29/08 7:43	0:13	0:17
	11:36	-0.34	7/29/08 14:13	10:59	38.87	38.92	7/29/08 13:44	0:29	7/29/08 13:41	0:32	0:37
	17:42	-6.02	7/29/08 21:19	17:17	44.12	44.25	7/29/08 20:55	0:24	7/29/08 20:57	0:22	0:25
7/30/2008	0:36	-0.17	7/30/08 3:42	23:56	38.62	38.71	7/30/08 3:23	0:19	7/30/08 3:20	0:22	0:40
	6:30	-5.07	7/30/08 9:04	5:53	43.08	43.21	7/30/08 8:43	0:21	7/30/08 8:46	0:18	0:37
	12:42	-0.31	7/30/08 15:14	12:04	38.68	38.82	7/30/08 14:45	0:29	7/30/08 14:45	0:29	0:38
	18:42	-6.42	7/30/08 22:25	18:22	44.37	44.63	7/30/08 22:00	0:25	7/30/08 21:54	0:31	0:20
7/31/2008	1:36	-0.26	7/31/08 4:29	1:01	38.44	38.73	7/31/08 4:05	0:24	7/31/08 4:17	0:12	0:35
	7:12	-5.59	7/31/08 10:29	6:51	43.25	43.62				10:29	0:21
	13:48	-0.28	7/31/08 16:03				AVG=	0:23	AVG=	0:23	0:31 TIME OFFSET
	19:54	-6.66	7/31/08 23:22								
AVERAGE LOWS		-0.27	AVERAGE LOWS		38.65	38.80					
AVERAGE HIGHS		-5.56	AVERAGE HIGHS		43.59	43.75					
AVERAGE RANGE		-5.29	AVERAGE RANGE		4.94	4.95					

FOR PERIOD 7/29 THRU 7/31 THE RANGE RATIO FROM SANDY HOOK TO HARS SITE IS : 0.93

AT SANDY HOOK 7/29 thru 7/31

USING AVERAGE LOWS AND HIGHS
CALCULATED MTL= 2.91 MLW

AT HARS 7/29 thru 7/31

USING AVERAGE LOWS AND HIGHS
CALCULATED MTL= 41.12

RAW 41.27 RAW Corrected

USING 2.91 MLW AS BEING THE VALUE OF MTL AT SANDY HOOK AND THE RANGE RATIO OF 0.93 0.94 corrected

THE VALUE OF MTL AT HARS IS CALCULATED TO BE 2.72 MLW 2.73 CORRECTED

**********TENTATIVELY**********

THEREFORE THE SUBMERSIBLE TIDE DATA AT THE HARS SITE WILL REQUIRE TO BE DEDUCTED FROM THE RAW READINGS FOR THE PERIOD 7/29 THRU 7/31 — 41.12 (AVERAGE MTL) - 2.72 = 38.40

**********FINAL**********

THEREFORE THE SUBMERSIBLE TIDE DATA AT THE HARS SITE WILL REQUIRE TO BE DEDUCTED FROM THE RAW READINGS FOR THE PERIOD 7/29 THRU 7/31 — 41.27 (AVERAGE MTL) - 2.73 = 38.54

RANGE CORRECTOR = 0.94

TIME OFFSET = 0:31

Figure 4.0-1-6

Result Plots of Comparison between Submersible Tide data and NOAA Tide data (with 2006 and 2008 Range and Time Offset correctors), and RTK GPS data for 06/18/08.

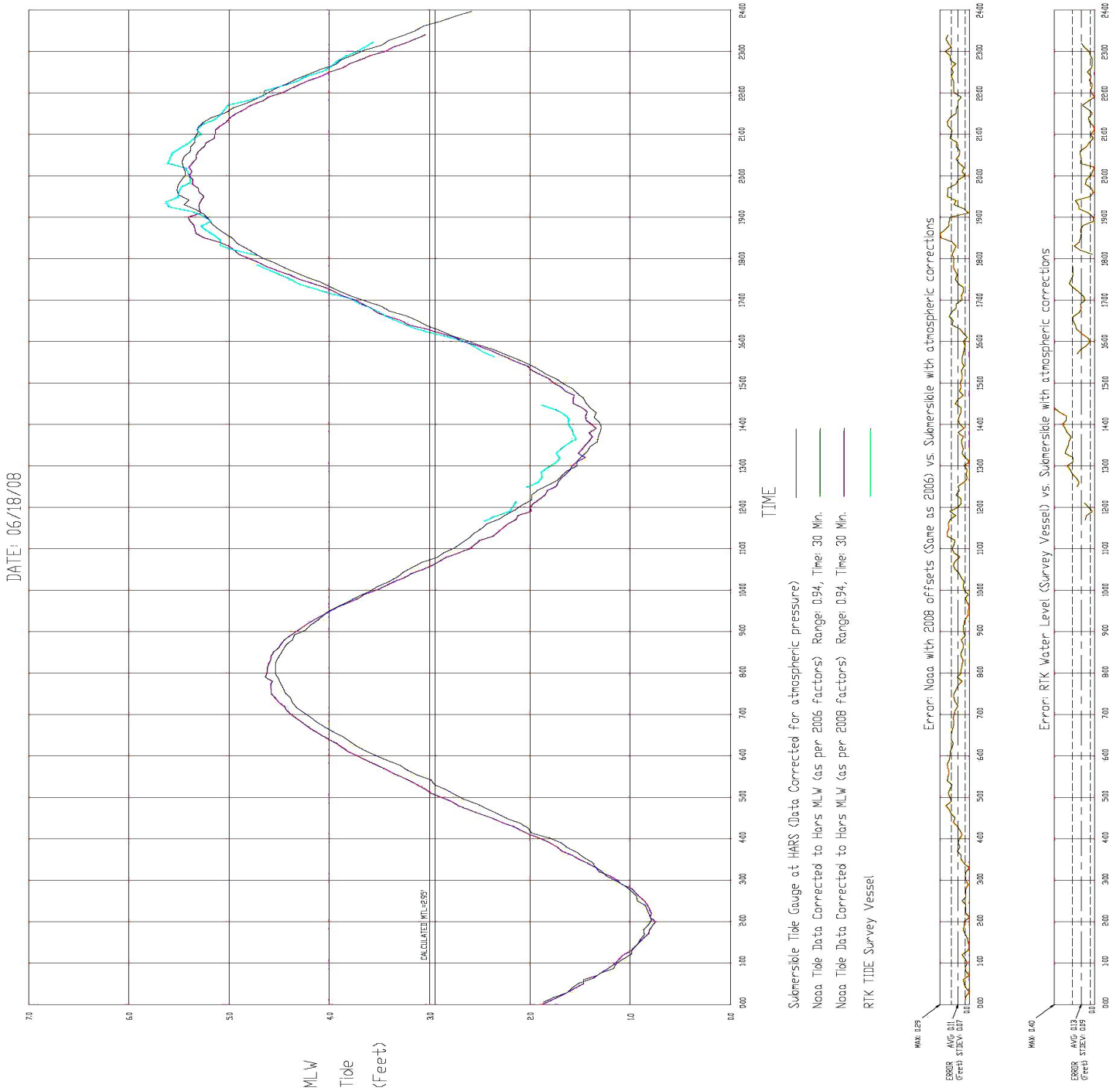


Figure 4.0-1-7

Result Plots of Comparison between Submersible Tide data and NOAA Tide data (with 2006 and 2008 Range and Time Offset correctors), and RTK GPS data for 06/19/08.

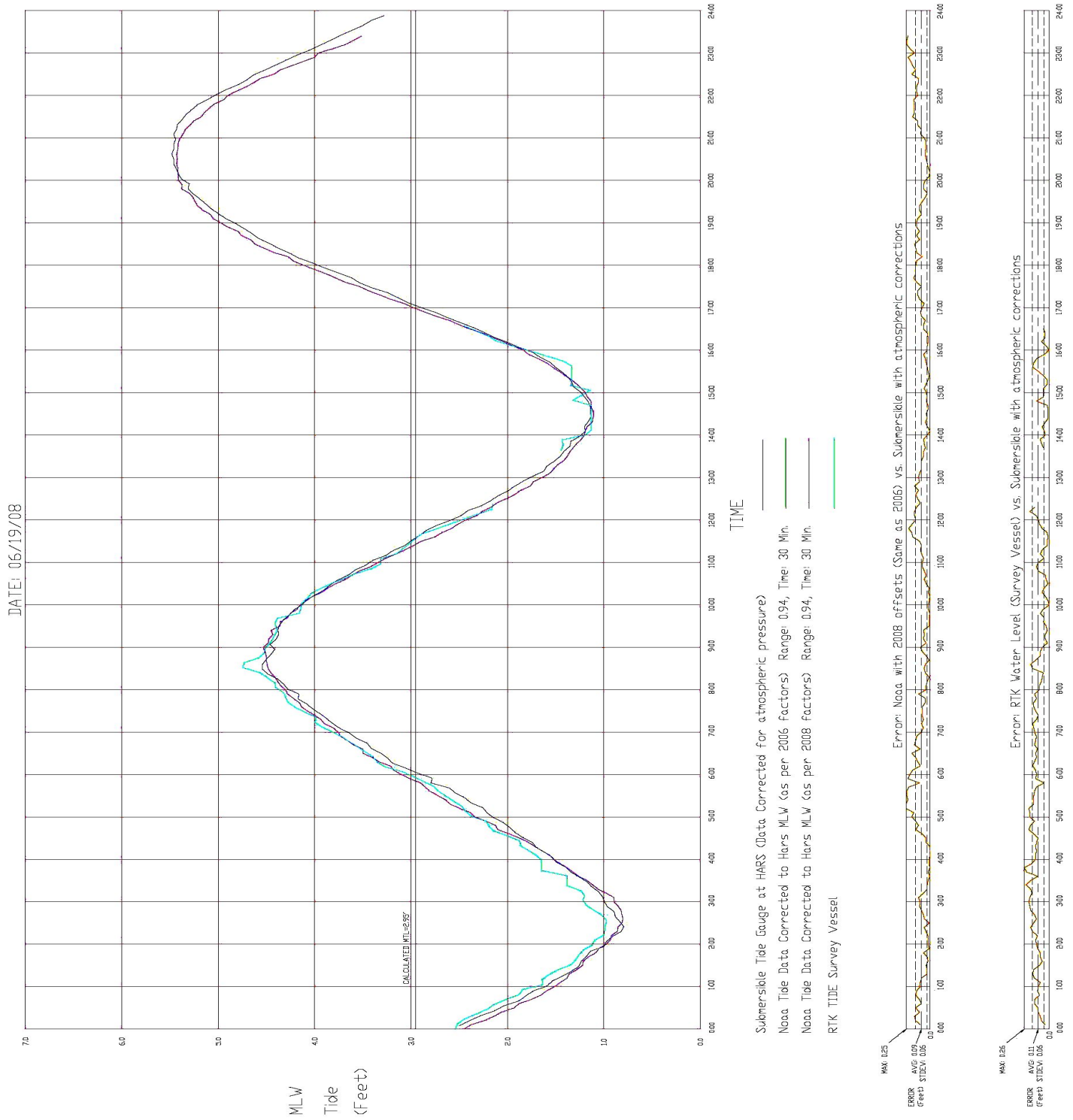


Figure 4.0-1-8

Result Plots of Comparison between Submersible Tide data and NOAA Tide data (with 2006 and 2008 Range and Time Offset correctors), and RTK GPS data for 06/23/08.

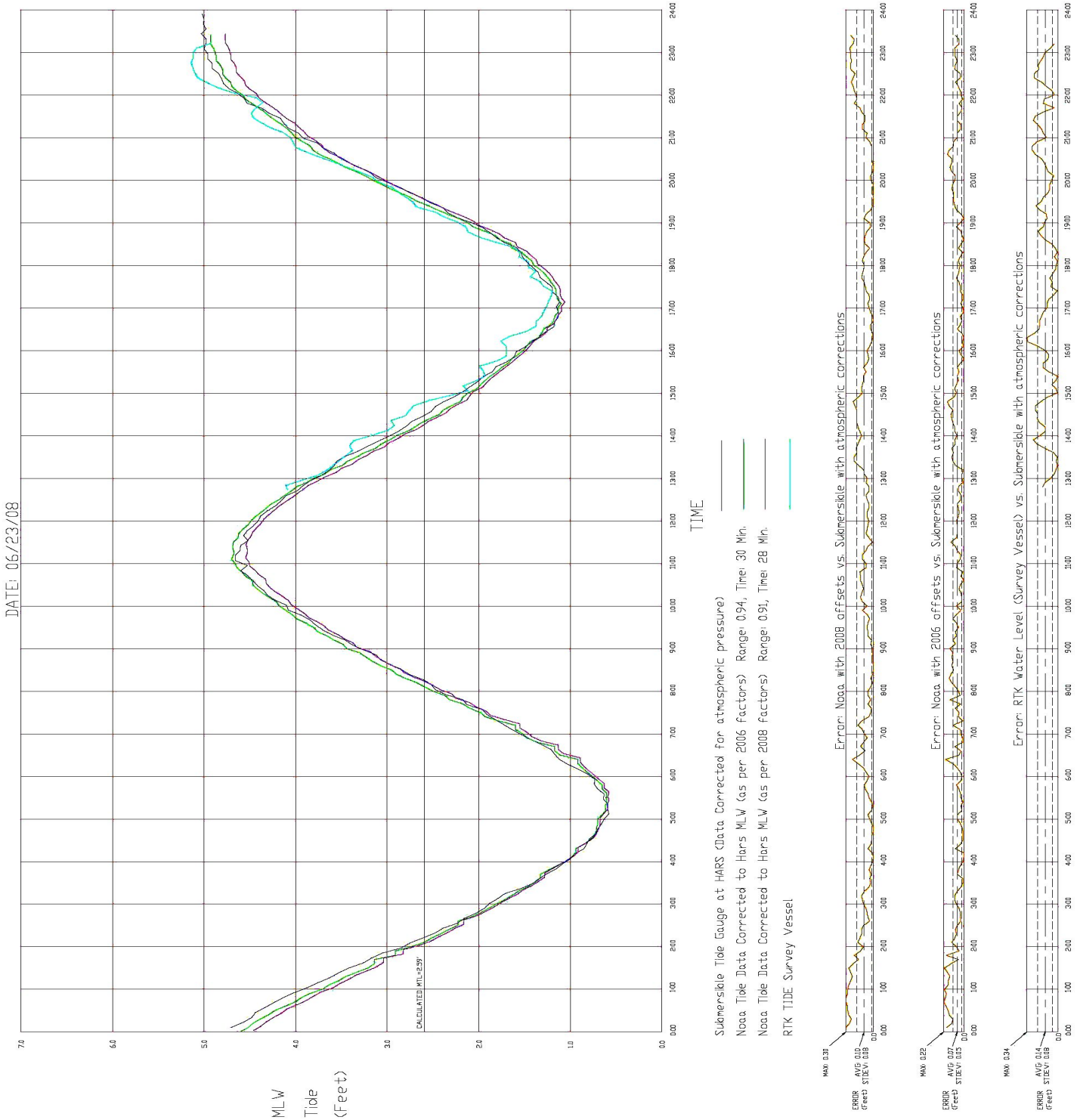


Figure 4.0-1-9

Result Plots of Comparison between Submersible Tide data and NOAA Tide data (with 2006 and 2008 Range and Time Offset correctors), and RTK GPS data for 06/24/08.

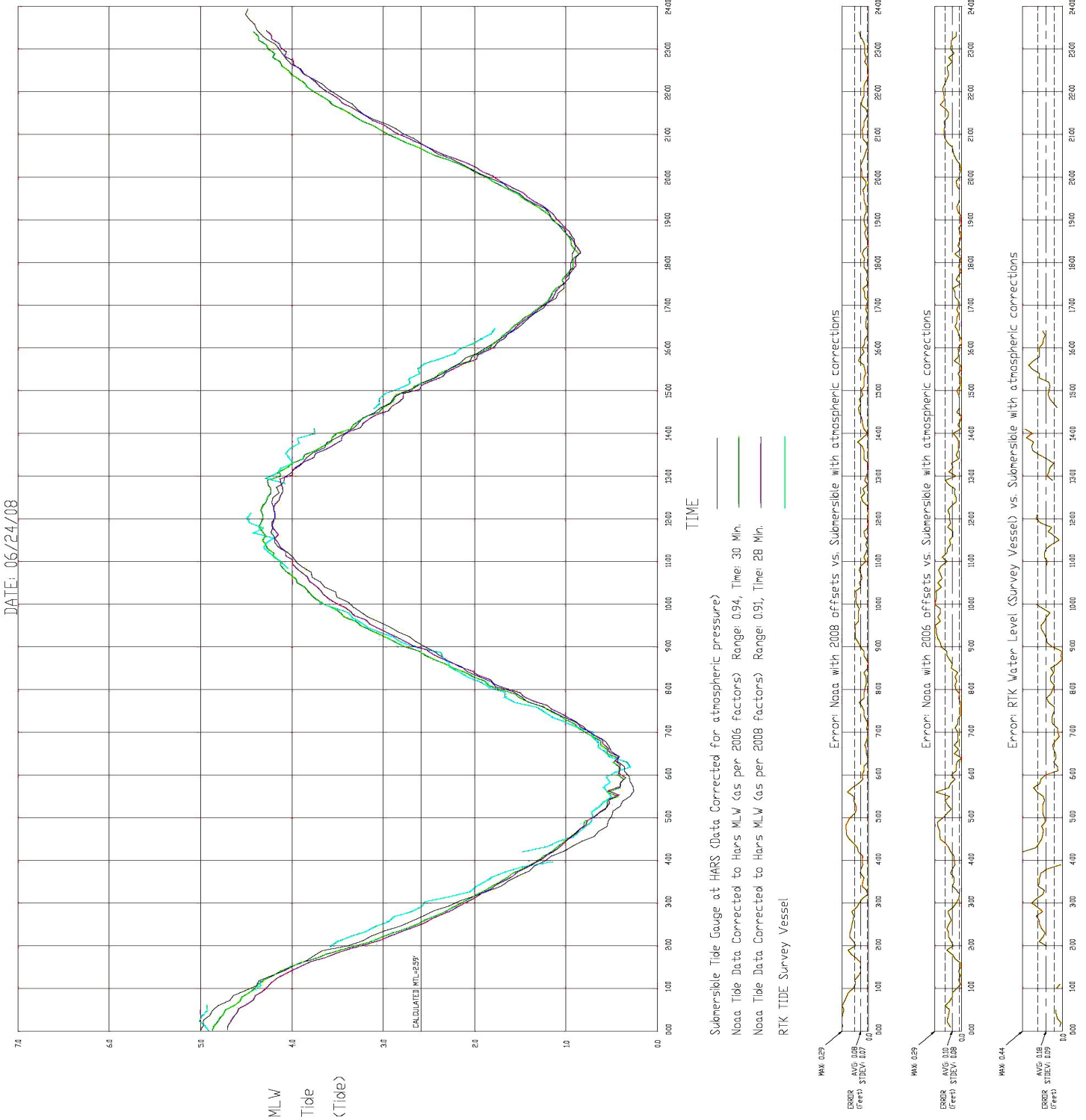


Figure 4.0-1-10

Result Plots of Comparison between Submersible Tide data and NOAA Tide data (with 2006 and 2008 Range and Time Offset correctors), and RTK GPS data for 07/07/08.

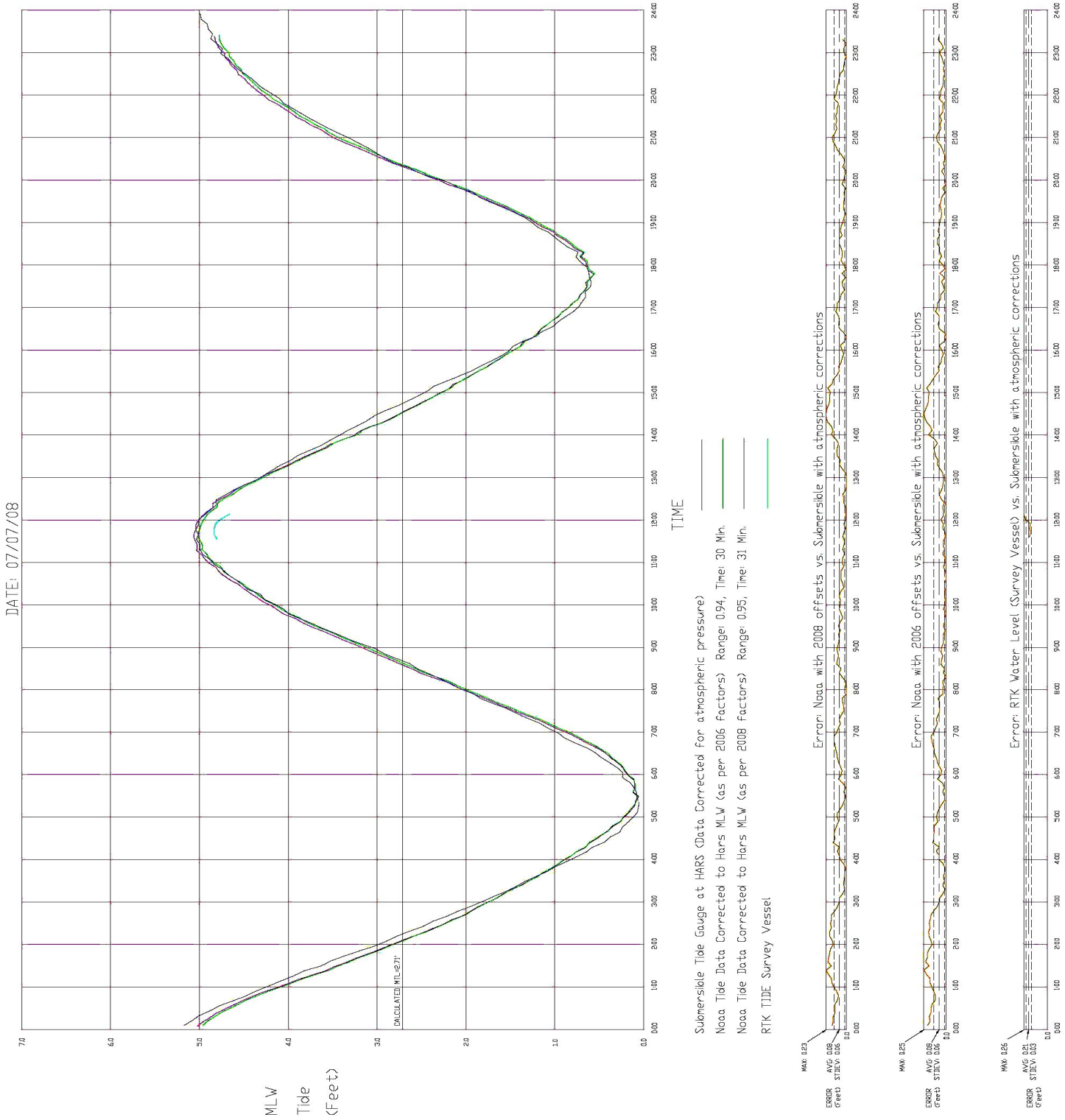


Figure 4.0-1-11

Result Plots of Comparison between Submersible Tide data and NOAA Tide data (with 2006 and 2008 Range and Time Offset correctors), and RTK GPS data for 07/08/08.

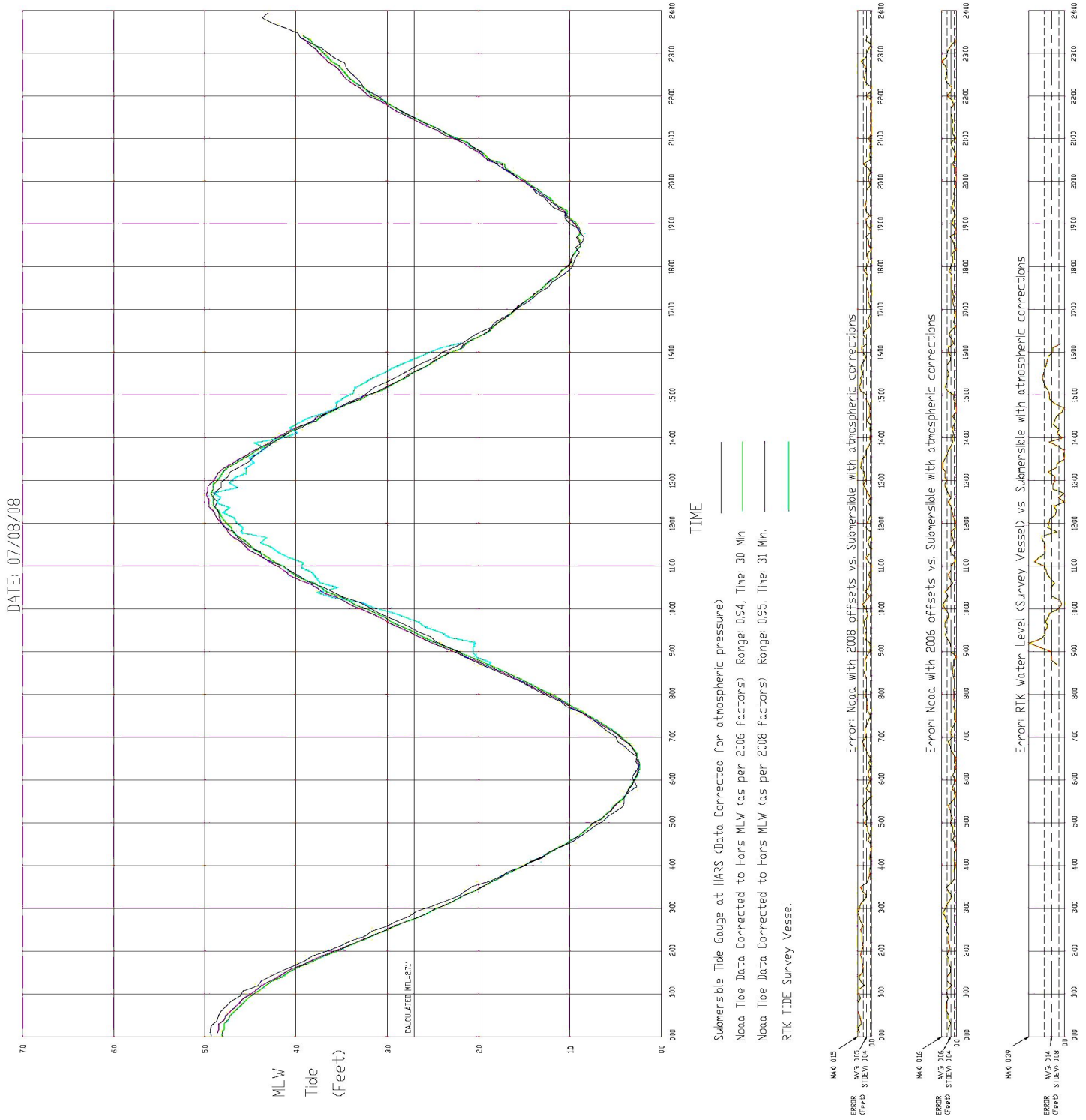


Figure 4.0-1-12

Result Plots of Comparison between Submersible Tide data and NOAA Tide data (with 2006 and 2008 Range and Time Offset correctors), and RTK GPS data for 07/17/08.

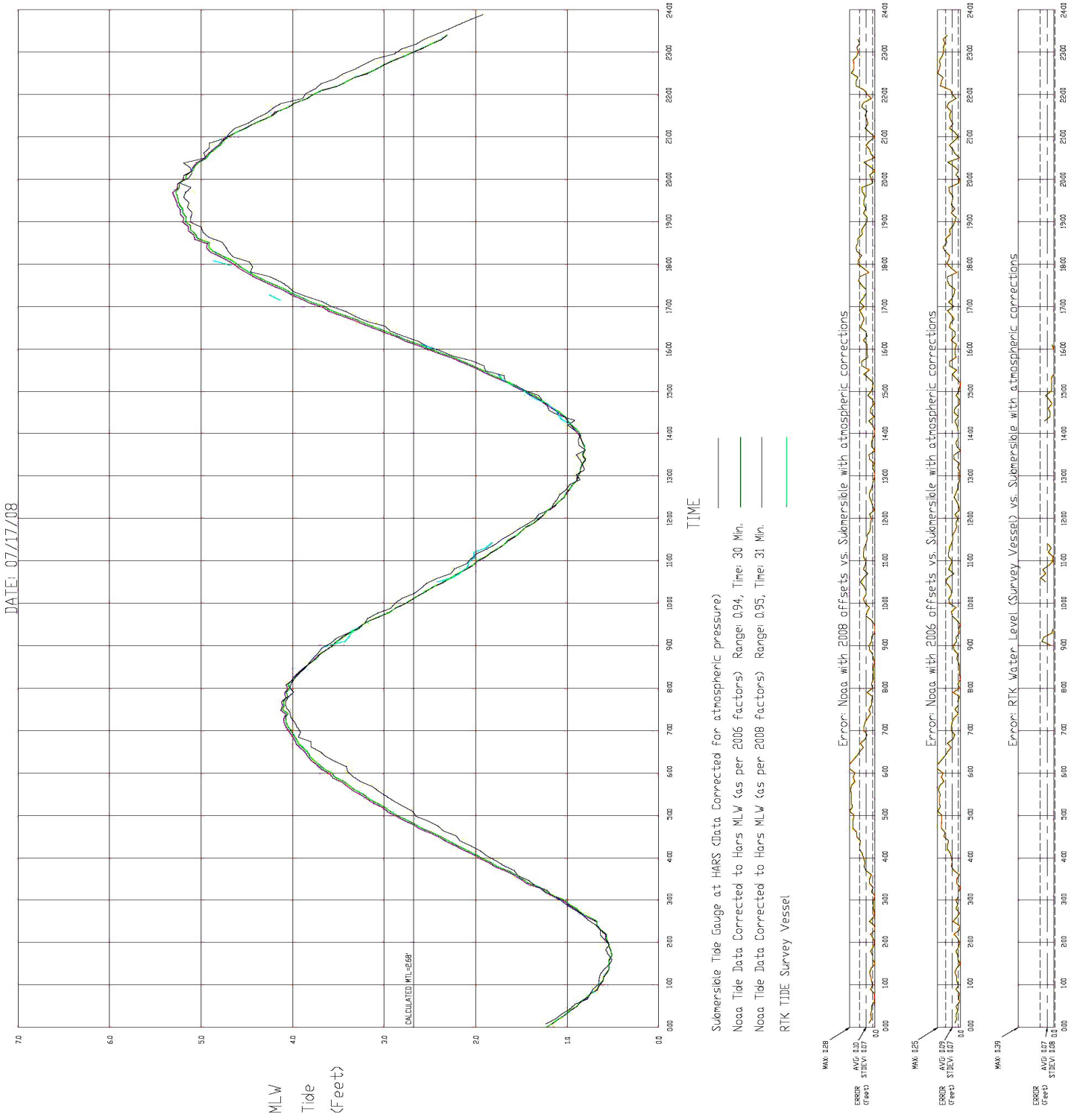


Figure 4.0-1-13

Result Plots of Comparison between Submersible Tide data and NOAA Tide data (with 2006 and 2008 Range and Time Offset correctors), and RTK GPS data for 07/18/08.

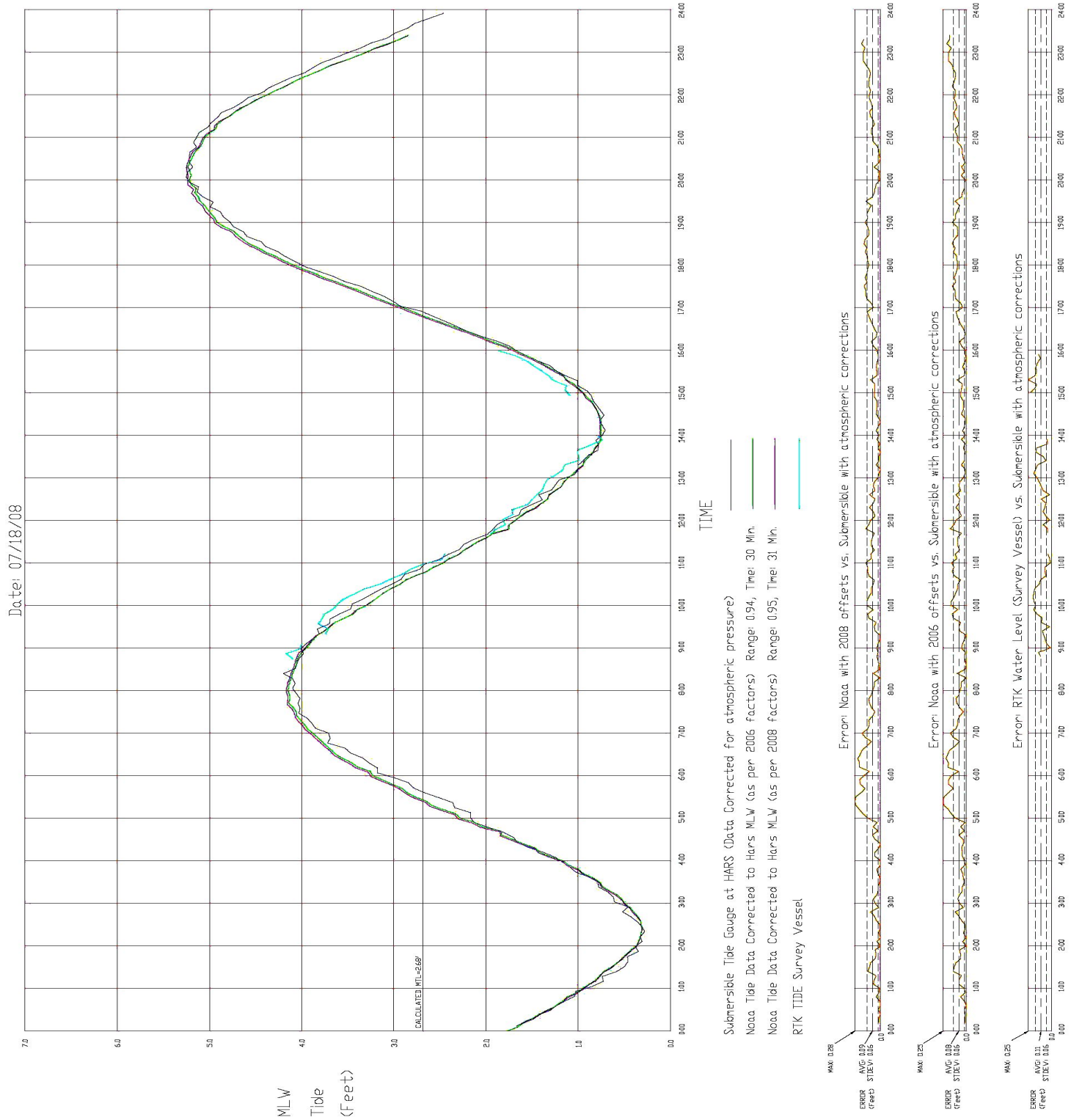


Figure 4.0-1-14

Result Plots of Comparison between Submersible Tide data and NOAA Tide data (with 2006 and 2008 Range and Time Offset correctors), and RTK GPS data for 07/23/08.

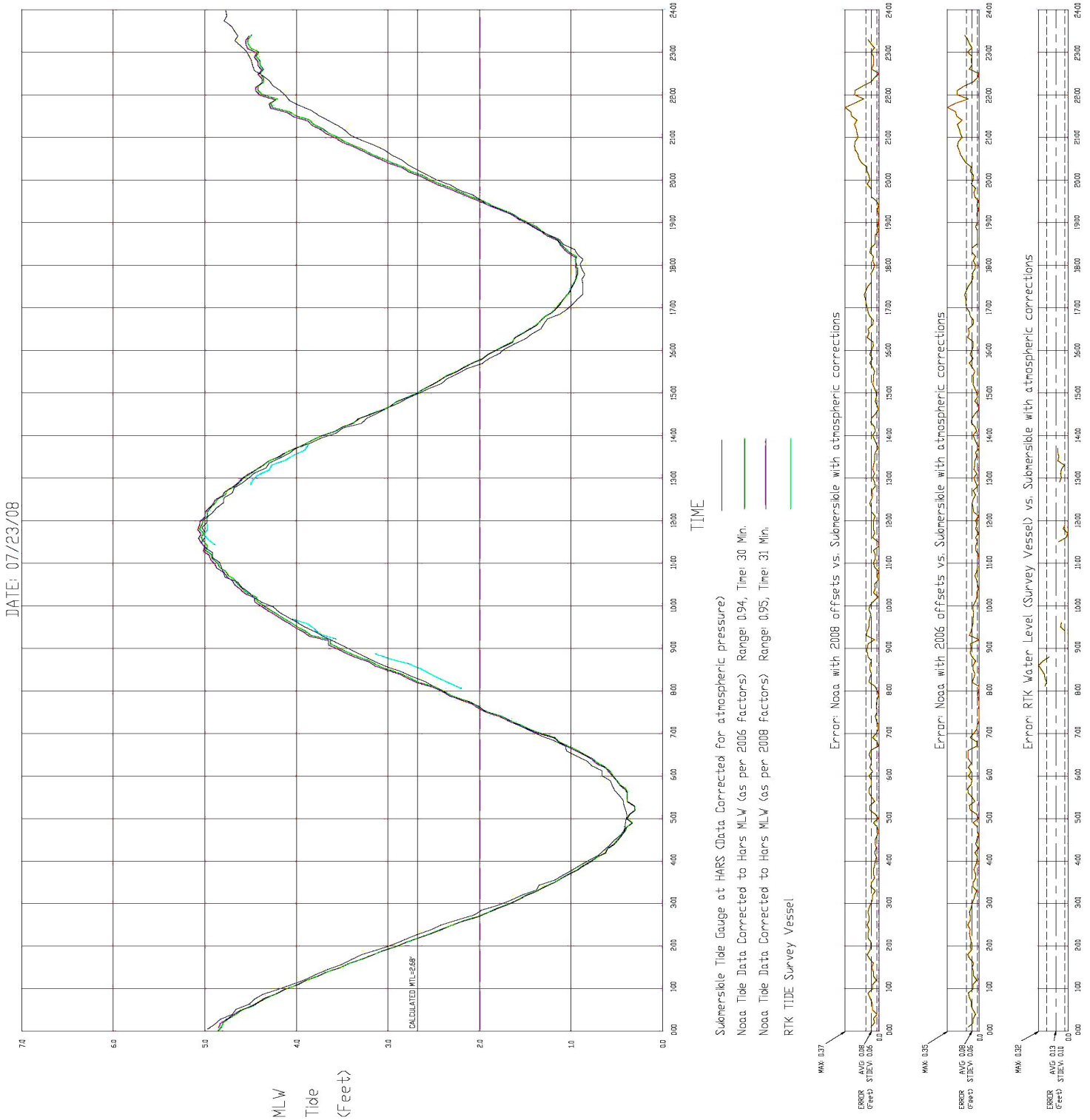


Figure 4.0-1-15

Result Plots of Comparison between Submersible Tide data and NOAA Tide data (with 2006 and 2008 Range and Time Offset correctors), and RTK GPS data for 07/30/08.

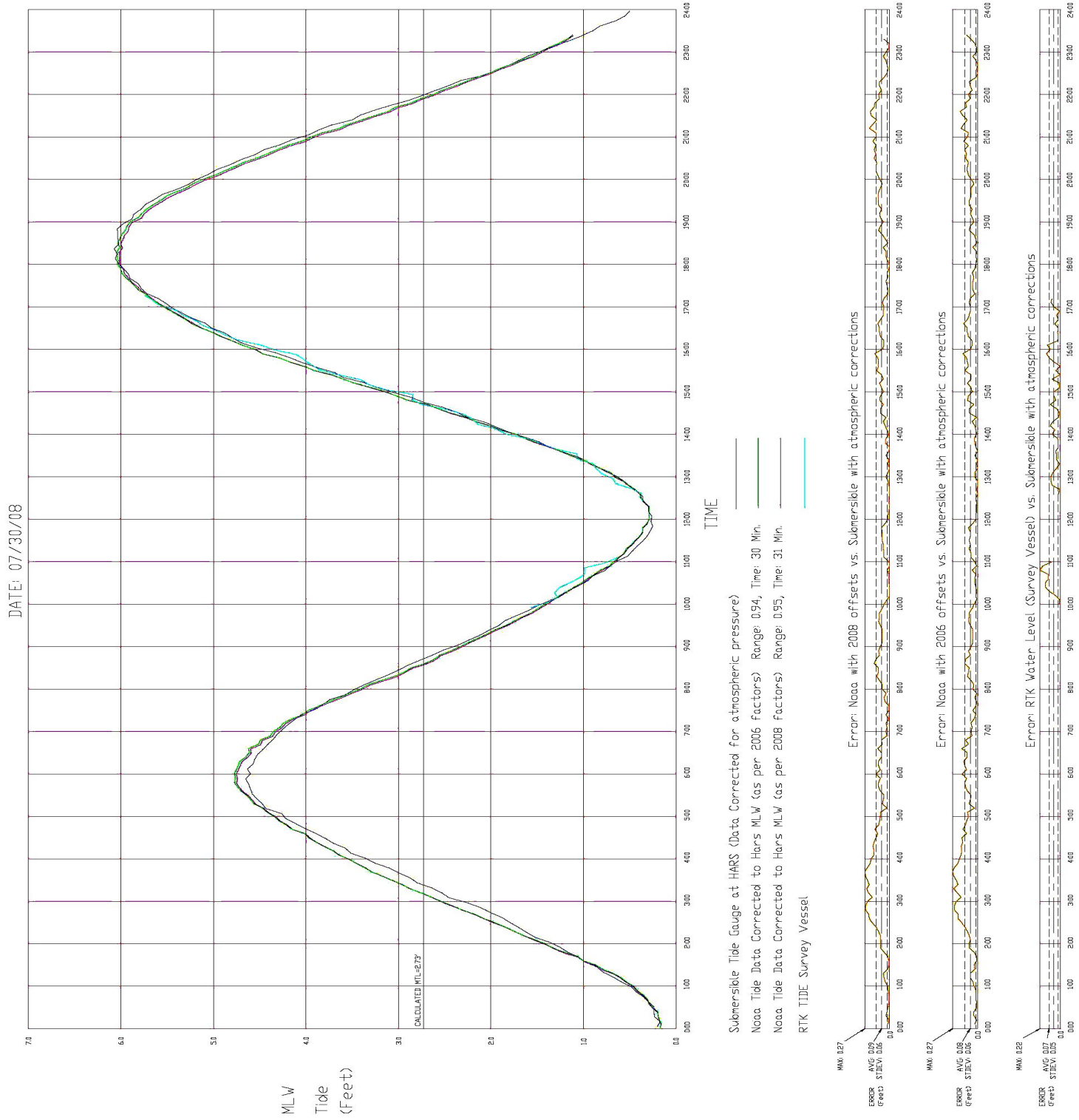


Table 4.0-1-16

Calculated errors between Submersible Tide data and NOAA Tide data (with 2006 and 2008 Range and Time Offset correctors), and RTK GPS data for each survey day and for duration of survey.

DATE	Average	Stdev.	Max	Comparison To Submersile Tide Gauge
06/18/08	0.11	0.07	0.29	**Noaa-With-2006/2008 Correctors**
	0.13	0.09	0.40	**RTK**
06/19/08	0.09	0.06	0.25	**Noaa-With-2006/2008 Correctors**
	0.11	0.06	0.26	**RTK**
06/23/08	0.10	0.08	0.30	**Noaa-With-2008 Correctors**
	0.07	0.05	0.22	**Noaa-With-2006 Correctors**
	0.14	0.08	0.34	**RTK**
06/24/08	0.08	0.07	0.29	**Noaa-With-2008 Correctors**
	0.10	0.08	0.29	**Noaa-With-2006 Correctors**
	0.18	0.09	0.44	**RTK**
07/07/08	0.08	0.06	0.23	**Noaa-With-2008 Correctors**
	0.08	0.06	0.25	**Noaa-With-2006 Correctors**
	0.21	0.03	0.26	**RTK**
07/08/08	0.05	0.04	0.15	**Noaa-With-2008 Correctors**
	0.06	0.04	0.16	**Noaa-With-2006 Correctors**
	0.14	0.08	0.39	**RTK**
07/17/08	0.10	0.07	0.28	**Noaa-With-2008 Correctors**
	0.09	0.07	0.25	**Noaa-With-2006 Correctors**
	0.07	0.08	0.39	**RTK**
07/18/08	0.09	0.06	0.28	**Noaa-With-2008 Correctors**
	0.08	0.06	0.25	**Noaa-With-2006 Correctors**
	0.11	0.06	0.25	**RTK**
07/23/08	0.08	0.06	0.37	**Noaa-With-2008 Correctors**
	0.08	0.06	0.35	**Noaa-With-2006 Correctors**
	0.13	0.10	0.32	**RTK**
07/30/08	0.09	0.06	0.27	**Noaa-With-2008 Correctors**
	0.08	0.06	0.27	**Noaa-With-2006 Correctors**
	0.07	0.05	0.22	**RTK**
Survey Duration	**0.09**	**0.07**	**0.37**	**Noaa-With-2008 Correctors**
Survey Duration	**0.08**	**0.06**	**0.35**	**Noaa-With-2006 Correctors**
Survey Duration	**0.13**	**0.09**	**0.44**	**RTK**

5.0 Cross-Track Analysis

Cross-track analysis was performed to provide a quality check on the accuracy of the multibeam data. Cross-track lines are run perpendicular to the main direction of survey lines to produce areas of overlapping data that can be analyzed and errors quantified to provide an indication of the overall quality of data.

For the 2008 survey the main body of survey lines were run in a North-South direction and for every ten (10) main body lines a cross-track line was run in an East-West direction. This yielded a total of twelve (12) cross-track lines, which were then analyzed utilizing the Beam Angle Test module within the Hypack Processing software. The Beam Angle Test compares multibeam check lines to a reference surface and estimates the depth accuracy of the multibeam system at different angle limits. The estimated accuracy can be used to determine if the multibeam system meets survey specifications. In this case the reference surface used was the final 10x10 xyz of the processed main body multibeam data. Results from this analysis are seen in Section 5.1.

5.1 Cross-Track Analysis Results

Table 5.1-1 show the results from the Hypack Beam Analysis for each crossing. The analysis software generates; Max Outlier, Mean Difference, Standard Deviation and 95% Confidence for the beam angle limits specified. All but two of the crossings show that the 95% confidence is less than 0.7', while crossing 0718_1614 is 0.84' and crossing 0717_1820 is 0.96'. The mean difference for all crossings is less than 0.16', while the standard deviation for all crossings is less than 0.49'. The maximum outlier is 3.08'. Figures 5.1-1 to 5.1-2 show screen captures of the summary plots for the errors at +/- 60 deg. for each crossing.

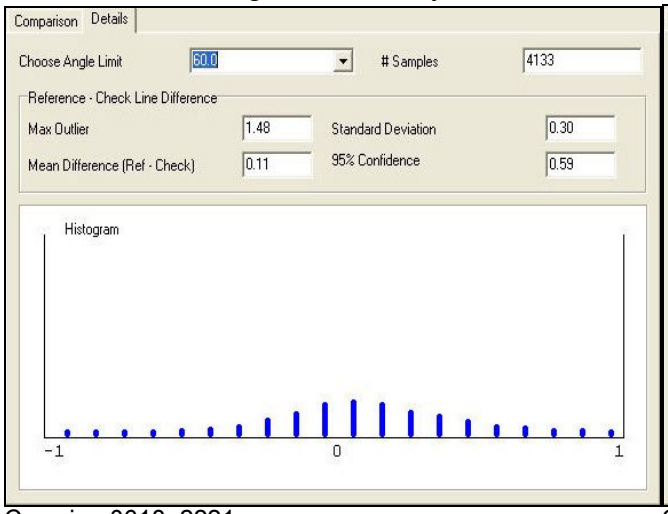
Table 5.1-1

Summary of Beam Analysis Results for all crossings during HARS 2008 survey

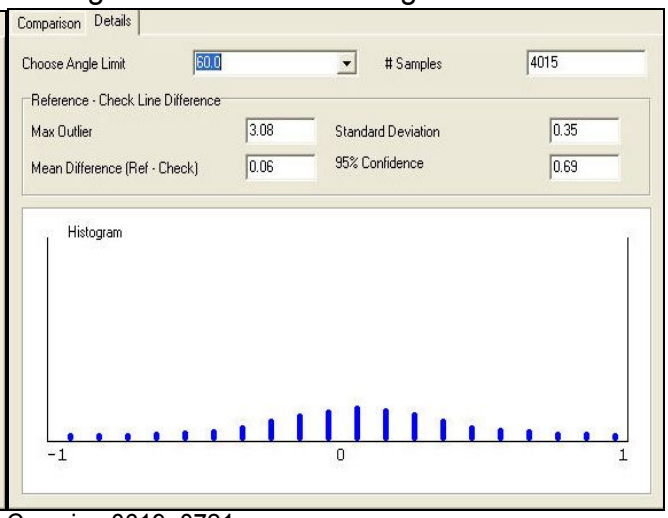
Crossing	Beam Angle	Max. Outlier	Mean Diff.	Std Dev.	95%	Crossing	Beam Angle	Max. Outlier	Mean Diff.	Std Dev.	95%	Crossing	Beam Angle	Max. Outlier	Mean Diff.	Std Dev.	95%
0618-2221	+/-20	1.24	-0.03	0.23	0.46	0624W_1002	+/-20	1.02	-0.08	0.23	0.44	0730_1554B	+/-20	1.94	-0.07	0.25	0.48
	+/-25	1.24	-0.04	0.23	0.46		+/-25	1.02	-0.07	0.23	0.45		+/-25	1.94	-0.07	0.25	0.49
	+/-30	1.24	-0.03	0.23	0.45		+/-30	1.02	-0.07	0.22	0.44		+/-30	1.94	-0.06	0.25	0.49
	+/-35	1.24	-0.02	0.23	0.45		+/-35	1.05	-0.07	0.22	0.43		+/-35	1.94	-0.05	0.25	0.49
	+/-40	1.24	0.00	0.24	0.46		+/-40	1.28	-0.06	0.22	0.43		+/-40	2.20	-0.04	0.26	0.51
	+/-45	1.24	0.02	0.24	0.47		+/-45	1.28	-0.05	0.22	0.43		+/-45	2.20	-0.04	0.26	0.51
	+/-50	1.24	0.03	0.25	0.48		+/-50	1.28	-0.04	0.22	0.44		+/-50	2.20	-0.02	0.26	0.52
	+/-55	1.48	0.05	0.26	0.50		+/-55	1.28	-0.02	0.23	0.46		+/-55	2.20	-0.01	0.27	0.53
	+/-60	1.48	0.11	0.30	0.59		+/-60	1.41	0.03	0.27	0.52		+/-60	2.20	0.01	0.28	0.56
0619_0721	+/-20	2.69	0.02	0.34	0.66	0708_1611	+/-20	1.08	-0.02	0.21	0.42	0730_1701	+/-20	1.08	-0.06	0.23	0.46
	+/-25	2.69	0.03	0.34	0.67		+/-25	1.08	-0.03	0.21	0.42		+/-25	1.08	-0.06	0.23	0.46
	+/-30	3.08	0.03	0.34	0.67		+/-30	1.08	-0.02	0.21	0.42		+/-30	1.08	-0.06	0.23	0.46
	+/-35	3.08	0.04	0.35	0.68		+/-35	1.08	-0.03	0.21	0.42		+/-35	1.08	-0.05	0.23	0.45
	+/-40	3.08	0.04	0.35	0.68		+/-40	1.18	-0.03	0.21	0.42		+/-40	1.08	-0.04	0.23	0.44
	+/-45	3.08	0.05	0.35	0.68		+/-45	1.18	-0.04	0.22	0.44		+/-45	1.08	-0.04	0.23	0.44
	+/-50	3.08	0.05	0.34	0.67		+/-50	1.35	-0.04	0.23	0.45		+/-50	1.11	-0.03	0.23	0.45
	+/-55	3.08	0.06	0.34	0.67		+/-55	1.45	-0.05	0.24	0.48		+/-55	1.11	-0.02	0.23	0.46
	+/-60	3.08	0.06	0.35	0.69		+/-60	1.45	-0.07	0.27	0.53		+/-60	1.11	0.00	0.25	0.49
0619_1627	+/-20	1.64	-0.09	0.21	0.41	0717_1820	+/-20	2.16	-0.14	0.42	0.83	0730_1705	+/-20	1.41	-0.17	0.24	0.47
	+/-25	1.64	-0.09	0.21	0.41		+/-25	2.16	-0.12	0.43	0.84		+/-25	1.41	-0.16	0.24	0.48
	+/-30	1.64	-0.09	0.21	0.40		+/-30	2.16	-0.11	0.43	0.84		+/-30	1.41	-0.16	0.24	0.47
	+/-35	1.64	-0.09	0.20	0.40		+/-35	2.16	-0.10	0.43	0.84		+/-35	1.41	-0.15	0.24	0.47
	+/-40	1.64	-0.09	0.20	0.40		+/-40	2.16	-0.09	0.44	0.86		+/-40	1.41	-0.14	0.24	0.48
	+/-45	1.64	-0.09	0.20	0.40		+/-45	2.16	-0.09	0.44	0.87		+/-45	1.41	-0.14	0.25	0.48
	+/-50	1.64	-0.09	0.20	0.40		+/-50	2.16	-0.09	0.46	0.90		+/-50	1.51	-0.13	0.25	0.49
	+/-55	1.64	-0.09	0.20	0.40		+/-55	2.16	-0.08	0.47	0.92		+/-55	1.51	-0.11	0.26	0.50
	+/-60	1.64	-0.08	0.21	0.42		+/-60	2.16	-0.07	0.49	0.96		+/-60	1.70	-0.08	0.27	0.53
0623_2241	+/-20	1.09	0.01	0.20	0.39	0718_1614	+/-20	1.94	-0.10	0.36	0.71						
	+/-25	1.09	0.03	0.19	0.37		+/-25	1.94	-0.09	0.36	0.71						
	+/-30	0.99	0.04	0.21	0.41		+/-30	1.94	-0.08	0.36	0.71						
	+/-35	0.92	0.03	0.19	0.37		+/-35	1.94	-0.08	0.36	0.71						
	+/-40	1.05	0.04	0.21	0.41		+/-40	1.94	-0.08	0.36	0.71						
	+/-45	1.44	0.03	0.22	0.43		+/-45	2.03	-0.09	0.37	0.72						
	+/-50	1.44	0.04	0.25	0.50		+/-50	2.16	-0.10	0.38	0.75						
	+/-55	1.44	0.05	0.22	0.43		+/-55	2.16	-0.13	0.40	0.79						
	+/-60	1.44	0.09	0.26	0.50		+/-60	2.16	-0.16	0.43	0.84						
0624E_1627A	+/-20	0.88	-0.11	0.22	0.43	0723_1403	+/-20	1.25	0.00	0.32	0.62						
	+/-25	0.88	-0.10	0.22	0.44		+/-25	1.25	0.01	0.32	0.63						
	+/-30	0.88	-0.09	0.23	0.45		+/-30	1.25	0.01	0.32	0.63						
	+/-35	0.88	-0.08	0.23	0.46		+/-35	1.25	0.01	0.32	0.63						
	+/-40	0.88	-0.08	0.23	0.46		+/-40	1.25	0.01	0.32	0.63						
	+/-45	0.92	-0.08	0.23	0.46		+/-45	1.25	0.01	0.32	0.63						
	+/-50	1.02	-0.09	0.23	0.46		+/-50	1.28	0.00	0.32	0.63						
	+/-55	1.02	-0.10	0.24	0.47		+/-55	1.57	0.00	0.32	0.63						
	+/-60	1.02	-0.11	0.25	0.49		+/-60	1.57	0.00	0.32	0.63						

Figure 5.1-1

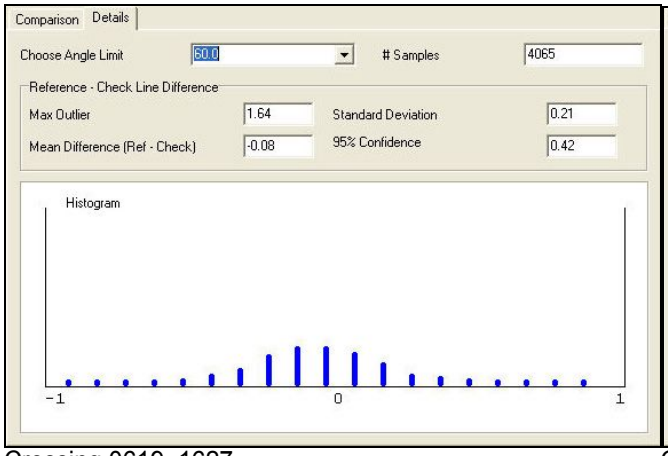
Plots of +/- 60 Deg. Beam Analysis Results for crossings 06/18 to 06/24 during HARS 2008 survey



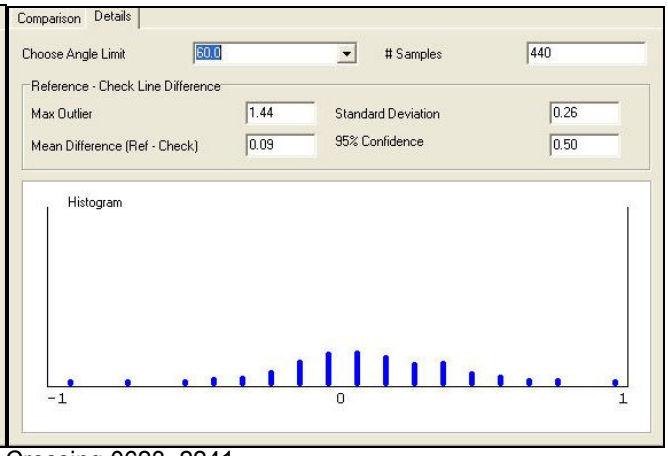
Crossing 0618_2221



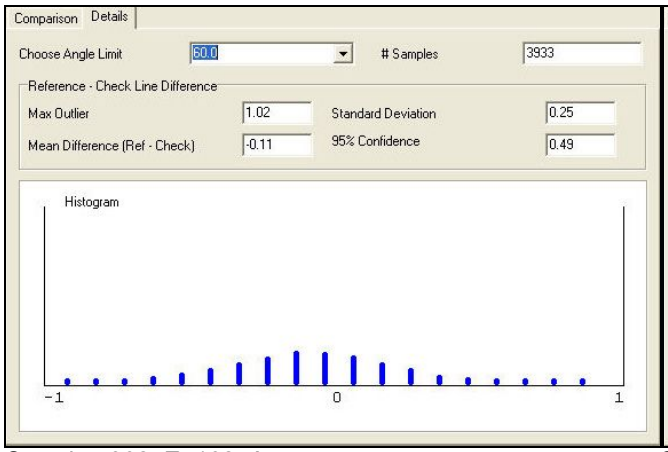
Crossing 0619_0721



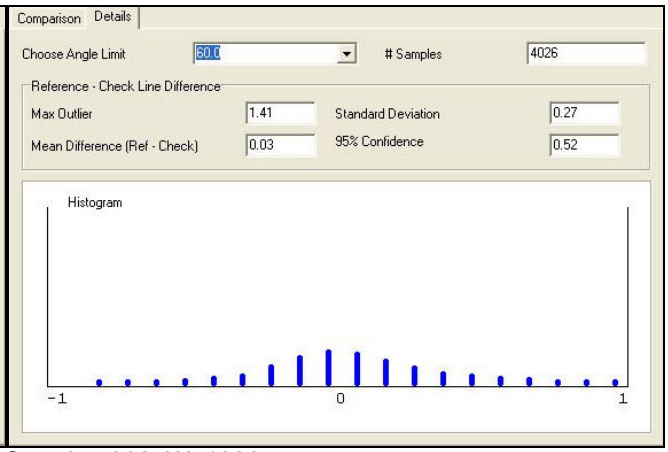
Crossing 0619_1627



Crossing 0623_2241



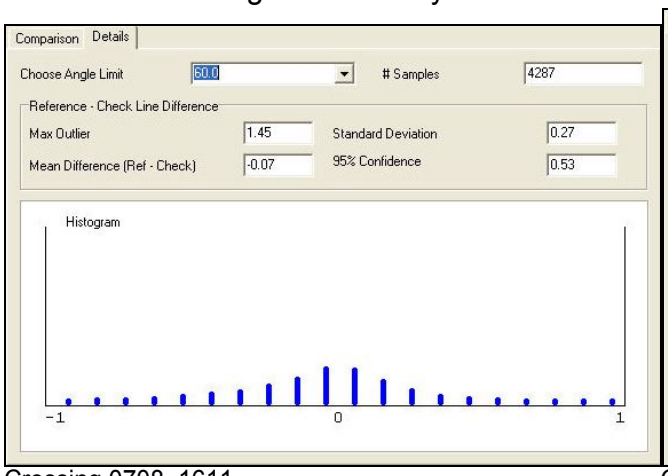
Crossing 0624E_1627A



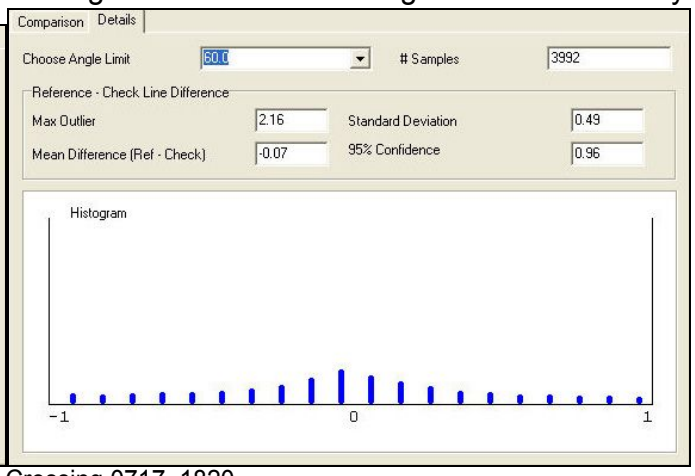
Crossing 0624W_1002

Figure 5.1-2

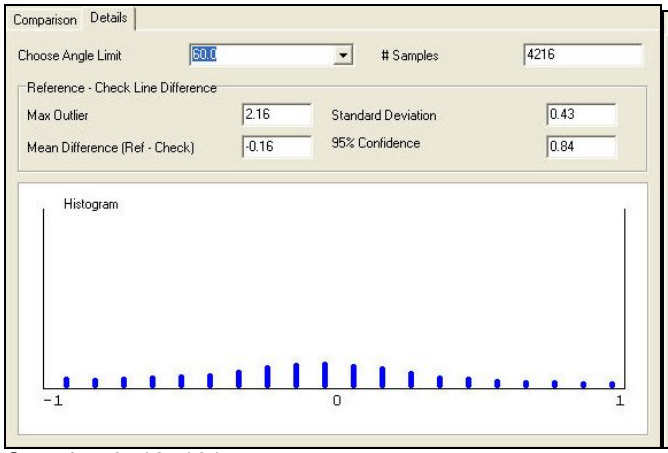
Plots of +/- 60 Deg. Beam Analysis Results for crossings 07/08 to 07/23 during HARS 2008 survey



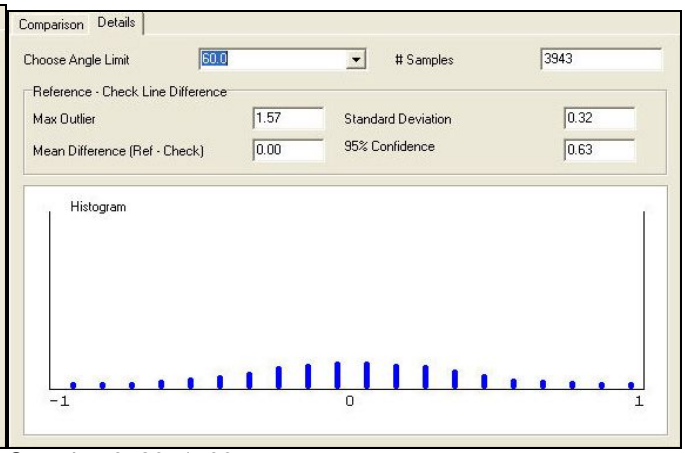
Crossing 0708_1611



Crossing 0717_1820

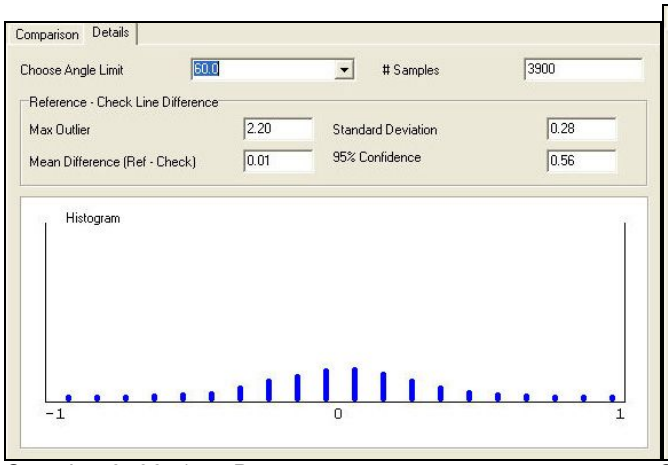


Crossing 0718_1614

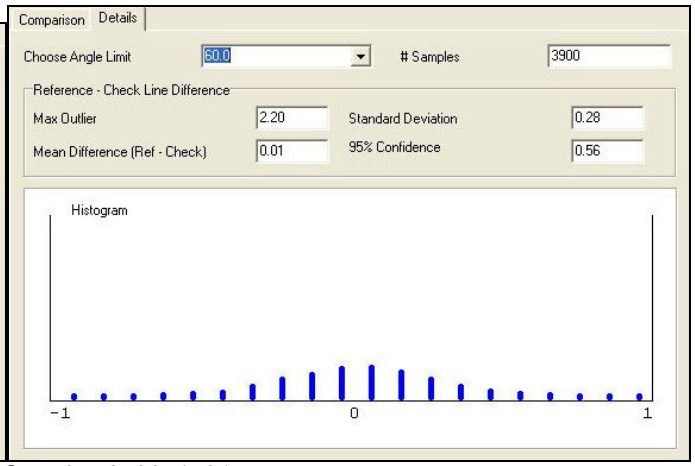


Crossing 0723_1403

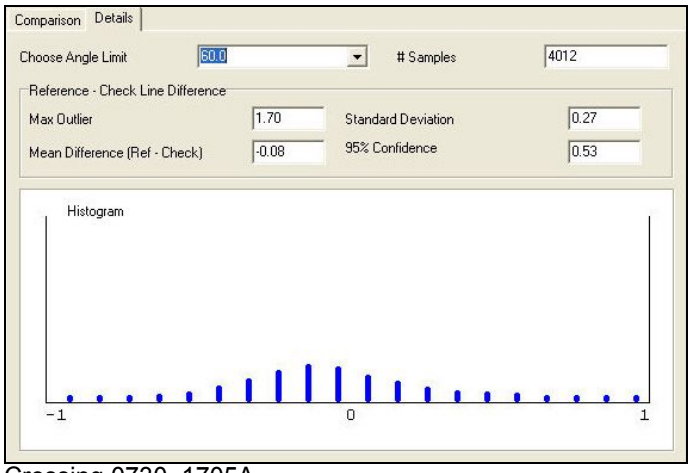
Figure 5.1-2
Plots of +/- 60 Deg. Beam Analysis Results for crossings on 07/30 during HARS 2008 survey



Crossing 0730_1554B



Crossing 0730_1701



Crossing 0730_1705A