

## C. Vertical and Horizontal Control

Additional information discussing the vertical and horizontal control for this survey can be found in the accompanying HVCR.

### C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water.

#### Standard Vertical Control Methods Used:

Discrete Zoning

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

<b>Station Name</b>	<b>Station ID</b>
Unalaska, Dutch Harbor	9462620
King Cove	9459881

*Table 10: NWLON Tide Stations*

The following subordinate water level stations were established for this survey:

Station Name	Station ID
Broad Bight	9462676
SE Tigalda Island	9462705
Green Bight	9462786

Table 11: Subordinate Tide Stations

File Name	Status
9462676.tid	Verified Observed
9462705.tid	Verified Observed
9462786.tid	Verified Observed

Table 12: Water Level Files (.tid)

File Name	Status
OPR-Q191-KR-13_Zoning_20131008.zfd	Preliminary

Table 13: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 10/24/2013. The final tide note was received on 10/31/2013.

On October 08, 2013, John Oswald and Associates (JOA) issued verified tidal data and zoning for OPR-Q191-KR-13. All sounding data was then re-merged using CARIS HIPS and SIPS tide routine. JOA verified tidal data were used for all final Navigation BASE surfaces and S-57 Feature files. It should be noted that the tidal data applied to OPR-Q191-KR-13 is JOA verified and not CO-OPs verified. JOA are currently in the WALI verification process, which is pending, awaiting CO-OPs approval. Since the timeframe for CO-OPs verification is unknown, FPI were given approval, by our COTR, to submit the data with the JOA verified tides and zoning applied.

## C.2 Horizontal Control

The horizontal datum for this project is NAD83.

The following PPK methods were used for horizontal control:

### Single Base

For real-time DGPS corrections, a CSI MBX-3 unit was tuned to the Cold Bay, Alaska USCG DGPS site. The unit output differentially corrected positions at 1 Hz to the (POS MV) 320 V4 where it was integrated with inertial data, and a position for the top-center of the IMU generated. This position was logged concurrently with the bathymetry from WinFrog and the POS file using Fugro Pelagos PosMvLogger. It was later corrected for offsets to the multibeam echosounder (MBES) by CARIS HIPS in post-processing.

Final positioning was done using post-processed kinematic (PPK) methods. Applanix POSPac MMS v5.4 software was used in conjunction with the POS files and local 1Hz base station data to generate a higher accuracy position, which was applied in processing to replace the real-time position records.

The following user installed stations were used for horizontal control:

<b>HVCR Site ID</b>	<b>Base Station ID</b>
Broad Bight	BB_E
SE Tigalda Island	TI_N

*Table 14: User Installed Base Stations*

The following DGPS Stations were used for horizontal control:

<b>DGPS Stations</b>
Cold Bay DGPS Station

*Table 15: USCG DGPS Stations*