

Vancouver Fraser Port Authority (VFPA) maintains a database of highly accurate hydrographic survey data throughout its jurisdiction. The survey data is used to monitor navigation channels, deep-sea berths and approaches to terminals.

The majority of the survey data is collected by Public Works Government Services of Canada (PWGSC) and funded by VFPA through an annual hydrographic survey program that strives to collect new data at each berth at least once every 4 years or earlier if required.

From time to time, VFPA accepts 3<sup>rd</sup> party survey data on an interim basis as long as additional under-keel clearance allowance is utilized by the BC Coast Pilots (BCCP) while navigating and the terminal operator during loading operations. The amount of additional under-keel clearance may vary between surveys and is ultimately determined from a detailed review of the survey data, including the associated metadata, and then discussed with BCCP.

### Survey Requirements:

- 1) Hydrographic surveys must meet Canadian Hydrographic Service (CHS) “Standards for Hydrographic Surveys” In particular, Surveys must meet “Special Order Survey with Type C! Coverage” as indicated by the highlighted section in Table 1 below:

TABLE 1  
Standards for Hydrographic Surveys

ORDER	Exclusive	Special	1	2	3	4 (Imprecise)	
Examples of Typical Areas	Shallow water in Harbours, berthing areas, and associated critical channels with minimum under-keel clearances or engineering surveys	Harbours, berthing areas, and associated critical channels with minimum under-keel clearances	Harbours, harbour approach channels, recommended tracks and some coastal areas with depths up to 100m	Areas up to 200m water depth	Offshore areas not described in the previous orders	All areas where the accuracies do not meet the requirements of the previous orders	
<b>H</b>	Horizontal Accuracy (95% Confidence Level)	1m	2m	5m + 5% of depth	20m + 5% of depth	150m + 5% of depth	> 150m + 5% of depth
<b>V</b>	Depth Accuracy for Reduced Depths (95% Confidence Level) <sup>(1)</sup>	a = 0.15m b = 0.0075	a = 0.25m b = 0.0075	a = 0.5m b = 0.013	a = 1.0m b = 0.023	Same as Order 2	> than values of order 2
<b>D</b>	System Detection Capability	Features > 0.5m cubed	Features > 1m cubed	Features > 2m cubed in depths up to 40 m; 10% of depth beyond 40m <sup>(2)</sup>	N/A	N/A	N/A
<b>Type of coverage (M270)</b>							
<b>C</b>	1. complete coverage	(multibeam, multi-transducer, acoustically swept);					
	2. systematic survey	(single-beam echo sounder lines run parallel at pre-planned line spacing, LiDAR);					
	3. sparse coverage	(lead-line surveys, reconnaissance, track soundings, spot soundings);					
	4. unsurveyed						

## ***Survey Requirements & Process - Continued***

- 2) Metadata must be recorded and provided to VFPA in standard xml format (ISO19115)

### **Authentication Process:**

Currently there are two paths to authenticating the survey data so it can be added to VFPA's hydrographic survey database:

- 1) VFPA
- 2) Terminal Operator

The process for each of the authentication paths are outlined below.

#### **Path 1 – VFPA**

- 1) Terminal operator provides VFPA with advance notification that a hydrographic survey is required.
- 2) VFPA then liaises with PWGSC and slots the requested survey into the survey schedule
- 3) Coordination between VFPA, PWGSC and terminal operator is required to find a date and time when the berth is available for survey and surveyors are available.
- 4) Once the survey data is collected, PWGSC will post process the data in a timely manner including their rigorous quality control and quality assurance process.
- 5) When VFPA receives the data from PWGSC, it will be brought into two separate software systems and the berth pocket will be interrogated thoroughly to identify shoalest depth.
- 6) VFPA will compare the two methods to confirm shoalest depth and prepare an updated Berth Sounding Drawing. The drawing includes a red circle around the control depth.
- 7) The drawing is then shared with the Pacific Pilotage Authority (PPA,) and BCCP for comment and discussion.
- 8) Once agreement is reached in regards to the control depth, PPA notifies the terminal operator of the new control depth and advises that both PPA and VFPA will update their websites accordingly within the next few days unless the terminal operator expresses concern.
- 9) If terminal operator agrees, PPA and VFPA websites are updated accordingly.

## ***Survey Requirements & Process - Continued***

### **Path 2 – Terminal Operator**

- 1) Terminal operator contracts surveyor and requests a hydrographic survey that meets the standard identified above.
- 2) Once the terminal operator is satisfied with the survey results, the survey data and associated metadata are emailed to CHS Hydrographic Data Centre at [DFO.PACCHS-SHCPAC.MPO@dfo-mpo.gc.ca](mailto:DFO.PACCHS-SHCPAC.MPO@dfo-mpo.gc.ca). (The survey data will not be accepted by CHS without suitable metadata, for example an ISO19115 metadata standard xml file).
- 3) CHS will then validate the data based on priorities assigned by their chart production requirements.
- 4) CHS will only incorporate 3<sup>rd</sup> party data into their bathymetric database if they are confident of its quality.
- 5) Once CHS authenticates the survey data; PMV, PPA and BCCP will be notified that the data has been approved for navigation purposes.
- 6) VFPA will then bring the survey data into two separate software systems and the berth pocket will be interrogated thoroughly to identify shoalest depth.
- 7) VFPA will compare the two methods in an effort to confirm shoalest depth and update the Berth Sounding Drawing accordingly. The drawing includes a red circle around the control depth.
- 8) The drawing is then shared with the Pacific Pilotage Authority (PPA,) and BCCP for comment and discussion.
- 9) Once agreement is reached in regards to the control depth, PPA notifies the terminal operator of the new control depth and advises that both PPA and VFPA will update their websites accordingly within the next few days unless the terminal operator expresses concern.
- 10) If terminal operator agrees, PPA and VFPA websites are updated accordingly.

The above process was formulated by VFPA in consultation with PPA and BCCP.

VFPA, PPA and BCCP value our terminal operators and trust the above process will help ensure accurate survey data is being used for determining control depths while safely maximizing the available depth.