

C. VERTICAL AND HORIZONTAL CONTROL

Refer to the Horizontal and Vertical Control Report* for a detailed description of the horizontal and vertical control used during this survey. A summary of horizontal and vertical control used for the survey follows.

C.1 VERTICAL CONTROL

The initial vertical control for this survey was based on the National Water Level Observation Network (NWLON) station at Virginia Key, FL (8723214). Preliminary tide zoning for the project was set out using time and range correctors relative to the continuously operating Virginia Key NWLON tide station. Preliminary tide corrections were used to reduce depth soundings during the data collection period, in order to assess the integrity of bathymetry and plan necessary reflies. *Concur.*

Final vertical control was based on tide stations established on Deerfield Pier, Anglin's Pier and Dania Pier by Baxley Ocean Visions (BOV). The three tide gauges were related to the initial survey datum (NAVD88) by CPE on July 12, 2008. Tide records were corrected to MLLW for the NOAA work using the values in the table below. Further details on the derivation of these corrections are provided in the Horizontal and Vertical Control Report*. The tide gauges operated continuously from July 12, 2008 through to August 24, 2008. *Concur. *Data included with survey deliverables.*

Station details are as follows:

Location	NAD83		NAVD88 – MLLW Correction (m)
	Latitude (N)	Longitude (W)	
Deerfield Pier	26° 19.0'	80° 08.3'	+ 0.660
Anglin's Pier	26° 11.4'	80° 08.4'	+ 0.702
Dania Pier	26° 03.3'	80° 10.8'	+ 0.623

C.2 ZONING

The final tide zones were designed to incorporate at least one observed tide station (established by BOV). In some of the zones two observed tide stations were used to provide a co-tidal model. An analysis of depth benchmark and crossline comparisons, and overlaps of the mainlines of sounding concluded that final tide zoning was adequate. The final tide zones superseded the preliminary tide zone. *Concur.*

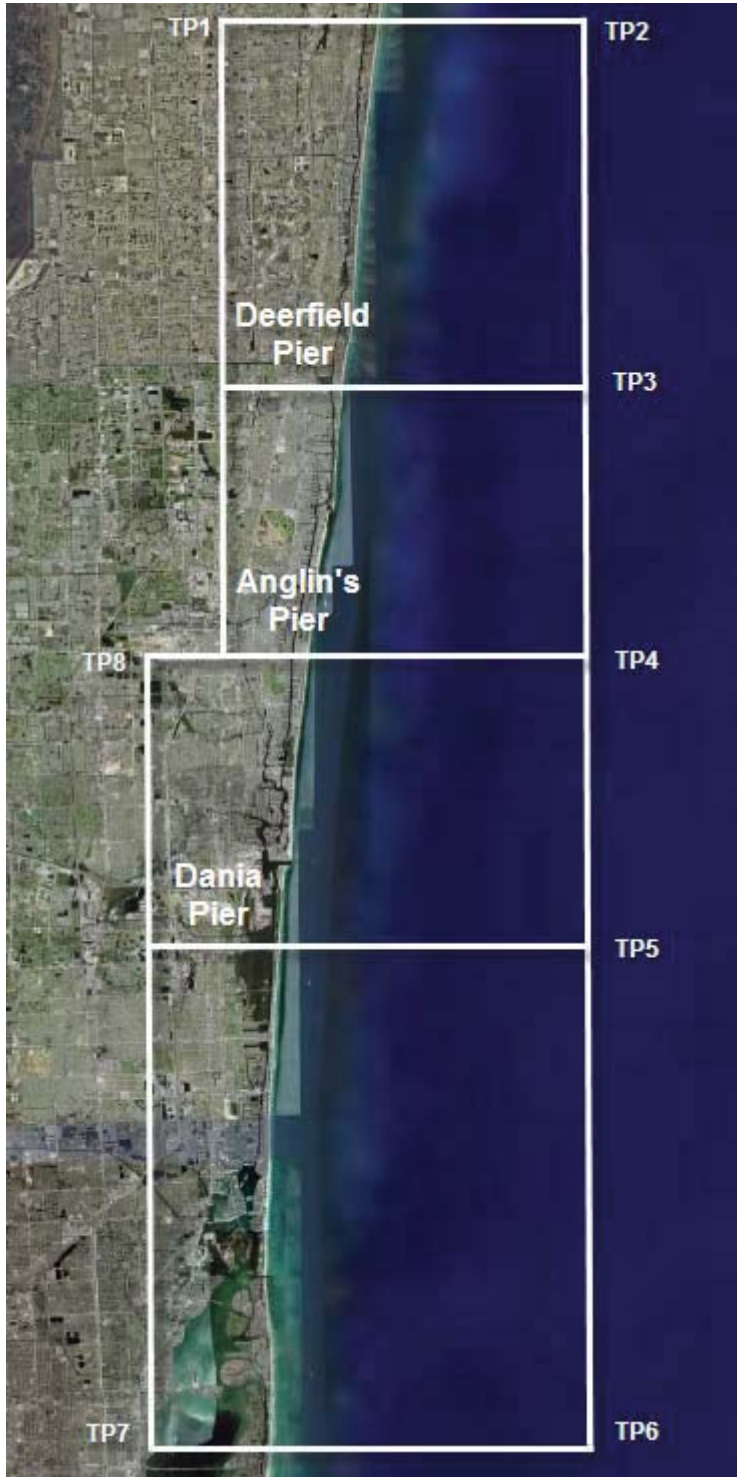


Figure 3 – Final Tide Zones in the LADS GS

The values for the differences between MLLW and MHW for adjacent tidal benchmarks and NWLON gauges are shown in the diagram below:

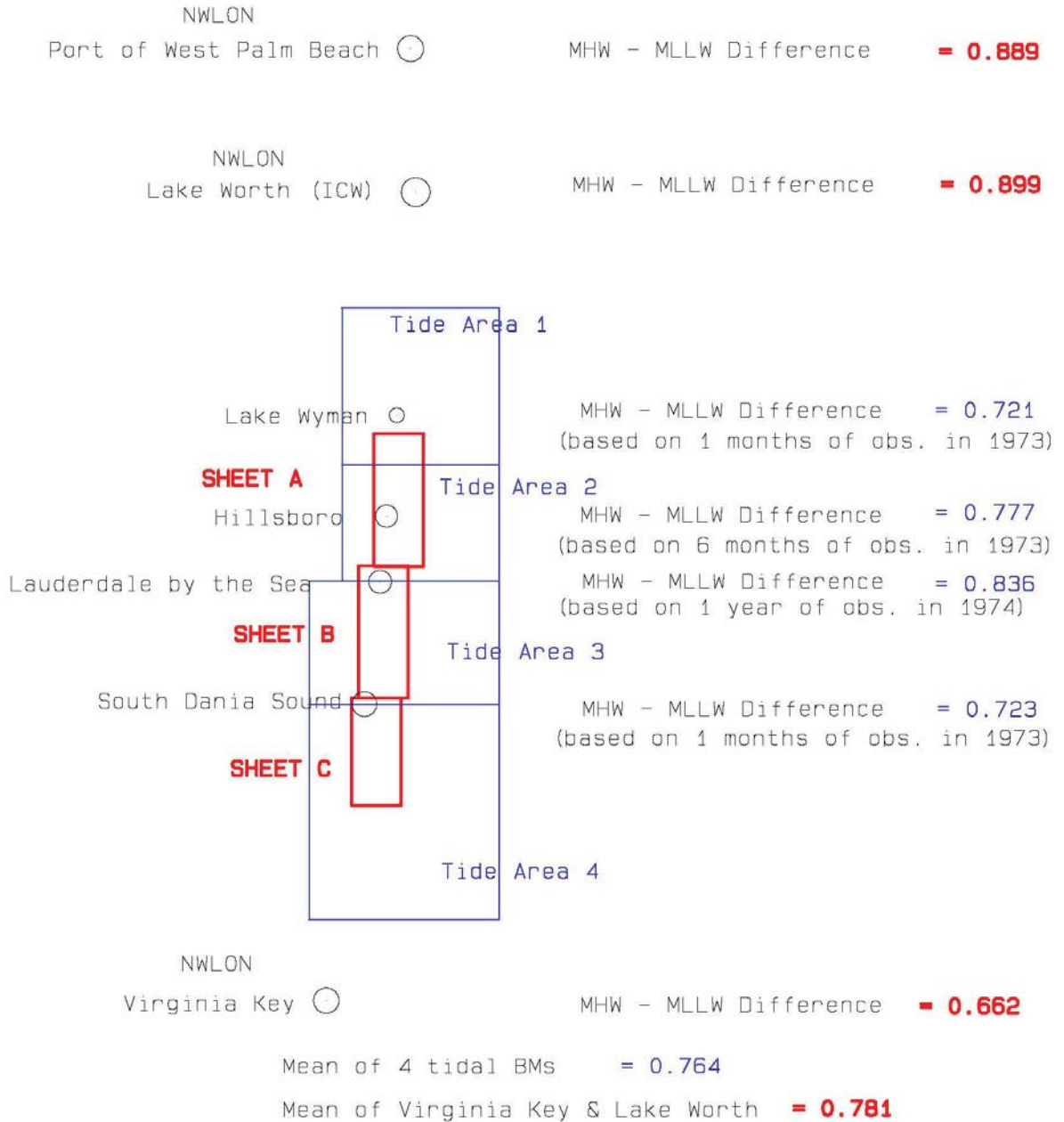


Figure 4 – Vertical Difference between MLLW and MHW for Tidal Benchmarks and NWLON Gauges

The mean value of MLLW – MHW differences for tidal benchmarks is 0.764m. The mean value of MLLW – MHW differences for adjacent NWLON gauges is 0.781m. Therefore, for all registered sheets under OPR-H328-KRL-09, including H12117, a MHW value of 0.77m has been used.

C.3 HORIZONTAL CONTROL

Data collection and processing were conducted in the AS and GS on World Geodetic System 1984 (WGS84) on Universal Transverse Mercator (Northern Hemisphere) projection UTM (N) in Zone 17, Central Meridian 81° W. This data was post-processed and all soundings are positioned relative to the North American Datum 1983 (NAD83). All units are in ~~meters~~ *feet at MLLW*.

C.3.1 LADS Local GPS Base Station – Fort Lauderdale

Real-time positions were determined using an Ashtech GG24 GPS receiver, differentially corrected in real-time by a Fugro Omnistar GPS receiver on the aircraft (WADGPS mode). A local GPS base station was coordinated by CPE on the top of a light pole at the Ft. Lauderdale Executive Airport on July 10, 2008, in order to post-process more accurate KGPS positions following survey flights.

The derived NAD83 coordinates for the local GPS base station are:

NAD83			UTM (N) Zone 17	
Latitude (N)	Longitude (W)	Ellipsoidal Height (m)	Easting (m)	Northing (m)
26° 11' 42.4877"	80° 10' 17.4843"	-14.957	582776.318	2897558.340

Post-processed KGPS positions were determined offline using data logged at the local GPS base station and on the aircraft. This data was processed with Waypoint GrafNav Software to calculate a KGPS position solution for the survey flights. The post-processed KGPS positions were imported into the GS and applied to all soundings. This provided increased sounding position accuracy from the real-time WADGPS.