

SURVEYOR ORDINANCE 1960  
SURVEYORS (CONDUCT OF HYDROGRAPHIC SURVEYS)  
REGULATIONS 2017

---

ARRANGEMENT OF REGULATIONS

---

Regulation

1. Citation and commencement
2. Interpretation
3. Application
4. Personal direction and supervision
5. E.S.P.
6. Site location
7. Hydrographic information
8. Standard and specification
9. Survey order
10. Horizontal and depths accuracy
11. Horizontal datum
12. Vertical datum
13. Leveling
14. Positioning and navigation
15. Positioning integrity
16. Tidal observation
17. Coast lining and topography
18. Sounding line spacing and cross-line
19. Calibration
20. Side scan sonar
21. Current measurement
22. Sampling
23. Data processing
24. Plotting scale
25. Records
26. Submission of survey plans and records
27. Certification

## SURVEYORS ORDINANCE 1960

(No. 22 of 1960)

SURVEYORS (CONDUCT OF HYDROGRAPHIC SURVEYS)  
REGULATIONS 2017

In exercise of the powers conferred by section 19 of the Surveyors Ordinance 1960 [No. 22 of 1960], the Surveyors Board, with the approval of the State Secretary, makes the following regulations:

**Citation and commencement**

1. (1) These regulations may be cited as the Surveyors (Conduct of Hydrographic Surveys) Regulations 2017.

(2) These Regulations come into operation on the date of its publication in the *Gazette*.

**Interpretation**

2. In these Regulations unless the context otherwise requires:-

“ASCII” means American Standard Code Information Interchange;

“Board” means the Surveyors Board established under section 3 of the Ordinance;

“Chart Datum” means the lowest level due to astronomical effects and is exclusive of meteorological effects for instance it is the level below which the ocean tide never falls, allowing for the movements of the sun, moon and earth;

“DGPS” means the Differential Global Positioning System equipment that uses a network of fixed, ground-based reference stations to broadcast the difference between the positions indicated by the satellite systems and the known fixed positions;

“Director” means the Director of Lands and Surveys Department in the State and includes any officer duly authorised to act in that behalf;

“District Surveyor” means the District Surveyor of the Lands and Surveys Department in the District and includes any officer duly authorised to act in that behalf;

“E.S.P.” means Engineering Survey Paper containing instruction by the Director to carry out the topographical or engineering surveys by Licensed Surveyor;

“Hydrography” is the branch of applied sciences which deals with the measurement and description of the physical features of oceans, seas, coastal areas, lakes and rivers, as well as with the prediction of their change over time, for preliminary purpose of safety navigation and in support of marine activities, including economic development, security and defence, scientific research and environmental protection;

“Hydrographic Surveys” means bathymetric surveys which require the correct interrelation of boundaries or of boundary marks and the making and recording of all measurements and calculations relevant thereto and the drawing and reproduction of plans therefrom;

“IHO” means the International Hydrographic Organisation;

“Licensed Surveyor” means a registered surveyor licensed in accordance with section 10 of the Ordinance;

“Mean Sea Level” means the average value of levels observed each hour over the period of at least a year (preferably 19 years) or the average sea level in the absence of tide;

“Ordinance” means the Surveyors Ordinance 1960;

“RMS” means root mean square, used to measure the differences between values (sample and population) predicted by a model or an estimator and the values actually observed;

“R.S.O.” means Borneo Rectified Skew Orthomorphic projection;

“RTK” means Real Time Kinematic satellite navigation, a technique used to enhance the precision of position data derived from satellite-based positioning systems;

“Survey Technician” means a survey technician registered in accordance with subregulation 4(3) of the Surveyors (Conduct of Title Surveys) Regulations 1962.

### **Application**

3. These Regulations shall apply for Hydrographic Surveys carried out within Sabah and shall not cover surveys for nautical charts.

### **Personal direction and supervision**

4. Every hydrographic surveying works shall be made under the immediate personal direction and supervision of a Licensed Surveyor and in strict accordance with these Regulations.

### **E.S.P.**

5. (1) A Licensed Surveyor shall apply for an E.S.P. to commence a survey to the Director and such application shall set out the purpose and extent of the proposed survey area.

(2) The Licensed Surveyor shall obtain frequency clearances from the appropriate Government departments.

### **Site location**

6. The Licensed Surveyor shall obtain from the client, the relevant proposed site and the extent of the area to be surveyed.

### **Hydrographic information**

7. Hydrographic data collected shall be sufficiently accurate and that the spatial uncertainty of data be adequately quantified so as to be safely used by mariners (commercial, military or recreational).

### **Standard and specification**

8. The survey is to be referred to World Geodetic System 84 (WGS84) Datum and is to be plotted on the R.S.O.

### **Survey order**

9. To accommodate in a systematic manner the different requirements for areas to be surveyed, four orders of survey shall be defined as follows:

- (a) Special Order: Hydrographic Survey approach engineering standards and their use is intended to be restricted to specific critical areas with minimum underkeel clearance and where bottom characteristics are potentially hazardous to vessel.
- (b) Order 1: Hydrographic Survey are intended for harbour, harbour approach channels, recommended tracks, inland navigation channels, and coastal areas of high commercial traffic density where underkeel clearance is less critical and the geophysical properties of the seafloor are less hazardous to vessel.
- (c) Order 2: Hydrographic Survey are intended for areas with depths less than 200m not covered by special Order and Order 1 and where a general description of the bathymetry is sufficient to ensure there are no obstruction on the seafloor that will endanger the type of vessel expected to transit or work the area.
- (d) Order 3: Hydrographic Survey are intended for all areas not covered by Special Order, Order 1 and Order 2 in water depths in excess of 200m.

### **Horizontal and depths accuracy**

10. Horizontal and depth accuracy shall adhere to IHO standard.

### **Horizontal datum**

11. (1) All geodetic/control stations used for control extension or establishing of new station must be derived from 2<sup>nd</sup> Class order or better, approved by the Lands and Surveys Department, Sabah, Malaysia.

(2) The horizontal coordinates may be established by DGPS or RTK GPS.

### **Vertical datum**

12. (1) Vertical datum shall be referenced to existing bench mark, Malaysia MyGeoid or Chart Datum established by National Hydrographic Centre.

(2) The Licensed Surveyor shall provide conversions of MSL and Chart Datum.

### **Leveling**

13. (1) Height Control survey by method of leveling or GPS MyRTKnet Survey or combination of these methods to the monumented survey reference marks.

(2) Maximum misclosure shall not exceed  $\pm 20 \sqrt{k}$  mm, where k is sum of the distances levelled in kilometers.

**Positioning and navigation**

14. Positioning and navigation of the survey vessel during the survey operation shall be using real time DGPS/RTK GPS methods.

**Positioning integrity**

15. (1) Prior to sounding operation, the navigation system shall be checked at the known point to confirm its positioning integrity.

(2) DGPS receiver(s) should be verified against a known coordinated survey reference point in the vicinity of the survey area.

**Tidal observation**

16. (1) Tide pole (gauge) or auto tide gauge shall be established at a suitable location in the survey area.

(2) Tidal observation shall be carried out at 10 minutes interval whenever soundings are being carried out over the water body.

(3) Sounding shall be reduced to datum from observed tides.

(4) Measured data shall be tabulated and processed in the manner sufficient for engineering survey.

(5) Digital data files shall be submitted with ASCII data and accessible by standard spreadsheet software.

**Coast lining and topography**

17. Coastline and topography for survey area shall be surveyed in the field at the scale of the survey using appropriate method/equipment to depict boundary of foreshore, delineation of drying lines and all topographic details.

**Sounding line spacing and cross-line**

18. (1) Line spacing shall be at 25m, 50m, 100m or more for the various orders of survey or may depend on client requirements or the IHO standards.

(2) The survey lines shall be generally be run perpendicular to the general alignment of the shoreline.

(3) Cross lines shall be run at right angles to the normal direction of the sounding lines.

**Calibration**

19. (1) Standard calibration techniques should be completed prior to and after the acquisition of data.

(2) Equipment calibration shall be conducted at regular intervals and documented in order to support the quality estimate given to the final survey dataset.

#### **Side scan sonar**

20. (1) The survey lines shall be run at suitable intervals with dual coverage and shall be carried out in a manner to provide the scanned corridor of not less than 100% overlap.

(2) All obstructions, debris or other features lying on or protruding from the seabed located by the sonar survey shall be investigated and identified by divers or some other acceptable means.

(3) The positions of all features mentioned in subregulation (2) must be plotted at suitable scale.

#### **Current measurement**

21. (1) The current measurement shall use the Acoustic Doppler Current Profiler (ADCP).

(2) Each data recording shall be the average of all valid data over the 10 minute intervals.

(3) The output of the recording data for speed shall be in centimeter/second and direction in degrees relative to True North.

#### **Sampling**

22. (1) The nature of the seabed shall be determined by sampling or maybe inferred from other sensors.

(2) Samples shall be spaced according to the seabed geology.

#### **Data processing**

23. The Licensed Surveyor shall provide a detail methodology in the processing of the data set and list out all the various software used. The accuracy, in term of RMS, must be provided and the result shall be in R.S.O. system.

#### **Plotting scale**

24. All Plans shall be plotted at suitable scales.

#### **Records**

25. Upon the completion of the hydrographic surveying works, the Licensed Surveyor shall submit to the client the survey plans, records and report.

#### **Submission of survey plans and records**

26. The Licensed Surveyor shall submit a copy of the survey plans, records, reports and all digital survey data to the Director.

**Certification**

27. Every survey plan shall bear a certification by the Licensed Surveyor in the following form:

“I, ..... a surveyor licensed under the Surveyors Ordinance 1960, certify that the survey from which this plan has been prepared was carried out in the field in strict accordance with the Surveyors (Conduct of Hydrographic Surveys) Regulations 2017, and that this plan correctly represents the survey completed on the ..... day of ....., 20 .....

Dated this        day of        , 2017.

.....  
*Licensed Surveyor”.*

Made 14 June 2017

HAJI SAFAR BIN UNTONG,  
*Chairman,*  
*Surveyors Board, Sabah.*

I approved the foregoing Regulations.

Dated 28 June 2017

TAN SRI DATUK SERI PANGLIMA HAJI SUKARTI BIN HAJI WAKIMAN,  
*State Secretary.*