

C. VERTICAL AND HORIZONTAL CONTROL *See also the Evaluation Report.*

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

C.1 VERTICAL CONTROL

Vertical control for the survey was based on the Mean Lower Low Water tidal datum (MLLW). The operating National Water Level Observation Network (NWLON) station at Magueyes Island, PR (9759110) located at the eastern extent of the survey area served as preliminary vertical control.

A subordinate tide station at Punta Guanajibo (9759421) located at the northern extent of the survey area was installed and operated for the duration of the survey. Upon completion of the survey, the datum was established for the subordinate gauge and the final verified tides for both the subordinate and NWLON tide gauges provided the vertical control.

Station details are as follows:

Gauge	Location	WGS84	
		Latitude	Longitude
9759110	Magueyes Island	17° 58.3' N	67° 02.8' W
9759421	Punta Guanajibo	18° 09.6' N	67° 10.9' W

C.2 ZONING

NOAA supplied tide zones that cover the extent of the survey area, with time and range correctors relative to the Magueyes Island tide station. These are as follows:

Tide Zone	GS Identifier	Time Corrector	Range Corrector	Reference Station
PRS15	1	-18 minutes	1.59	9759110
PRS14	2	-18 minutes	1.45	9759110
PRS13	3	-18 minutes	1.23	9759110
PRS12	4	-18 minutes	1.09	9759110
PRS11	5	-24 minutes	1.01	9759110
PRS10	6	-24 minutes	0.94	9759110
PRS9	7	-24 minutes	0.94	9759110
PRS9A	8	-18 minutes	0.94	9759110
PRS8	9	-6 minutes	0.94	9759110
PRS7	10	0 minutes	0.94	9759110

The proposed final tide zoning was computed once the datum for the subordinate tide gauge was established. The proposed final zoning is a combination of both the NWLON gauge, in which the zoning for the southern part of the survey area was derived, and the subordinate gauge, which provided zoning for the western part of the survey area. The proposed final zoning areas are as follows:

Tide Zone	GS Identifier	Time Corrector	Range Corrector	Reference Station
JOA14	1/2	0 minutes	x 1.00	9759421
JOA13	3	0 minutes	x 0.90	9759421
JOA12	4	0 minutes	x 0.85	9759421
JOA11	5	-6 minutes	x 0.81	9759421
JOA10	6	-6 minutes	x 0.77	9759421
JOA09	7	-24 minutes	x 0.94	9759110
JOA09A	8	-18 minutes	x 0.94	9759110
JOA08	9	-6 minutes	x 0.94	9759110
JOA07	10	0 minutes	x 0.94	9759110

An analysis of crosslines and overlaps of the mainlines of soundings concluded that tide zoning was adequate; therefore, the proposed final tide zoning correctors have been considered to be the final zoning correctors for the survey.

The verified tides supplied by NOAA were independently checked by John Oswald and Associates. Once the data was checked, a fifth degree polynomial was applied to the tidal data and this data was then supplied to Tenix LADS Inc. for the application of tides.

The preliminary tide zone areas were adopted as the final tide zone areas. The range and time correctors changed, as zones JOA10-JOA14 are relative to the subordinate tide station.

For final processing, the time and amplitude correctors were applied to the tidal data delivered by John Oswald and Associates. Soundings were then reduced to MLLW using these corrected tides.

The data was viewed across the zone boundaries, which once again validated the final verified tides and zoning.

C.3 HORIZONTAL CONTROL

Data collection and processing were conducted on the Airborne and Ground Systems in World Geodetic System (WGS84) on Universal Transverse Mercator (Northern Hemisphere) projection UTM (N) in Zone 19, Central Meridian 69° West. All units are in meters. This data was post-processed and all soundings are relative to the North American Datum 1983 (NAD83).

C.3.1 LADS Local GPS Base Station – Puerto Rico

Real-time positions were determined using an Ashtech GG24 GPS receiver aided by Wide Area Differential GPS (WADGPS). A local GPS base station was coordinated by John