

3. The ZOC system consists of five quality categories for assessed data (ZOC A1, A2, B, C, D), with a sixth category for data which has not been assessed (ZOC U).

4. The abridged International Hydrographic Organization (IHO) ZOC table below (ref: S-57 Edition 3.1 Supplement 2) explains the six ZOC categories. For more information see the IHO website.

ZOC	Position Accuracy	Depth Accuracy		Seafloor Coverage	Typical Survey Characteristics
A1	± 5 m + 5% depth	=0.50 + 1% depth		Full area search undertaken. Significant seafloor features ¹ detected and depths measured.	Controlled, systematic survey ² high position and depth accuracy achieved using DGPS or a minimum three high quality lines of position (LOP) and a multibeam, channel or mechanical sweep system.
		Depth (m)	Accuracy (m)		
		10 30 100 1000	± 0.6 ± 0.8 ± 1.5 ± 10.5		
A2	± 20 m	= 1.00 + 2% depth		Full area search undertaken. Significant seafloor features ¹ detected and depths measured.	Controlled, systematic survey ² achieving position and depth accuracy less than ZOC A1 and using a modern survey echosounder ³ and a sonar or mechanical sweep system.
		Depth (m)	Accuracy (m)		
		10 30 100 1000	± 1.2 ± 1.6 ± 3.0 ± 21.0		
B	± 50 m	= 1.00 + 2% depth		Full area search not achieved; uncharted features, hazardous to surface navigation are not expected but may exist.	Controlled, systematic survey ² achieving similar depth but lesser position accuracies than ZOCA2, using a modern survey echosounder ³ , but no sonar or mechanical sweep system.
		Depth (m)	Accuracy (m)		
		10 30 100 1000	± 1.2 ± 1.6 ± 3.0 ± 21.0		
C	± 500 m	= 2.00 + 5% depth		Full area search not achieved, depth anomalies may be expected.	Low accuracy survey or data collected on an opportunity basis such as soundings on passage.
		Depth (m)	Accuracy (m)		
		10 30 100 1000	± 2.5 ± 3.5 ± 7.0 ± 52.0		
D	worse than ZOC C	Worse Than ZOC C		Full area search not achieved, large depth anomalies may be expected.	Poor quality data or data that cannot be quality assessed due to lack of information.
U	Unassessed - The quality of the bathymetric data has yet to be assessed				

Notes:

1. Significant seafloor features are defined as those rising above depicted depths by more than:

Depth	Significant Feature
a. <40 m	2 m
b. >40 m	10% depth

A full seafloor search indicates that a systematic survey was conducted using detection systems, depth measurement systems, procedures, and trained personnel designed to detect and measure depths on significant seafloor features. Significant features are included on the chart as scale allows. It is impossible to guarantee that no significant feature could remain undetected, and significant features may have become present in the area since the time of the survey.

2. Controlled, systematic surveys (ZOC A1, A2 and B) - surveys comprising planned survey lines, on a geodetic datum that can be transformed to WGS 84.

3. Modern survey echosounder - a high precision single beam depth measuring equipment, generally including all survey echosounders designed post 1970.

5. The assessment of hydrographic data quality is based on:

- position accuracy
- depth accuracy
- seafloor coverage ie: the certainty of feature detection
- typical survey characteristics.

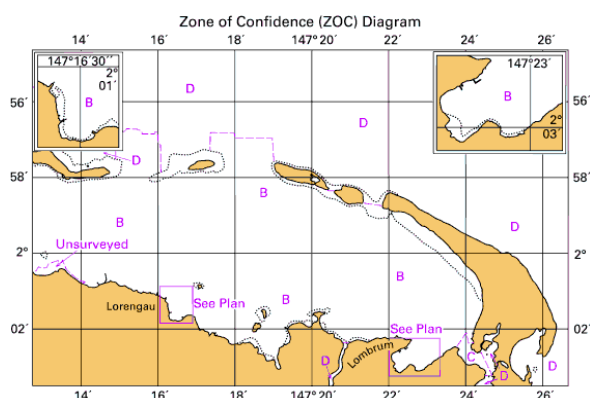
6. It should be appreciated that the higher ZOC categories, particularly ZOC A1 and A2, require very high accuracy surveys which are only achievable with recent technology. Modern surveys of critical areas can be expected to carry ZOC A2 classification whilst ZOC A1 will cover only those areas surveyed to exceptionally stringent standards for special reasons. Therefore many sea lanes which until now have been regarded as adequately surveyed may carry a ZOC B classification.

7. ZOC C is a very broad category which covers a range of surveys, from those which may be very thorough but just fail to meet the higher accuracy (ZOC B) criterion. Typically, it is a survey unlikely to have undergone a comprehensive sonar sweep to ascertain the presence of depth anomalies between adjacent survey lines. The existence of uncharted features hazardous to surface navigation will vary from situation to situation. The mariner should further assess the quality of

data in these areas based on detail shown on the chart such as coverage, broken contours, upright (approximate in ENC) soundings etc. Areas which show italic soundings can be used with more confidence than areas which show upright or approximate soundings.

8. Soundings in ZOC category D areas will always be shown as upright or approximate soundings. ZOC D will also be used to indicate unsurveyed areas in the ZOC Diagram.
9. ZOC U is used to indicate areas where survey information included on the chart or ENC has not been assessed yet for accuracy. This would usually happen when there hasn't been time to assess a new survey before the chart or ENC is published. However, ZOC U is generally not used for bathymetric areas on Australian products.
10. Put in simple terms, mariners should be able to navigate with confidence in areas with ZOC A1 and A2 classifications. It is also unlikely that an uncharted danger exists in ZOC B areas. In ZOC C areas mariners should exercise a degree of caution since hazardous uncharted features may be expected. More caution is required for areas with upright/approximate soundings than for italic soundings. ZOC D contains very sparse data and may not have been surveyed at all therefore mariners should enter with extreme caution. It is good practise for mariners to treat ZOC U areas with the same degree of caution as ZOC D (extreme caution).

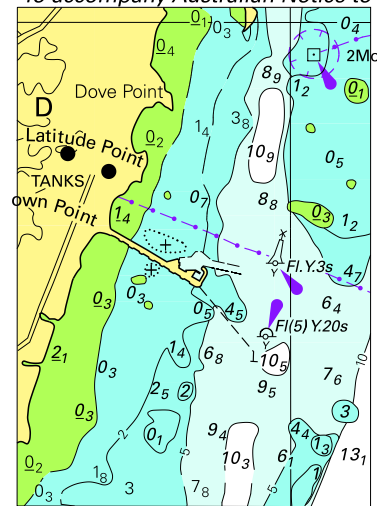
ZOC Diagram and Table Found on Paper Nautical Charts and Seafarer RNCs



ZOC CATEGORIES
(For details see Australian Seafarers Handbook, AHP20)

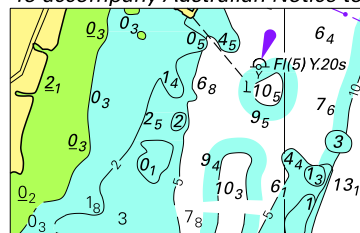
ZOC	POSITION ACCURACY	DEPTH ACCURACY	SEAFLOOR COVERAGE
A1	± 5m	=0.50m + 1% <i>d</i>	Significant seafloor features detected
A2	± 20m	=1.00m + 2% <i>d</i>	Significant seafloor features detected
B	± 50m	=1.00m + 2% <i>d</i>	Uncharted features hazardous to surface navigation are not expected but may exist
C	± 500m	=2.00m + 5% <i>d</i>	Depth anomalies may be expected
D	Worse than ZOC C	Worse than ZOC C	Large depth anomalies may be expected
U	Unassessed – The quality of the bathymetric data has yet to be assessed		

To accompany Australian Notice to Mariners 1010/2011



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Block for chart Aus 742 (46.8 x 65.9mm)

To accompany Australian Notice to Mariners 1010/2011



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